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It Never Hurts to Ask

Often, there's an inverse relationship between age and curiosity. Kids have a million and one questions. They continually ask Why? How? and What if?. Adults typically say, "That's just the way it is," and move on without additional thought or discussion.

But not always.

Last month, I attended the Airfield Operations Technology Summit at Hawthorne Municipal Airport, hosted by Team Eagle. Many of the speakers were from other industries, and they discussed solutions such as artificial intelligence and augmented reality that could potentially be applied to aviation. Based on the Q&A at the end of each session, it sounded as if elementary school students were in the audience. The questions were endless. And fruitful! Clearly, the presenters had pulled back the curtain and opened a window of possibilities. Attendees wanted more.

Many label the airport industry as "risk-averse." There's a lot of following and duplicating taking place, and that's understandable given the safety implications involved. But to be fair, there's also some pretty significant innovation happening that would make any inquisitive third grader proud.

PAUL BOWERS, PUBLISHER

Charleston International deserves kudos for being the first U.S. airport to install new technology that locates gunshots fired in the public side of the terminal. Ontario International deserves credit for looking past the immediacy of a lounge RFP to also find a solution for parking. And then there's Milwaukee Mitchell International, my home airport, taking a chance on people who get few breaks and becoming the first in the industry to partner with Goodwill Industries on an internship program. These three projects, plus others worth emulating, are all in this issue. I hope you enjoy them.

Innovative airport programs deserve to be congratulated and shared. We all owe a hearty Thank You to the people who have enough curiosity to ask questions and make them realities.

Cheers!

Paul

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Move Over Mardi Gras, New Orleans Int'l is Opening a New Terminal

BY JODI RICHARDS

Not that New Orleans *needs* a reason to party, but the opening of the new terminal at Louis Armstrong New Orleans International (MSY) will surely merit some hearty celebrations. After nearly four years of construction and four delays of the opening date, the new 35-gate facility is scheduled to open this fall. But before the music plays and confetti flies, the airport has to make the move to its new home on the north side of the airfield.

A new 972,000-square-foot, three-concourse terminal is the star piece of MSY's $1.029 billion capital program. A new apron and additional aircraft parking positions round out the investment, as well as enabling projects such as relocating the airfield lighting vault and FAA navigational aids, constructing a stormwater pump station and building a new airport roadway system.

Expressing it in decidedly local terms, the amount of concrete poured for the terminal project alone is equivalent to almost 174 million bowls of gumbo.


KEVIN DOLLIOLE

The need for a new terminal was multi-faceted, explains Kevin Dolliole, director of aviation. With portions dating back to the 1950s, the current building is a "patchwork of improvements over time, with facilities and infrastructure from different eras all connected together." Evolving security requirements and operational needs have made it inefficient, and the aging infrastructure is costly to maintain and operate, he explains.

FACTS&FIGURES

Project: New Terminal & Other Capital Upgrades

Location: Louis Armstrong New Orleans Int'l Airport

Cost: $1.029 billion

Groundbreaking: Jan. 2016

Grand Opening: Fall 2019

Project Manager: Burns & McDonnell

Structural Engineer: Walter P. Moore

Design Team: Pelli Clark Pelli, Manning Architects; Crescent City Aviation Team (joint venture of LEO A DALY & Atkins North America Inc.)

Architects of Record: Atkins North America; LEO A DALEY; EStudio

Operational Readiness & Transition Services: Chrysalis Aviation Solutions

Contractor: Hunt-Gibbs-Boh-Metro Joint Venture

Passenger Boarding Bridges: JBT

Passenger Boarding Bridge Procurement & Installation: AERO Group

Aircraft Parking Layouts: AERO Group

Highlights: Consolidated security checkpoint; 40 post-security concessions; common-use technology; inline baggage screening; new parking facilities

"We have a lot of space in the facility, but much of it is in the wrong place," notes Jordan Taylor, aviation principal at LEO A DALY, which participated in the programming, planning and site analysis. Concessions are heavily concentrated pre-security, holdrooms are undersized and three separate security checkpoints are inefficient for processing passengers and TSA staffing.

JORDAN TAYLOR

But that's all changing.

LEO A DALY conducted an analysis of the options to meet MSY's growing demand and the needs of the aging facility in 2011. At that time, the options included renovation in place, construction to the west of the current terminal, a new terminal built on the north side of the airfield, and what Taylor calls a "do nothing" approach.

Renovation was considered but proved to be less feasible due to the state and condition of the current facilities. In April 2013, the New Orleans Aviation Board

announced that a new terminal on the north side was the best option. The selected parcel was a relatively clean greenfield site that could easily tie into the existing runway/taxiway system, explains Taylor.

While a new apron was necessary to connect the northside development to the existing pavement, one of the main advantages to the strategy is that MSY will have a brand new terminal without the added expense of constructing new runways and taxiways.


CHRIS SPANN

Moreover, a greenfield site means that the majority of construction occurs outside the secure area—a significant logistics benefit. "It was very nice to be able to fence off the construction site and have construction done non-AOA [airport operations area]," says Chris Spann, project manager at Burns & McDonnell.

That's not to say the project was a breeze. Preparing the former swampland for construction involved considerable work. As part of a nine-month surcharge program, crews imported about 8 feet of sand to consolidate the soil and push out water before construction. To ensure further stability, the buildings are constructed on more than 5,000 100-foot piles. "Even the light poles are all on piles because the soil is so unique to this area," notes Spann.

Welcome to N'awlins

The new terminal was designed by Pelli Clark Pelli, Manning Architects and the Crescent City Aviation Team (a joint venture of LEO A DALY and Atkins North America). The team's primary objectives were operational functionality and creating an architecturally unique facility that reflects the region.

As soon as visitors arrive, the sights, sounds and smells of The Big Easy will greet them, says Dolliole. In the arrivals area, an atrium that connects all three levels of the terminal features a round bandstand surrounded with live greenery called the Jazz Garden. In true French Quarter fashion, local performers will provide live music to entertain travelers. "No matter where you are in the terminal, you will hear music," he notes.

Beyond paying homage to the city's iconic food and music, the new design went a step further by incorporating some of the city's more subliminal features.


DANIEL TAYLOR

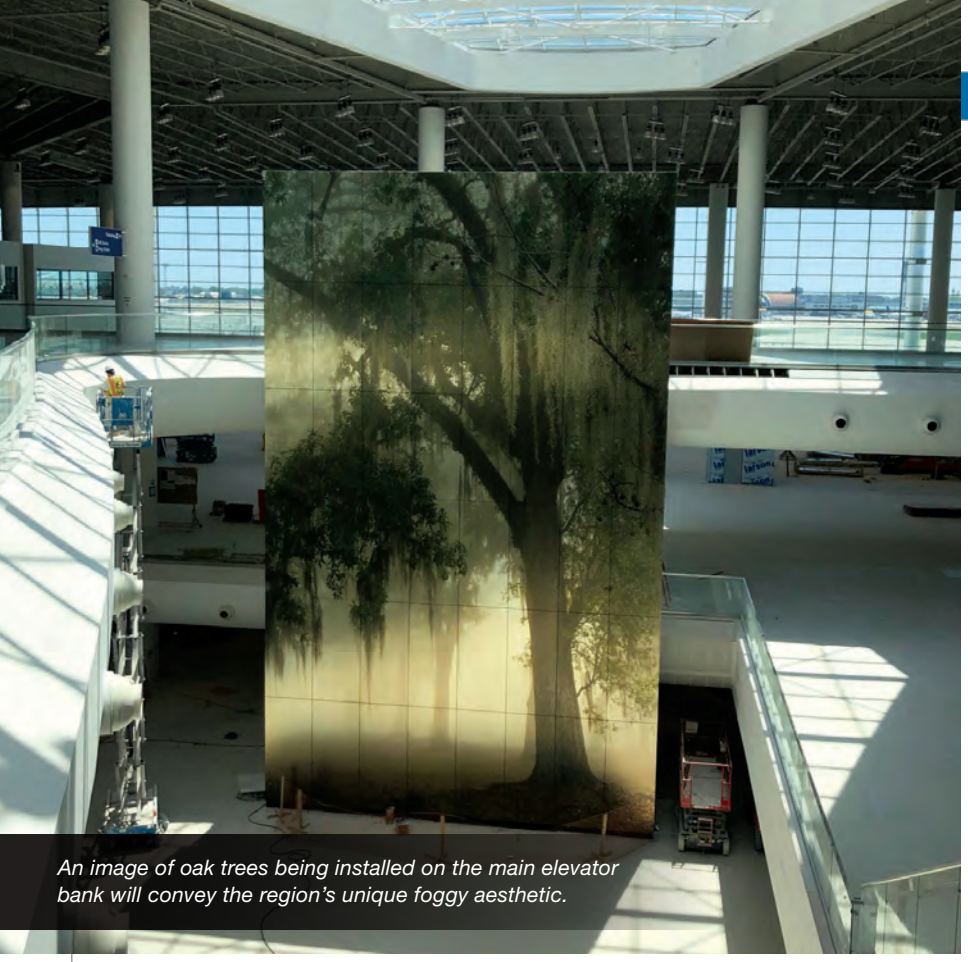
"A well-known cultural quirk about New Orleans is that it has its own directional compass," explains Daniel Taylor, the Atkins senior architect who lead the design team after the conceptual design was complete.

The new northside terminal is slated to open this fall.

"Traditional references such as north, south, east and west are replaced by lakeside, riverside, downtown and uptown. This is because the shape of the city resembles a curve (hence another New Orleans' nickname, The Crescent City), which makes traditional directions difficult to use. Streets bend and turn ever so gently that you can lose your sense of direction easily, creating a general geographic disorientation that locals have come to accept."

The design of MSY's central atrium subtly conveys this feeling by having several elements, such as skylights, that are purposely not in perfect symmetry. "This gives the sense of mystery and allure that visitors feel while walking the city's streets; but the overall interior design of the terminal with its volumetric simplicity makes wayfinding intuitive," notes Taylor. "The terminal's central atrium and the positioning of stairs and elevators allow passengers to naturally flow to the security checkpoint, concourses or baggage claim."

Another characteristic that terminal designers sought to emulate is the region's unique foggy aesthetic. In winter, sepia-like



An image of oak trees being installed on the main elevator bank will convey the region's unique foggy aesthetic.

tones are created when sunlight hits morning fog as it rolls through thermal inversions, where cold air is trapped by a layer of warmer air. To recreate this quintessential Louisiana look, a massive glass-sealed image of oak trees captured by a local photographer graces the terminal's main elevator. "Printed on transparent sheets and layered on top of a silver backing, the image has a three-dimensional look that reflects light in a similar way the sun fills a foggy New Orleans morning," says Taylor.

Addressing Limitations

"There are a number of improvements built into the new facility we couldn't achieve here [in the existing terminal]," says Dolliole. For instance, physical constraints in the current facility do not allow the three separate security checkpoints to process passengers in an efficient manner or allow for expansion, which causes frequent backups. Additionally, once travelers clear the checkpoint, they cannot move to other airside concourses.

The new terminal features a consolidated security checkpoint designed to accommodate up to 17

lanes of TSA equipment. Once screened, travelers will have access to the entire airside area, with a larger variety of concessions options.

"Our concessions program is not properly located in this facility," Dolliole says of the current terminal. Post-9/11 security requirements inspire passengers to spend more time airside. However, the old terminal does not have the physical capacity to adjust to that change. "This situation is remedied in the new facility, where the bulk of the concessions program is airside," he relates. The new lineup includes local favorites like Café Du Monde, Emeril, Fleurty Girl and MOPHO.

Where the old terminal is disjointed, dark and crowded, the new terminal is designed to be connected, light and airy. Passengers will pass through the consolidated security checkpoint and enter a sky-lit, voluminous hall with the choices of only left or right to simplify wayfinding.

On the concourses, plenty of seating and open viewpoints to the airfield encourage travelers to relax, notes Jordan Taylor of LEO A DALY.

Designing an aesthetically pleasing structure that can withstand Category 5 hurricane-strength winds was a special challenge. A substantial glass curtainwall, rated to withstand wind speeds up to 150 mph, brings in light and creates visual connections that make the terminal more inviting and friendly, Taylor explains.

Energy-efficient mechanical systems are expected to save the airport about 12% annually. The use of stratification ventilation, which only heats the bottom 10 to 12 feet of a large volume area, is a key example.

Radiant floors in the post-security area were installed below the large skylights and adjacent to the 55-foot glass curtainwall to address solar heat gain. When cooling is needed, tubes in the floor pump chilled water underneath to cool the floor and provide an efficient, higher level of interior climate comfort.

Improving Flow

The existing terminal is prone to congestion on the main curb because arriving and departing passengers compete for space. Traffic approaching the new terminal will use both sides of the building, a flow pattern designed to optimize traffic depending on the type of vehicle and its purpose. "We'll get more efficiencies in our on-airport roadway system by the four-way split of traffic approaching the facility," Dolliole explains.

Curbside check-in belts will further improve the flow of passengers and baggage, and a new inline screening system was added to make subsequent baggage handling more efficient as well. Common-use technology is built into the new facility for some airline partners.

Traditional signage inside the terminal and dynamic signage in the new parking facilities will make wayfinding easier for passengers, Dolliole notes.

A short-term garage with 2,190 spaces includes a walkway from the fourth floor to the ticketing/check-in area on the third level of the new terminal. Across from the arrivals area on the east

side of the facility, a new long-term garage with 2,750 parking spaces is being constructed. A surface lot with 685 spaces is a short walk from the terminal, while the garage that currently provides long-term parking at the existing terminal will transition into a 2,438-space economy garage with shuttle service.

Airside, the new terminal has 35 gates: six in Concourse A, 14 in Concourse B and 15 in Concourse C. A double taxi lane between concourses B and C allows planes to move in and out without blocking the other concourses, which is a problem at the existing terminal. The airfield also will have nine full-size remain overnight positions.

Significant Growth

For the last three years, MSY has experienced record growth, with 13.1 million passengers in 2018, a 9.3% increase over 2017, which was also a record year of 12 million passengers, a 7% increase over 2016.

The new terminal is designed to better handle growing traffic, with flexibility to expand on the west end and, to a lesser extent, to the east. "It was the thought process early on that we couldn't construct something on that side of the airfield that would be constrained just to those gates," explains Dolliole. "We had to have a good ability to grow the facility."

That ability has already proved critical. "No sooner did we get a shovel in the ground and the airlines said 'We need more gates,'" Jordan Taylor reports. Because expansion was already figured into plans devised with Building Information Modeling, the design team was able to react to the change more efficiently. In addition, Border Protection Services changed its operating procedure to have passengers collect their baggage before processing through Immigration, which required a modification to the Federal Inspection Station layout.

The current layout allows for the addition of another six-gate concourse, and there is space in the footprint for the expansion of baggage claim.

BIM's Role


ANDREW GRAHAM

Building Information Modeling (BIM) was critical to the design of the project and provided numerous benefits, relates Andrew Graham, associate architect with LEO A DALY.

In particular, it facilitated the management of a large and complex team of partners. The terminal project alone involved 34 different digital models, each representing a different member of the consultant team combined with a different building system. "We are able to use the digital technology to work through the coordination of systems and help us as we get the different pieces of the building to fit together," Graham relates.

The first step was developing a project execution plan for how the team would produce the design through construction documents, then through delivery to the contractor and ultimately for use during construction. "This plan lays out how the entire design team will work in a digital

environment and sets up a plan for 3-D modeling for the project," he explains.

From the structural design to the framing of the roof, BIM was integral, allowing for a more efficient design and construction, adds Graham. Coordinating digitally continues through the fabrication and construction processes, as contractors and subcontractors reference the 3-D models to build out the terminal.

BIM also allowed the team to save time in the design and production of construction documents because changes automatically adjust and recalculate affected systems. In contrast, changes in a CAD-based system or 2-D documents would have likely meant starting over completely. "That helped a lot with the structural design, led by Walter P. Moore, in optimizing this building and project," says Graham.

"We really relied on these digital systems to help with how we carried out the design and how we made sure everything was working," he adds.

BIM also allowed for flow analysis to ensure efficiencies as travelers move throughout the building, as well as wind speed analysis and testing of the structural system to make sure the new terminal can withstand a Category 5 hurricane. Using computational fluid dynamic modeling, fire protection engineers were able to determine that smoke control and fire protection systems worked appropriately and were optimized for the facility.

Everybody Ready?

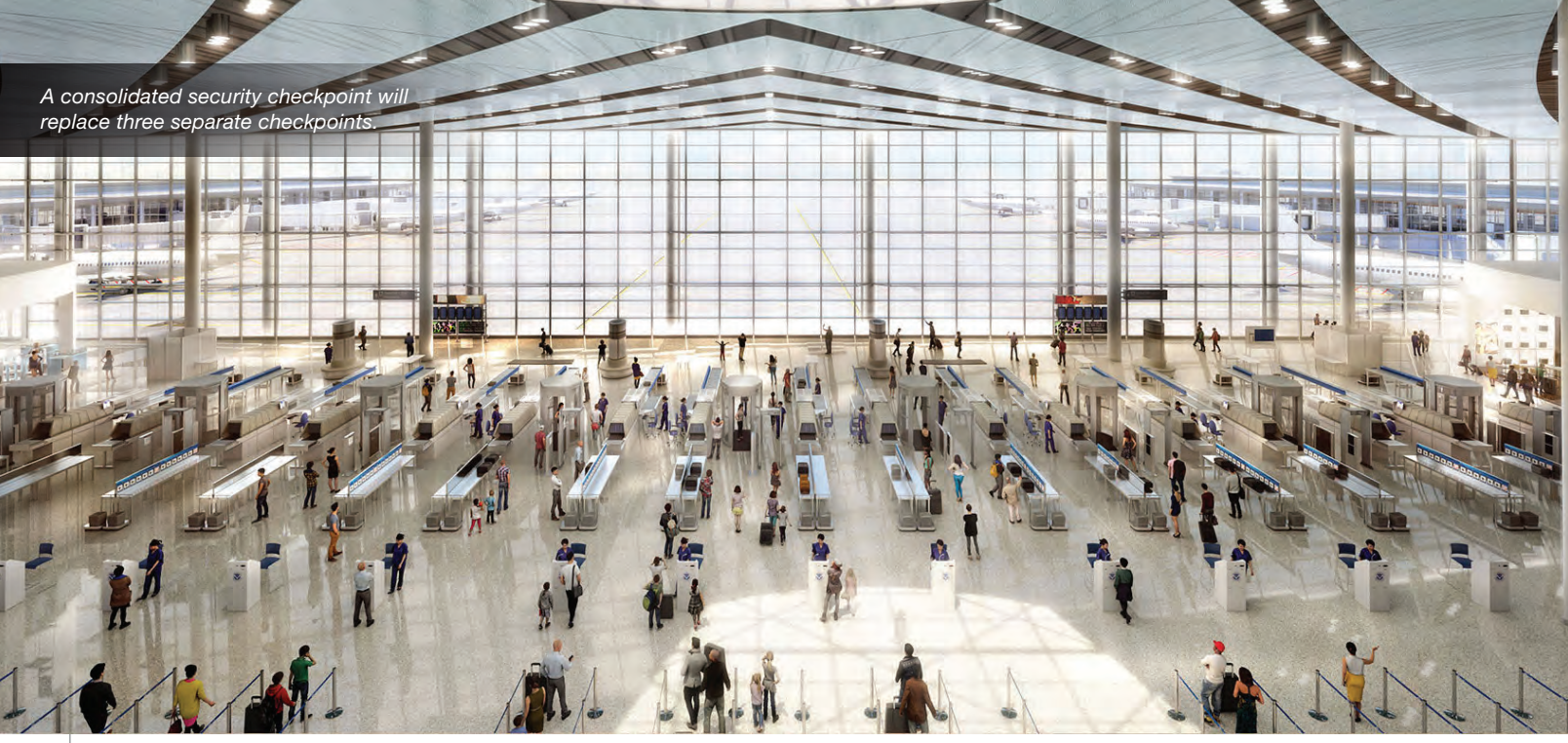
With construction nearing completion, one major task still looms large: planning and completing the move from the existing terminal to the new. To make the process go as smoothly as possible, MSY hired Chrysalis Global Aviation for operational readiness and transition (ORAT) services.

"There are 18 to 24 months of planning going into that overnight move," Dolliole advises.

Chrysalis Managing Partner Suzanne Phelps and her team are taking a full inventory of the airport to prepare. "They work through the process and coordinate every aspect of the move," says Dolliole.

SUZANNE PHELPS

Designers made ample use of natural light.



A consolidated security checkpoint will replace three separate checkpoints.

In essence, an ORAT consultant addresses all activities beyond construction that need to occur to ensure that the airport is prepared to operate in its new environment, Phelps explains. "We assess the changes that will have to occur, and we implement supporting activities."

Beyond moving equipment and people, Chrysalis is responsible for training, documentation, trials/simulations and tenant orientation/engagement. It is also tasked with ensuring that the new facilities meet tenants' needs.

Specific duties include passenger simulations, compiling an exhaustive inventory of tenant spaces, establishing a phased move plan and supervising the contracted moving company.

The first step of tackling a project of this magnitude is taking an inventory of stakeholders, relates Phelps. "We need to figure out who is either impacting or impacted by this project," she explains. The list of entities and groups that need to be ready for MSY's opening day is long: airlines, service providers, airport staff, rental car agencies, ground transportation providers, TSA, CBP, FAA, and the traveling public.

"There are often policy changes that have to be made to support the new environment," Phelps notes. Chrysalis documents processes and procedures, prepares tenant manuals and ensures that employees are trained on the operation and maintenance of new equipment. For example, if the new facility has stainless steel finishes where the old one does not, the cleaning staff may need new supplies.

An ORAT newsletter for all airport stakeholders and tenants is published regularly to provide updates on the project and move. "We're a clearinghouse, a liaison between the program and the staff and tenants," Phelps summarizes. "We are problem-solvers, troubleshooters."

The month before the move will focus on trials and simulations, as well as orientation and training. Weeks prior to the move, most equipment and supplies will be in place in the new terminal. "We will keep just what is needed to get through those last few weeks here," Dolliole explains. "It's not like we're pushing everything overnight. A lot of it is pre-staged."

The ORAT team encourages setting up as much as possible before the move to reduce stress and give personnel the opportunity to "play house" before the new terminal is officially activated. The night of the move is reserved for mission-critical items only.

"The first day, they need to be serving passengers, not looking for pencils," emphasizes Phelps.

Literally, the biggest items to move will be aircraft, which will end operations at the old facility and then be positioned at the new terminal for operations the following morning.

When the doors open, the ORAT team will be at the ready to provide support and address issues that invariably arise. Chrysalis will also manage additional move activities. "You can only absorb so much in advance," explains Phelps. "Once you're actually operating or maintaining the equipment, then you know what your real questions are and you're at a point where you can soak up more knowledge."

A move like this is an opportunity for a "reset," she adds. "Imagine the morale boost if you can spend your time keeping the facility pristine instead of walking around with a roll of duct tape in one hand and a magic marker in the other."

Dolliole says contracting an ORAT company is critical for a move of this scale. "Chrysalis has touched a full move of this nature before, and they come in armed with that knowledge."

Case in point: Chrysalis managed the recent LAX terminal swap, which relocated 55 airlines and service providers during three overnight moves. Leveraging the company's experience allowed MSY to stay focused on its primary missions, notes Phelps.

"Operations staff, airlines and all the stakeholders already have full-time jobs, and you should not dilute those resources," she advises. "We look across the entire organization and make sure nothing gets missed."

Dynamic Digital Display Illuminates New Check-in Canopy at Richmond Int'l

FACTS&FIGURES

Project: New Check-in Canopy & Counter Signage

Location: Richmond (VA) Int'l Airport

Cost: $990,000

Project Timeline: 2017-Jan. 2019

Architect: Gresham Smith

General Contractor: RMT Construction & Development Group

Display & Content Provider: Daktronics

Sign Subcontractor: Casbro Digital Signage

Electrical Subcontractor: Local Electric Company Inc.

Special Systems/Technology Consultant: Arora Engineers Inc.

Electrical Engineer: Engineers Plus, P.C.

When Richmond International Airport (RIC) built its new terminal in 2007, the original budget included funds for an array of state-of-the-art digital displays in the passenger check-in area. However, escalating construction costs and subsequent value engineering resulted in a much different outcome.

For the past dozen years, the thriving Virginia airport used passive text on metal signboards to indicate airline positions and queues for passengers in various seating classes. That all changed in January, when RIC unveiled its new cantilevered canopy above the ticketing counters, complete with a border of two 4-millimeter LED ribbon video displays, each stretching 150 feet long.


RUSS PEADEN

Russ Peaden, director of Airport Real Estate and Facilities, was not a fan of the rudimentary light boxes with vinyl letters that the new systems replaced. "Block lettering showed, 'First Class' here, or 'Drop Bag' there," Peaden recalls. "The plan had been to have better digital imaging over the ticket counter to give it a more professional and modern look. All along, it was something that we wanted to do; it was just a matter of timing and funding."

BEFORE

BY NICOLE NELSON

Naturally, he is pleased that RIC recently achieved, and even improved upon, the signage included in its initial terminal plans. “It was fortunate that we were able to pull it together as we have,” he says.

Peaden credits Jon E. Mathiasen, the airport’s chief executive officer, for initiating the $990,000 project two years ago.

Standout Design

The airport hired Gresham Smith for architectural and engineering design services to replace the canopy above its ticketing/check-in counters, and then rolled the signage update into the larger canopy project. The firm has worked with RIC on many projects since 1992.

"We replaced the canopy with a similar design for continuity and wayfinding, but a little different, updated aesthetic," says Eric Sweet, a senior interior designer with the company. "The wash of new LED lighting freshened up the entire area."


ERIC SWEET

While Gresham Smith led the design efforts, Arora Engineers provided technical and systems consulting.

"Arora helped us out with lighting the stack and understanding, specifically, how fine the pixel pitch needed to be with regard to viewing distance, size and cost," Sweet explains.

Daktronics was selected via a public bid process to manufacture the $500,000 digital sign.

"Instead of having one small display over each counter position, they wanted one large, continuous display to use for wayfinding and to provide an architectural element," remarks Daktronics Regional Sales Manager Kevin Palmeter.

Electrical and data support was provided by the general contractor (RMT), electrical subcontractor (Local Electric) and signage subcontractor (Casbro). Ancillary projects included installing new lights and re-wiring existing circuits.

The Softer Side

Beyond providing hardware, Daktronics also helped on the software side with content development.

Because the new digital display spans the entire ticketing area, it can be used to provide travelers with a little entertainment while they wait, notes Palmeter. While RIC has yet to leverage such additional elements, it may elect to offer news, flight information or other types of content on the new display in the future.

"There is additional usable space beyond just displaying 'first class' here, 'business class' here, and 'bag drop' there," Palmeter explains. "The airport can change those messages out. They could display seasonal or holiday messages."

Palmeter credits his Daktronics colleague, RIC Project Manager Sarah Opitz, for leading the airport through its first round of content creation using Venus Control Suite software.


SARAH OPITZ

"Most of the content was just utilizing the airline logos with their colors," Opitz says, noting that the design ranged from passenger prompts for specific carriers to a general "Welcome to Richmond International Airport" message above vacant counter spaces.

All seven of RIC's major airlines are currently using Daktronics-designed broadcast images, and the company remains on call to assist them in developing new content in the future.

Intrinsic Value

With the installation complete, Peaden is pleased with the new display's messaging, information and quality.

"It is a good, long-lasting product that will wear well and has a lot of utility," he comments. "The way Gresham Smith specified the components and system, it's not going to be obsolete tomorrow. The ability exists to grow into it, and I think it's a win/win."

While Peaden doesn't envision running paid advertising on the new display, he says it still provides value for the airport.

"The return on investment is the finishing touch of an overall enhanced image at the ticket counter," he explains. "The display has a long-term payback, in terms of the ability for it to grow as a dynamic sign. There are a lot of capabilities there that we've yet to really appreciate, but we are already realizing benefits. It has been a quick partial payback on a long-term investment."

The airport's new LED display stretches 150 feet long.

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Love Field Improves Checked Bag Resolution Area & Invests in RFID Tracking

BY JODI RICHARDS

Dallas Love Field

FACTS&FIGURES

Project: Baggage Handling System Improvements

Location: Dallas Love Field

Key Components: Renovating Checked Bag Resolution Area; new Mobile Inspection Tables; infrastructure for Radio Frequency Identification technology

Added Capacity: 8 inspection stations, bringing total to 16

Cost: $8.8 million

Funding: City of Dallas; Southwest Airlines

Project Manager: VTC

Barcode/RFID Scanning Equipment: SICK

Baggage Handling System Mfr/Installer: Jervis B. Webb Co.

Key Successes: Improving flow of baggage handling system; improving work conditions in Checked Bag Resolution Area; reducing lift injuries

Future Benefit: Improved bag tracking capabilities

In late 2018, Dallas Love Field (DAL) wrapped up an $8.8 million renovation to ease congestion in its Checked Baggage Resolution Area (CBRA). Looking beyond traditional fixes, the project team deployed Mobile Inspection Tables to speed the area's flow and improve conditions for the TSA personnel who work there.

The airport also seized the opportunity to install infrastructure for Radio Frequency Identification (RFID) throughout its baggage handling system. "We think that's going to be the next evolution for us," says Aviation Director Mark Duebner.

MARK DUEBNER

The new RFID infrastructure lays the groundwork for meeting International Air Transport Association Resolution 753, which took effect last June. It states that member airlines must track baggage at four key points: passenger handover to the carrier, loading to the

aircraft, delivery to the transfer area, and return to the passenger. Additionally, airlines need to share the tracking information with interline journey partners as needed.

The resolution is designed to reduce global baggage mishandling, increase efficiency in baggage operations and provide a better passenger experience.

Officials at DAL are counting on RFID to help the cause. "Managing bags around the airport is fairly hectic every day because of the volume of flights we're doing with the limited amount of space," Duebner relates.

While the airport has encountered some hesitation from airlines about the investment needed to fully utilize RFID, Duebner says it will be an important customer service enhancement. He emphasizes that the benefits of being able to track a bag's location throughout the system cannot be overstated—especially for an active facility like DAL.

"Our obligation as an airport is to create infrastructure that helps the airlines be more successful," Duebner explains. "Our schedule is so tight, we're doing more than 10 flights per day per gate."

Such volume and pace are not conducive for baggage handling. For instance, when a plane is reassigned to a different gate, there is a chance the associated bag cart could miss the reassignment. With RFID readers, the airline could more quickly and efficiently determine the appropriate location for bags.

The airport worked with its baggage handling systems supplier, Jervis B. Webb, which contracted SICK to upgrade its existing scanning infrastructure and baggage dimensioning system. The company also added RFID read points throughout the system.

"Love Field is very much preparing for the future," says Tom Gebler, account director of Airport Systems for SICK. "They've laid in the infrastructure to support a much greater use of RFID within the airport."


TOM GEBLER

The airport's ultimate goal is to completely eliminate unidentified bags. "Whenever a bag doesn't do what it's supposed to do, it really causes a ripple effect," comments Duebner.

RFID Benefits

Once the airport's new system is fully operational, RFID tags will be scanned as bags enter the handing system at curbside check-in and ticket counters. Next, bags will move to what Gebler calls the security feed, where an array reads barcodes and RFID tags, and also checks dimensions to ensure they will fit through the explosives detection system. From there, bags move into the checked bag inspection system, where they are scanned, cleared and pass by outbound scanning points with RFID and barcode readers for sorting to one of three makeup units. At the makeup units, RFID readers will scan the tags again, changing custody from the airport baggage handling system back to the airline, to be loaded on the plane.

The new system will require much less human involvement. "Mishandling of bags will be reduced substantially by using RFID," Gebler predicts. He notes that in controlled testing, read rates for RFID tags can exceed 99%, while rates for barcode reading range from 93% to 97%, depending on the technology used. "Quite a few less bags are handled manually in an RFID system than they would be in a traditional barcode system," he adds.

In addition to its Resolution 753 implications, RFID provides airports and airlines a better sense of baggage handling system performance, Gebler says. Stakeholders can use tracking data to see how effectively bags are processed through the system. "How long it's taking to process bags is a very important performance metric to understand," he notes. "If bags are taking a long time in the reconciliation area, that could be a big concern for both the airport and airlines because bags won't make it to the flight on time."

If a bag gets mishandled in the process, RFID technology can be used to determine its last read point. For instance, in the unlikely event that a bag not cleared by TSA is loaded onto a flight, personnel can use a portable RFID reader to scan rows of bags to find the correct one. "Otherwise, you have to literally go look at every tag to find the bag, which can be very time consuming," Gebler adds.

Ideally, Duebner would like to see RFID in use at the airport by the end of this year. "We've done a lot of the pre-work; now it's just getting down to the nitty-gritty of cost estimates and working with the airlines on the implementation," he comments.

Bags that require manual inspection are delivered to and from TSA officers on automated mobile tables.

CBRA Overhaul

In anticipation of the Wright Amendment expiring in October 2014, DAL executed an extensive terminal modernization, which included a new baggage handling system. As anticipated, passenger traffic promptly increased when associated flight restrictions were removed. Volume at DAL jumped from 4.2 million enplanements in 2013 to 4.7 million in 2014 and 7.2 million in 2015.

Despite the installation of a new baggage handling system, volume increases still caused strain—particularly in the CBRA, which had only eight stations for manual screening. "The number of tables, even when fully staffed, was not sufficient to keep up with the volume," Duebner recalls. Bags would back up on the line and eventually stop the whole system.

The CBRA was sometimes a chokepoint, agrees Jeff Akers, project manager with VTC.

In 2016 and 2017, DAL worked with TSA to audit the baggage handling system to work toward improving its performance. Ultimately, the number of CBRA stations was deemed inadequate for the volume of bags at DAL as a result of changes in TSA design criteria.

After evaluating the system and its throughput, the project team determined that physical expansion with traditional linear conveyors was not a viable option due to space constraints. "It became a big challenge," Duebner notes.

"We needed to look outside the box in terms of how we were going to move bags and expand throughput in that area," recalls Akers.

Working closely with contracting and design partners is key to any project, but collaboration was especially important for the CBRA project, Duebner reflects. "Using mobile tables was a solution brought to us by our partners," he offers as an example. "You have to keep an open mind and challenge everyone you're working with to seek new solutions."


PAUL DUGAS

The team suffered a difficult blow when Paul Dugas, project manager for SICK, died just before crews finished their work. "Everybody in the baggage handling system industry knew Paul, and Paul knew everybody," Akers reflects. "I was always amazed by how responsive and in tune with every job he was, especially considering how many projects he was involved in. Paul was truly one of a kind."

To provide continuity, Gebler and Karl Willner, who manages SICK's Logistics Automation project managers, stepped in for the remainder of the project. "Paul was truly loved and respected throughout the company and industry, and his passing was a huge loss," says Gebler. "The amount of condolence emails and calls from customers was pretty overwhelming."

Funding & Installation

Having provided funds for the airport's initial baggage handling system project, TSA denied its request for funding to update the system. Instead, DAL worked with its largest airline tenant, Southwest, to help cover the cost of adding eight more inspection stations to the CBRA, bringing the overall total to 16.

"Like a lot of other airports, the issue we have is that the baggage handling system was designed after the footprint of the airport terminal had been established," Duebner explains. "Our screening activities essentially happen in the basement of the building, which is hard to expand."

The airport's baggage handling system designer, VTC, validated an innovative solution offered by the airport's baggage handling system manufacturer/installer, Jervis B. Webb. As a result, the airport invested in a new system that uses automated guided vehicles rather than a conveyor system to move bags. The conveyor system carries bags identified for manual screening into the CBRA and drops each onto a mobile inspection table. The mobile tables then drive themselves to an inspection station, where a TSA officer performs the necessary screening. Once a bag is cleared, the officer pushes a button, and the mobile table takes the bag back for reinsertion onto a conveyor for cleared baggage.

Duebner reports that the first 10 mobile inspection tables went in fairly easily. "It's a really simple system," he comments.

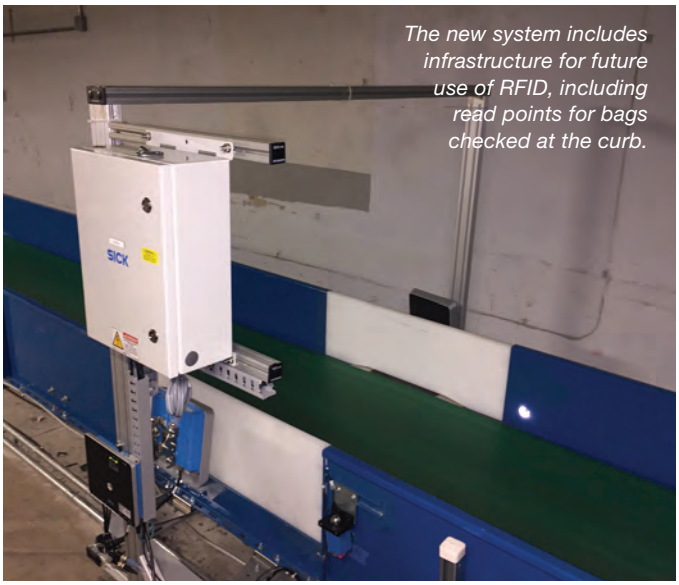
Removing a wall adjacent to the screening area created the space needed to add the new stations. Once the new stations were in operation, the original stations were taken out of service.

The phased project also added RFID read points at the ticket counter conveyors, curbside check-in conveyors, TSA baggage inspection station and baggage makeup units, where bags wait to be loaded onto carts for transport to aircraft.

"The big benefit we've seen is a significantly more pleasant environment for the agents," notes Duebner. The new system reduces noise and heat in the CBRA room, and TSA personnel no longer have to lift or drag bags on/off conveyor belts for screening. Such transfers are now automated, which has already reduced lift injuries. Mobile inspection tables also increase efficiency by allowing agents to quickly transition from one bag to another. "As soon as agents are done screening one bag, they can turn around and work on a bag that is already positioned at the next station," Duebner explains.

If there is an issue with any one of the mobile tables, it can be taken out of service without impacting the rest of the system.

Looking ahead, Duebner says that RFID and automated vehicles could have additional applications for automated bag storage and retrieval. At airports like DAL with a limited makeup area, bags that are checked early take up valuable space. A system using RFID and mobile inspection tables could potentially deliver such bags to another area and then reinsert them into the system at a more appropriate time. But that would require another round of design, procurement and execution.



The new system includes infrastructure for future use of RFID, including read points for bags checked at the curb.

For now, DAL is enjoying the improved pace and work conditions of its new CBRA. "We consider the project to be a big success in a lot of ways," Duebner concludes.

Coming soon: RFID bag tracking.

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Charleston Int'l Blankets Pre-Security Areas With Gunshot Detection Sensors

BY RONNIE L. WENDT

FACTS&FIGURES

Project: Gunshot Detection System

Location: Charleston (SC) Int'l Airport

Operating Entity: The Charleston County Aviation Authority

Cost: Less than $100,000

System: Guardian Indoor Active Shooter Detection & Reporting System, from Shooter Detection Systems

Security Systems Partner: Johnson Controls Security Solutions

Project Timeline: Aug. 2018-early 2019

Key Benefits: Shot detection in public side of terminal speeds response to verified threats; system integrates with access control, video management & critical communications systems

There's a poignant art exhibit at Charleston International Airport (CHS) about the church shooting that rocked the South Carolina city in 2015. The memorial includes a Bible open to the passage that victims were studying the night of the tragedy. For most, the multimedia display is a tribute to the nine people killed and five wounded in the racially charged incident. For Paul Campbell, executive director and chief executive officer of the Charleston County Aviation Authority, it is also a somber reminder of CHS' commitment to the safety of its passengers and community.


PAUL CAMPBELL

"The airport continually seeks advanced solutions to provide better protection for passengers against all measures of threats. But the 2015 Emanuel African Methodist Episcopal Church shooting, and other mass shootings that followed, sparked the airport's search for active shooter technology," he commented in a press release.

That quest led to the recent installation of an approximately $100,000 gunshot detection system that covers baggage claim, ticketing and other areas of the terminal before the TSA checkpoint. "It is

my understanding that we are the first airport in the country to utilize this technology in a public setting," says Tedd Steele, senior network architect at CHS.

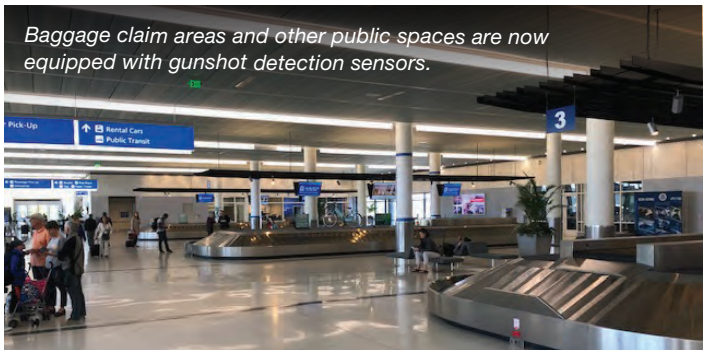
TEDD STEELE

The Guardian Indoor Active Shooter Detection and Reporting System, by Shooter Detection Systems (SDS), provides the airport with location information and associated video within 1½ seconds after a shot is fired to help speed response to verified shooting incidents. Campbell calls it "life-saving technology that adds a vital layer of security against the active shooter threat."

Minimizing Chaos

Multiple airport shootings here and abroad have inspired a growing interest in shot detection technology. As of mid-April, Abilene Regional in Texas is the latest U.S. airport to install a system like the one at CHS, and other Category X airports are also using the technology. Los Angeles International recently announced plans to install the Guardian System in its new automated people mover facility.

Christian Connors, chief executive officer of SDS, notes that many terminal operators are interested in preventing the mass confusion that occurs during actual or suspected incidents. "Airport personnel don't always know there is a shooting right away, and sometimes there is a lot of misinformation that goes out once they do," Connors explains. "Look at what happened at JFK International



Baggage claim areas and other public spaces are now equipped with gunshot detection sensors.

when people were cheering about the Olympics, and others thought it was an active shooter situation. The post-analysis of that incident found there were reports of 40 shooters, when in fact there was no shooter at all. Even at Fort Lauderdale, when there was an active shooter, the airport received reports of multiple shooters in other terminals when, in fact, there was only one. Our system takes confusion and human panic out of the loop by digitizing everything and quickly getting information out to security personnel and police, as well as passengers."

The installation at CHS came after an exhaustive review of various gunshot detection systems, says Steele. Ultimately, the airport selected the Guardian System for its technology, performance and third-party credentials, including SAFETY Act Certification by the U.S. Department of Homeland Security. Officials also liked that the airport's security systems provider, Johnson Controls Security Solutions, had previously partnered with SDS on other projects.

"We wanted a system that was very reliable and compatible with what we already had," summarizes Airport Security Manager Nick Haynes.

The project team found it attractive that the SDS system already had certified integrations with the other technologies used in the airport's security system. Johnson Controls installed the new shot detection technology and will help maintain it.

"The airport wanted a complete package that could simply plug into their current system, and our system fit the bill," says Connors.

System Specs

Originally developed for the battlefield, the Guardian System utilizes sensors placed every 80 feet within a given space. The sensors use a combination of acoustic and infrared technology to "hear" the sound and "see" the flash of a gunshot. The system processes audio and visual information from the sensors to determine if a gunshot occurred. According to company personnel, the system can pinpoint a shooter's location to within 40 feet.

"There are no false positives," adds Steele. "The system can determine gunshots with a high degree of accuracy thanks to the dual-mode sensors. It knows the difference between firecrackers or loud bangs and a gunshot."

Moreover, the system at CHS is configured to trigger multiple reactions if a shot is detected. Alarms are automatically triggered,

specific doors are locked or unlocked, information is sent to first responders and alerts are broadcast through the public address system. Because the shot detection system is integrated with the airport's video management system, security cameras can track a shooter's movement through the facility, which helps police find the perpetrator and neutralize the threat more quickly.

For all this to happen seamlessly, the sensors must be placed correctly. Johnson Controls and SDS performed a walkthrough of the terminal with a software tool that ensures coverage overlaps to eliminate dead zones. Crews then installed sensors along the ceiling of pre-security areas.

"The system requires a cabled infrastructure," states Greg Livesay, a business development specialist with the Advanced Technologies Group, Government Technologies of Johnson Controls Security Solutions. "To do this, we figured out what the most appropriate design would be, and then ran the cable and installed the devices."

Few other changes were required at CHS because the airport already had a robust infrastructure in place, notes Connors.

Sensors have anti-tamper technology to prevent physical sabotage. In addition, each contains a firewall and uses military-grade encryption to prevent hacking. "If someone were to manipulate them, a maintenance alarm is sent immediately to the gateway, and any connected systems are also notified," Livesay says. Standard maintenance needs are communicated via text alerts.

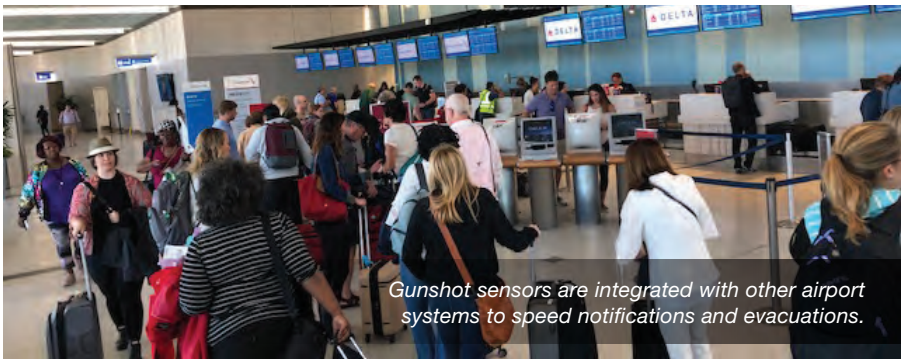
The sensors are plug-and-play technology and do not require calibration, adds Connors. They are also programmed to perform a built-in test to analyze their components and output. Such records are logged; so if there is an issue with a sensor, an alert is sent automatically to the airport and integrator.

"In other words, if someone hangs a neon sign next to a sensor after it is installed, the sensor will know its environment has changed, and it will let you know," explains Connors. "In addition, we use a patented gunshot tester during installation to ensure each sensor is online and working; and then we run a simulation and training tools tests to ensure all integrations are configured correctly."

According to military-style reliability tests, SDS sensors and components have a minimum lifecycle of approximately 10 years.

Deep Integration

After sensors were installed at CHS, Johnson Controls integrated the new Guardian system with the airport's access control system and other systems. The multifaceted integration is what enables the system to generate gunshot detection alarms, activate facility doors, cue cameras to record a shooter's location and stream live video and



Gunshot sensors are integrated with other airport systems to speed notifications and evacuations.

maps to significantly reduce response time during an active shooter incident.

"The integration was quite simple," reports Connors. "It's a software integration that has been certified on both sides."

If a shooting would occur at baggage claim, security cameras tied to the sensors installed there will automatically pull up views of the area. "We have numerous cameras that are tied to each sensor," explains Steele. "As each sensor is triggered, it will automatically initiate an alarm call within the Genetec Security Desk system that [airport] police monitor 24/7. They will get an alarm along with video of the area and a map of where the sensors are. Even though this is not a large airport, we still want responding officers to know where to go."

Integrating the gunshot detection system into the facility's video management system was key, Connors emphasizes. "1½ seconds after the shot goes off, responders have video. Some of our customers have up to 2,000 cameras, and it's impossible to search that many cameras quickly. By integrating with the video management system, we bring up the exact area where the shot occurred so officials can see what is happening in that area, how many people are injured, and how many shooters there are. All of this happens without anyone having to make a panicked 911 call."

The airport may also integrate the system with flight information boards located throughout the terminal. This would allow it to use the digital displays to alert passengers who have passed through the TSA checkpoint about an active shooter situation on the pre-security side.

The extent of integration at CHS is what makes its system truly unique—and more effective, notes Livesay. A standalone gunshot detection system not integrated with other airport systems would connect to a computer in the security operations center and send text messages to first responders.

"When you move to what Charleston's done with integration, users don't interact with the gateway anymore; they interact with their usual systems. Shot detection becomes another sensor on their workstations," he explains. "A video management system has a graphical user interface of camera locations; so when a gunshot goes off, video from that

Charleston Int'l Honors Church Massacre Victims

In late 2017, Charleston International Airport opened an exhibit to honor the nine parishioners killed and five others wounded during Bible study at Mother Emanuel AME Church in 2015.

The exhibit, in the Central Hall, includes two 5-foot-high stained-glass panes separated by a glass partition. The panes depict the church with nine white doves and a cross. In the center of the exhibit, encased in glass, is a Bible open to the passage of scripture the study group was reading when a self-proclaimed white supremacist began his massacre. A closed Bible that belonged to Rev. Clementa Pinckney, the church's pastor who was killed in the shooting, is placed beside it.

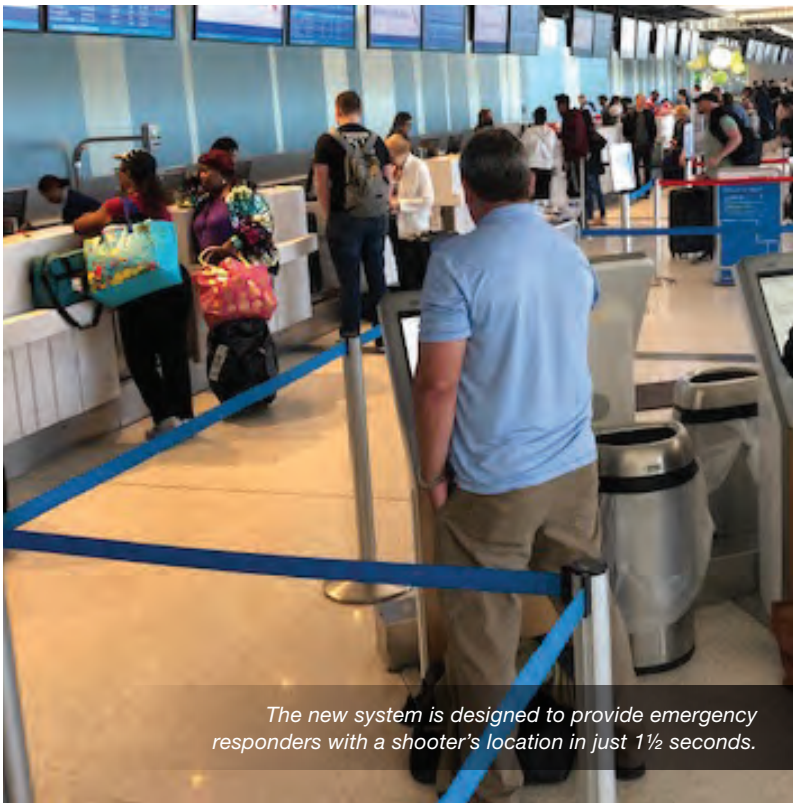
The tribute also features photographs of the historic downtown church and an oil painting by an area artist.

An airport statement about the exhibit notes that it provides "a place for reflection and contemplation" for millions of people who pass through the airport.

"Our airport is the most used public building in our community," said Henry Fishburne, a member of the Charleston County Aviation Authority Board, in the press release. "The Aviation Authority Board and staff believe this tribute is fitting because the attack on the church and its worshippers was also an attack on our whole community."

"This will be a solemn space and serves to honor those whose lives were taken, those who survived and their families," said Margaret Seidler, an Authority Board member and project organizer. "It also reminds our citizens and visitors about the Charleston response—the peace, community spirit and unity displayed in the aftermath of the June 17, 2015, tragedy."

The project also inspired charity. Mead & Hunt donated design services for the exhibit, and nearly two dozen local companies provided construction and other related services.



The new system is designed to provide emergency responders with a shooter's location in just 1½ seconds.

area will be pulled to the front. Operators will see it and turn to their standard operating procedure, which is an all-call on the radio with a description of the suspect and location. There will also be some predictive knowledge going out, such as where the shooter is headed. They are no longer just responding to a threat but responding in an intelligent way."

Integration and response improvements notwithstanding, Campbell hopes CHS will never need to use its new gunshot detection system.

Haynes agrees wholeheartedly, noting that it's gratifying to help make CHS more secure and potentially encourage other airports to do the same. "We keep having issues across the country, but it seems like no one ever does anything to correct them," he reflects. "We hope others will see what we've done and follow our lead to try and reduce some of these problems."

Editor's Note: To help maximize security and safety at Charleston International, we omitted certain details about its new gunshot detection system. However, airport personnel will gladly answer questions directly from industry peers. Contact Nicholas Haynes at 843.767.7261 for more specific details.

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Greater Rochester Int'l Designs Terminal Specifically for the Community It Serves

BY ROBERT NORDSTROM


PHOTO: JIM MONTANUS PHOTOGRAPHY

FACTS&FIGURES

Project: Terminal Rehabilitation

Location: Greater Rochester (NY) Int'l Airport

Facility Size: 392,708 sq. ft.; 2 concourses

Cost: $79 million

Funding: Winnings from 2016 Upstate Airport Economic & Revitalization Competition ($39.8 million); passenger facility charges ($31.7 million); airport authority funds ($6.8 million); FAA Airport Improvement Program ($700,000)

Timeline: Sept. 2016-Oct. 2018

Interior Design, Architectural & Engineering Consultants: CHA Companies; SEI Design Group

Canopy Design & Engineering: Passero Associates

Smart Terminal Initiatives: VS Energy

Construction Management: LeChase Construction Services

Prime Contractors: Alpine Systems (ROCview); Fabritec Structures (canopy); Ramsey Construction (foundation & site work for canopy); Grayco (interior carpentry & ceiling ribbons); Steve General Contractors, Inc. (general contractor)

Hearing Assistive Systems: Hewitt Young Electric; Kaplan-Schmidt Electric; Landry Mechanical Contractors; Motion Savvy

Significant Features: Real-time gate video that allows travelers to monitor boarding status from outside holdroom; automated facility system that links lights & HVAC controls to flight activity; hearing loops & sign-to-voice translation for travelers with hearing loss; interactive play areas inspired by National Museum of Play; outdoor terminal entrance canopy with colored LED lights

Of Note: Project team engaged Rochester Institute of Technology & National Technical Institute for the Deaf in the development of features for customers with hearing loss

Awards & Honors: 2018 Most Innovative Small/Medium Hub Airport in the Nation (American Assn. of Airport Executives); 2018 Advocacy Award (Hearing Loss Assn. of America); 2018 Structural Project of the Year Award (American Public Works Assn., Genesee Valley Chapter, NY); 2018 Project of the Year Award – Structures for the Gateway to Monroe County (American Public Works Assn, New York Chapter); 2019 Platinum Award—Transportation (American Council of Engineering Cos, NY); 2019 Community Organization of the Year Award (Hearing Loss Assn. of America); only small-hub U.S. airport selected to present at 2019 Passenger Terminal Expo, London.

It's not marketing hyperbole when Monroe County Executive Cheryl Dinolfo describes the newly renovated terminal at Greater Rochester International Airport (ROC) as a "next-generation travel hub." She has plenty of concrete examples to back up the claim.


CHERYL DINOLFO

The airport, which serves as a gateway to New York's Finger Lakes Region, is taking passenger services and building automation to the next level with features such as facility systems that link lights and temperature controls to flight activity; cutting-edge technologies that assist travelers with hearing loss; and real-time video of holdrooms to decrease "gate hugging."

Because ROC was a 2016 winner of Governor Andrew Cuomo's Upstate Airport Economic and Revitalization Competition, nearly half of the $79 million project was paid for by the state. The rest came from passenger facility charges, the airport authority and the Airport Improvement Program (see Facts & Figures to the left for specific amounts).

The overarching goal of the renovation was to create a positive environment for travelers and to stimulate local economic development. "From curb to cabin, we wanted to make the


ANDY MOORE

travel experience better for everyone in our community," explains Airport Director Andy Moore.

Currently, ROC serves approximately 2.5 million travelers annually and has an economic impact of more than $800 million per year. Two particularly important local entities include the Rochester Institute of Technology and the National Technical Institute for the Deaf, the world's largest college for the deaf and hard of hearing.

"Both institutes are significant customers of the airport," Moore says. "We talked to a lot of people—travel agents, corporate travel managers, business people who use the airport, leisure travelers—and asked a lot of questions to find out how travelers perceive and experience the airport from the minute they come on the property to the minute they leave. That approach all started at the top with Cheryl Dinolfo, who mandated that the airport be integrated with the community."

First Impressions Count

The airport and county responded to local input with dramatic and inclusive initiatives. From the outside entryway to technological innovations throughout the interior, ROC transformed its 30-year-old terminal into a 21st century high-tech facility custom designed for the unique community it serves.

Where to start? At the entrance to the airport property, of course—where the old New York Department of Transportation road sign, which simply said "Airport" with an arrow, was replaced with a larger, lighted monument sign. In addition, ROC installed energy-efficient LED street light fixtures and updated wayfinding signage for rental car return, departures, arrivals and parking.

A new smartphone lot, with free Wi-Fi and a large flight information display (also LED), helps ease curbside congestion at the terminal. The lot also includes electric vehicle charging stations.

A new canopy that covers the terminal's departure and arrival roadways is a significant improvement. "An obstacle to travelers was the walk from the parking garage and other parking lots to the terminal through the rain, snow and slush we get here in the Northeast," Moore explains. Problem solved: Today, travelers move beneath a dramatic canopy built with 1,050 tons of U.S-made steel covered in 87,000 square feet of PTFE Teflon® tensile membrane fabric. The extremely durable and weather-resistant polytetrafluoroethylene woven fiberglass membrane is designed for conditions ranging from frigid artic cold to desert heat and has a life expectancy exceeding 30 years.

In addition to shielding customers from inclement weather, the canopy also provides a stable environment for additional security cameras with facial recognition technology. The project also includes solar panels and a system that collects rainwater for landscape irrigation.

To make the canopy aesthetically pleasing as well as functional, Passero Associates designed it with programmable LED lights

The airport can change the color of the canopy's lights to create seasonal displays.

PHOTO: JIM MONTANUS PHOTOGRAPHY

(2,200 white and 367 color blast fixtures). The ability to create custom lighting for holidays such as Christmas, Fourth of July or Halloween really gives it the "wow factor," notes Moore.

The project team had to engineer and build the multipurpose canopy quickly. "Time was short, and the design and construction of this massive structure had to be completed in half the time typical for such a project," recalls Passero Northeast Aviation Services Director Greg Topping. "This demonstrates what is possible with outstanding teamwork."

GREG TOPPING

BILL JOHNSTON

One of a Kind

Partnership and coordination were critical to the renovation's success, Moore notes. At its peak, the project had approximately 200 construction workers on site at one time. Nevertheless, ROC Deputy Director Bill Johnston reflects, "We were able to overcome the challenges of construction and maintain a fully operational airport with minimal disruption to travelers and tenants throughout the project."

CHA Companies served as the lead design and engineering consultant for interior terminal renovations. Per the county's direction, the design team of CHA Companies and SEI Design Group focused on blending practical and aesthetic improvements. A glass wall etched with the Rochester skyline separates the terminal's airside and landside areas at the security checkpoint. Acrylic resin ribbons hanging from the ceiling suggest the flow of

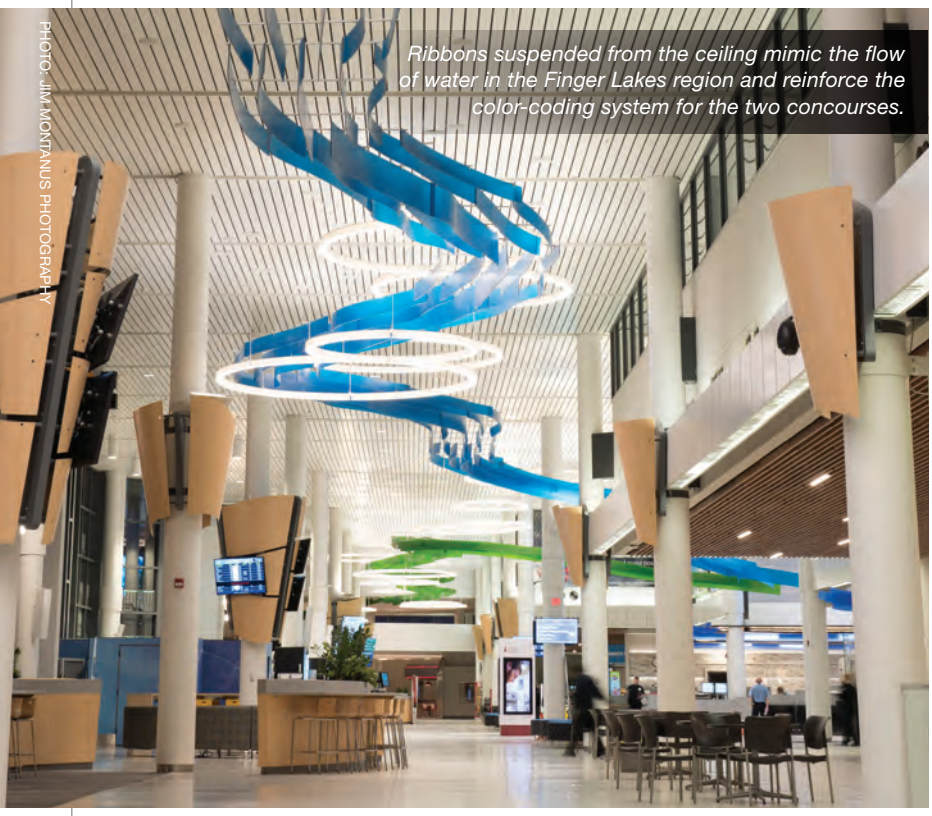

PHOTO: JIM MONTANUS PHOTOGRAPHY

Ribbons suspended from the ceiling mimic the flow of water in the Finger Lakes region and reinforce the color-coding system for the two concourses.

water prevalent throughout the Finger Lakes region, while also color-coding the two concourses—green for Concourse A and blue for Concourse B.

A new web-based control system for facility lighting and heating/venting/air conditioning makes for better energy management and cost efficiency. Integrated with the airport's flight information display system, the automated control system decreases airflow and dims holdroom lights after aircraft leave. Airport Operations reports that the associated energy savings are significant—about 30% for the entire building.

To assist deaf and hard-of-hearing travelers, digital LED screens throughout the terminal provide wayfinding assistance and visual messaging in coordination with the airport's paging system. Smart LED color lighting is paired with the flight information display system to communicate active/inactive gates, overhead paging, boarding and emergency information.

At ticketing, rental car and food/beverage counters, cutting-edge sign-to-voice technology is being tested and will be soon deployed to translate American Sign Language hand movements to voice or text for service

agents. In addition, the airport installed hearing loops throughout the terminal. The loop system uses a specially designed amplifier connected to the terminal's public address system and to wiring embedded in the floor. Electrical currents sent through the wires generate electromagnetic fields that can be received by t-coil features in hearing aids or cochlear implants. Customers with such implants or hearing aids can receive amplified audio announcements without ambient background noise. Loops installed at point-of-sale locations such as ticketing, concessions and car rental counters capture and amplify the sound of customer service agents' voices and deliver it wirelessly to customers wearing hearing aids with t-coils. ROC and the Rochester Chapter of the Hearing Loss Association of America have forged a mutually beneficial relationship over the years; input from the association was invaluable throughout the development, installation and testing of the new system, Moore informs.


FABIO BENDANA

"Much of what we implemented here, the innovative technologies, are the first of their kind in airports," notes CHA Program Manager Fabio Bendana. "It was groundbreaking. We created a lab right here in the airport where we could test systems and technologies we planned to install. It took quite a few smart people in one room to design these new and unconventional systems."

Security & Service Improvements

While ROC implemented some changes specifically for customers with hearing loss, many are broader based. Catering to tech-toting travelers, the airport installed more than 1,000 new device-charging outlets throughout the terminal and increased the bandwidth of its free Wi-Fi from 3 GB to 500 GB. Other new amenities include a post-security business center and a pre-security conference room for passengers and local businesses alike.

The airport also increased the size of its six-lane TSA checkpoint by 40% to allow more space for queuing and maneuvering carry-on luggage, wheelchairs and strollers. The expansion provides room to better accommodate future passenger traffic growth.

Project design consolidated two concourse exit paths into one centralized exit path to create a new single flow of passengers through the food court and retail concessions area toward a new arrivals greeting area and baggage claim.

PHOTO: JIM MONTANUS PHOTOGRAPHY

The Strong Museum of Play helped the airport develop two interactive play areas.

Eight facial recognition cameras and 26 object-left-behind cameras with video recording and database subscription crosscheck were installed throughout the interior and exterior areas of the terminal.

A new passenger information network called ROCview allows travelers to view real-time video of gate areas from any location in the terminal, thus eliminating the perceived need to sit within view of their gate. "Our goal is for people to enjoy other areas of the terminal building, whether in a restaurant, business center or play area," Moore explains. "With this new video technology, they can just pull up their gate on their device and see what's going on at any point in time. It alleviates stress and anxiety, which is always an important goal in an airport setting."

To encourage passengers to spend some of their post-security wait time eating and drinking, designers expanded the food court with a shared-use lounge space that features floor-to-ceiling windows overlooking the airfield.

Community Showcase

When ROC's two-year terminal renovation ended in October 2018, it not only came in on time and on budget, it also garnered a lot of industry awards (see list on Page 39). In many ways, the project provides a blueprint of how to tailor a facility's structure, services and technologies to the community and travelers it serves: Start by asking questions, then respond specifically and innovatively to the answers received.

"We worked closely with the Rochester Institute of Technology and the National Technical Institute for the Deaf and Hearing Loss Association of America to develop cutting-edge technologies that would make the terminal function more efficiently for the deaf and hard-of-hearing community," Moore emphasizes. "At the same time, we made a concentrated effort to highlight what the Rochester community at large has to offer."

For example, Rochester is home to the Strong Museum of Play, one of the largest interactive children's play museums in the country. To highlight this unique attraction, the airport worked with the museum to develop two indoor interactive play zones for the terminal. The National Toy Hall of Fame-themed area in Concourse A includes a giant toy dump truck, oversized Etch A Sketch and Twister-inspired game for young children. Travelers of all ages can play iconic video games, including a supersized version of Pong, free of charge in Concourse B at the World Video Game Hall of Fame exhibit.

"It's all part of showing visitors what Rochester has to offer, the hometown feel we wanted to create," Moore summarizes.

The new terminal exceeds requirements of the 1990 Americans with Disabilities Act (ADA). "With the innovative, one-of-a-kind technologies we've put in place for the deaf and hard of hearing, we have expanded services for passengers of all needs," Bendana reflects. "Each time I am at the airport, someone comments on how intuitive the terminal is with the signage, lighting and colors. This has been a very successful project, and we're very proud of what the team accomplished for the community."

Photography by: Rich Taylor and Andrew Latreille

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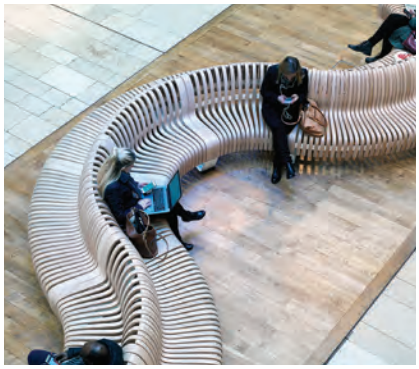

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Mitchell Int'l First in Industry to Host Goodwill Internship Program

BY BRIAN SALGADO

FACTS&FIGURES

Project: Internship Program for Young Adults with Disabilities

Location: Milwaukee Mitchell Int'l Airport

Program: Project SEARCH

Facilitators: WI Dept. of Workforce Development's Div. of Vocational Rehabilitation; Goodwill Industries; Milwaukee Public Schools

Concessionaire Partners: HMSHost; Paradies Lagardère

Source for Intern Candidates: Milwaukee Public Schools

Project Scope: 6 students completed 9-month internships with concessionaires in 2017-2018; 3 secured employment at airport (at Paradies Lagardere warehouse; D terminal's Milwaukee News; pre-security at CNBC & Milwaukee Marketplace); 2 are working elsewhere; 1 is pursuing further education. A new group of 6 more interns is currently in place.

Award: 1st place in "Partnering with Concessionaires/ Service Providers" category at 2018 Airports Council International-North America Marketing & Communications Conference

An internship program at Milwaukee Mitchell International Airport (MKE) is literally changing lives by providing invaluable work experience for young adults with disabilities. Now in its second year, the award-winning inclusion initiative also enhances the airport's culture and provides concessionaires with a new pool of candidates to meet their workforce needs.

When MKE approached its vendors about the Project SEARCH program, two industry leaders immediately stepped forward to participate: global restauranteur HMSHost, which operates more than half of the airport's restaurants, and Paradies Lagardère, which manages almost all of its retail stores. Together, the two companies employed six interns for nine months, rotating students through three different 10-week paid work experiences.

"One of the most pleasant surprises is the feedback we got from vendors in terms of how fulfilling it was for them to be involved in the project," reports Airport Director Brian Dranzik. "The interns came to the airport willing to work, *wanting* to work and had a good attitude on a daily basis. They wanted to jump in and do anything. As we talked with the vendors, we've found that it had a lasting impact on their organizations."


BRIAN DRANZIK

Employers participating in the program report that the interns bring an undeniable "x-factor" to their work. "I'm so pleased with the positive morale this has brought to our team," says Lori Becker, general manager of Paradies Lagardère


LORI BECKER

at MKE. “Everyone came together to help these interns and train them to be successful. The students are appreciative and want to learn. I’m very proud of how my team has stepped up and given back. The interns bring a ray of sunshine to the work atmosphere.”

The program has also garnered attention within the industry. MKE received first place in the “Partnering with Concessionaires/Service Providers” category at the 2018 Airports Council International-North America Marketing and Communications Conference in Ottawa.

Given the success of the first session, another group of six students is currently on the job, working from 16 to 30 hours per week at food/beverage and retail locations in the airport such as Famous Famiglia, Delta’s SkyClub, HMSHost’s Starbucks and French Meadow Bakery, and the Milwaukee Marketplace retail store.

Interns with the Project SEARCH program must meet the same badging requirements and follow the same safety and security procedures as all other employees at MKE. Milwaukee Public Schools provides a licensed special education teacher to lead the training and work at the airport. Goodwill Industries provides two skills trainers who work with the concessionaires to help facilitate on-the-job success for participants.

While MKE does not incur any direct costs associated with the program, it does furnish free office space for program use and provides staff and logistical support from its properties, operations and marketing/public relations divisions.

New Frontier

Developed by Erin Riehle at Cincinnati Children’s Hospital Medical Center in 1996, Project SEARCH is designed to provide job opportunities to young adults with developmental disabilities.

Nationally and abroad, Project SEARCH has over 600 sites located in 47 states and nine countries. MKE is Project SEARCH’s first airport site.

The Wisconsin Division of Vocational Rehabilitation (DVR) operates 27 Project SEARCH sites throughout Wisconsin, including the MKE site. DVR, a division of the state’s Department of Workforce Development, brought the nationally-recognized program to Wisconsin in 2008.

“The airport is like a mini city,” says Christine Schulz, manager of community employment and connection for EmpowerOne at Goodwill Industries of Southeastern Wisconsin Inc. “There are opportunities for our young adults to participate, along with the high level of security and very strong expectations. So, we knew we had to bring in the right interns to do the job.”

Planning for the project began in late 2016 and carried into 2017. Paradies Lagardère and HMSHost received Project SEARCH national model training at MKE and participated in interviews and skills assessments with potential interns from Milwaukee Public Schools.

Goodwill provided disability awareness training to employees at Paradies Lagardère and HMSHost, and Milwaukee Public Schools provided an instructor for onsite classroom training for the interns. Milwaukee Public Schools also provided interns with tablets and other technology needed to participate in the program.

After completing their training from Paradies Lagardère and HMSHost, interns perform daily tasks under the direction of supervisors, their Milwaukee Public Schools instructor and two Goodwill skills trainers. The first group of interns also had the opportunity to volunteer for the airport’s USO Christmas party, work in various Paradies tent sales and share their experiences at an airport/airline tenant meeting. MKE provided additional opportunities by taking interns on a tour of the air traffic control tower and a commercial airplane.

“I think the enrichment activities put it all in context for the interns,” notes Dena Radtke, manager of social work and transition services for Milwaukee Public Schools. “They’re seeing how their role supports the larger mission of running the whole airport, and everyone has a role in making the airport successful.”

Challenges & Successes

Schulz acknowledges that the first session of the program included a substantial learning curve for all parties involved. To help interns acclimate to their new positions, Goodwill trainers held role-playing sessions for a variety of potential experiences, including security issues and customer service interactions. Goodwill also trained the interns on communication and meeting skills, creating PowerPoint presentations, teamwork, financial responsibility and job interviews.

Interns gain valuable job experience working at HMSHost and Paradies Lagardère locations.

"We want them to be the most successful employees possible before they get into a permanent job once they complete Project SEARCH," Schulz explains.

After completing the work skills program, interns were recognized during a ceremony held at the airport in June 2018. Rebecca Kleefisch, Wisconsin's lieutenant governor at the time, delivered the keynote address.

One of MKE's goals for the first session of the program was 100% employment placement for participants. Earlier this year, five of the six original interns were working at least 16 hours per week, and the sixth was pursuing further education. Paradies Lagardère and HMSHost each hired one intern from the program, one student is working for Eulen America, which services the Delta SkyClub at the airport, and three parlayed their work experience at MKE into other jobs.

Inspired by results of the first session, additional concessionaires are considering joining the program. Robert Kiepert, director of Operations for HMSHost at MKE, encourages more participation. "The biggest thing we found that was most beneficial is from Day 1, we communicated with Goodwill on a regular basis and connected with the teachers from Milwaukee Public Schools," he says. "When more people get involved, it will just strengthen the program, and you can see the reward at the end of the year during the graduation program."

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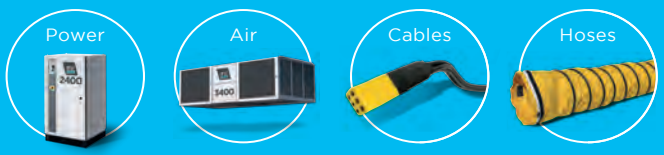

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New Arrestor Bed at DeKalb-Peachtree Signals Industry Change

BY THOMAS J. SMITH

FACTS&FIGURES

Project: Engineered Materials Arresting Bed

Location: DeKalb-Peachtree Airport

Owner: DeKalb County, GA

Cost: $8 million for runway safety zone; $2.5 million for EMAS bed

Funding: 90% federal, 5% state, 5% airport

Construction: July 2017-Dec. 2018

Final Grading: April 2019

EMAS Manufacturer: Zodiac Aerospace

General Contractor: Astra Group

Project Engineer: Michael Baker Int'l

Drainage Engineer: Aulick Engineering

EMAS Block Installation: Boland's North Inc.

Electrical: Trinity Electrical

Asphalt: Stewart Brothers

Retaining Wall Installation: Bonn-J

Erosion Control: Watkins Environmental

Grooving: SE Grinding

Concrete: IP, LLC

The recently completed engineered materials arresting system (EMAS) at DeKalb-Peachtree Airport (PDK) is significant because it provides Atlanta's primary airport for business aircraft with an FAA-compliant runway safety zone. As one of the last U.S. installations by the system manufacturer, the project also has industrywide implications.

Until fall 2020, no other FAA-approved EMAS will be sold in the U.S.; and the system that will be available then is not currently eligible for FAA funding.

Zodiac Aerospace, the French company that supplied the EMAS bed installed at PDK (and more than 100 others at nearly 70 U.S. airports), is no longer selling its system in the U.S. The company announced the change in February 2018, when it merged with Safran, another French aerospace firm. Per an agreement with Zodiac related to a patent infringement lawsuit, the Swedish firm Runway Safe will not begin selling its EMAS beds in the U.S. until September 2020.

JOSEPH SNYDER

The changes put domestic airports needing EMAS in a tough position. "I don't know of any other systems that would meet the requirements of both being produced in the U.S. and also one that has passed the testing required by the FAA," explains Joseph Snyder, the Michael Baker International engineer in charge of PDK's project. "It's a difficult process to maneuver."

Although Zodiac is a French company, its systems were manufactured in the U.S. Runway Safe's EMAS bed is FAA-approved, but is not currently available in the U.S. and is not eligible for FAA funding because it is not manufactured in the U.S. Thus far, Chicago Midway International is the only U.S. airport to install the Swedish system. It installed four Runway Safe EMAS beds from 2014 to 2016.

Both Zodiac and Runway Safe systems use crushable material to stop aircraft during a runway overrun. As an aircraft enters the EMAS bed, its tires sink into the lightweight material, causing the plane to decelerate and eventually stop. Zodiac arrestor beds use crushable cellular cement material to slow the forward movement; Runway Safe beds are made of foamed silica aggregate made from recycled glass.

Materials from both systems that are damaged during an overrun can be removed and replaced with new materials. Safran says it will continue to manufacture replacement blocks for existing Zodiac EMAS beds at the company's plant in New Jersey.

Accelerated Improvement

The active catalyst for PDK's $8 million runway safety area project occurred in 2012, when a Beechcraft jet overran the main runway, rolled down an embankment and pierced a fence along the airport property line. The fence prevented the plane from entering a public roadway that runs along the airfield, notes Airport Director Mario A. Evans.

MARIO EVANS

Airport officials had been discussing runway safety zone improvements with the FAA since 2010, but the 2012 incident put PDK at the top of the priority list, explains Evans.

Runway 21L is 6,001 feet long with an additional 1,000-foot displaced threshold, but it previously lacked a 1,000-foot long safety area, per FAA requirements. In addition, the FAA air traffic control localizer array was located within the already short safety area.

"Prior to construction, they were never able to use the full 5,001 feet," Snyder explains. "They were short on the safety area by 400 feet, thus the available runway was never more than 4,600 feet for landing operations."

Planning for the project took five years. During that time, designers also explored relocating the roadway to create the needed safety zone. When plans for a runway extension and EMAS installation prevailed, the team considered systems from Zodiac and Runway Safe.

"We did our homework in looking at other EMAS beds across the country," Evans recalls. "We even visited one in Greenville, SC. Their drop is even greater than others."

According to FAA data, the Zodiac system has performed successfully in 15 incidents. In all cases, aircraft were stopped within the safety zone, and no passengers were injured.

The new $8 million runway safety area at PDK includes 250 feet of pavement at the end of the runway and 350 more feet of EMAS bed. The federal government paid 90%, while the state and airport each contributed 5%.

The arrestor bed, which cost $2.5 million, consists of 1,746 blocks that range in depth from 4 inches to 16 inches. The bed was designed for the weight of the average business jet that uses the airport—such as Gulfstream IV and V series aircraft. However, PDK's runway can handle larger Bombardier Global Express and Gulfstream 650 aircraft.

Work Delays

Construction began in July 2017 and was expected to end in February 2018; but unusually rainy weather and an unexpected site issue caused considerable delays. The bulk of the project wasn't completed until December 2018, with final grading outside of the safety area still underway this April.

Preparatory projects included relocating storm and sanitary sewer lines, the FAA fiber optic lines that are part of the airport's navigation lighting system and the FAA localizer.

Preliminary site work required crews to truck in 80,000 cubic yards of soil to raise the grade of the safety area. A 30-foot retaining wall was installed at the end of the runway and along airport property to hold back the new grade. The wall was needed to keep soil and water from flowing through a cemetery located directly adjacent to the airport property and safety area.

Frequent rain made it difficult to move and compact the soil. (2018 was the second-wettest in Atlanta since the 1950s). For each day of rain, it took three days for the soil to dry, Snyder notes.

As dirt was being moved in the safety area, crews discovered an active 60-inch storm sewer line that wasn't depicted on the site plans or previous as-builts. It took three months to design a new line to connect into the storm sewer network, build it 40 feet beneath the new grade and install a new manhole.

Crews worked at night to shape the safety area so the runway could remain active. In the last 60 days, daytime limitations were imposed on aircraft operations.

In the first 30 days, Runway 21L was limited to departures only except at night. In the final 30 days, the runway was open for both departures and arrivals, but the available landing distance was limited to 4,551 feet.

Overall, PDK had 151,132 operations in 2018. Of those, fully 110,000 were from transient business jets. Local traffic is primarily piston aircraft.

The airport maintains tie-down spots and 153 T-hangars for about 410 aircraft that are based at PDK Based aircraft are about evenly split between business jets and piston pleasure crafts.

The airport's new runway safety area was completed late last year.

For more information about engineered materials arresting systems, go to https://www.faa.gov/news/fact_sheets/news_story.cfm?newsid=13754.

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Retro-Style TWA Hotel Debuts at JFK Int'l

BY VICTORIA SOUKUP

The first on-site hotel at John F. Kennedy International Airport (JFK) is a nostalgic 1960s flashback thanks to the recent transformation of architect Eero Saarinen's iconic TWA Flight Center into the new TWA Hotel.

Scheduled to open in mid-May, the facility is a tribute to the golden age of jet travel, complete with swanky red carpeting, elegant white staircases and a sunken cocktail lounge that serves martinis, Old Fashioneds and other vintage favorites. In short, it looks like somewhere *Mad Men's* Don Draper and Roger Sterling would take clients for a long night of drinking and Sinatra music. And there's TWA branding at every turn.

The $230 million renovation and construction project was executed by a public-private partnership between MCR/Morse Development, JetBlue and the Port Authority of New York and New Jersey.


DON FREE

"JFK is embarking on a sweeping redevelopment as part of Governor Cuomo's vision of a new JFK that will make it a model of modern airport facilities internationally," explains Don Free, the airport's program director for aviation business development. "With every JFK terminal looking at

PHOTO: DAVID MITCHELL

THE PORT AUTHORITY OF NY & NJ

undergoing a rebuild or major addition as part of the $13 billion redevelopment, the TWA Hotel and Conference Center project is a welcome addition to the JFK landscape, an iconic new structure that will help set the bar for the entire airport."

Executives from MCR/Morse, the project's developer and lead investor, emphasize the significance of the new hotel. "Having a place for passengers and customers to sleep that is walkable from all the terminals is a big deal," notes Chief Executive Officer Tyler Morse. "That amenity has never existed before at JFK. Heathrow has five on-airport hotels, DFW has three…but JFK never had one until now."

TYLER MORSE

FACTS&FIGURES

Project: Renovating 1962 TWA Flight Center into New TWA Hotel

Location: John F. Kennedy Int'l Airport

Cost: $230 million

Size: 512 guest rooms; 200,000-sq.-ft. hotel lobby; 50,000-sq.-ft. conference center; 10,000-sq.-ft. observation/pool deck

Project Format: Public-Private Partnership

Lead Developer & Investor: MCR/Morse

Key Partners: MCR; JetBlue; Port Authority of New York & New Jersey

Hotel & Conference Center Design: Stonehill Taylor Architects, P.C.

Construction: Turner Construction Co.

Glass Curtain Wall on Hotel: Fabbrica

Hotel Millwork: Highland Wood Products; Hilltop Woodworking

Sunken Lounge Operator: Gerber Group

Cogeneration Plant Enclosures: Epsilon Industries

Of Note: First on-site hotel at JFK; 1960s décor & furnishings; retro cocktail lounge; noise-minimizing glass curtain wall; vintage jetliner displayed on the tarmac

When customers step down into The Sunken Lounge, they also step back in time.

PHOTO: MAX TOUHEY

The project was a labor of love for Morse, because it combined two of his longtime passions: aviation and hotels. "I've admired this building forever and the ability to bring it back to life was a once-in-a-lifetime opportunity," he reflects.

Amid the facility's many vintage details, such as replicas of swizzle sticks from TWA's signature in-flight drinks, are two intentional anachronisms: the absence of cigarette smoke and the addition of high-speed Wi-Fi.

Building on History

In its heyday, the TWA Flight Center was a glamorous and bustling airline terminal. But after the once-dominant carrier went out of business, the building sat unoccupied since 2001. Eventually, the Port Authority of New York and New Jersey hired MCR/Morse to turn the mothballed facility into a hotel.

"The TWA idea was our concept to bring back the incredible history and legacy of the carrier," Morse explains. "We bid competitively and beat out related groups, including Donald Trump's company."

Crews began work in fall 2016 and completed the project earlier this year. Turner Construction Company led efforts to renovate the historic flight center and construct new hotel/conference center facilities.

Extensive work was required to restore the structure that opened back in 1962 to its former glory. "When we got in there, the building still had asbestos, lead paint and non-tempered glass," recalls Morse. "All of that had to be replaced and abated."

Designers repurposed the flight center, famous for its futuristic winged architecture, into a 200,000-square-foot lobby for the new hotel. "It's the largest hotel lobby in the world and is the entirety of Saarinen's building," Morse says.

The expansive space includes high-end retail outlets, six restaurants and eight bars. The Sunken Lounge contains a conversation pit and chili pepper red carpeting—both signature Saarinen creations. Gerber Group, a New York City firm that specializes in innovative bars and restaurants, operates the retro cocktail lounge.

A 50,000-square-foot event and conference center, capable of accommodating 1,600 people, is situated behind the lobby. Guest rooms are located in two seven-story buildings that were constructed behind the former flight center. There is also a 12,000-square-foot ballroom/pre-function space and a 10,000-square-foot observation and pool deck.

The new development connects to JFK's Terminal 5 (where JetBlue operates) via Saarinen's flight tubes, which film buffs may

PHOTO: TOUHEY PHOTOGRAPHY/TURNER CONSTRUCTION COMPANY

The winged exterior of the original TWA Flight Center is an architectural icon of the 1960s.

remember from the movie *Catch Me If You Can*. "You can walk from our building right into Terminal 5," Morse says. The AirTrain, which loads/unloads in front of the new facility, transports passengers to the airport's nine other terminals.

GARY MCASSEY

Careful logistics were required during construction of the two hotel buildings and conference center because the worksite was essentially landlocked by Terminal 5, the Flight Center building and the two flight tubes. "Navigating the construction area was a challenge," recalls Turner Project Executive Gary McAssey. "We had to dig under the existing tubes to create a passageway to get heavy equipment back and forth from the conference center."

Because the development was hemmed in, construction crews had to dig deep. The conference center, for example, is 30 feet below grade and 25 feet below the water table of nearby Jamaica Bay. "Since water travels easily through sand, the biggest challenge was keeping the grade dry so we could complete construction," McAssey explains. "We had a high-powered dewatering system pumping 2,000 gallons a minute 24 hours a day, seven days a week for eight months."

Project designers also had to ensure the stability of soil around the construction area, which was closely monitored in real-time. Instead of driving sheet piling and spending millions of dollars on steel, crews used two innovative SOE (support of excavation) systems to stabilize the ground. Workers created special material mixes by using an excavator and 42-inch auger to blend 7.7 million pounds of cement into deep soil.

Special Requirements

Morse says the most challenging aspect was navigating the numerous government agencies involved with the project, predominantly the Port Authority of New York and New Jersey, the city of New York, 14 preservationist groups and eight federal agencies, including the FAA because the work involved a change to the airport's layout. "We also completed an environmental review of the project, which was very complex and time-consuming," he adds.

The design process received considerable emphasis. "We could have put hotel rooms in the flight center, but we opted to construct them separately because we didn't want to overwhelm the existing building," explains Morse. "We were careful to highlight Eero Saarinen's masterpiece while adding hotel rooms, restaurants and other accouterments."

Guest rooms feature floor-to-ceiling, full-width windows to highlight views of the flight center building and the airport's busy runways. A 4½-inch thick, triple-glazed curtain wall with special transmission glass was engineered by Fabbrica to cancel associated aircraft noise. According to company officials, the JFK hotel has the second-thickest glass wall in the world, behind only the U.S. Embassy in London. TWA Hotel curtain wall includes 2,000 glass panels, each weighing 1,600 pounds.

"When you stand in the rooms, it is dead silence," McAssey says. "It's very impressive."

All rooms are outfitted with classic midcentury modern furniture by Knoll, including Saarinen's famous executive chair, womb chair and pedestal tulip side table. Each is also equipped with a full wet bar, rewired vintage rotary phone and TWA-branded toiletries.

The rooms' wooden martini bars and tambour walls were custom-built by 200 Amish woodworkers from Ohio using locally grown walnut trees. The massive project required 20 semitrailers of logs and took five months to complete. In true Amish fashion, nothing was wasted. Unused lumber pieces were tossed into factory furnaces for heat, and sawdust was turned into bedding for horses and cows.

Renovation of the former Flight Center involved some structural alterations to

the historic building as well as restoration or replication of the original tile and lighting. McAssey reports that the tiling work was particularly tedious because many of the floor penny tiles were damaged. “It was painstaking work,” he says. “The hard part was tying the new section into the old section. The crew literally had to grind each tile.”

Workers also recreated the structure’s historic structural pillars, recoated the winged roof and restored damaged sections to match original geometry.

Beyond the unique requirements of historic renovations, Turner Construction encountered challenges typical of other North American airport projects: having a competent labor workforce available and keeping a close eye on the bottom line.


JAY FRASER

“There is tremendous pressure on pricing for materials and equipment that are incorporated in these major aviation projects,” notes Jay Fraser, the company’s vice president and general manager of Aviation. “Strong local presence and familiarity with local markets as well as regional and national labor suppliers and specialty contractor providers is key to manage the challenges associated with labor and material resources.”

In order to minimize interruptions, Turner scheduled some crews to work between 11 p.m. and 4 a.m., when JetBlue was not operating at the terminal. “The majority of our aviation projects involve complex expansion, renovation and modernization projects that occur on active airport properties,” Fraser says. “Planning, organizing and executing construction operations so they occur safely and do not impact passengers or ongoing airport operations is of critical importance.”

Environmental Features

MCR opted to install its own CoGen (cogeneration) power plant, which earned LEED Silver status. “We did it for a combination of economic reasons and environmental reasons,” Morse explains. “We can generate power for a lot less than buying it from the grid. And, the Port Authority was supportive of doing a microgrid-type of format. It’s a better mousetrap.”


PHOTO: DAVID MITCHELL


PHOTO: DAVID MITCHELL

The hotel combines vintage design details with modern conveniences such as high-speed Wi-Fi.

While some people may consider the move a risk, Morse notes that the local grid is not that stable. "We did the right thing for the environment and the right thing for the project," he comments.

The 4,000-square-foot CoGen building was prefabricated off-site to save time and space. That also allowed the contractor to start work on the plant six months before the facility was prepared to accept it. "Traditionally, you would construct a CoGen plant on the job," explains McAssey. "But if we would have built the plant in place, construction would have started in March 2018. Instead, we were able to start the fabrication and assembly of equipment in the prefab enclosures in September 2017."

The CoGen plant, which has a natural gas feed, was fabricated in 10 sections, each completely fitted out with equipment and fully piped. The sections were installed atop the north hotel building on a 6-inch floating slab to mitigate the operating noise. "When you're in a room, you can't hear any aircraft or even the CoGen plant which sits above it," McAssey says.

In a separate voluntary initiative, ground material from the project helped reinforce the nearby Spring Creek Park, a wildlife refuge in the Gateway National Recreation Area along the Jamaica Bay shoreline. MCR/Morse Development donated roughly 74,000 cubic feet of sand excavated from the TWA Hotel site to the National Park Service. The sand, valued at about $5 million, will help reduce the risk of storm damage and flooding in a neighborhood that was devastated by Hurricane Sandy in 2012. The donation supports efforts to restore more than 225 acres of wetland and coastal forest.

Celebrating the Sixties

The new hotel and conference center hinges on 1962, when the TWA Flight Center originally opened. "It was a very special year—not just in aviation, but also in America," explains Morse. "*Dr. No*, the first James Bond movie, came out; it was Camelot, and Kennedy was president. *Spiderman* came out that year, and so did the *Jetsons*, the first color TV show on prime time.

"John Glenn had just circled the Earth, and the Cuban missile crisis was going on," he continues. "It was the epic struggle of Capitalism versus Communism, and the total reformation of the Catholic Church, with Mass going from Latin to English. The Barbie Dream House came out that year, the supersonic jet was in development, the microwave oven premiered…1962 really was an amazing year and celebrating it is a big deal."

Airport officials also highlight the project's link with the past. "The airport has a rich history with TWA, and the opportunity to bring back the TWA brand was a major selling point," says Free. "It is a first-rate hotel for a first-rate airport. As a result, the TWA Hotel will play a major role in the overall creation of a world-class JFK."


PHOTO: DAVID MITCHELL

Quick Ascent

Public interest in the project has been strong. In fact, when the hotel opened for reservations on Feb. 14, its website


PHOTO: DAVID MITCHELL

crashed. "Thousands of people were booking rooms from all over the world—from Perth to Singapore, and the U.K. to Russia," Morse explains. "People are very excited about it."

He also anticipates strong interest in the conference center's meeting rooms and ballrooms for corporate and private events. "We think we will average 100 weddings and 50 bar/bat mitzvahs a year," he predicts. "A Delta pilot and Southwest flight attendant actually postponed their wedding for a year so they could get married in our building."

If the current array of restaurants and bars isn't enough, a 1958 TWA Lockheed Constellation jetliner is being transformed into another cocktail lounge. Once completed, the restored aircraft will be parked on the tarmac, with full views from the Sunken Lounge.

MCR also developed the TWA Lounge at 1WTC, a satellite event space lounge on the 86th Floor of the One World Trade Center building. The lounge is decorated with TWA memorabilia, David Klein poster art, a sunken lounge with chili pepper red carpeting, vintage TWA uniforms and a custom Solari departure board.

The lounge offers a clear view of JFK, and a telescope in the lounge points directly at the new TWA Hotel. "We wanted to make a psychological connection between the city of New York and the project at the airport," Morse says. "It's been our staging area for a TWA museum we want to eventually build at JFK."

Spartanburg Downtown Memorial Enhances Facilities With Runway Extension & Other Improvements

BY KEN WYSOCKY

City of SPARTANBURG
Downtown Memorial Airport

FACTS&FIGURES

Projects: Runway Expansion; Public Park; Terminal Renovation

Location: Spartanburg (SC) Memorial Downtown Airport

Est. Annual Operations: 33,000

Runway Cost: $30 million

Runway Funding: 90% FAA; 5% state; 5% city

New Runway Length: 5,852 ft. (650-ft. extension)

Construction: 2016 to late 2018

Runway Closure: 4 months in 2018

Engineering/Project Management: W. K. Dickson

Instrument Landing System: Thales Group

PAPI Lights: NBP Corp.

Terminal Renovation Cost: $4.4 million

Renovation Funding: City of Spartanburg

Airport Park Cost: $975,000

Park Funding: City of Spartanburg

Key Benefits: Increased safety; new capabilities for larger corporate aircraft; ability to accept overflow traffic from other regional airports as business activity increases; expected revenue increases

South Carolina's historic Spartanburg Downtown Memorial Airport (SPA) has undergone an extreme makeover of sorts in the last seven years to enhance its economic development role and help it better compete with neighboring airports. The multi-project effort was capped by a $30 million runway rehabilitation and extension that opened in October 2018.

Other major improvements at the city-owned general aviation airport include a new navigation system and runway lights, added during the recent runway extension; a city-funded playground and park, completed last spring; and renovation of the airport's 81-year-old Art Deco terminal building, coupled with a reconfigured and expanded parking lot. The $4.4 million terminal project, completed in 2011 and also funded by the city, included two new units of T hangars.

"The runway and the terminal were in pretty bad shape," recalls Terry Connorton, SPA director since December 2017. But recent improvements help position the growing

PHOTO: ROSS DRONE PHOTOGRAPHY

airport to better serve a business boom in Upstate South Carolina, home to major companies like BMW Manufacturing Corp., GE Power, Michelin North America, Lowes, Home Depot and Milliken & Co.


TERRY CONNORTON

"There's a lot of Upstate growth right now," Connorton explains. "The city of Spartanburg also has been undergoing dramatic growth for the last several years. There are more people and businesses moving east, toward us, so we're starting to pick up a lot of overflow

The city provided funds for a public park at the airport.

air traffic—planes that typically go to GSP (Greenville-Spartanburg International Airport).

"We're right in the crosshairs of I-26 and I-85, so our expansion helps us take advantage of all this economic growth. We're in a good location to take on more business."

The airport's series of landside and airside improvements are designed to help it compete with other regional airports. Aside from GSP, the city-owned airport vies for traffic with five other general aviation facilities: Greenville Downtown Airport, Donaldson Center Airport and three small county airports. About 80% of SPA's operations are business related, while recreational traffic accounts for most of the remainder.

Currently, SPA handles nearly 33,000 operations annually and is estimated to generate $41.8 million annual impact on the local economy.

Accommodating Larger Planes

The $30 million runway project, which involved resurfacing the airport's sole runway and extending it by 650 feet, represents the most significant improvement. The FAA paid 90% of the cost; the state and city chipped in 5% each.

Now 5,852 feet long with a new navigation system, Runway 5-23 makes the airport more attractive to companies with larger corporate jets, such as Gulfstream 550s—a boon to business prospects. "A lot of planes still can get in and out on shorter runways; but to do so, they can't carry as much fuel," Connorton explains. "So with the longer runway, business jets can fly longer distances without having to stop. They don't want to stop and refuel because it costs money and time."

The runway project was executed in three phases. Phase one started in 2016 and was completed in mid-2017. It centered on

moving 1.7 million cubic yards of soil and filling in a small pond that sat in the path of the runway extension.

Phase two started in mid 2018 and focused on resurfacing the existing runway and building the extension. “We had considered closing just half of the runway down, but decided to rip off the Band-Aid,bite the bullet and close it completely to get it done faster,” Connorton remarks.

The closure was supposed to last two months, ending in August, with all air traffic diverted to other local airports in the meantime. But the closure instead lasted into four months, courtesy of Hurricane Florence in September and Hurricane Michael in October. “It rained a lot…so we ended up with an Olympic-size swimming pool—a 6,000-foot-long ditch filled with water,” Connorton recalls. “As a result, we spent a lot of time digging drainage ditches.”

The runway opened in late October. During the phase of the project, crews installed a new navigation system (precision approach path indicator, or PAPI, lights) at each end of the runway. The airport is also installing an upgraded instrument landing system, scheduled for completion later this year.

Playground & Park

While the runway project provides improvements for customers, a $975,000 park funded by the city is helping raise public awareness about the airport.

Built on property vacated by the Civil Air Patrol, the seven-acre park features two playground areas with aviation-themed equipment, a multipurpose athletic field, a splash pad, fitness equipment, two pavilion shelters, picnic tables, restrooms facilities and a paved walking path.

“It’s a very popular place,” Connorton reports. “It brings a lot of people over (to the city’s west side), and they realize there’s actually an airport here. A lot of people see airplanes around here, but they think they’re going to Greenville-Spartanburg, even though they’re actually landing here. It’s a real shot in the arm for the airport in terms of people coming out and realizing there’s an airport here.”

Visitors may not realize it, but the playground and adjoining pathways are positioned to replicate the airport’s original layout in 1927. “From up above, you can see

The park's sidewalks and pathways replicate the original airfield layout from 1927.

PHOTO: ROSS DRONE PHOTOGRAPHY

how the original runways were laid out," Connorton says. "There's a tall slide that stands where the control tower was, plus the swings are airplanes and the walkways feature runway markings."

The new aviation-themed park helps fulfill one of Connorton's goals: making sure the general public understands SPA's rich history. For example, Charles Lindbergh visited the airport in 1927, during a nationwide tour following his historic solo flight across the Atlantic Ocean. At the time, SPA was the state's first and only commercial airport. In 1931, Amelia Earhart became another famous fly-in visitor; and the airport provided the state's first airmail service.

Cultivating Goodwill

The park helps achieve another of Connorton's ongoing goals: improving community outreach. Toward that end, he established the Spartanburg Aviation Community Program, which gives local schools the opportunity to use the airport as a classroom. "It enables local educators to see if any students might be interested in pursuing aviation careers," says Connorton. "And the park helps promote that, because people who go there can see planes landing and taking off."

The program exposes students to a variety of aviation careers. They can attend an educational class sponsored by the Civil Air Patrol, use a flight simulator, attend a session about glider flight, see how planes are refueled and serviced, work on an airplane with an aviation mechanic and take a short plane ride to another local airport for lunch.

"You can't put a monetary value on it, but for a local airport to survive, you have to have goodwill from the city and its residents," he explains. "Otherwise, they think the airport is just for rich people…they only focus on the noise and don't see its greater value. And the park plays a small role in that."

Connorton also teaches free ground school classes on weekends for young people and visits local schools to talk about aviation. Doing so, he hopes to create some goodwill beyond existing airplane owners and pilots.

"When people can see the value of an airport and how it supports the city by bringing in business and creating jobs, it all adds up," he explains. "They need to understand that airports create a ripple effect in terms of economic impact. The airport employs workers that refuel aircraft. Visitors fly here and rent cars, stay in hotels, rent conference rooms and eat meals at restaurants. The airport creates a huge impact, and we want to keep playing a vital role in the area's economic growth."

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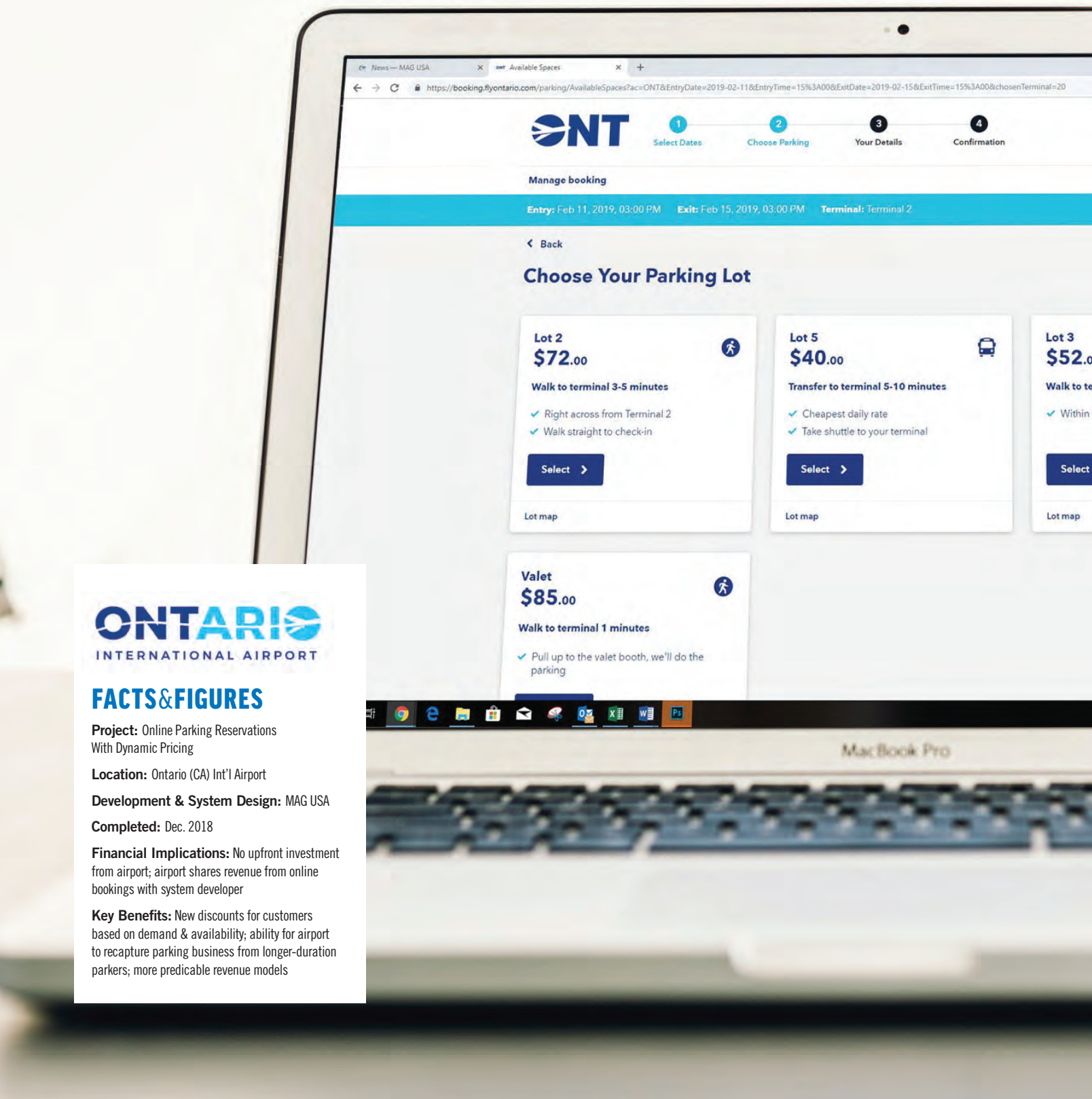
Dynamic Parking Prices & Online Reservations Prove Popular at Ontario Int'l

BY KRISTIN VANDERHEY SHAW



ONTARIO INTERNATIONAL AIRPORT

FACTS&FIGURES

Project: Online Parking Reservations With Dynamic Pricing

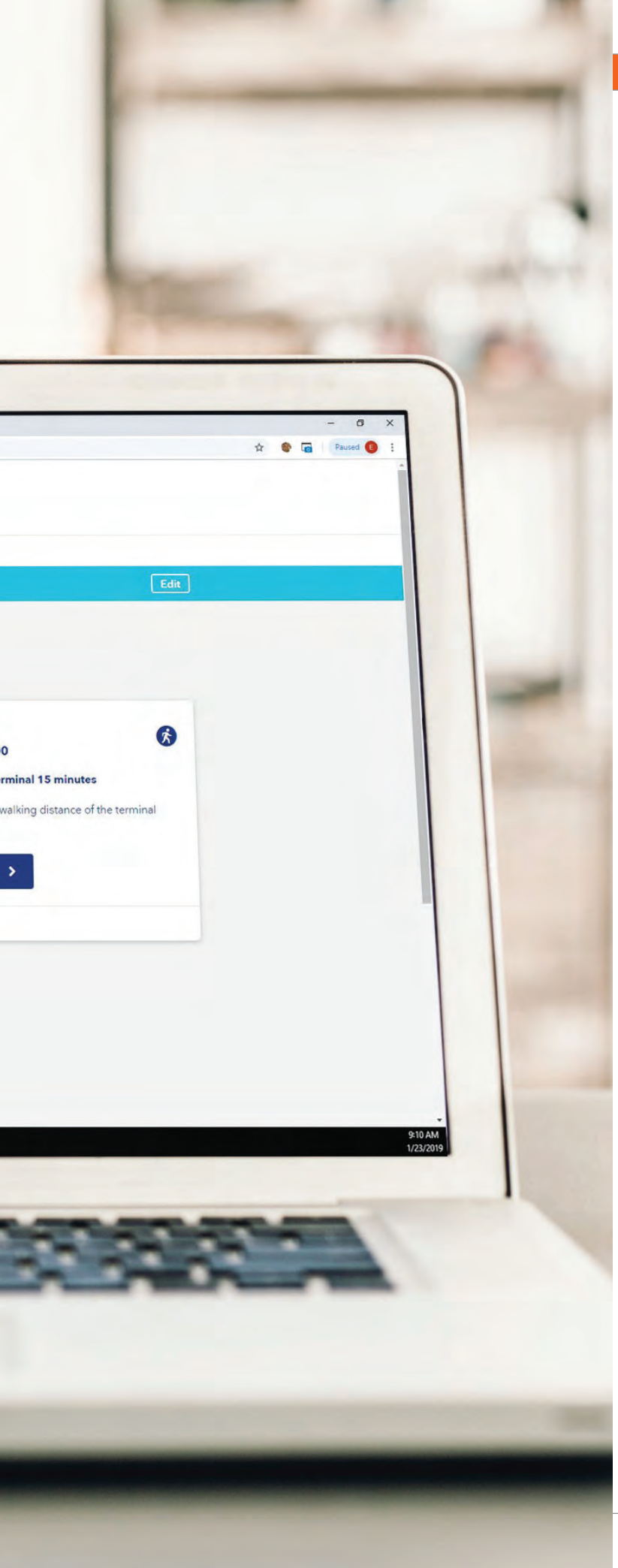
Location: Ontario (CA) Int'l Airport

Development & System Design: MAG USA

Completed: Dec. 2018

Financial Implications: No upfront investment from airport; airport shares revenue from online bookings with system developer

Key Benefits: New discounts for customers based on demand & availability; ability for airport to recapture parking business from longer-duration parkers; more predicable revenue models



Ontario International (ONT) wasn't looking for a digital parking upgrade. In fact, the Southern California airport was focused on adding a new lounge. In the end, it got both by issuing a request for proposals with intentionally wide parameters.


MARK THORPE

"I wanted to accomplish two goals," explains ONT Chief Executive Officer Mark Thorpe. "We needed a new lounge for China Airlines, but we were open to other creative business proposals, too. MAG USA offered to build an Escape Lounge and also help us grow our parking revenue. It was a double victory in that sense."

Parking is a key issue at ONT due to rising enplanements driven by continual expansion in the area. Located about 40 miles east of Los Angeles and 20 miles west of San Bernardino, ONT is in the heart of one of the fastest growing population centers in the U.S.—an area also plagued by notorious roadway congestion. Moreover, the airport draws steady tourist traffic from Disneyland in Anaheim. Last year, ONT served more than 5 million passengers.

When vying for customers, ONT stresses an easy in-and-out experience compared to nearby alternatives. It is also able to operate 24/7, without the curfew restrictions that many airports in Southern California must observe. Offering customers the chance to save money by reserving a parking spot through the airport's website may prove to be a competitive advantage, too.

In total, ONT has five parking lots plus valet service, and officials actively work to attract passengers to on-site parking. Typically, the airport collects more than $17 million per year for parking despite a plethora of off-site competitors.

With the new system operating since December 2018, the airport is enthusiastic about making the change to online booking and dynamic pricing.

"Airports, like airlines, never want to be the first one to try something," says Thorpe. "But for us, the reward was totally worth the risk. I couldn't be more pleased with how this is starting off."

Beyond Online Booking

After the airport signed an agreement with MAG USA, it took the company about six months to implement the new system. The modern online booking option is designed to make reserving a parking spot at ONT as easy as booking a hotel or flight. Dynamic pricing and yield management result in better efficiency and revenue maximization for

The new system offers customers discounts to maximize use of the airport's parking capacity.

MARTIN JONES

the airport, explains MAG USA President and Chief Executive Officer Martin Jones. By pairing the reservation system and data analytics with search engine optimization, social media, third-party distribution and advertising, the new program is driving more traffic to the site, reports Thorpe.

The system is administered by MAG-O (short for MAG online), a division the company established two years ago that has since grown exponentially. What initially required four employees now requires about 150. Essentially, the group packaged MAG USA's capabilities into a system that resembles a software-as-a-service (SaaS) solution with four main components: a booking engine; marketing services to help drive demand; capabilities that allow customers to book via various methods on multiple channels; and an umbrella trading module.

The system sells parking the same way Hotwire and Priceline sell hotel rooms, car rentals and

airfares—offering discounts for capacity that might otherwise go unused. At ONT, it's helping fill parking spots that previously remained empty. As Thorpe explains it, the airport is recapturing parking revenue by selling a great deal of inventory that in the past "spoiled."

Jones explains the genesis for the program this way: "Ten years ago or so in the U.K., everybody was taking a ticket and paying the equivalent of $20 per day to park. It was difficult to plan because we didn't know who was going to park at the airports, nor could we stimulate demand. So we really couldn't compete with other travel options."

The company consequently developed a system that provides customers with dynamic pricing driven by more than 3 million machine learning algorithms and 3,000 predictive models. By reserving their parking in advance, passengers gain peace of mind and sometimes a lower rate. The algorithms can be changed on a dime to offer right-sized pricing based on demand. The result is more satisfied customers and a better revenue source for the airport, says Jones.

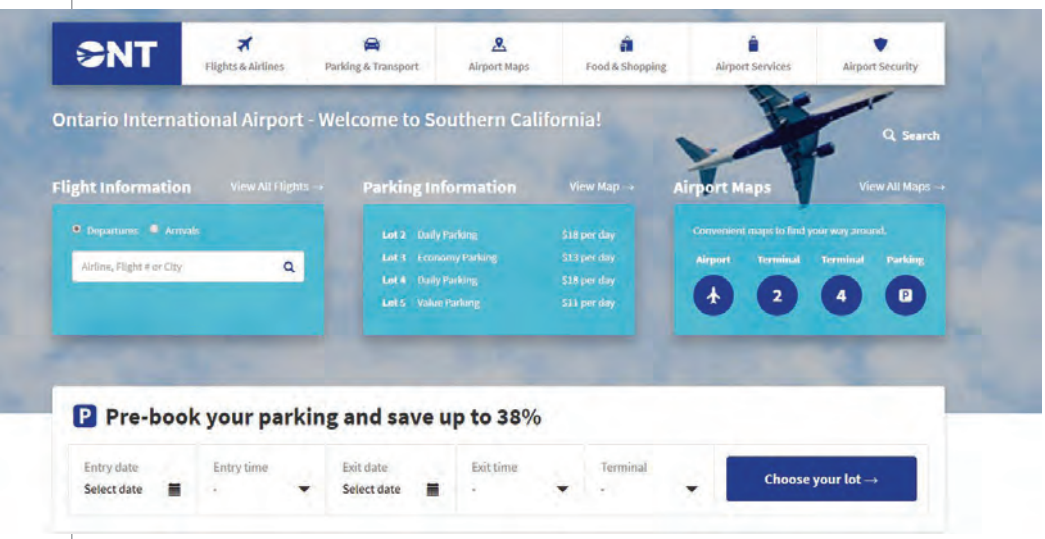
"The vast majority of U.S. airports work on a price-per-day model," he explains. "Typically, passengers will park for an average of two days. After that, it becomes more advantageous for them to take a train or taxi. We can match the parking price based on what length stay a passenger is looking for."

Thorpe agrees, noting that ONT's biggest competitors for parking revenue aren't other airports, they're off-site lots and other transportation options to the airport.


JOHN WILDMAN

John Wildman, vice president of parking for MAG USA, says that ONT is the first airport to execute true dynamic pricing by offering parking options at the right time to the right customers. He believes it's important to keep up with companies like Amazon, which offers customers a streamlined experience; so MAG USA monitors its software and changes with the market.

"There are a number of airports that take reservations online," he says. "But it's managing the whole approach holistically that creates value. It requires a real culture change because, innately, airports are not technology companies. They might purchase a product and they think they're done for a while. In this case, constantly harnessing data analytics and thousands of forecasting models integrates parking into as many channels as possible for long-term growth."



Algorithms and predictive modeling provide dynamic pricing based on supply and demand.

The new system at ONT approaches airport parking the same way airlines have priced seats for decades, adds Thorpe.

"The great thing about dynamic pricing is that usually, the price is less for the customer," he says. "Those who are more price-sensitive can find a better rate than customers who roll up willing to pay the posted price."

Enthusiastic Reception

Jones says the biggest surprise was how many passengers chose to pre-book online. "There was a kind of pent-up demand," he explains. "Customers are parking longer, which has been pleasing to see. Now people are staying for four, five, even 10 days or up to a month. And that's good, because that means we're touching the market of people who would not have parked here before."

Thorpe appreciates that the new online system did not require up-front investment from the airport. Instead, it struck a revenue-sharing agreement with MAG USA that is based on incremental growth. If parking revenue increases more dramatically, MAG USA does not receive a windfall; the agreement is designed to favor ONT in such circumstances.

"We earn the incremental revenue, and MAG USA's algorithms protect the existing rollup revenue, which allows us to maintain our premium parking income," explains Thorpe. "They get a share of what they sell, not of *all* parking revenue. If you think about how much airports pay to bring in buses and parking systems, making parking more attractive to customers is much more efficient."

Other Possible Developments

An on-site parking lot that was closed by Los Angeles World Airports in 2006 (when it still owned and operated ONT) is being eyed for possible redevelopment or alternate use. By offering competitive pricing and valet service in the lot, the airport could produce more revenue and possibly buy back that real estate and grow the airport, explains Thorpe.

Offering valet service would present the opportunity to bundle parking services with lounge access, which in turn brings in more food and beverage revenue. "Valet service is particularly interesting for us, because we have 50 acres dedicated to parking that I hope we can eventually use for other purposes," says Thorpe. "Something like terminal space or commercial development would generate even more revenue than parking.

"Additionally, we can look at the break-even point and figure out what the best price point is. The roll-up fee might be $25 per day; but for those who pre-book, it might be $15 or $20. Not only is it a great service, but you can keep the valet folks much busier and customers more satisfied."

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THE GATEWAY TO STEP-FREE BOARDING

Appleton Int'l Renovates Terminal, Partners With Local Hospital

BY MINDY HAMLIN

With annual passenger growth of 7% to 25% over the last four years, Appleton International Airport (ATW) knew it was time to renovate its sole terminal.

Last year, ATW became the third-busiest airport in Wisconsin and *Bloomberg News* ranked it as the fourth-fastest growing airport in the country; but it was still operating out of a facility originally built in the 1960s. Although the county had expanded and refurbished the terminal more than a dozen times throughout the years, the facilities weren't keeping pace with ATW's sizable year-after-year volume increases.

"The ticket counters and baggage claim were cramped and had not been updated since the '80s," explains Airport Director Abe Weber. "We also really needed to expand the checkpoint because we were processing more than 700,000 people through a 12-foot space."

ABE WEBER

FACTS&FIGURES

Project: Terminal Renovation

Location: Appleton (WI) Int'l Airport

Annual Passenger Volume: 717,000

Facility Size: 50,000 sq. ft.

Cost: $7.8 million

Funding: 58% FAA Airport Improvement Program; 10% state funding; 20% local funding; 12% passenger facility charges

Architecture & Design: Mead & Hunt

General Contractor: SMA Construction Services

Acoustical Ceilings: Verhalen Commercial Interiors

Aluminum/Glazing: Corcoran Glass & Paint

Boarding Bridge/Power Units: JBT AeroTech

Casework: Customer Laminating Specialists

Concrete Precast: Spancrete

Concrete: Carew Concrete & Supplies Co.

Doors: Block Iron & Supply Co.

Drywall: Kohel Drywall

Earthwork: L&H GYR

Electrical: Electrical Synergies

Epoxy Matrix Terrazzo Flooring: Wisconsin Terrazzo & Tile

Fire Protection: PACE Corp.

HVAC Systems: B&P Mechanical

Masonry: Schelfhout & Decleene Masonry

Metal Panels: Muza Sheet Metal

Metals: L&N Metal Works

Overhead Ceiling Grilles: Overhead Door

Painting: Omni Glass & Paint

Plumbing: Johnson & Jonet

Pedestrian Security Breach Doors: Record USA

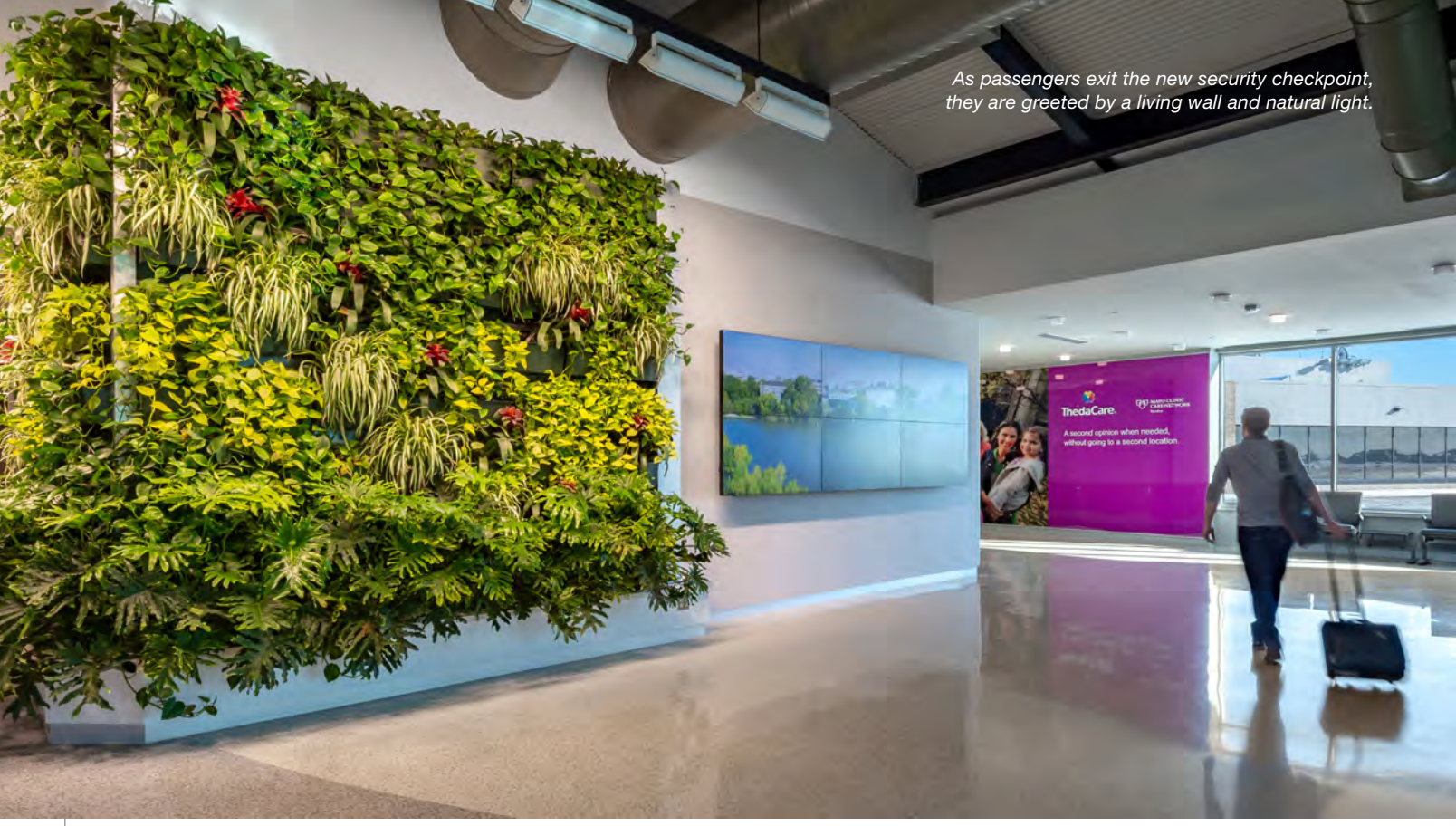
Plastic Toilet Partitions/Toilet Accessories: Laforce

Rebar: Harris Rebar

Rolling Security Shutters: Overhead Door

Roofing: Mathena Roofing

Tiling & Tile Carpet: Macco's Commercial Interiors



As passengers exit the new security checkpoint, they are greeted by a living wall and natural light.

To prepare for the $7.8 million renovation, ATW built a consolidated rental car facility in 2017. By moving rental car agencies from the terminal to a nearby parking area, the airport created the space needed to move forward with its planned renovations.

For the terminal project, ATW turned to its long-time architecture firm, Mead & Hunt. The ultimate goal was to improve the terminal environment and travel experience for customers while also focusing on sustainability and regional context.


MITCHELL WALKER

"This project was designed to create a traditional, linear pathway from pre-security to post-security," explains Mitchell Walker, a client manager and designer with Mead & Hunt. "What we wanted to do was create a seamless design so customers were walking into one terminal."

Overall, the project spanned 50,000 square feet of space and was completed in February.

Ambitious Environmental Goals

The new terminal's architectural design was driven by a recently completed sustainability master plan Mead & Hunt developed for the airport as part of an FAA pilot program.

The plan outlines design solutions for meeting the airport's record passenger growth while defining and meeting carbon emissions goals. By increasing the use of renewable energy and other sustainability measures, ATW hopes to be carbon neutral by 2030—a goal achieved by very few airports.

Part of the plan is expanding its use of solar energy.

"The airport already has solar on the roof of its terminal building and solar hot water heating. However, the roof is slated to be replaced in the old portion of the building," says Walker.

As an alternative, the project team designed multiple solar canopies for the short-term parking area. "We finished three solar arrays as part of the terminal area program. The airport will be expanding to a fourth this spring," Walker reports. "The solar panels will reduce the need for off-site energy, significantly reducing operating costs."

Other sustainability-driven features in the new terminal include low-flow toilets and bathroom faucets to decrease water usage and durable vinyl wall coverings and terrazzo flooring to lengthen replacement cycles and decrease needed maintenance.

Community Partner

In addition to energy use, ATW's sustainability plan also focuses on community health and wellness. A partnership between the airport and ThedaCare addresses those aspects head-on.

A tour of ATW helped show ThedaCare's president and chief executive officer that the airport and hospital share similar goals. "Both organizations serve the same market in Northeast and Central Wisconsin," says Imran A. Andrabi, MD, FAAFP. "We want to create opportunities where we are able to take care of people in the community, where they live and work. Through this partnership, we are creating a healthier, more comfortable travel experience for passengers, whose health needs are served by both of us."

IMRAN A. ANDRABI, MD, FAAFP

One of the first cooperative projects was a mother's room with a baby changing station, dimmable lights, comfortable seating for nursing mothers, a refrigerator, sink, microwave and readily accessible power outlets.

"The room was designed in partnership with our knowledgeable family care providers with convenience in mind," explains Dr. Andrabi. "We feel it's important for parents and families to feel supported in their

The airport relocated concessions to create space for a larger TSA checkpoint.

healthcare decisions, and developing a mother's room allows us to show that support."

The hospital also worked with ATW to develop healthy options for the terminal's restaurants.

"The recipes were developed with ThedaCare Executive Chef Larry London taking ingredients restaurant staff already use and changing the preparation to create a healthier item," explains Andrabi. "We want to make healthy choices more convenient for travelers, so they may take care of their health needs while traveling."

Other projects include hand sanitizer stands, mini hand sanitizers and digital boards with travel and wellness tips.

"It was a lot of fun to work with the hospital," Weber reflects. "I consider our staff very passionate about airports. They are very passionate about health."

Creating a New Customer Experience

After sustained growth over several years, the renovation coincided with a 25% annual increase of passengers in 2018.

"Since we were experiencing such growth, one of our biggest challenges was keeping queuing and traffic flow areas open as we were doing construction," recalls Weber. "We went through spring break 2018 with half of our checkpoint closed."

The new, more streamlined security checkpoint features a living plant wall and an open floor plan for improved circulation and wayfinding.

The newly renovated ticketing/check-in area features more queuing space and updated ticket counters.

Throughout renovations, the project team's priorities were clear: Do not delay flights or shut down operations. Construction work was consequently divided into four phases to limit the impact on customers and airport operations.

Phase one focused on moving/rebuilding the restaurant and the airport gift shop. That paved the way for proceeding with the other phases, which included renovating the ticketing and baggage claim areas, creating more queuing space for departing passengers and expanding the TSA checkpoint and terminal bathrooms.

"The restaurant and gift shop were bookending the checkpoint and restricting any expansion," explains Walker.

Managing the impact of all four phases largely fell to SMA Construction, prime contractor for the project.

"With any airport, if you are leaving it open, the biggest challenge is retaining full operations for passengers and tenants," observes SMA Project Manager Kevin Winkler.

In retrospect, Weber credits much of project's success to the support ATW received from its tenants.

"The airlines and TSA provided an exceptional level of customer service," he reports. "Essentially 50% of our terminal and concourse were impacted by crews painting walls, moving walls, pushing ticket counters around, etc. The core staff that work at the airport was so pleasant and understanding as we worked through the entire project."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Norfolk Int'l Completes Nail-Biter Runway Rehab

BY JENNIFER BRADLEY

NORFOLK INTERNATIONAL AIRPORT

FACTS&FIGURES

Project: Runway Rehab & Centerline Replacement

Location: Norfolk (VA) Int'l Airport

Owner: Norfolk Airport Authority

Project Cost: $15 million

Construction: Aug. 7-Oct. 28, 2018

Prime Contractor: Virginia Paving Co.-Hampton Roads

Electrical Contractor: Atlantic Electric, LLC

Prime Design Contractor: Kimley-Horn

Design Subcontractor: Connico Inc.

Quick-set Concrete: Western Materials

The first phase of a multi-part runway rehabilitation project was completed at Norfolk International Airport (ORF) last fall. The $15 million project was closely monitored by many, including commercial and cargo airlines that depend on the Virginia airport every day

It was early 2015 when airport personnel began noticing that the lights on ORF's sole commercial runway were out of grade tolerance. For the next year and a half, efforts were made to raise the lights by filling around and underneath the cans. Maintenance crews monitored and adjusted the cans until more extensive work could be done, explains Anthony Rondeau, deputy executive director of Engineering and Facilities at the Norfolk Airport Authority.

ANTHONY RONDEAU

"At first it seemed like a few isolated issues. But then it gradually became a challenge that impacted all the cans in the center 6,000-foot asphalt section of the runway," Rondeau recalls. "Our maintenance efforts were successful for a time, but certainly nothing permanent."

That's when the airport began working on a long-term fix.

In early August 2018, it closed Runway 5-23, and 178 workers and 76 pieces of equipment got to work. Each night, crews performed carefully choreographed work sequences for less than four hours, and then cleaned away the equipment and debris so the 9,000-foot runway could open at 5 a.m. the next morning.

That routine continued seven days a week until late October, with only five days impacted by rain. "Even then, contractors were able to be productive with saw cutting, coring and other similar efforts," Rondeau reports.

Bracing for the Big Challenge

Preparations for the three months of active construction began in fall 2016, when the airport authority hired Kimley-Horn to perform a thorough runway evaluation. In addition to the settling can lights, roughness was also a major concern, notes Robert Jones, project manager at Kimley-Horn. The center 6,000-foot section of the runway contained original asphalt from the 1940s, and the two 1,500-foot-long concrete end sections were more than 40 years old. While the runway had been maintained, aircraft tires had worn the grooving off of many areas and time had generally taken its toll.

ROBERT JONES

The team scheduled Phase 1 of the runway rehabilitation for 2018, with at least two or three more phases to follow. The second construction project is slated for 2020. "We're looking to do the two runway ends in separate years, and then the center section the following," explains Jones. "We just have to keep this runway open and operational around some major rehabilitation work."

Rondeau notes that project team relied heavily on Kimley-Horn's guidance to help make airport officials comfortable with the design and associated amount of work required for Phase 1.

"They were able to reference prior projects where they had addressed these exact issues and knew what construction techniques had to be used," he says. "The initial primary objective was to deal with the light cans for the center line, so that's what we did."

About one month before construction began, Virginia Paving Company-Hampton Roads came on board as the primary contractor, and Atlantic Electric was hired as the primary electrical contractor.

"We had to get it together really quickly," says Brian Nettles, division manager of Airfields & Special Projects for Atlantic Electric. "The timeline was very aggressive, but so was the project itself. I needed several top crews for this job."


BRIAN NETTLES

Mark Range, an assistant plant manager with Virginia Paving who was active at the project site, notes that airport personnel became more comfortable with the tight work schedule after seeing the runway open on time each morning. "When we started the job and tasks began to go like they were supposed to each night, we gained their trust," says Range. "They grew confident in what we were doing quite quickly."

On a related note, Rondeau counsels other airports to "go with their gut" when designing and executing such projects. "Pick a team and a process that you're comfortable with," he advises, noting that the project owner must be completely on board, since that's who will be held accountable if anything goes wrong. "One of my biggest takeaways from this project was the need to be comfortable at all times with all actions taking place on your runway, regardless of size."

Team ORF


STEVE STERLING

Steve Sterling, deputy executive director at the Norfolk Airport Authority, describes the key portion of ORF's recent project as open-heart surgery on the runway. The center was cut open, repaired and put back together strong enough to hold aircraft within five hours. Pulling it off required a team of expert contractors and an acute awareness of safety, he emphasizes.

The crews that worked side-by-side on the project thoroughly impressed Lonnie Minson, operations manager for Virginia Paving Company-Hampton Roads. "These weren't problem people, they were solution people," says Minson. "It took many, many entities to make it come together and put that runway back in service by 5:00 each morning."


SRI KUMAR

The prime contractor and subcontractor had extensive aviation fieldwork experience and were very knowledgeable—which is not always the case, notes Sri Kumar, a project

Workers raised the new centerline lights to match the surface level of the new asphalt overlay.

engineer at Connico. Nevertheless, everyone was still willing to learn, take suggestions and ask questions, he adds.

"The thing I'm most proud of is the way the team handled everything," says Kumar. "The engineers responded quickly. The contractor and his subs were very open to communications. Everyone really had the interest of the project in mind."

Kumar's sentiments are echoed throughout the extensive project roster.

Minson says the No. 1 lesson learned was the importance of teamwork and communication. "If you don't have a good team, you're not going to succeed on a project like this," he says. "We hit no glitches, which is rare. But all of our subcontractors understood that if there was an issue, it wasn't just their problem, it was everybody's; and whatever we had to do, we would to fix it."

The Norfolk Airport Authority noticed, and valued, the tangible team spirit.

"Everyone knew they had to achieve a significant amount of work each night and that squabbling over little details wasn't going to get anybody anywhere," Rondeau observes. "It was a very cooperative group, which made the project work."

Nettles acknowledges that he initially worried about all the things that could potentially go wrong, because there was so little time each night for the crews to adjust. "They could handle it, but some of them had never been under that extreme level of pressure," he explains. "Our guys did a wonderful job."

Single-Runway Scheduling

The airport, Kimley-Horn and Connico worked together to devise an intricate timetable for the project. Coordinating with ORF's airline partners, they developed a detailed 12-week overnight runway closure schedule.

Rondeau says scheduling with the airlines was simple, because they were cooperative participants and notified the airport about their published flight schedules far in advance. They understood the limited flexibility ORF had with one commercial runway and wanted the work to be completed for their benefit, he explains.

"Just to accommodate the five-hour closure, we set the construction schedule 10 months in advance," says Jones. "For Phase 2, we're looking at 18 months to coordinate with the airlines."

The list of nighttime pavement work was long: concrete repair, concrete replacement, profile milling, survey work, correcting center grades, striping, sealcoating, crack sealing. And at the same time, Atlantic Electric was performing work on the lights.

To get it all done, coordination had to start months in advance.

"We established everything on paper beforehand," says Kumar. "Then, we got to the site early every night, staged the equipment, made sure it worked, verified that everybody we needed was there, reviewed the plan and also kept an eye on the weather."

The go/no go call was made each night by 11:30 p.m. so security checks could be performed before work began. In particular, centerline demolition required specific weather conditions. "It was a big decision every night," recalls Range. "Luckily, we never really got caught. Sometimes there was a chance we didn't want to take, and it rained later and we thanked ourselves for pushing ahead."

Minson notes that the work plan included many layers of redundancy, including backup crews, equipment and materials. Contingencies were in place for everyone and everything, every single night, he emphasizes.

The goal wasn't simply to complete the prescribed work each night; crews and equipment also had to get off the runway before aircraft would be waiting to depart. "We were never, ever late—not one single minute," reports Minson.

And every morning, the runway needed to be completely clear.

"We couldn't even leave one stone," says Range. It took 20 minutes to set up each night, and another 30 to 45 minutes to clean up the following morning. That left no more than 3½ hours of work time in between.

Practice Makes Perfect

Extensive testing and preparations before the project began helped provide Sterling and other airport representatives peace of mind. Crews even used a surplus piece of pavement to rehearse techniques and model the results.

Workers used the Runway Pavement Profiler (built and operated by Pavement Technical Solutions Inc.) to measure the runway profile and determine Boeing Bump Index levels of roughness over the length of the runway. This allowed the team to develop plans for roughness mitigation. Profile grinding and pavement removal/replacement to established new

Crews used diamond grinding equipment to improve the smoothness of the Portland Cement Concrete pavement.

grades provided significant smoothness improvements, notes Jones.

Quick-set concrete by Western Materials was the project's saving grace—but also a substantial challenge, says Minson. "You'd have 10 minutes and it was set, and then you couldn't work it," he explains. The concrete set to 4,500 psi in just 60 minutes.

"There were a lot of nervous people," adds Jones. "So before we went out, we field-tested all of this. We did test anchor installations, both helical pile and the rapid-set concrete, then we tested light installations."

All the preparations apparently paid off.

"When the construction was done, we ran the Profiler over the runway and it came in at an acceptable level without any further work," Sterling reports proudly.

Needless to say, the airlines were pleased to see the project end successfully; and so was the airport.

"This is the first time in a very, very long time we've been able to sleep at night knowing all of the centerline lights are within tolerance," concludes Rondeau. "It's a big relief to our staff not having to keep up that level of constant maintenance."

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PHOTO: DENVER INTERNATIONAL AIRPORT

Denver Int'l Expands Bag Drop Options With Valet Service at Remote Parking Lots

BY THOMAS J. SMITH

FACTS&FIGURES

Project: New Remote Check-in/Bag Drop

Location: Denver Int'l Airport

Drop Spots: 2 remote parking lots served by shuttle buses

Point of Difference: Free valet-style service

Volume: 3,500 bags/month

Current Airline Participants: American; Delta; Southwest; United Airlines

Service Debut: Nov. 2018

Service Provider: Bags Inc.

Cost: No charge for passengers; airport pays per bag fee

Est. First-Year Costs: $300,000

Key Benefits: Enhanced customer service; decreased congestion at check-in counters in terminal

As a follow-up to its popular transit station bag drop, Denver International Airport (DEN) debuted free luggage drops at two remote parking lots in November. The new sites up the ante with valet-style service.

Earlier this year, the parking lot bag drops were handling about 3,500 pieces of luggage per month.

While a few other U.S. airports offer various forms of remote luggage drop off, DEN is the first with free valet service.

Drivers parking in the airport's Pikes Peak and Mt. Elbert shuttle lots don't even have to leave their vehicles to use the service. Attendants armed with iPads check them in, print their boarding passes, tag their checked bags and take the process from there. After parking, passengers simply catch a shuttle bus to the terminal, unencumbered by checked baggage.

Third-Party Operator

DEN contracts Florida-based Bags Inc. to provide the service. Company employees greet drivers, check them in and place their tagged baggage in secured vans, which deliver it to the airport for screening. "Their bags will meet them at their destination," explains Herald Hensley, DEN's acting senior vice president for parking and transportation service.


HERALD HENSLEY

There are a few restrictions. Passengers need to arrive at the parking lot 90 minutes prior to their departure times, and the service is limited to domestic flights on American Airlines, Delta Air Lines, Southwest Airlines and United Airlines.

"This is a gift to our mutual customers," Hensley explains, noting that the airport does

not charge passengers or airlines for the valet service. "It very much fits with what we are trying to do here at the airport—make it easier to fly."

The new service is largely aimed at families, who tend to be the largest users of DEN's shuttle lots. "We felt this would be a real amenity for them," notes Hensley. Customers who use the new bag drops don't have to juggle suitcases, car seats and small children as they make their way onto shuttles and through the terminal.

The program began in November 2018 as a pilot and has been extended until November 2019. After some initial start-up costs, DEN pays its vendor on a per bag basis. The contract has been valued by DEN at $300,000 for the first year.

Since service is provided at customers' vehicles, the new bag drops required little setup or infrastructure investment by the airport. In one lot, space was cleared in an existing building for Bags crews. A trailer serves as their office in the other lot.

Bags has handled remote luggage drops for cruise lines and resorts for about 25 years. The company was privately held until it was sold last October for $275 million to SP Plus Corp., a national operator of parking facilities and related services.

According to press coverage about the sale, Bags operates in more than 250 cities and delivered more than 5 million checked bags to and from hotels and resorts in 2017.

The company declined to be interviewed for this story.

PHOTO: DENVER INTERNATIONAL AIRPORT

Passengers can remain in their vehicles while an attendant checks them in, prints their boarding passes and tags their checked bags.

Expansion Anticipated

At peak travel times, there are six Bags employees on duty at DEN. Crews rotate between the two shuttle lots, as only one facility is open at a time. The lots hold about 8,700 vehicles each.

Secured vans deliver tagged bags to the terminal for screening.

PHOTO: DENVER INTERNATIONAL AIRPORT

While DEN does not charge airlines for the service, Hensley notes that each carrier spent money to integrate its reservations system with Bags' computer system. "Bags is working with other airlines to get more airlines involved," he reports. "We are confident that in the near future, we will be able to add more airlines."

The new valet bag drops are the second and third locations for DEN passengers. The airport added a drop point in the transit center that opened in 2016 for a new light rail line connection between downtown Denver to the terminal. The center, which is located under the Westin Hotel, also serves as the drop point for parking lot shuttles and public bus service.

Bags Inc. also operates the remote check-in/bag drop option located on the station platform. As the transit center was being developed, DEN reached out to the company to determine if the site would work for a remote drop off. The airport first tested the concept as a pilot and then put the service out to bid, with Bags winning the contract. Now, the company handles about 9,500 bags per month at the transit center.

The early drop off allows travelers to avoid standing in line inside the terminal, notes Hensley. Passengers using any of the airport's remote check-in/bag drop locations can go straight to the TSA screening stations.

When DEN was first considering a remote bag drop for the transit center, Hensley traveled to Phoenix Sky Harbor International Airport (PHX), an early pioneer in offering the service. At that time, it was very popular, he notes. PHX has since ended its contract with Bags.

The Early Bag Check Program at PHX ended in November 2017 after a five-year run. According to the airport, Bags' bid in August 2017 for a new contract was higher than its previous $1.1 million annual costs. Usage peaked at more than 280,000 bags in 2016 and started declining in 2017.

At PHX, airlines contributed to 30% of the fee. The service was provided at the consolidated rental car center, the East economy parking lot and the train station, where local public transit connected with the airport.

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What to Do *Before* a Crisis Hits

Extreme weather, active shooters, civil unrest and infectious disease outbreaks. These chaotic events are in the news almost daily, and airports are often at the center of the associated media coverage. No airport wants to find itself in the national spotlight for being unprepared or not reacting effectively during an emergency.

MARK CROSBY

Mark Crosby, A.A.E., is a principal consultant for Ross & Baruzzini with 20+ years of experience as an airport executive. His areas of expertise include airport security, public safety and emergency management. Previously, Crosby served as director of Public Safety and Security at Portland International Airport. He recently coauthored the after-action report for a stolen aircraft incident at Seattle-Tacoma International Airport and was appointed to the Airports Council International World Standing Security Committee and the Insider Threat Subcommittee of TSA's Aviation Security Advisory Council.

More than ever before, airport executives need to be prepared for crises, because the impacts to operations reach far beyond the actual event. Gone are the days when an airport could simply perform a cursory annual review of its Airport Emergency Plans (AEPs) and hold a triennial full-scale aircraft crash exercise. Consider the recent string of high-profile incidents that have occurred at airports: terminal-wide power outages, demonstrations/protests, active shooters, spontaneous widespread evacuations, mass care/sheltering, repatriation, wildfires and attempted theft of commercial aircraft. Not a single one is required to be covered in an AEP.

To better prepare for crises and emergencies, airport executives and their teams should focus on the 3 Rs — relationships, readiness and resources.

Relationships

Decision-making during an emergency is different from the more standard, bureaucratic decision-making process. During emergencies, most airports implement the nationally adopted guidelines of the Incident Command System (ICS). During larger events, airports will usually establish an Incident Command Post (ICP) with an Incident Commander (IC) and an Emergency Operations Center (EOC) run by an EOC Manager. But each airport has its own unique politics. To overcome this, airports should spend more time discussing, planning and training to better define the roles of the ICPs/ICs and the EOCs/EOC managers while considering the following:

- Where do their decision-making authorities separate?
- How and when is unified command implemented?
- What happens if there are multiple incidents or the original event changes?
- Which entity will be responsible for keeping part of the airport open while the event is being addressed?

Having periodic meetings with ICs, EOC Managers and key mutual aid providers is critically important for constructive relationships that make unified command more likely to be successful.

Readiness

To improve readiness, airports should regularly review and update their plans, and also exercise them more often. While it's difficult for executives to make time for such exercises while operating their airports and planning for the future, the best emergency management programs have buy-in from the top. Senior executives need to support readiness by personally leading the way and actively participating in training and exercises. Another key to success is ensuring that the airport's Emergency Manager (EM) isn't buried in the organizational chart. To ensure that EMs' voices are heard, airports need to put them and their supervisors high enough in the organization that key first responders support their planning and exercising efforts. Readiness improves when leadership shows that it's important.

Resources

Too often, EMs are added *after* a crisis occurs. Airports typically don't budget for full-time equivalent (FTE) positions unless they're mandated, as was the case after 9/11, when increased security/law enforcement was required and FAA started the rulemaking process on safety management systems.

The time has come, however, for a paradigm shift regarding emergency management resources. Airports that cannot afford to hire FTEs, or do not wish to do so, can contract consultants to provide "on-call" EM services—just as they hire outside planners, architects and engineers for capital projects. Contracting EM services can allow operators to benefit from a consultant's experience at other airports without incurring annual salary and overhead expenses.

Unusual, unexpected and unfair events will continue to happen at airports. The key is to be proactive, by taking a fresh look at your EM relationships, readiness and resources. As Ben Franklin said, "If you fail to plan, you are planning to fail."

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