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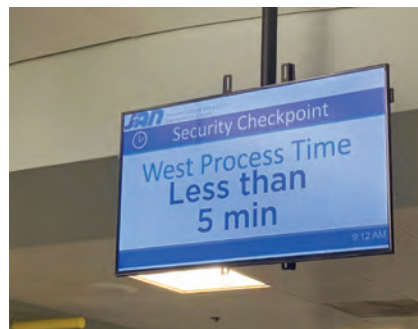
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**Publisher**  
**Paul H. Bowers**  
 paulbowers@airportimprovement.com  
 262.510.7832

**Editorial Consultant**  
**Rebecca Douglas**  
 rebeccadouglas@airportimprovement.com  
 815.621.4525

**Social Media Director**  
**Kristin Shaw**  
 kristinshaw@airportimprovement.com

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

**Circulation Director**  
**Lisa Monday**  
 lisamondays@airportimprovement.com

**Webmaster**  
**Matt Tews**  
 matttews@airportimprovement.com

**Contributing Writers**  
**Jennifer Bradley, Mindy Hamlin, Nicole Nelson, Paul Nolan, Robert Nordstrom, Mike Schwanz, Kristin Vanderhey Shaw, Thomas Smith, Victoria Soukup, Ronnie Wendt, Jennifer Daack Woolson, Ken Wysocky**

**Advertising**  
**Paul H. Bowers**  
 paulbowers@airportimprovement.com  
 262.510.7832

**Adrienne Gibson**  
 adriennegibson@airportimprovement.com  
 262.844.4368

**Vicki Jensen**  
 vickijensen@airportimprovement.com  
 414-331-9768

**Editorial Advisory Board**  
**David Byers, Ph.D.**  
 Quadrex Aviation, LLC

**Paul Cudmore**  
 Eagle Integrated Solutions

**William Fife**  
 Peer Review Consultant

**Glenn S. Januska**  
 Casper/Natrona County Int'l Airport

**Chris Norton**  
 VTC

**Eric Peterson**  
 Alliance

**Donna Speidel**  
 Sightline Airport Marking Consultants

**AIRPORT IMPROVEMENT** published bi-monthly by Chapel Road Communications LLC, 3780 Chapel Road, Brookfield, WI 53045. All statements, including product claims, are those of the person or organization making the statement or claim. The publisher does not adopt any such statement or claim as its own and any such statement or claim does not necessarily reflect the opinion of the publisher. Printed in the USA. POSTMASTER: Send address changes to AIRPORT IMPROVEMENT to 3780 Chapel Road, Brookfield, WI 53045. All rights reserved. Permission to reprint or quote excerpts granted only upon written request.



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# Picks & Pans

2020 is off to a roaring start. Passenger traffic continues at a robust pace, and construction projects seem to be shaping and reshaping airports everywhere. Here at *Airport Improvement*, we've enjoyed being out in the industry taking it all in to share with you. Here are just a few Picks and Pans from my early 2020 travels.

**PICK:** IABSC's Annual BHS Summit. This association has a lot going on! Its impressive gathering in Dallas brought together key participants from airlines, airports, consultants, suppliers and contractors to share best practices throughout the baggage industry.

**PICK:** Farmer Brown restaurant at SFO, with Pliny the Elder on tap. Yum!

**PAN:** REAL ID. We've got a potential crisis brewing here, folks. This will be a major change for the traveling public. On a positive note, I came across one TSA agent who was diligently reminding passengers to obtain their REAL ID, or soon they won't be able to fly. But we need more than education; we also need facilitation. Look for an article in our May/June issue about what some airports are doing proactively to prepare for the Oct. 1 transition.

**PICK:** MKE's new coat check service. Travelers departing from Milwaukee for warmer destinations can leave their bulky winter

coats at the airport to save the hassle of lugging them along.

**PAN:** Crowded, unattended restrooms. We're making progress; but on any given day, there are still too many airport restrooms in need of cleaning. Check out Page 40 to see how ATL is using technology to keep on top of theirs.

**PICK:** The ACC/AAAE Airport Planning Design & Construction Symposium in Reno. This event is growing exponentially, which just demonstrates that great content begets great attendance. Congrats to everyone involved.

**PAN:** Inadequate airport funding. Passenger growth has put a strain on our infrastructure. If funding isn't increased soon, we'll fall further behind. It's hard to miss, but this is an election year. Make sure that the people who will represent you have your airport's best interests in mind. And make sure your voices are heard—now and in November.

Cheers!

*Paul*



PAUL BOWERS, PUBLISHER

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# Portland Int'l Mounts Multibillion-Dollar Capital Campaign to Stay on Top

BY ROBERT NORDSTROM



## PORT OF PORTLAND

### FACTS&FIGURES

**Project:** Widespread Capital Improvements

**Location:** Portland (OR) Int'l Airport

**Key Initiatives:** Rental Car Quick Turnaround Facility; Concourse E Extension; Concourse B Redevelopment & Concourse A Demolition; Consolidated Rental Car Facility & Parking Garage; Terminal Expansion & Remodel

**Umbrella Campaign:** PDX Next

**Timeline:** 2018-2025


**Anticipated Total Cost:** \$2.25 billion

**Funding:** Airlines; rental car companies; FAA; TSA

**Architects:** Mackenzie (quick turnaround facility); YGH Architecture (parking garage); Hennebery Eddy, Rentress (Concourse E); ZGF Architects (Concourse B & terminal core)

**General Contractors:** Hoffman Construction (quick turnaround facility); JE Dunn (parking garage); Hoffman/Skanska JV (Concourse B & terminal core); Skanska (Concourse E)

**Impetus:** Projected 2.3% annual growth rate, resulting in 27 million annual passengers by 2035

 Portland International (PDX) regularly ranks among the nation's top airports for amenities, customer service and traveler satisfaction. *Travel + Leisure* magazine has rated PDX the best U.S. airport for seven consecutive years. *Money* magazine ranked it No. 1 in 2019, up from second place in 2018.

The Oregon airport consistently scores high points for customer comforts such as Wi-Fi access and its array of restaurants, bars and retail shops. Travelers can also visit a spa or get their hair trimmed at a barbershop. Concourse C even has a small 17-seat cinema that shows short G-rated films.

But remaining on top takes work and investment. And that's exactly what the Port of Portland is doing—to the tune of about \$2.25 billion. Responding to growth projections in the airport's 2010 Master Plan, management identified key infrastructure improvements needed to accommodate the anticipated 2.3% annual growth and 27 million passengers by

2035. (Last year, just shy of 20 million traveled through PDX.)

The five primary projects, collectively referred to under the banner of PDX Next, are:

- a new \$67 million rental car quick turnaround facility, which opened in March 2018;
- the extension of Concourse E, scheduled for completion this June at a cost of \$215 million;
- the redevelopment of Concourse B and demolition of Concourse A, slated to be finished in summer 2021 for \$100 million;
- a new \$282 million consolidated rental car facility and parking garage, which is expected to open in late 2021; and
- a terminal expansion and remodel, with an expected budget of \$1.65 billion and completion slated for 2025.

"An airport is a system," reflects PDX Chief Projects Officer Vince Granato. "We look at



it holistically. We had completed a lot of work on the airfield leading up to the 2010 Master Plan. But in developing the Master Plan, we found that projected growth in traffic demanded that we address other parts of the system, which included close-in parking, rental car operations and the terminal building itself. You can have all the airspace capacity you want, but if people can't get to and through your facilities, you have a problem."



VINCE GRANATO

### What to Tackle First?

Granato acknowledges that it is unusual to have so many projects going on simultaneously, but notes that they had to be done that way. The pieces fit together, despite the significant impact each has on the airport's infrastructure and operations.

It was determined that rental car operations would be the first area stressed by increasing passenger volume. Moreover, leases were coming up, the rental car companies needed additional facilities, and PDX wanted all eight to be onsite and closer to the terminal building. Currently, three are off-site operations.

It quickly became evident that the companies needed a quick turnaround facility closer to the terminal. The original 25-year-old facility where they cleaned, washed and refueled their rental vehicles was "drastically undersized and terribly inefficient from an operations standpoint," notes Granato. The new facility is much more efficient and environmentally friendly, with a system that reclaims, treats and reuses wash water.

Granato reports that the rental car companies were very supportive of the project and agreed to pay for the building costs and sign new 20-year agreements.

At PDX, rental car operations are closely tied to customer parking. Currently, and until the new garage opens, rental cars are parked on the two lower levels of the short-term garage. Due to space constraints, not all rental car companies can keep vehicles on site; and those that do limit the number of slots available for short-term customer parking. When the new garage opens in 2021, all rental cars will be consolidated on the lower two floors, and 550 short-term parking slots will become available for customers on the second floor. In total, the new garage will add 2,450 parking spaces near the terminal.

Moving all rental car operators onsite and close to the terminal will eliminate the need for shuttle service to and from remote facilities, and, in turn, help ease traffic congestion and reduce overall vehicle emissions. In addition, the new short-term parking spaces that are created should encourage drivers to leave their vehicles in the garage and duck into the terminal to meet passengers rather than circling the pickup area, which adds to traffic congestion and emissions.

After space is freed in the current short-term parking garage, management tentatively plans to move ride-share operations into the lower level of the short-term garage. "Currently, Uber, Lyft and other ride-share operations work along our lower commercial roadway," Granato explains. "There are times when the traffic gets backed up onto Airport Way, the highway leading into the airport. We are conducting a study now, but I expect that we will move ride-share operations to the first floor of the parking garage after the rental cars move out. It will get them off the roadway and make it easier for drivers to pick up travelers on the lower roadway outside of baggage claim."

### Terminal Balancing

Currently, about 70% of passengers and 75% of baggage at PDX

move through concourses A, B and C on the south side of the terminal. Not surprisingly, this can hamper traffic flow at the TSA checkpoints and create significant challenges for baggage screeners and concessionaires. To better balance the volume between the south and north concourses, the airport is adding six new gates to Concourse E on the north side of the terminal.

Southwest Airlines has agreed to lease all six new gates. When it moves onto Concourse E, space will be freed up for other carriers on Concourse C. Ultimately, concourses B and C will handle 50% of the traffic on the south side of the terminal and concourses D and E will accommodate the other half on the north side.

The \$215 million Concourse E extension, which is scheduled for completion in June, will include seven new concessions. The new 150,000-square-foot area is being outfitted with large upper windows to add more natural light, and a floor-to-ceiling wall of windows on the east end to showcase the snowcapped peak of Mount Hood. Juliett, a bar dedicated to women in aviation, will offer the best views at the airport, reports Granato. Located at the far end of the extension, it is being developed by Lightning

Bar Collective, the group behind some of the area's favorite drinking places.

"We try to create a Portland neighborhood feel throughout the concourse," Granato explains. Concessions are gathered together in two pods rather than being scattered along the concourse. Local restaurants and shops, including Oregon's famous Tillamook Creamery and independent record label and craft boutique Tender Loving Empire, were selected to give travelers a taste of Portland's good life. Two installations by environmental artist Jacob Hashimoto portray elements of the Pacific Northwest with clouds of kite-like discs and abstractions of Portland icons in undulating landscapes that float overhead.

### Addition & Subtraction

On the south side of the terminal, the airport will demolish Concourse A and remodel/expand Concourse B. Management debated what to do with the outdated Concourse A, which was built in the late 1980s, and eventually decided to remove it and extend Concourse B by 300 feet.

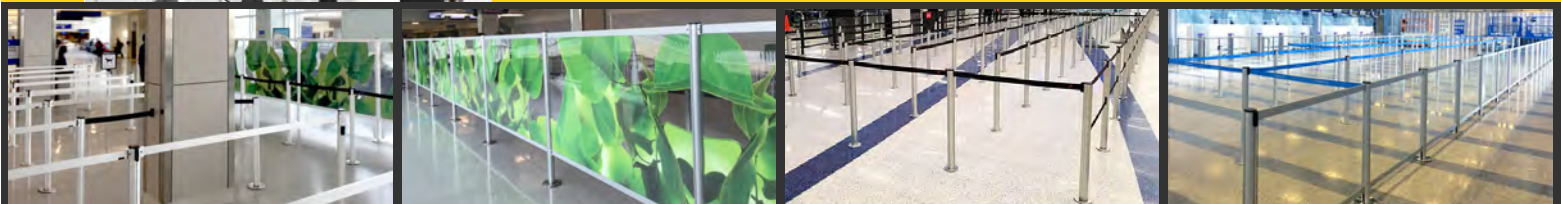
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The remodeled Concourse B is slated to open in summer 2021.



When Southwest moves to Concourse E, Alaska Airlines and Horizon Air can spread out on Concourse B, which will have six groundload holdrooms. The airport is also adding an additional jet bridge, for a total of four loading bridge positions.

Demolition of Concourse A is scheduled to begin this fall, and the remodeled Concourse B is slated to open in summer 2021. The renovated space will include include high ceilings with floor-to-ceiling windows that allow travelers to watch planes take off and climb skyward. Project designers specified extensive greenery in the common areas to bring nature indoors. Two local food and beverage operations—Screen Door and Good Coffee—will be added to the concessions lineup.

“The remodeled Concourse B will provide a much better experience for passengers in terms of concessions, cellphone charging stations, seating and other amenities,” Granato emphasizes.

## Granddaddy Project

With its four smaller projects either completed, in process or scheduled for construction, PDX is gearing up for the April 2020 design presentation of its granddaddy project: the \$1.65 billion expansion and rehab of the terminal core, slated for completion in 2025.

“The expanded and renovated terminal will be designed to accommodate traveler growth over the next 15 to 20 years,” Granato relates. “Our current building is actually six or seven buildings that have been stitched together from the 1950s on.”

The large project will be broken into two phases. During the first, crews will expand the terminal 150 feet to the west. Then, TSA will move into the newly expanded area, thus freeing the existing terminal building for a complete remodel.

Currently, building codes for the multiple terminal building structures vary according to when and why they were constructed. In particular, the seismic codes vary dramatically. To remedy this situation, the airport will construct a new roof over the entire terminal facility to ensure that the new structure is seismically resilient. This will also facilitate demolition and subsequent reconstruction of a more open and flexible interior space.

“The short story is that we’ll push security out to the west, construct a new roof and remodel the interior to create a better space for the airlines,” Granato summarizes. “The present terminal was designed when airline ticket counters were the most valuable real estate at the airport. That’s no longer the case.”



# SNOW SOLUTIONS

Airports meet snow removal challenges with knowledge and creativity

Maintaining a clear and safe airfield during a snow event is a challenge and airports rely heavily on reliable snow removal equipment. When faced with the additional challenge of ensuring their equipment would meet current and future snow removal needs, some airports landed on creative solutions, with the help of extensive industry networking and research.

## ROCKY MOUNTAIN METROPOLITAN AIRPORT

For Rocky Mountain Metropolitan (BJC) in Broomfield, CO, Fleet Manager Jeff Dewey says the tow-behind brooms his airport had been using as part of its snow removal equipment entourage were very unreliable. “You take them out and wonder if you’re going to be able to finish the snowstorm with them,” he recalls.

Dewey says he conducted a lot of research and networking with other airports, particularly those that battle more ice than BJC typically sees. “And I made sure I was out to the International Snow Symposium on an equipment year so I could truly put my hands on the equipment and talk with those who are using it,” he relates.



JEFF DEWEY

The existing BJC snow removal fleet included three Western Star plow trucks, so Dewey, along with airport management, determined the best solution was to modify the existing trucks to add an Overaasen RS400 sweeper. This was done by removing the dump body of the plow truck, shortening the frame, installing a fifth wheel to the broom itself, installing a counterweight underneath and installing the control system for the sweeper in the cab of the truck.





The result is a multi-function snow removal machine that Dewey says is meeting his airport's needs. "Our operators and our operations department used to do nothing but complain, moan and groan about the sweepers we had," he recalls. Since putting the Overaasen sweepers into use, Dewey says he hears positive remarks on the reliability, performance, user-friendliness and ease of operation.

Another benefit of the tow-behind broom for BJC, Dewey says, is the ability to separate the plow truck from the broom. This allows operators to cross utilize the plow trucks in tighter areas on the airfield. "So now I don't have to own that much more specialized equipment—I can utilize and cross utilize what I have," he adds. "We have one driver being able to remove snow, broom and if you need the function of air blast, it's all there."

"Being able to plow, sweep and blow at the same time reduces the amount of time it takes to clear the runway and ramp area for one operator," states Bill Myslik, the main distributor of Overaasen in North America.

Ensuring the modified multi-function piece of equipment was ready for snow season at BJC was a challenge, relates Myslik. BJC had a tight window between the previous snow season and the next, so the abbreviated manufacturing timeline was a benefit for the airport. He credits



BILL MYSLIK

Overaasen's efficient manufacturing process with its ability to supply customers with a broom in just 90-120 days.

Working with Transwest, a Western Star dealer, Myslik was able to coordinate the modifications and delivery of the units to Dewey and his staff. "Timing was critical and coordination between Transwest, us and the airport was critical to get it done on time," he says. "They now have a high-speed, reliable, good-performing, multi-function piece of equipment."

This conversion project at BJC was self-funded, something for which Dewey relates he feels very fortunate. "I was able to choose what I wanted and did not have the restrictions of the Buy America Act with AIP funding," he says. "I did my homework. The Overaasen definitely wasn't the cheapest, but I feel I got my money's worth."

"I picked the product, not the sales representation behind it," Dewey adds. "But in the end, it was a very good decision for the equipment itself, as well as the support and sales representation behind it."

## SOUTHWEST WYOMING REGIONAL AIRPORT

With an aging fleet, Southwest Wyoming Regional (RKS) was lacking the proper equipment to maintain the airfield in compliance with the updated FAA Runway Condition Assessment Matrix, relates Devon Brubaker, airport manager. "It



DEVON BRUBAKER

became critical that we had a fully functional runway sweeper so we could get down to bare pavement," he says.

Brubaker says that his research was also in-depth and comprehensive, visiting airports that owned and operated different pieces, as well as attending industry events, all to discuss firsthand experience with the airports operating the equipment.

Brubaker says his research was roughly a two-year process, visiting other airports to learn about and experience a variety of equipment options. "We determined what we liked and didn't like and worked through the specifications to make sure that we got a piece of equipment we'd be happy with," he explains.

Namely, RKS wanted a reliable piece of snow removal equipment with low lifecycle costs in terms of ongoing maintenance. And with a small staff, it is imperative that the equipment be easy to use because every operator must be proficient with each piece of equipment, Brubaker adds.

The solution for RKS is a Western Star chassis with Overaasen broom and folding wing plow, relates Brubaker. One thing that stood out about the Overaasen, is the simplistic design. "We just felt it wasn't over-engineered. The controls system was fairly intuitive and pretty easy to operate," he explains.

RKS's former broom was not easy to operate and was prone to errors that nobody at the airport knew how to fix. "People aren't scared by this piece of equipment. They're eager to get into it and don't feel stress and anxiety over it."

“The biggest benefit that we’re seeing is having a clear and safe runway during a winter storm,” Brubaker says. Additionally, with a small staff, a multi-function piece of snow removal equipment has provided greater efficiency. RKS serves some 50,000 annual passengers.

Another challenge for RKS was the size of its maintenance and storage facility. With a 27-foot folding wing plow, the airport is able to effectively and efficiently plow the runway, but when not in service, the plow folds up to no wider than 16 feet and can easily fit in the building. “Which means they don’t have to pull the plow off outside in the weather and then have to reinstall it outside,” Myslik relates.

Brubaker stresses the importance of doing the research about various equipment available and asking a lot of questions. “I found the best thing to do was to go onto the airports that have it in use and ask the operators and mechanics, ‘what do you like, what don’t you like?’”

“We took all that extra effort on the front end to make sure we got the specs right,” he says.

## WINNIPEG INTERNATIONAL

At Winnipeg International (YWG), Roberto Furletti says his staff was also dealing with unreliability and downtime due to maintenance of its sweepers, which led him to look at replacing them “earlier than

we would normally because of the increase in downtime and maintenance costs.” More maintenance of the sweepers also meant a lack of time to maintain other equipment and caused the airport to send some equipment out for repairs, as opposed to performing the work in-house.



ROBERTO FURLETTI

Furletti agrees that research, including visiting other airports and attending the International Snow Symposium, was critical to the decision-making process for YWG. “We spoke to both the operators of the machinery as well as the mechanics. In addition to simplicity of design, Furletti says he was on the hunt for a sweeper that was easy to maintain, reliable, easy for the operators to control and high performing.

“We chose the RS400 tow-behind sweeper for reliability, maintainability, performance features and user features,” Furletti relates. With Myslik’s coordination, one of YWG’s Snow Maulers was converted to accommodate the Overaasen sweeper. It will take delivery of a second later this year.

“Because the Snow Maulers are still in good operational condition with many years of life left in them, they were able to make it into a better, multi-function machine with the reliable, high-performance Overaasen sweeper,” Myslik relates.

YWG has a fleet of eight sweepers.

“Do your homework,” advises Furletti. “Invest the time upfront and actually go see the sweepers and speak to the users that have been using them for a bit. Get input from everyone that is going to be using the machine or maintaining them.”

## JACKSON HOLE (WY) AIRPORT

At Jackson Hole Airport (JAC), the airport is reaping similar benefits with a fleet of four Oshkosh trucks modified to accommodate the RS400 Overaasen sweeper, expanding their capabilities by making them multi-function machines. “They have a small staff and it enhanced the performance and reduced the runway closure times for cleaning the runway with less staff,” Myslik relates.

Key to note, Myslik says, is that the Overaasen sweeper can be installed on any chassis of an airport’s choice. “The reliability and performance of the Overaasen technology and quality engineering has been proven worldwide,” he adds.

The Overaasen sweepers feature cassette-style bristles manufactured by SIB, rather than wafer-style, Myslik states, which makes changing the bristles safer and less time-consuming. A job that may have taken two workers four hours can now be done within an hour. “With the cassettes, they can run them down to the maximum usage, pull







them off in the shop, change them and get back out on the runway in an hour,” he explains. “That’s cost effectiveness for these smaller airports that are working on a limited budget.”

“Airports should be able to get 100+ hours out of a set of bristles,” Myslik adds. That efficiency is due to Overaasen’s technology, he explains, which increases broom speed with the forward speed of the truck and automatically adjusts the pattern to keep it consistent. “So you’re not having a higher RPM at a lower speed and burning bristles up when it’s not necessary.”

These airport managers invested the time and energy in research to ensure the best possible solution for their facilities, and there are options when upgrading or augmenting a fleet. “An airport can take an existing plow truck chassis—which is in good condition, lower hours and good performing—and turn it into a multi-function piece of equipment,” Myslik says. “They keep the value of the chassis and add to it.” This increases the efficiency of what one operator can accomplish—plowing, sweeping and air blasting the runway with one piece of equipment, making operations much more cost-effective, he adds.

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## THE FOD BOSS

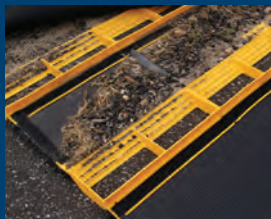
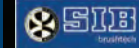


Photo courtesy of NASA



Cassette Brush System



A new consolidated rental car facility and exit toll plaza will support the renovated terminal.

Enabling projects for the terminal rehab and expansion will begin in 2020 with utility work and the installation of some support columns. A ground source heat pump system will be used to heat and cool the expanded terminal. Importantly, the new system will consume less energy than the current one—even with the additional 185,569 square feet of terminal space.

Due to the size of the project, construction will be a joint venture between Hoffman Construction Company and Skanska USA. “Once we move TSA and travelers out to the new security checkpoint, we can begin to open up and rebuild the terminal space,” Granato relates. “It will be challenging, but we feel we are developing a good plan, and it is certainly achievable.”



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Of course, all of this is easier said than done—especially while continuing to move 50,000 to 70,000 travelers through the terminal every day. Communication is key for all of the projects, Granato stresses. To that end, the airport frequently posts updates about the various projects to special media portals created for each key audience—employees, traveling public and tenants.

“We are committed to letting everyone know what we are doing and why we are doing it,” Granato explains. “We are America’s best airport, and our intent is to remain America’s best airport. That’s the goal we’ve set for ourselves. We know how much people love this airport, and we take that very seriously.” 



*After renovations are complete, concourses B (shown here) and C will handle about half of the airport’s overall traffic.*

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## FACTS&FIGURES

**Project:** Terminal Lobby Renovations

**Locations:** Daniel K. Inouye Int'l Airport, Honolulu; Lihue Airport, Kauai; Kahului Airport, Maui; Hilo Int'l & Kona Int'l Airport, Hawaii

**Funded By:** Hawaiian Airlines

**Project Management/Design Architect at HNL:** Landrum & Brown

**General Contractor:** Hensel Phelps

**Kiosks:** VelocityOne, by Embross

**Bag Tags:** eezeetags, distributed in the U.S. by Gateway Business Communications

**Signage Construction & Installation:** Blue Skies Global

**Podium Panel Design & Wall Motifs:** Keone Nunes

**Digital Signage:** CDW

# Hawaiian Airports Debut New Check-in Kiosks & Self-Adhesive Bag Tags

BY MINDY HAMLIN

The ticketing lobby at Daniel K. Inouye International Airport (HNL) on the island of Honolulu was transformed late last year with fresh finishes and updated check-in kiosks that print a new breed of bag tags. Podium panels now feature custom graphics designed by a Maui tattoo artist.

The new self-service kiosks, 54 in all, allow passengers to check themselves in and print their own tags for checked baggage. But you won't find backing paper from the tags strewn about the floor or overflowing from garbage cans. The new kiosks at HNL print self-adhesive bag tags designed to save time and reduce waste. A special adhesive sticks the two sides of each tag together, but does not stick to bags, floors or passengers' fingers and clothes.

The kiosks and bag tags are part of a multimillion-dollar initiative launched last year by Hawaiian Airlines to renovate lobbies at five airports it serves. Updates have also been completed at Lihue Airport on the island of Kauai, Kahului Airport on Maui, and Hilo International Airport and Kona International Airport on the "big island" of Hawaii.

The renovation projects were spurred by the need to replace aging check-in kiosks; but the airline also took the opportunity to find new ways to improve the passenger experience.

"The kiosks were about 10 years old," points out Randy Arnold, Hawaiian Airlines' project manager. "They typically only last five years, but we pushed them to the limits because we wanted to make sure the lobby design for each airport was just right."



RANDY ARNOLD

As the airline sought to ensure a consistent passenger experience at each of its airports, it turned to Embross for more modern, higher-tech kiosks. The self-adhesive bag tags they print, inspired by those used at a growing number of European airports, are provided by Dutch company eezeetags. To accommodate the tags' unique adhesive, Embross partnered with printer manufacturer Custom to add special rollers to its VelocityOne kiosks.

"What we have now is the latest-generation kiosks," reports Arnold. "They have a smaller footprint, but larger and more responsive touch screens."

## Faster, More Efficient Self-Service

"Airports continue to look for ways to improve the passenger experience. Using eezeetags, airports are able to improve passenger flow and reduce operational costs," says Jon Sikorski, account executive at Gateway Business Communications, the company's U.S. distributor.



JON SIKORSKI



New self-adhesive tags are estimated to speed up the self-tagging process by about 20 seconds per passenger.

While eezeetags are currently used at more than 50 airports worldwide, the company is hoping HNL and the four other Hawaiian airports will provide proof-of-concept for the U.S. market. Sikorski attributes the product's acceptance in Europe to the preponderance of common-use facilities and systems.

"We have been doing self-tagging for the past 10 years," says Arnold. "When we first renovated Honolulu in 2011, we went to 100% self-tagging there. As part of our terminal lobby renovations, we decided to use the newest generation of kiosks, dual bag tag printing and flatbed passport readers."

Borry Vrieling, founder and managing director of eezeetags, notes that the company's self-adhesive tags speed up the bag-drop process, on average, by 20



BORRY VRIELING

seconds per passenger. Sikorski credits the simplicity of the product. "All you have to do is put two dots together," he points out.

Last year, 50 million passengers used ezeetags, reports Vrieling. "This means less lines, less frustration and happy passengers who spend more money on food and beverage."

**Island Touches**

In addition to adding new check-in kiosks and bag tags, Hawaiian Airlines also refreshed its ticket lobbies. As part of the project, it commissioned Keone Nunes, a master tattooist and cultural practitioner from Maui, to portray the canoe voyages ancient

Hawaiians' made between the islands. The symbolic design Nunes created highlights the lashing used on the canoes' sails, but also includes subtle symbols that speak to the history and culture of each island.

At HNL, the lobby refresh was just the beginning of a larger two-year renovation project. With congestion growing, Hawaiian Airlines turned to its long-time partner Landrum & Brown to help alleviate crowding in the ticketing lobbies of terminals 2 and 3.

Project designers arranged the new self-serve check-in kiosks in diagonal rows to facilitate passenger flow. "Previously, the ticketing areas were set up in a configuration of pods," explains Mark Perryman, Landrum & Brown's chief executive officer and managing director. "As a result, some kiosks didn't get used at all. We worked the new Embross equipment into the design, and the ticketing process is now much more streamlined. Hawaiian Airlines ended up with more kiosks because of the configuration, and the flow is much more intuitive, allowing passengers to move through a lot faster."



MARK PERRYMAN

Arnold notes that now, passengers can easily see which kiosks are unoccupied as soon as they enter the lobby.

Airline personnel estimate that the new kiosks will shave 30 to 60 seconds off the average time of three and one-half minutes passengers spend at the self-service terminals.

Other improvements at HNL included reconfigured passenger queuing at ticketing counters to improve lobby flow and new signage and check-in podiums with bag scales. Future elements of the modernization program will include new counters for guest service, baggage drop and premium check-in stations. A self-drop bag area for travelers will be another major component.

"We still have improvements to make in Honolulu, including an automated self-bag drop experience," says Arnold. "This is what we are working on this year, and we are looking at several vendors who can develop the self-bag drop process for us."

Each day, Hawaiian Airlines serves an average 32,000 passengers; and about 19,000 begin or end their travel at HNL. ✈️



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# Minneapolis-St. Paul Int'l Gives Passengers a Taste of the Great Outdoors

BY VICTORIA SOUKUP



## FACTS&FIGURES

**Project:** Food Court Renovation

**Location:** Minneapolis-St. Paul Int'l Airport

**Site:** Terminal 1, Concourse C

**Size:** 6,000 sq. ft.

**Cost:** \$2 million

**Construction Timeline:** 4 months, completed in March 2019

**Food Court Manager & Operator:** HMSHost

**Interior Design:** Ideation Design Group

**Seating Manufacturer:** Cape Furniture

**Contractor:** Sheehy Construction Co.

**Design Features:** Sculpted metal trees; hanging lanterns; enclosed cabin-like seating areas; outdoorsy decor

**Accolade:** Minnesota Shopping Center Association 2019 Starr Award for Best Design & Aesthetics Renovation/Remodel: Interior Retail Under 8,000 Sq. Ft.

What used to be a standard 1990s food court in Terminal 1 at Minneapolis-St. Paul International Airport (MSP) is now a rustic Northwoods getaway, complete with cabin-like seating enclosures and a faux forest.

The Metropolitan Airports Commission and restaurant operator HMSHost teamed up on a \$2 million renovation that transformed the 6,000-square-foot area into a unique space that is delighting both customers and MSP management.

"In recent years, we've focused on integrating architecture, art and concessions

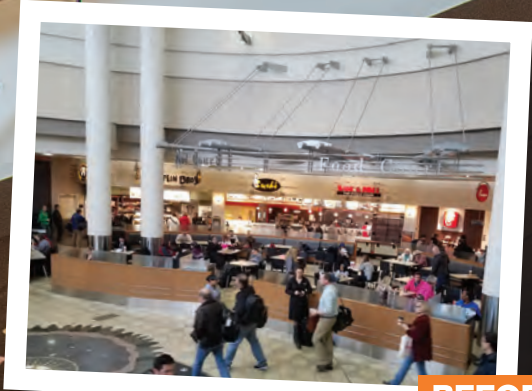
in ways that create a genuine Minnesota experience within MSP Airport," explains Metropolitan Airports Commission CEO Brian Ryks. "The new Concourse C food court is a great example of bringing all those aspects together to create a sense of place."

The four-month project, which was completed last March, is enjoying commercial and artistic success. One restaurant that installed a kiosk ordering



BRIAN RYKS





**BEFORE**



system reports that its average guest check has increased 20% compared to orders placed with nearby counter personnel. Moreover, the food court's Northwoods design garnered a 2019 Starr Award from the Minnesota Shopping Center Association.

The recent renovation in Terminal 1 is part of a major concessions overhaul that has added 35 new retail shops and 45 new restaurants throughout the airport during the past 3½ years. Officials at MSP report that overall concessions sales are up 27% since the changes began.

**“Up North” Experience**

Liz Grzechowiak, who served as assistant director of concessions and business development for the Metropolitan Airports

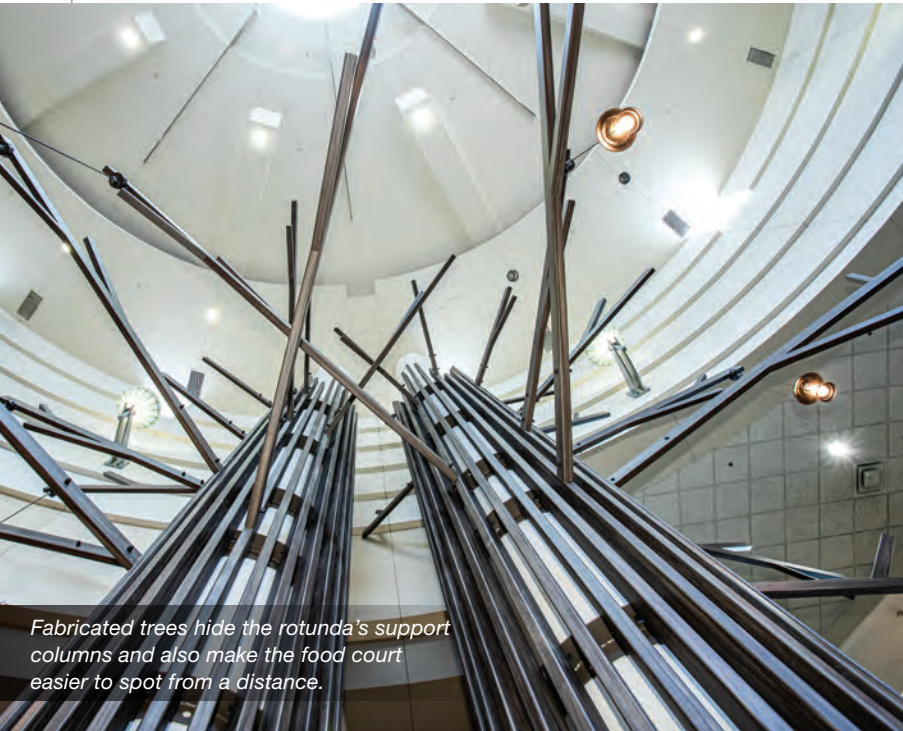


LIZ GRZECHOWIAK

Commission until February, says the Terminal 1 Concourse C dining area was previously an outdated “run-of-the-mill food court” with four restaurants. It offered the basics—a place to sit and eat; but MSP wanted more.

“Instead of just putting in another food court, the airport was looking to do something that was fun,” relates Grzechowiak. “Now, the airport offers travelers a comfortable, engaging experience. It’s charming, has a Paul Bunyan vibe to it and everything is dramatic in size. It’s modern, urban and industrial looking, yet it feels like it’s authentic and antiquated—truly northern Minnesota.”

Customers enter the canopy of a forest, created by sculpted metal trees that are adorned with hanging lanterns. Cozy, rustic seating and flannel fabric further reinforce the Northwoods design. “An ode to the great outdoors of Minnesota, this space is



*Fabricated trees hide the rotunda's support columns and also make the food court easier to spot from a distance.*

functional, inviting and peppered with thoughtful details that breathe life into the space," she notes.

Arlette Mulford, senior director of Design and Architecture for HMSHost, explains that it was important to follow the airport's Minnesota design theme, because the concessions area is in a highly visible main corridor. "Our design team used this inspiration as a jumping off point to create the Northwoods design and showcase Minnesota's love for the outdoors and the natural environment," explains Mulford.

Large fabricated trees hide four columns that support the food court's 40-foot-high rotunda. Lighting is suspended from an overhead canopy formed by welded metal tree branches. The dark tile flooring has rounded edges to resemble shorelines. After all, Minnesota is the Land of 10,000 Lakes.

The new food court has 28 tables with 97 seats—a combination of high- and low-top community tables, plus small cabin-like structures that offer more privacy. "We wanted to create the feeling of homey cabins within the environment, so we completed the space by

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incorporating buffalo check plaid coverings and hanging lanterns to give travelers an added sense of warmth and comfort,” says Mulford.

Visually, the new rotunda adds a striking and voluminous architectural feature that is visible from a nearby upper level as well as down the concourse it serves. “Four giant columns extend up to the ceiling to support the structure. Utilizing those columns as vertical design elements creates an impact from a distance,” she explains.

**Populating of the Forest**

While many airports use their menus or food and beverage providers to add local flavor, MSP relied on architecture and interior design. “There’s only a handful of nationally branded QSRs (quick-service restaurants) that originate here in Minnesota, so we tried to accomplish a ‘sense of place’ through design and aesthetics rather than food,” explains Grzechowiak.

Space constraints within the new footprint prompted project developers to downsize from four concepts to three. Starbucks, Smashburger and Chick-fil-A were selected based on quality, variety, familiarity and speed of service.

HMSHost worked with the Metropolitan Airports Commission to identify concepts that leverage the available space and appeal to a wide variety of passengers. “Ultimately, all three concepts meet travelers’ dining needs and offer a balanced variety of choices,” says Michael Price, vice president of Business Development for HMSHost. “Travelers can choose from lighter and healthy selections of snacks and salads, to heartier options including the ever-popular chicken sandwich and custom burgers.”

“This area of the airport experiences high traffic with travelers quickly moving between concourses, but there are also gates nearby,” adds Price. “Because these concepts bring such a large traveler demand, the back-of-house equipment and storage use for this space was a deciding factor in moving from four concepts to three.”

**Tech Option Boosts Revenue**

Three kiosks installed at the beginning of the Smashburger queue give customers the opportunity to place their orders via touch screens rather than recite them to counter personnel. “Not only have we modernized the appearance of the area, but we’ve also modernized the amenities to allow for different forms of ordering and payment,” says Grzechowiak.

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Cabin-like table enclosures reinforce the Northwoods design scheme.

The kiosks give customers more decision-making time, which has translated into guest checks that are 20% higher than orders placed at the counter. “When standing at a counter, there’s a lot

of pressure to make decisions quickly and be really efficient,” he explains. “With the kiosk, there’s less pressure. You don’t have a human staring at you asking, ‘What would you like?’”

In particular, the kiosks have boosted sales of upgrade options. “People seem more willing to add on additional items when there’s a picture in front of them, say of hot, juicy bacon,” reports Grzechowiak. “Adding on those residuals really influences the guest check.”

HMSHost is not surprised that travelers are responding positively to the food court’s new technology, updated aesthetics and national brands. “When you have a well-executed space, such as this, with the right concepts that cater to more traveler behaviors, we see more foot traffic; and that leads to increased revenue,” relates Price. “As passengers continue to see what’s available here, along with the strengths of these brands, we see this as an opportunity to continue to drive growth.”

From the airport C-suite, Ryks says that the recent renovation takes MSP’s food and beverage concessions to an entirely new level. “It redefines what a food court can be and gives travelers insight into how extraordinary Minnesota is,” he comments. “Hopefully, they’ll want to return and explore more of what the region has to offer.” ✈️

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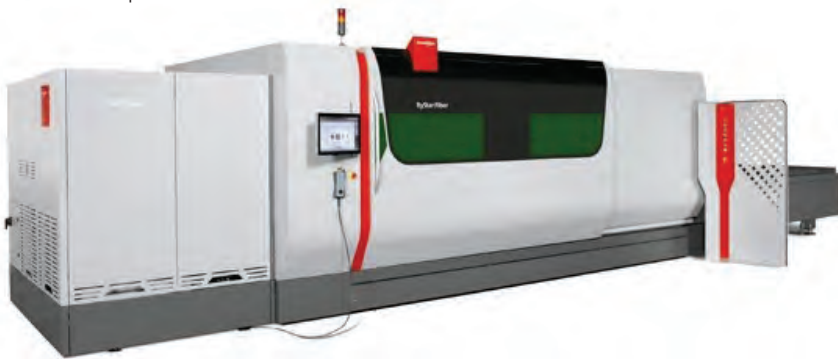
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## Local Non-Profit Savors Airport Food Donations

Food and beverage concessionaires at Minneapolis-St. Paul International Airport (MSP) are doing more than serving customers; they're also helping reduce hunger in the Twin Cities. Instead of tossing out unsold, unexpired food, they donate it to Loaves and Fishes, a local non-profit agency that distributes much-needed nutrition throughout the community.

Now in its third year, the initiative at MSP donated an estimated 55,000 pounds of food to Loaves and Fishes in 2019 alone. The agency collects food from stores, restaurants and other donors for use at food banks, dining sites and street-level outreach programs.

"We are a natural outlet for rescuing food from the airport that is ready to eat," says Cathy Maes, the agency's executive director. "The benefit of working with MSP is that the food can go right from the airport to be immediately reused."

Powered by 10,000 volunteers and 40 paid staff members, Loaves and Fishes serves 3,500 meals every day to those in need. Maes notes that MSP is one of the agency's top providers in terms of food variety.

Donations from airport concessionaires range from prepackaged sandwiches and salads to leftover soups and pans of lasagna. The airlines also get involved, donating nuts from their in-flight service and items such as ketchup packets and snack foods that are close to expiring.

"The ready-to-eat food we get from MSP is fresh since it only stays on the concourse for less than 18 hours," Maes notes. "It was all being thrown away before we partnered."

Food donations collected at the airport are used in a variety of ways. "If we have a bunch of salads from MSP, one of our chefs could have an easy night and make a real big salad by opening packages and adding them all together," she explains. "Or, a packaged sandwich could be given to someone on the street or placed in the backpack of someone at a homeless shelter for another meal. That's pretty much the greatest part of this MSP program—the food comes in a myriad of ways, and we can use all of it."

### Vendor-Led Initiative

The idea to donate surplus food to the hungry started with personnel at HMSHost restaurants and quickly spread throughout MSP.

"The program expanded to become an airport-wide effort, with other airport concessionaires joining HMSHost to help more of our community in need," reports Butch Howard, senior director of Operations with HMSHost. "The fresh, ready-to-eat surplus

food makes a positive difference not only in the airport's sustainability efforts, but most importantly in helping feed the local community."

Each week, Loaves and Fishes receives about 915 pounds of food from the airport.

Pickups occur two or three times per week, depending on volume. "At first, we were picking up in a cargo van because that's all we had," recalls Maes. "But because the airport ended up generating so much interest, we were able to purchase a box truck at dock height that can hold a lot more food. That was a real bonus for us, and it now helps with a lot of other pickups as well."

MSP supports the concessionaire-run donation program by providing holding space for food designated for pickup.

"The initiative costs us nothing," notes Liz Grzechowiak, former assistant director of Concessions and Business Development for the Metropolitan Airports Commission. "Our community benefits because we are infusing high-quality, fresh food ingredients into a program that ensures every meal served includes quality proteins and fruits and vegetables."

HMSHost is proud to be a founding member of the program at MSP. "We are committed to making the world a better place by giving back to the local communities in which we operate," says Howard. "Partnering with a strong, well-established organization like Loaves and Fishes is key for other airports interested in taking on such a donation program." ✈️



CATHY MAES

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# Washington Dulles Continues to Brace for



## FACTS&FIGURES

**Project:** Winter Storm Preparation/Snow Removal

**Location:** Washington Dulles Int'l Airport

**Guiding Philosophies:** Keep calm during severe storms; allow staff & contractors ample time to arrive onsite before a storm hits; assess surface temps, snowfall rates, expected duration to determine appropriate response level; remain flexible with changing weather conditions


**Landside Contractor:** Top Dog Services of Olney, MD

**Airside Contractor for United Airlines:** Top Dog Services of Olney, MD

**Gates Covered:** 82

**Key Equipment:** 32 John Deere loaders; 4 Superior sweepers; 3 Stewart & Stevenson brooms; 3 Trecon 135-PDs Snowmelters

**Guiding Philosophies:** Rotate equipment regularly to prevent mechanical problems; don't get shorthanded for crew members; expect the unexpected

 Washington, D.C. is experiencing an especially mild winter this year. In fact, it is on track to be the fifth warmest on record for the past 150 years. (Fingers crossed, it doesn't prove to be a jinx.)

Even though it has had far fewer Nor'easters and blizzards to contend with, Washington Dulles International Airport (IAD) isn't letting down its guard. Steve Settle, IAD's former runway snow team manager, is keeping airport resources en pointe to deal with whatever Mother Nature has up her sleeve.



STEVE SETTLE

United Airlines is also intent on helping its hub location of 30+ years run safely in challenging winter weather. "Sometimes we are right on that ice line and we can see very difficult weather patterns," explains Rachel Shaw, director of Station Operations at IAD for United. "An ever-so slight shift in a storm system track can change our forecast drastically."

Todd Dickerson, president of Top Dog Services in Olney, MD, is well-acquainted with the unpredictable nature of D.C. weather. His crews have provided landside snow removal and ice control services at IAD for more than 20 years. And four years ago, Top Dog also became United's contractor of choice after crews assisted in a pinch when a storm dumped 33 inches of snow on the airport in less than 24 hours.



TODD DICKERSON

Over the years, Top Dog has evolved the processes and technology it leverages to clear the 82 gates United uses at IAD. Collectively, the United gates accommodate 250 flights/21,000 passengers each day.

"We swing with the wind," says Dickerson. "But you never really know during each winter what you're going to get."

## Mobilizing the Forces

Settle notes that determining a start time for response efforts is often a challenge because



# Winter Storms

BY JENNIFER BRADLEY

many employees live to the west and south of IAD, and have substantial commutes. Unfortunately, local weather patterns also typically come from those directions.

To allow enough time for employees and contractors to arrive onsite, the airport usually sets a snow-event start time three to four hours before a given storm is expected to hit. The predicted snowfall then triggers its level of response.

“Airport operators have to look hard at surface temps, snowfall rates, expected duration, and then pick the right response,” Settle explains.

He offers some examples:

- For 1.5 inches of snow with temperatures in the upper 20s, starting at 6 p.m. and ending by midnight, IAD issues a full recall for landside areas, which means all truck and parking lots have full coverage. It also activates an intermediate-level response for airside surfaces with three deicing trucks, 12 multi-function units, four rotary blowers, two supervisor trucks, four mechanics on standby and two solid material spreaders—with one shift of drivers covering the entire event.
- For up to 3 inches of snow in less than 10 hours, a “Level 10” is triggered, with landside and airside operations needing full teams. The airfield response is upgraded to a complete runway response team with up to 50 drivers and 10 mechanics for equipment support. They are split into two teams, so one group can rest while the other works.

“The biggest challenge is when we are in the middle of a smaller event and the forecast changes so drastically that we have to go into a full recall,” says Settle. This has happened only a few times in the last decade; but the first time it happened, supervisors found it difficult to keep assigned teams together. “It was a total nightmare,” recalls Settle. “We now assign a supervisor to place the drivers in the equipment and make the team operating on the runway whole. Once this is accomplished, they then turn their attention to the others that have arrived.”

As a private contractor, Dickerson prefers to over-staff during a storm, and notes that local farmers and police/fire employees are happy to supplement Top Dogs’ regular crews when the need arises. The company provides an on-site bunkhouse so equipment operators can rest between shifts. It also houses and feeds crews at a nearby hotel. “If these guys need a break, all they have to do is wave; and within a very short time, they’re relieved,” says Dickerson. “But our performance does not slow down.”

United appreciates Dickerson’s strategy. Shaw notes that planning with Top Dog begins three to five days before a winter storm is due to arrive; and constant partnership occurs until the weather front has passed.

“Through coordination with our vendors, we make sure our commitment to our customers is at the heart of everything we do,” she says.

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Todd Dickerson: [tsdickerson@topdogservices.com](mailto:tsdickerson@topdogservices.com)

### Technology Matters

Dickerson notes that telematics (using GPS and onboard diagnostics to monitor equipment movement and performance) has made a tremendous positive impact on the efficiency of Top Dogs' services at IAD, especially when clearing gates and ramp surfaces for United.

"This is a relatively new thing for us," says Shaw. "We do like it, because it allows us to have a bird's-eye view of where every piece of equipment is on the field, and we can tell Top Dog where we need additional assistance."

It also helps coordinate aircraft movement relative to snow removal efforts, which improves safety for staff and optimizes the passenger experience, she adds.

Top Dog remotely monitors all of its John Deere loaders, Stewart & Stevenson brooms, and Trecan Snowmelters. So it can, for instance, pinpoint why an individual machine is burning more fuel or running at a higher RPM. Dickerson notes that it is especially important to monitor fuel filters on melting machines due to the cold temperatures they operate in. "I've seen gel issues with diesel fuel," he explains.

"They are ahead of the game," Dickerson says of Trecan's telematic technology. "With the emissions controls on the units, we can stay at a high burn rate and level of efficiency."

Terry Dwyer, North American sales manager for Trecan Combustion Ltd., enthusiastically agrees that the equipment can save airports time and money.



TERRY DWYER

Top Dog uses three Trecan 135-PD Snowmelters at IAD, which can melt 135 tons of snow per hour. "That's perfect for that size airport," says Dwyer.

To other airports interested in the equipment, he says: "Look at the size of your facility and the weather patterns the last few years, and you can get a good handle on the size you'll need."

Orders for the specialized machines require six months or more lead-time, and airports need qualified personnel to operate them, adds Dwyer.

Shaw says that snow melting machines are instrumental in keeping United's gates open and flights in the air. Top Dog stages the equipment strategically, so crews can push snow from one

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end of the terminal to the other, and divide it between the gates.

“Doing it this way versus piling up snow every third or fourth gate makes our ramp a lot cleaner and safer, and it’s easier for employees to get in and out,” Shaw explains.

### One Step Ahead of the Storm

Dickerson rotates equipment every few years to stave off mechanical issues. “We don’t have time for breakdowns and lost hours when it’s time to work,” he emphasizes. “When it’s time to go, we have to go. In D.C., we might only get five large storms a year; but we need to be ready each time.”

He recalls a particularly rough 10-inch snow storm last winter: “Many times, it will hit us, go to New York City and then right back into the D.C. area; and that’s exactly what happened. The second wave brought 7 inches, and United Airlines gave us a time they wanted to be back open by.”

Using its tech-forward equipment, Top Dog beat the deadline by two hours.

Shaw says that Top Dog’s impressive snow management efforts were just another part of the “new United,” which is more focused

than ever on commitments to its customers. “These are innovations and improvements designed to help build a great experience for every customer, every flight, every day,” she explains. “We talk all the time and try to build relationships with our vendors to make them feel they are part of the United family.”

And speaking of family, Dickerson notes that a strong relationship with Top Dog’s John Deere equipment supplier also helps IAD manage winter weather challenges. The dealer supplies John Deere-certified mechanics during major storms; so if equipment goes down, service can be provided immediately.

### More Lessons to Learn

When it comes to winter weather, “expect the unexpected,” advises Dickerson.

Dwyer agrees, adding that it’s impossible to understate the value of being prepared. “It all comes down to time and money,” he says. “With people spending \$100,000 to truck snow out, having an insurance policy (like Snowmelters) is a very smart thing to do. It might be an easy January, but February might bring a snow bomb. With the right equipment, you’re covered. You won’t be scrambling, which is when the damage starts.”



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United Airlines uses the same contractor for snow removal around its gates that the airport uses for landside areas.



IAD's Settle reminds other airports to use sound judgment when planning for winter storms. "Don't panic; try to keep calm," he counsels. "I have been in events where it went from snow to ice, and cooler heads prevail every time."

"Knee-jerk reactions cause problems," he adds. "And since we're at the bottom of the Snowbelt, we have to plan accordingly."

This approach, plus strong partnerships with airlines and contractors, will undoubtedly help IAD continue to navigate D.C.'s unpredictable winters—and learn new lessons along the way. ✈️



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To	Flight #	Gate	Time	Status
Denver	Southwest 1432		8:20 A	
Detroit	DELTA 1662	B7	7:03 P	
Detroit	Southwest 5441	C13	9:15 P	
Detroit	DELTA 2973	B4	6:00 A	
FLauderdale	Southwest 686	C14	7:25 P	
FLauderdale	Southwest 5790		6:05 A	
FLauderdale	Southwest 1151		6:45 A	
Houston-Hobby	Southwest 5770		5:05 A	
Jacksonville	Southwest 260	C15	9:20 P	
Jacksonville	Southwest 1197		8:05 A	
Jacksonville	Southwest 1432		8:20 A	
Kansas City	Southwest 952	C15	8:05 P	
Kansas City	Southwest 1316		6:55 A	
Las Vegas	Southwest 473	C17	7:35 P	
Las Vegas	spirit 1838	A1	9:40 P	
Las Vegas	Southwest 212		6:45 A	
Las Vegas	Southwest 2148		8:20 A	
London-LHR	BRITISH AIRWAYS 222	B11	7:10 P	
Los Angeles	Southwest 4045	C7	8:05 P	
Los Angeles	Southwest 781		6:55 A	
Los Angeles	American 1092	C3	7:29 A	
Miami	American 2831	C10	5:45 A	
Milwaukee	Southwest 519	C25	9:30 P	
Minneapolis	Southwest 789	C7	6:55 P	Boarding
Minneapolis	DELTA 2331	B9	5:50 A	
Minneapolis	Southwest 5326		8:15 A	
New Orleans	Southwest 462	C19	7:10 P	
New York-JFK	American 3543	C10	6:46 A	
New York-LGA	Southwest 1198	C20	6:45 P	Departed
New York-LGA	DELTA 4842	B5	6:59 P	
New York-LGA	Southwest 672		5:45 A	
New York-LGA	American 4444	C10	7:07 A	

Tuesday, January 28, 2020

# DEPARTURES

To	Flight #	Gate	Time	Status
New York-LGA	DELTA 3698	B5	7:30 A	
Newark	UNITED 3993	A3	7:15 P	
Norfolk	Southwest 1098		6:20 A	
Oakland	Southwest 781		6:55 A	
Orlando	Southwest 110	C25	7:05 P	Boarding
Orlando	Southwest 1108	C22	7:35 P	
Orlando	Southwest 5781		5:30 A	
Panama City-ECP	Southwest 5003	C18	6:55 P	Boarding
Pensacola	Southwest 1155	C21	7:10 P	
Philadelphia	FRONTIER 2306	B12	7:38 P	
Philadelphia	Southwest 927	C17	9:15 P	
Philadelphia	Southwest 1314		6:00 A	
Philadelphia	American 853	C5	6:22 A	
Phoenix	Southwest 2202		6:00 A	
Pittsburgh	Southwest 1110	C16	9:40 P	
Raleigh/Durham	DELTA 6250	B3	7:55 P	
Raleigh/Durham	Southwest 35	C21	9:15 P	
Salt Lake City	DELTA 878	B3	6:40 P	Departed
San Antonio	Southwest 450	C18	8:00 P	
San Diego	Southwest 506		8:20 A	
Seattle	Southwest 2202		6:00 A	
Seattle	DELTA 2776	B3	7:15 A	
St. Louis	Southwest 522	C13	7:05 P	Boarding
Tampa	Southwest 547	C14	8:35 P	
Tampa	Southwest 1151		6:45 A	
Tampa	spirit 1651	A1	7:05 A	
Tupelo, MS	CONTOUR 3006	B9	6:45 P	
Washington-DCA	Southwest 1338	C9	9:15 P	
Washington-DCA	American 4616	C8	6:04 A	
Washington-DCA	Southwest 1536		7:40 A	
Washington-IAD	UNITED 6018	A4	6:45 P	Departed
Wichita	Southwest 522	C13	7:05 P	Boarding

Tuesday, January 28, 2020

# DEPARTURES

## Updated Info & Public Address Systems Reflect the New Vision at Nashville Int'l

BY KRISTIN V. SHAW

Flight information display systems (FIDS) are a passenger's lifeline. With all the crucial information travelers need to get to their gates on time, they're bound to create an impression on visitors. The real question is whether that impression is positive or negative.

As Nashville International Airport (BNA) kicked off a dynamic growth and expansion plan known as *BNA Vision*, updating the FIDS and public address system dovetailed nicely with the nearly \$1.4 billion initiative.

"Travel can be very stressful. The more we can do to give customers readily available information at their fingertips, the better," says Vanessa Hickman, assistant vice president of Information Technology at BNA. "We want our passengers to see very quickly their departures or arrivals. If we can alleviate stress, they can spend more time relaxing and engaging in more revenue-generating activities like food and retail."



VANESSA HICKMAN




BNA ARRIVALS 6:45 PM CST						
From	Flight #	Claim	Time	Status		
Atlanta	Southwest	1987	6	6:30 P	Arrived	
Atlanta	DELTA	932	6	6:48 P	Arrived	
Atlanta	DELTA	1173	6	8:08 P	Now 7:59 PM	
Baltimore	Southwest	2167	6	6:55 P	Arrived	
Baltimore	Southwest	1261	4	7:30 P	Now 7:20 PM	
Charlotte, NC	American	2306	1	7:01 P	Now 7:02 PM	
Chicago-MDW	Southwest	410	5	6:20 P	Arrived	
Chicago-MDW	Southwest	2167	5	6:55 P	Arrived	
Chicago-O'Hare	UNITED	5518	7	7:52 P	Now 7:44 PM	
Chicago-O'Hare	American	3227	2	8:12 P	Now 8:09 PM	
Dallas - DFW	American	1076	1	8:23 P		
Dallas (Love)	Southwest	1261	4	7:30 P	Now 7:20 PM	
Denver	Southwest	5003	3	6:10 P	Arrived	
Denver	Southwest	5743	5	7:20 P	Now 7:10 PM	
Denver	Southwest	1480	3	7:55 P	Now 8:05 PM	
Detroit	Southwest	410	5	6:20 P	Arrived	
FTLauderdale	spirit	222	8	7:21 P	InFlight	
Houston-Hobby	Southwest	686	3	6:30 P	ARRIVED	
Las Vegas	Southwest	1697	4	7:15 P	Now 7:05 PM	
Las Vegas	Southwest	952	3	7:30 P	Now 7:05 PM	
Manchester	Southwest	1155	3	6:35 P	Arrived	
Minneapolis	Southwest	1480	3	7:55 P	Now 8:05 PM	
New York-LGA	Southwest	1107	3	7:10 P	Now 7:00 PM	
Oklahoma City	Southwest	952	3	7:30 P	Now 7:05 PM	
Orlando	Southwest	1987	5	6:30 P	Arrived	
Orlando	Southwest	1155	3	6:35 P	Arrived	
Philadelphia	Southwest	5003	3	6:10 P	Arrived	
Philadelphia	FRONTIER	2307	6,7	6:43 P	Arrived	
Phoenix	Southwest	1229	5	7:35 P	Now 7:15 PM	
Raleigh/Durham	DELTA	6250	6	7:20 P	Arrived	
San Diego	Southwest	1229	5	7:35 P	Now 7:15 PM	
St. Louis	Southwest	547	4	8:00 P		


BNA BAG CLAIM 6:45 PM			
From	Flight #	Claim	
Atlanta	Southwest	1987	6
Baltimore	DELTA	932	6
Baltimore	Southwest	2167	6
Charlotte, NC	Southwest	1650	5
Chicago-MDW	American	2306	4
Chicago-MDW	Southwest	410	1
Chicago-MDW	Southwest	2167	6
Denver	Southwest	5003	5
Denver	Southwest	5743	3
Detroit	Southwest	410	6
Detroit	Southwest	1662	6
FTLauderdale	DELTA	1662	7
Houston-Hobby	spirit	222	8
Las Vegas	Southwest	686	3
Las Vegas	Southwest	1697	2
Las Vegas	Southwest	952	4
Manchester	Southwest	1155	3
New York-LGA	Southwest	1107	3
Oklahoma City	Southwest	952	3
Orlando	Southwest	1987	2
Orlando	Southwest	1155	6
Philadelphia	Southwest	5003	3
Philadelphia	FRONTIER	2307	3
Phoenix	Southwest	1130	6,7
Phoenix	Southwest	1229	6
Pittsburgh	Southwest	1130	6
Raleigh/Durham	DELTA	6250	6
San Diego	Southwest	1229	6

BNA 6:45 PM

Yazoo Brewing Company



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ARRIVALS

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## FACTS&FIGURES

**Project:** Upgrading Audio/Visual Communications

**Primary Components:** New Public Address System; Flight Information Display System; Electronic Video Display System

**Location:** Nashville Int'l Airport

**Cost:** \$5.9 million

**Design:** Late 2016 – Jan. 2018

**Construction/Installation:** Spring 2018

**System Activated:** Aug. 2019

**Prime Consultant/Engineering Design:** Arora Engineers

**Design:** Gresham Smith

**Design Support:** Connico

**Prime Contractor/System Integrator:** International Display Systems

**Public Address System Software:** Simpleway

**Public Address System Hardware:** QSC

**FIDS Software & Flight Data:** Infax

**Content Management Software:** Omnivex

**Content Management Software/FIDS Integration:** Infax

During a recent \$5.9 million project, crews replaced the entire FIDS, public address (PA) and electronic video display system (EVIDS) at the airport. The new EVIDS allows the airport to run video or important static content, such as emergency messaging, on any display. Previously, the displays included only flight information and weather maps.

“Now, the airport can build on top of this foundation to add all sorts of content, like video, dynamic directories, visual paging and a framework for how they present information to their customers,” says Jason Shevrin, senior vice president with Arora Engineers.



JASON SHEVRIN

### Finer Points for FIDS

Arora tag-teamed with Gresham Smith, which was responsible for creating templates for all of the airport's digital signage. When Gresham Smith designed BNA's original terminal in 1986, it was the firm's first complete terminal project. In this case, the company was



The airport recently replaced all of its flight information and electronic video displays.

tasked with devising color combinations and symbols that would appeal to customers and help ease their journey through the airport. The results showed the BNA team that their FIDS could look and feel better.

“This project was fun because the airport team was very open,” says Jim Harding, Gresham Smith’s director of Experiential Design and Wayfinding. “We got a feel for what they were looking for: clean, crisp and friendly. With that in mind, we leaned toward lighter, brighter imagery that pops.”



JIM HARDING

Harding explains that designers emphasized what is most important to passengers: the gate numbers. The new design they created incorporates a blue box to highlight and unify the row and gate numbers to draw the eye toward the gate numbers. The color scheme for the previous FIDS was dark green and blue, which felt heavy, he comments. Brighter screens gave the digital displays a fresh, clean look; and designers employed horizontal banding from white to light blue for clarity. Travelers can quickly find their cities and easily scan across for flight status, says Harding.

The new template was also designed to accommodate passengers who are colorblind.

“A couple of years ago, we led a research project and report on enhancing wayfinding for those with visual challenges,” explains Harding. “We used digital filters on our design concepts to represent red/green and blue/green colorblindness, and that showed us if we were using the right level of contrast. A lot of folks might not think of that, but it gave the airport a lot of confidence the FIDS would be legible for all customers.”

Gresham Smith also created a uniform look and feel for everything with information for passengers: signage, directional cues, FIDS, baggage information display systems and more. Harding emphasizes that consistency is important for passengers.

“You’d be surprised how many people don’t know where to look when they deplane,” agrees Shevrin. “The fonts,

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Arora provided the following services at Nashville International Airport.

- Airport wide study and report
- All universal cabling distribution system (backbone and horizontal cabling elements)
- Large LED FIDS displays in the terminal lobby
- Facility wide FIDS and PA systems
- FIDS and Public Address Standards
- Fire Alarm and Public Address Integration

To learn more about the Nashville FIDS & Public Address — Visual Paging project: [aroraengineers.com/project/BNA-FIDS-PA](http://aroraengineers.com/project/BNA-FIDS-PA)

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colors and logos were standardized to help ensure the way is clear. It's those small details that make a difference."

Because time is an essential currency for passengers, the local Nashville time is prominently featured on headers. Customer feedback prompted the project team to add "CST" behind the numbers. When crossing multiple zones, it's easy to lose track, notes Harding. Adding to that challenge, part of Tennessee is in the Eastern time zone, and part is in the Central zone.

The FIDS can also run information about live music presented at various stages throughout BNA. "People think of Nashville as Music City, USA," says Harding. Each FIDS bank consequently has three screens for flight information and one for alternate content, including what musicians are playing where and when.

Because FIDS are such a crucial touch point for passengers, Harding encourages airports to create unique local content. "It's the extension of the airport's voice and brand, and that is really important," he explains. "If you don't think of it that way, it's a missed opportunity."

### Synchronized Sights & Sounds

Instead of building separate FIDS and PA systems, Arora proposed a universal communications system, with a single interface to deliver synchronized visual and audio announcements. The result is consistency between what passengers hear and see.

The challenge was incorporating the concept into the massive construction that was about to kick off.

"We had a paging system that was more than 15 years old," says Hickman. "The technology behind that was difficult to support, and we needed to replace it. It was a balancing act: We had this project on deck, and the BNA Vision project came up alongside it."

Disseminating safety and security information was important to airport management, so the new paging system was rolled into plans going forward.

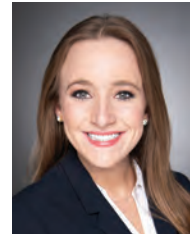
"Sometimes you have bad storms or incidents, and if we need to, we can now take over all of the screens in one isolated area or the whole terminal to tell people where they need to go," explains Hickman. "It keeps our public safe and secure, and it's easy breezy."

International Display Systems, the prime contractor and systems integrator for the project, brought in vendors including Simpleway, Omnivex, Pro Sound and Jarvis Sign. Infax provided messaging for the airport and presented flight information on displays. Infax provided FIDS software and the flight

data and integrated the Omnivex content management, which is also integrated with Simpleway's public address software.

Because it was already furnishing the security checkpoint wait-time monitors, the company integrated that information as well.

"Our unified solutions integrated smoothly into the airport's public address system for consistent audio and visual messaging airport wide," says Infax Vice President Tracy Davis. "The software and integration services ensured that BNA's audio-visual passenger experience was seamless and state-of-the-art."



TRACY DAVIS



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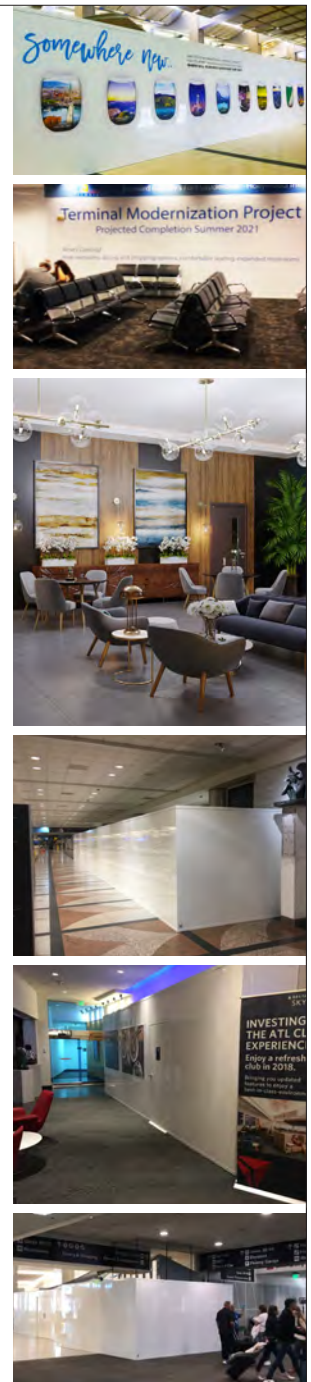
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**BNA LIVE MUSIC**  
11:07 AM


Featured Artists



**Zac Brown Band**  
2:30 PM  
Tootsies  
C Gates



**Carrie Underwood**  
5:30 PM  
Gibson  
C Gates



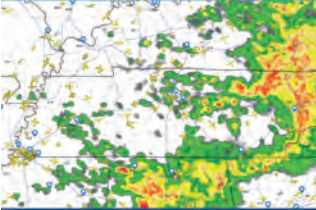
**Granger Smith**  
7:45 PM  
Tootsies  
A/B Gates

Artist	Location	Time	Gates
Tyler Childers	Gibson	12:00 PM	C
Turnstile	Tootsies	12:30 PM	C
Danielle Johnson	Neely's	2:00 PM	B
Wayne Hancock	Tootsies	2:30 PM	A/B
Duane Betts	Tootsies	4:30 PM	A/B
Ashlee + Evan	Gibson	4:30 PM	C
Jordan Brooker	Tootsies	6:00 PM	C
Chelsea Cutler	Tootsies	6:30 PM	A/B
Bob Dylan	Gibson	7:30 PM	C
Reba Dartin	Tootsies	8:30 PM	C

Friday August 24, 2019

**BNA WEATHER**  
11:07 AM

Local Temp: 65°F Wind: 5mph UV Index: 5



**LIVE MUSIC**

Artist	Location	Time	Gates
Tyler Childers	Gibson	12:00 PM	C
Turnstile	Tootsies	12:30 PM	C
Danielle Johnson	Neely's	2:00 PM	B
Wayne Hancock	Tootsies	2:30 PM	A/B
Duane Betts	Tootsies	4:30 PM	A/B
Ashlee + Evan	Gibson	4:30 PM	C
Jordan Brooker	Tootsies	6:00 PM	C
Chelsea Cutler	Tootsies	6:30 PM	A/B
Bob Dylan	Gibson	7:30 PM	C
Reba Dartin	Tootsies	8:30 PM	C

Friday August 24, 2019

**BNA ARRIVALS**  
11:07 AM

From	Flight #	Claim	Time	Status
Atlanta	DELTA 1412	1	6:35 AM	
Baltimore	Southwest 222	2	8:10 AM	
Boston	DELTA 4730	3	9:22 AM	
Charlotte	898	5	10:32 AM	
Chicago	Southwest 4210	1	10:34 AM	
Chicago	3763	5	10:38 AM	
Chicago	PROMISE 4742	4	11:20 AM	
Chicago	UNITED 4213	6	11:24 AM	
Chicago	Southwest 2511	6	11:24 AM	Delayed
Dallas	Southwest 1229	8	11:30 AM	
Dallas-Fort Worth	2853	3	11:34 AM	Delayed
Dallas-Fort Worth	DELTA 6583	1	11:40 AM	Delayed
Denver	Southwest 391	4	11:40 AM	
Denver	Southwest 2545	1	11:45 AM	
Denver	UNITED 5222	2	12:00 PM	
Detroit	DELTA 1480	6	12:00 PM	
Fort Lauderdale	Southwest 2471	5	12:05 PM	
Kansas City	Southwest 1332	2	12:15 PM	
Las Vegas	PROMISE 1999	3	12:22 PM	
Los Angeles	Southwest 1204	1	12:22 PM	
Minneapolis	DELTA 6208	7	12:22 PM	
New York-JFK	DELTA 5249	4	12:24 PM	
New York-JFK	5087	6	12:45 PM	
New York-JFK	3969	1	12:45 PM	
New York-LGA	DELTA 3952	1	12:47 PM	
Newark	UNITED 4160	2	12:52 PM	
Oakland	Southwest 7	3	12:55 PM	
Orlando	PROMISE 1688	5	12:55 PM	Delayed
Philadelphia	Southwest 1752	1	1:00 PM	
Raleigh/Durham	Southwest 2486	5	1:00 PM	
St Louis	Southwest 1376	8	1:00 PM	
Washington-DCA	UNITED 3803	7	1:05 PM	

Friday August 24, 2019

**BNA DEPARTURES**  
11:07 AM

Depart to	Flight #	Gate	Time	Status
Atlanta	DELTA 1412	B7	12:00 PM	
Baltimore	Southwest 222		1:00 PM	
Boston	DELTA 4730	B3	6:35 AM	
Charlotte	898	C8	12:55 PM	
Chicago	Southwest 4210	C19	12:22 PM	
Chicago	3763	C19	12:22 PM	
Chicago	PROMISE 4742	C10	12:22 PM	
Chicago	UNITED 4213	A3	12:47 PM	
Chicago	Southwest 2511	C22	1:00 PM	Delayed
Dallas	Southwest 1229	CA	12:05 PM	
Dallas-Fort Worth	2853	C3	11:40 AM	Delayed
Dallas-Fort Worth	DELTA 6583	C2	11:40 AM	Delayed
Denver	Southwest 391	B12	10:32 AM	
Denver	Southwest 2545	C19	12:24 PM	
Denver	UNITED 5222	AB	12:24 PM	
Detroit	DELTA 1480	B4	10:34 AM	
Fort Lauderdale	Southwest 2471	C14	11:20 AM	
Kansas City	Southwest 1332	C17	11:30 AM	
Las Vegas	PROMISE 1999	C12	12:22 AM	
Los Angeles	Southwest 1204	C10	12:55 PM	
Minneapolis	DELTA 6208	B3	8:10 AM	
New York-JFK	DELTA 5249	B2	12:36 AM	
New York-JFK	5087	C12	11:24 AM	
New York-JFK	3969	C10	11:34 AM	
New York-LGA	DELTA 3952	C19	11:24 AM	
Newark	UNITED 4160	A7	12:52 PM	
Oakland	Southwest 7	C12	12:45 PM	
Orlando	PROMISE 1688	B12	12:45 PM	Delayed
Philadelphia	Southwest 1752	C2	12:00 PM	
Raleigh/Durham	Southwest 2486	C19	11:45 AM	
St Louis	Southwest 1376	C7	1:00 PM	
Washington-DCA	UNITED 3803		1:05 PM	

Friday August 24, 2019

In addition to flight information, the airport also displays details about local weather and in-terminal music performances.

### Simplifying the Process

Imagine an old-fashioned marquee that uses large plastic letters to spell out messages—and only one employee has access to the basket of letters. In contrast, digital displays make it easy and fast for a wide variety of employees to update content.

“It was important to us because we want to make sure we’re providing the best service for our traveling public,” says Hickman. “The system we had in place was functional, but we wanted to give our end users the chance to not have to rely so much on IT.”

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Previously, personnel had to record an announcement, and then hand it off to more technical staff members in the IT department who could access the paging system. With the new system, any trained and authorized employee can enter an announcement on the network and automatically direct where it needs to go.

“It’s all in their hands now,” says Hickman. “They can integrate from different sources and push content into different components. Before, it took a programmer to do all that. What might have taken a day before now takes less than 15 minutes.”

A graphic artist develops content, and the team juggles emerging content from their suppliers, like concessionaires and various departments within the airport. The new plug-and-play method is more nimble, and allows for faster updates.

“Now, they don’t have to go to three and four different places to change something on the system,” says Shevrin. “They’re empowered and encouraged to change all of those things themselves.”

### Music City System

The airport was intent on having a PA system that would not only provide standard announcements, but also convey the local culture.

In addition to playing celebrity recordings from local musicians like Kellie Pickler, George Strait and the Band Perry, the new Simpleway platform has a custom voice library recorded by a Nashville native for more routine announcements. The project team wanted to ensure that up-to-date flight information and important airport announcements were delivered in a clear and consistent manner.

“The audio announcements are shared through a data interface for visible display so every passenger can receive the same information,” adds Brandy Bailey, North America director for Simpleway. “The visual display integration also aids in emergency situations, so that all passengers understand the steps necessary to get to a safe location.”



BRANDY BAILEY

### Making it Work

International Display Systems, the prime contractor/systems integrator for the overall project, leveraged its previous FIDS experience at BNA to make the more recent upgrades. In addition to upgrading and integrating the EVIDS, content management system and public address system, it also layered in the new Omnivex system.



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“The existing PA system was past its rated lifecycle and in need of replacement. Further, the airport authority had a vision to fully integrate the EVIDS, content management system and public address system for ADA compliance and customer service excellence,” explains Rob Keelor, vice president of International Display Systems. “The primary challenge was to migrate the legacy FIDS and public address systems to the new EVIDS, content management system and public address system in a fully-operational airport without any disruptions. This transfer was accomplished by mirroring the databases of the old FIDS and new EVIDS/CMS to allow them to operate in parallel, supporting both the legacy and new systems simultaneously and without interruption.”

When new links were confirmed, the project team switched over the input sources and interfaces in one shift and decommissioned the old FIDS servers. The public address system was a little more challenging because the new system is network-based, while the old system had a proprietary serial interface. Technicians consequently put the new PA system rack equipment and network microphone stations in the new EVIDS/content management system/public address system backbone while new speakers and cables were being installed, and then tied the new speakers and speaker cables to existing PA system.

“Once all equipment was installed and operational, we transitioned the PA system around-the-clock over the course of one work week,” Keelor explains. “This allowed us to essentially transition one concourse per night. The next morning, we were ready to train the users on the new system. We supported both old and new systems so there was no loss of operation.”

### Dueling Projects

Last year, 18.2 million passengers traveled into and out of BNA—14.2% more than in 2018. And BNA expects passenger traffic to increase from 18 million to 23 million as the city continues to grow.

With nearly \$1.4 billion of capital projects, BNA Vision is the airport’s game plan to keep pace with the growth. Major components of the program include:

- a redesigned main lobby;
- on-site hotel;
- additional parking garage with pedestrian plaza;
- more than 90 retail, concessions and passenger services locations;
- 10 additional security screening lanes;
- and a new International Arrivals Facility.

The massive expansion and improvement initiative is slated to wrap up by the end of 2023.

“We had already started the [flight information and public address systems] project, and the rest of the organization was working on the BNA Vision project,” says Hickman. “We had to make sure construction stayed ahead of us. When we started this project, there was a plan to build a new data closet to support what we were doing, and then we had to move it. I didn’t want to get in the way of the BNA Vision project, so we had to stay ahead of it. And because we laid the footprint, we were able to adapt.”

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The information/communication systems project had to adjust several times because of other construction schedules; other times it took priority. The successful outcome of this project was based on the cooperation between airport staff and third-party vendors, says Arora's Shevrin.

"Everyone worked together to ensure staff flexibility so that each piece was installed and ready according to the changing construction schedule," he says.

Due to other simultaneous construction, the project was installed in phases, and an expansion is planned for the new areas still being built. The new virtual servers were installed first, followed by workstations as the new system became available.

**Choose Wisely**

Speaking from the airport's perspective, Hickman stresses the importance of having strong, reliable contractors and vendors for such projects.

"I'd advise you to pick your partner wisely and do your research. And stay in touch with the business side," she adds. "I'm from IT and like the cool technology; so I have to make sure that it also fits the business."



Designers used color, type style, horizontal banding, etc. to help passengers find the information they need.

On that note, Shevrin says that the lifecycle will be long for the airport's new FIDS, EVIDS and PA system—at least a decade or more. "Any new audio or visual systems brought on as part of the Vision program will be built onto the system," he says. "We set the standard for many years to come." ✈️

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## FACTS & FIGURES

**Project:** Smart Restroom Management System

**Location:** Hartsfield-Jackson Atlanta Int'l Airport

**Facility Operator:** Atlanta Airlines Terminal Co.

**To-Date Project Costs:** \$265,000 in a phased trial deployment

**2020 Budget:** \$950,000 for airport-wide deployment

**System Debut:** June 2018 (Concourse B restrooms equipped with smart towel & tissue dispensers)

**Deployment to Date (Feb. 2020):** 4 women's restrooms, 4 men's, one family are fully IoT-enabled in Concourse B, Concourse E has IoT-enabled towel and tissue dispensers in the boarding level restrooms

**Affected Dispensers and Fixtures:** 108 toilets; 48 urinals; 66 faucets; 314 tissue dispensers; 117 hand sanitizer dispensers; 187 towel dispensers

**System:** KOLO™ Smart Monitoring System

**Provider:** GP PRO, a division of Georgia-Pacific LLC

**Associated Products:** enMotion® & Compact® paper towel, toilet tissue & sanitizer dispensers by GP PRO; TOTO EcoPower® flush valves & faucets

**Exterior Capacity Signage:** Infax

**Stall Occupancy Indicators:** Tooshlights® by Modus Systems

**Customer Satisfaction Survey Kiosks:** Avius

**Key Benefits:** Enhanced customer experience; decreased water use & paper waste; increased timeliness for cleaning & repairs; labor efficiencies

# Atlanta Int'l Brings Internet of Things Into its Restrooms

BY NICOLE NELSON



First it was smartphones and smart TVs, then smart cars and watches.

What's next, smart restrooms? In a word, yes. And Hartsfield-Jackson Atlanta International Airport (ATL) has them.

Last summer, ATL became the first facility in the world with a fully connected smart restroom. All of its fixtures—toilets, faucets, paper towel and soap dispensers, toilet paper holders, etc.—wirelessly transmit condition and usage reports to maintenance staff. The real-time information allows custodians to keep the facilities clean, fully stocked with supplies and in proper working order when needed rather than on a pre-determined time interval.

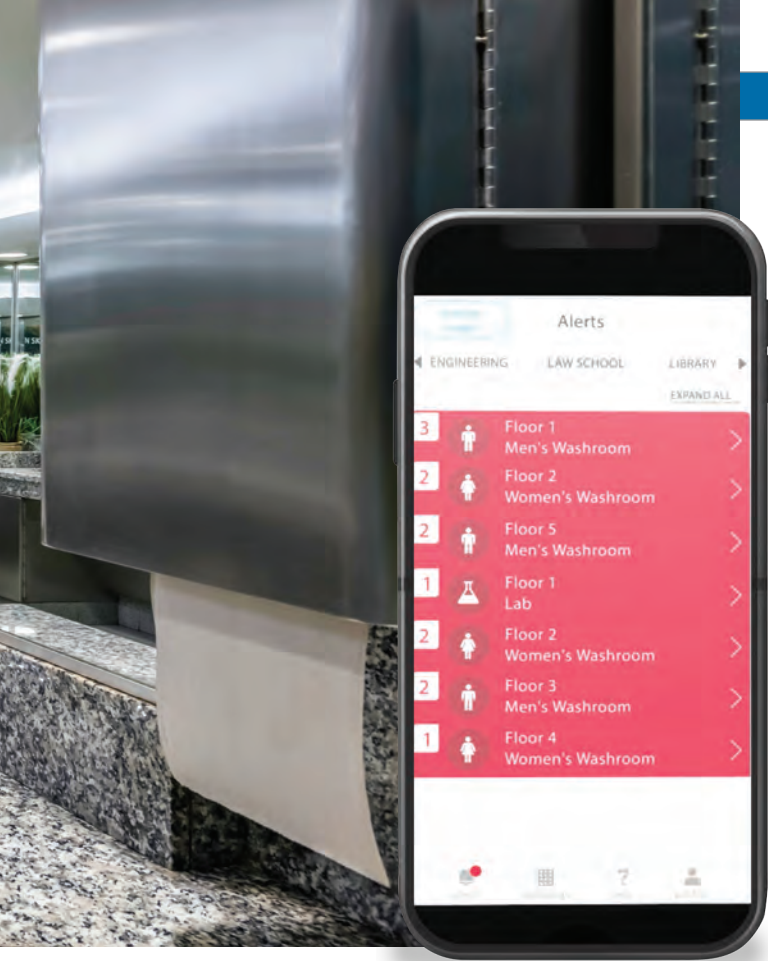
The proprietary high-tech system debuted in parts of Concourse B in June 2018, and has since been implemented throughout the concourse. The boarding level restrooms on Concourse E also

have smart towel and tissue dispensers. Maintenance workers now receive timely updates about more than 800 various restroom dispensers and fixtures.

By the end of this year, that number is expected to nearly double, as smart technology is added to all restrooms in ATL's Domestic Terminal and on concourses A and B. Some restrooms on concourses C, D and E also scheduled for upgrades.

Atlanta Airlines Terminal Company (AATC), the airline-owned firm that manages all 7.2 million square feet of ATL's airside and landside facilities, spearheaded and executed the tech-forward project. As of February, the company had spent \$265,000 in trial deployment, and project stakeholders were continuing to validate associated data, evaluate the technology's effect on the passenger experience and





Smith's dissertation not only earned him an advanced degree, it also inspired a string of improvements and state-of-the-art advancements to ATL's restrooms that are ongoing. His goal: provide passengers with a truly "delightful" experience in ATL's highly trafficked restrooms.

Initial changes, such as updating the music and addressing unpleasant odors, were relatively minor and inexpensive but provided noticeable improvements for customers. Other early tweaks were more environmentally driven, such as switching discolored painted vents to stainless steel, and replacing incandescent and fluorescent lighting with LEDs.

But Smith felt it was important for ATL's restrooms to become "smart" and wirelessly connected. This core objective led to a key partnership with Georgia-Pacific for a broad-based, high-tech restroom management solution.

Ginger Lange, Ph.D., (one of Smith's cohorts from Georgia State) figured prominently into the change. As Georgia-Pacific's Senior Director of Smart Restrooms, Lange convinced Smith that Georgia-Pacific had the technology and wherewithal to help ATL improve its restroom maintenance—and also provide the delightful customer experience Smith sought.

### Delightfully Smart

The subsequent collaboration between the two doctoral candidates and their respective Atlanta-based companies yielded a significant development: the first commercial restroom that fully leverages integration provided by the internet of things (IoT).

The commercial product that transpired is the KOLO™ Smart Monitoring System, from GP PRO, a division of Georgia-Pacific. It uses advanced sensors and cloud technology to transmit information from restroom fixtures to custodians via a mobile app. The system also integrates information from traffic management and customer feedback devices.

Importantly, the KOLO system works with select third-party fixtures as well as GP PRO products such as towel, toilet tissue, and soap or hand sanitizer dispensers. For instance, it receives valuable data from TOTO EcoPower® flush valves and faucets about usage, malfunctions, outages and leaks. When an anomaly is detected, staff is alerted in real time so problems can be addressed immediately.

"Airports are recognizing the importance of the restroom in the overall passenger experience, and Kofi [Smith] knew it was very important for restrooms to become connected and smart—meaning that the devices and dispensers in the restrooms had to become connected and smart," says Mike Slawson, vice president and general manager of the Smart Restrooms business for GP PRO.

The results from trials in Concourse B have been impressive. Slawson reports that product outages (toilet tissue, paper towel, hand sanitizer, etc.) dropped 51% from June 2018

assess its return on investment. The budget for an airport-wide deployment this fiscal year is \$950,000.

AATC President and Chief Executive Officer Kofi Smith, Ph.D., links the tech additions to improving the passenger experience. While completing his Doctorate of Business Administration at Georgia State University, Smith took a deep dive into the delicate relationship between restroom cleanliness and customer satisfaction.



KOFI SMITH

In his role at ATL, he inherently knew that restrooms were a major factor in affecting the passenger experience at the world's busiest airport. But he dissected and analyzed that assumption while writing his doctoral dissertation.

"I started doing research, and restrooms are the No. 1 most important characteristic of an airport to business travelers, and the second most important aspect to the leisure travelers," Smith notes, summarizing 2015-2017 J.D. Power data used in his thesis.

"If you create a *delightful* experience, passengers will spend 45% more when they return to your airport, and a delighted traveler will spend 190% more than a dissatisfied passenger."

With clear ties between concessions revenue and traveler satisfaction—particularly passengers' experience with restrooms—Smith embarked on his academic and operational mission to improve ATL's loos.

"I took all of these little dots in my head, connected them and wrote a dissertation on improving and enhancing the passenger experience in the restroom," he explains.



MIKE SLAWSON

to December 2019 when the KOLO system was first installed. Moreover, 88% of custodians surveyed in Concourse B feel that the system is making them more efficient.

### Delightfully Sustainable & Safe

From an environmental standpoint, the system is helping the airport save paper and water.

Slawson reports that tissue waste fell 40% during the Concourse B test period. Less tissue is thrown away when rolls can be changed based on usage rather than shift-based intervals.

“We are learning so much more about water consumption by fixture, by bathroom, and by concourse through our connected sensor faucets and flush valves,” says Bhavik Patel, director of Business Strategy for TOTO USA.



BHAVIK PATEL

After measuring its water footprint, ATL has reduced overall consumption year over year. Patel reports that Concourse B is saving nearly \$5,000 per month in water costs since 48 low-flush urinals were installed in October 2019. The new fixtures reduce water consumption from half a gallon to 1 pint per flush.

There are also associated benefits for risk mitigation. When plumbing failures or leaks can be detected in real-time, staff can prevent property damage or fall risks associated with water overflow.

Patel notes that impending maintenance issues can be flagged proactively, for attention by the night shift when customer traffic decreases. “Just being able to remotely monitor and manage your facility is one of the best outcomes,” he adds.

Like Smith, Patel highlights the opportunities to enhance customer service. “We know our faucets and flush valves are working, so the user experience should be better—and we are seeing that,” says Patel.

### New Customer Conveniences

Passengers have been particularly impressed by stall indicators within the B-23 restrooms that display if stalls are available. Inside the restrooms, indicators supplied by Modus Systems eliminate the need for passengers to crouch and look for feet to determine if an individual stall is occupied.

Avius survey kiosks are posted outside the restrooms to capture passengers’ feedback regarding their experience. Early results show more exceptional ratings on Concourse B, which

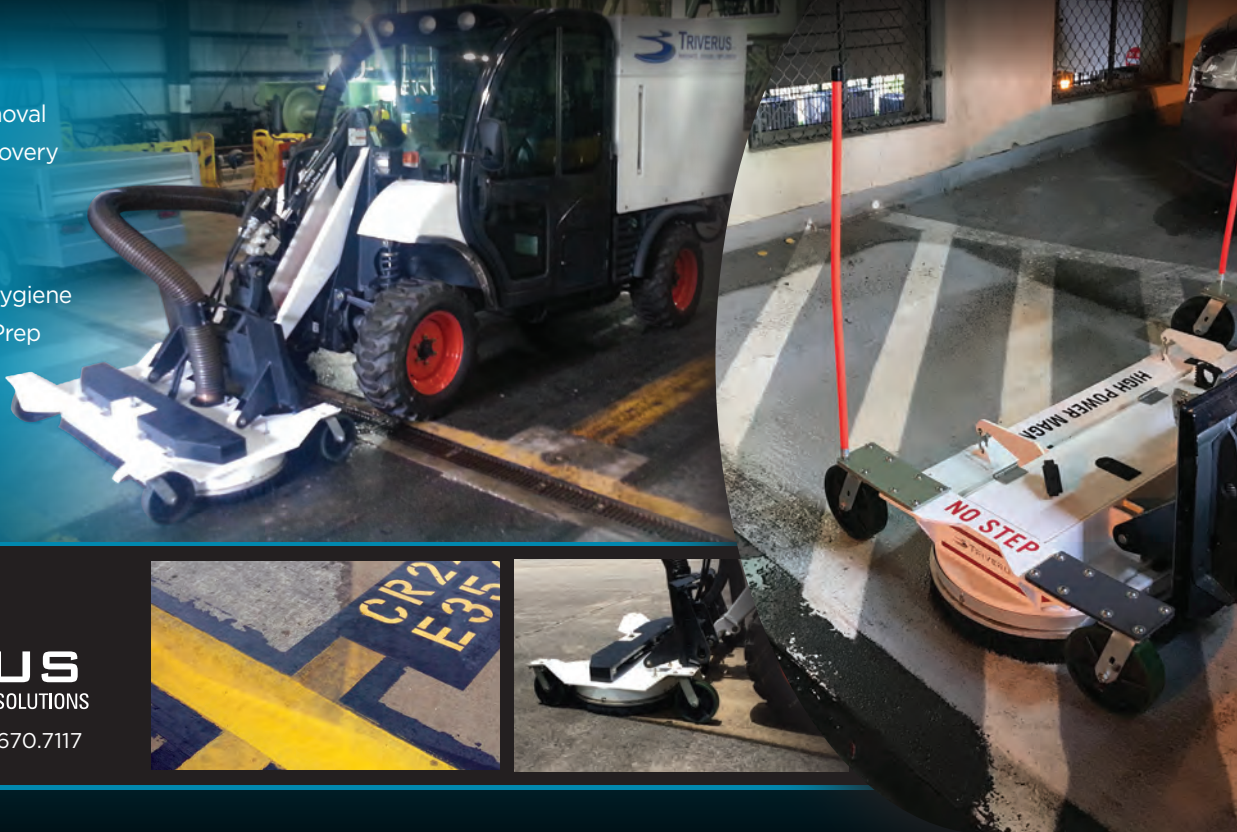
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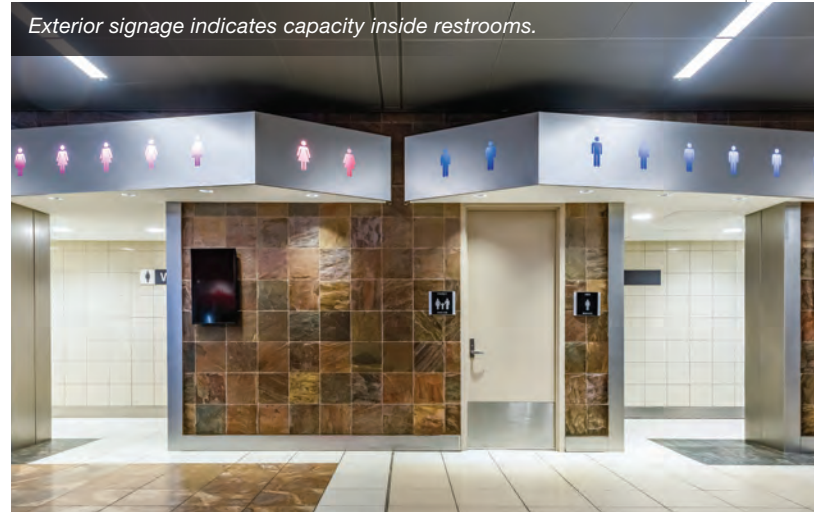


has KOLO technology, than on Concourse A, where it hasn't been deployed. Both are Delta concourses with similar-sized restrooms and passenger volumes. Satisfaction increased among males and females, but males at a higher margin.

Even more striking is the impact on towel outages. On average, female restrooms on Concourse B have 68.8% less complaints about towels running out than restrooms on Concourse A over the same time period. Male restrooms generated 27% less complaints as well.

Concourse B restrooms are consistently rated among the best maintained in the industry, but any negative feedback provided by passengers immediately passes through the KOLO System to the custodian's mobile device. Custodians respond quickly to these feedback alerts, keeping one complaint from turning into 10 or 20 or more.

"In the janitorial services industry, there's typically an emphasis either on elevating the experience of restroom users or in gaining labor efficiencies and reducing cost. Those two goals are both extremely important at airports," says GP PRO's Slawson. "Hartsfield-Jackson Atlanta, being the busiest airport in the world, has tremendous throughput in their restrooms. But at the same



Exterior signage indicates capacity inside restrooms.

time, they've also recognized the importance of giving passengers an elevated passenger experience."

Together, the restroom enhancements and technology installations create an overall more positive experience for passengers traveling through the bustling facility. ✈️



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# New Runway at Pullman-Moscow Regional Required Perseverance & Broad Cooperation

BY KEN WYSOCKY



PULLMAN-MOSCOW  
REGIONAL AIRPORT

## FACTS&FIGURES

**Project:** New Runway

**Location:** Pullman-Moscow Regional Airport

**2019 Passenger Volume:** 138,299

**Cost:** Approx. \$154 million (including nearly \$52 million for earthwork)

**Funding:** Nearly \$142 million FAA grant; balance from local and state governments, universities & private sector

**Runway Construction:** 2016 through most of 2019

**Engineering Consultant:** Mead & Hunt

**Prime Contractors:** M.A. DeAtley Construction Inc.; N.A. Degerstrom Inc.

**Paving Contractor:** Poe Asphalt Paving Inc.

**Runway Lighting Manufacturer:** Airport Lighting Co.

**Signage Manufacturer:** AGM Inc.

**Box Culvert Mfg :** Oldcastle Infrastructure

**Key Benefits:** New runway accommodates larger aircraft/facilitates additional airline service; reduces weather-related flight delays & cancellations; retains key transportation hub for the region

When Pullman-Moscow Regional Airport (PUW) in Pullman, WA, cut the ribbon on its new \$154 million runway last October, officials celebrated much more than a major capital improvement. They celebrated one of the last steps in a complicated venture that spanned more than 10 years and required cooperation among a long list of key stakeholders.

Quarterbacked by engineering consulting firm Mead & Hunt, the multifaceted project required PUW to acquire 300+ acres of land from seven different entities, reroute a 1½-mile section of creek that ran under the old runway and move more than 8 million cubic yards of soil to create enough flat land for a new runway. Moreover, it also had to relocate three miles of high-voltage

electrical lines and cobble together a complicated funding package.

Planning for the project began back in 2006, and construction started in 2016. The new runway is 7,100 feet long and 150 feet wide—400 feet longer and 50 feet wider than the airport's old runway. It is also outfitted with updated lighting and a new instrument landing system. Tony Bean, PUW's executive director, explains that the new airfield systems, combined with reduced airspace obstructions, allow pilots to land during fog and other inclement weather that used to cause many flight cancellations.



TONY BEAN



The runway project even spurred a change in a federal law that essentially created a more equitable funding formula between two cities in different states (such as Pullman and Moscow). That cut the cities' funding contribution by about \$3 million, Bean notes.

"This was a very challenging project," he reflects. "We had to grind away at it for years...It required one giant collaborative effort with everyone pulling in the same direction, even as we were dealing with land acquisitions and complexities that weren't normal for projects like this."

Personnel from Mead & Hunt describe the project in similar terms. "This easily was the most complex runway job I've ever been a part of," says Kevin Mulcaster, the firm's program manager for the project. "It posed a variety of technical challenges along the way, which added layers of complexity, including land acquisitions going on at the same time as construction."



KEVIN MULCASTER

"From an engineering perspective, it's certainly the most complex project I've ever seen," adds Design Manager Ryan Bergstrom. "You should never say never, but I don't think something like this will ever cross my desk again."

"The new landing systems increased pilot visual range to a half mile and 200 feet of elevation, compared to 1½ miles and 500 feet of altitude before," elaborates Bean. "We also raised the west end of the runway by 15 feet to get it high enough for instrumentation without obstructions in the approach area."

### Multiple Funding Sources

Piecing together funding for the project also was a complex endeavor. The FAA paid for nearly 92% of the project; and the cities of Pullman, WA, and Moscow, ID, which jointly own the airport, each kicked in \$2.5 million.

The balance of public funding came from Whitman County in Washington, Latah County in Idaho, the Port of Whitman County, the University of Idaho (in Moscow), Washington State University (in Pullman), the Washington State Department of Transportation's Aviation Division and the Idaho Transportation Department's Division of Aeronautics. Private funding came from Schweitzer Engineering Laboratories Inc., which is headquartered in Pullman, and a personal contribution from Schweitzer president and founder Edwin O. Schweitzer III and his wife, Beatriz.



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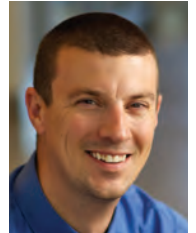
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Crews milled the markings off the old runway, and will remove the rest of the pavement this spring.



### Basic Aerodynamics

The need to accommodate larger aircraft was the catalyst for the complicated endeavor. In 2006, Horizon Air—PUW’s only commercial carrier—announced it would convert its fleet to larger, 76-passenger prop planes. But the runway did not comply with FAA design standards; for example, the runway and taxiway were too close together and the runway width was insufficient to accommodate the size of aircraft operating at PUW.



RYAN BERGSTROM

That provided regional stakeholders with two choices: improve PUW’s runway or lose commercial air service. “That was a significant choice for these communities to make,” Bean relates. “We have two land-grant (agricultural) universities here with international students, plus Schweitzer Engineering Laboratories, a global



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company with four corporate aircraft...and no interstate highway or railroad lines nearby.”

In addition, athletic teams from both universities use charter flights that rely on Boeing 737s and Airbus A319/320 jets.

“Losing (commercial) air service would have created a massive loss to the quality of life here,” explains Bean. “It might have forced negative operational impacts for the universities, which are major employers here.”

Officials considered moving the entire airport to a nearby location, but ultimately decided that the best solution was realigning the runway within the airport’s existing footprint. The east end of the new runway begins near the east end of the old runway, but runs in a more southwesterly direction than the old one.

The FAA granted the airport a modification to standard in 2006 that allowed larger aircraft to use the runway, as long as planes didn’t use the taxiway and runway at the same time. “We operated under those FAA standards for 13 years,” Bean notes. “It made things difficult to some extent, but we made it work. Like anything else, once you get used to it, it becomes routine.”

The new runway will help PUW expand its commercial service by attracting additional carriers, Bean notes.

Last year, the airport served about 138,300 passengers and 2,575 commercial operations.

**Preliminary Earthwork**

Increasing visibility for pilots was a key objective because PUW lies in the heart of the Palouse Region, a 4,000-square-mile area—mostly in Washington and Idaho—renowned for its spectacularly scenic rolling hills. The hills, which look like giant sand dunes, were formed over the eons by wind-blown silt known as “loess,” left behind when ancient lakes dried up tens of thousands of years ago.

Though beautiful, the surrounding topography and the runway’s orientation significantly reduced the airport’s reliability during inclement weather. As such, prime contractor M.A. DeAtley Construction moved roughly 8 million cubic yards of soil to resculpt the hills into an area flat enough for a runway and remove any terrain impacting the airport’s reliability.

The earthwork was a major cost component of the project, totaling just under \$52 million, notes Mulcaster. In all, preliminary earthwork took three years to complete and affected about 425 acres of the 900-acre airfield.

Crews leveled about one dozen large hills and, in some cases, moved soil more than one mile.

“We basically used scrapers to balance the cuts and the fills,” Bergstrom explains. “For every hill we cut, we found depressions to fill in.” The biggest elevation reduction on the project was 110 feet, and the deepest fill was 60 feet.

A stream that runs through the airport and under the old runway also presented a problem. Known as Airport Creek, it often flooded because five stormwater basins surrounding the airport drained into it. The creek also posed an obstacle to future development of hangars and ancillary facilities.

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A 3,100-foot culvert was added to manage a creek that runs through the airport and under the old runway.



The solution? Divert an approximately 1½ -mile-long segment of the creek so it runs along the north side of the new runway, then curls around its east end. The creek was also enclosed inside a roughly 3,100-foot-long culvert, created with concrete box-culvert sections made by Oldcastle Infrastructure. The culvert sections are 8 feet wide and 6 feet tall.

After the creek rounds the east end of the runway, it flows south again and empties into a floodplain created to eliminate flooding. Overall, wetlands mitigation work, creek diversion and stormwater system improvements cost nearly \$28 million, notes Mulcaster.

Another important component of the project was relocating roughly three miles of high-voltage electrical lines, including 34 transmission-line towers, owned by Avista Energy. The power lines ran along the south side of the runway, but would have interfered with the new runway alignment, Bergstrom explains.

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## Complex Land Deals

Negotiating the acquisition of about 300 acres of land from seven different entities also added to the project's complexity and lengthened its timeline. For starters, some of the land purchased by the airport was owned by entities with representatives on the airport's board of directors.

Moreover, the new runway's footprint required land where Washington State University research teams were performing sensitive studies of animals, ranging from bighorn sheep and grizzly bears to goats and cattle. Other research projects on the land involved diseases that affect apples.

"We dealt with a lot of land complexities that weren't normal for runway projects," Bean points out. "It required developing a very intricate schedule of tasks, all performed in concert with the university in order to avoid scaring the animals or impacting the research."

After two years of negotiating to reach an agreement, it took another year to move some associated research buildings to new locations. "And we still were building the runway at the same time," Bean adds.

"We didn't have to twist arms—there was a lot of support," he qualifies. "But it still was very difficult to do. Land acquisition can be a very adversarial process...and in this case, we also had to keep their research intact during the acquisition process."

## Finally Time For Construction

The runway was built in multiple stages during 2018 and 2019. The final paving, performed by Poe Asphalt Paving Inc., was performed in spring 2019, with the final markings applied in late summer.

During the last month of the project, PUW was shut down to facilitate the final work. From September 8 through October 10, contractors finalized construction of the new airfield, decommissioned the old runway, activated the new lighting and signage, and tested the new instrument approach procedures.

Most of the airport's four full-time employees and six-part-time employees kept working during the closure.



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*The new runway is positioned at a slightly different angle than the old one.*



The project isn't completely finished. The old runway was milled only deep enough to remove pavement markings; the rest of the pavement will be removed sometime this spring. Half of PUW's new taxiway will be constructed this year by prime contractor N.A. Degerstrom Inc., and the other half will be built in 2021. The airport's master plan also calls for building a new passenger terminal in the near future, Bean says, as well as more hangars and general aviation facilities.

### **Cooperation & Collaboration**

Looking back, Bean says good communication and complete transparency in all aspects of the project were essential to its success. "If problems arose, we dumped them out like a trashcan on a table so everyone could see them," he says. "By doing that, solutions became apparent quickly.


"Not everyone always liked all the solutions," he acknowledges. "But it all worked out in the end, thanks to a very transparent and collaborative process."

In particular, Bean says that the airport's board of directors—led by Pullman Mayor Glenn Johnson and Moscow Mayor Bill Lambert—was instrumental to the project's success. "If they

all decide to do something, it's successful," he explains. "They played huge roles in maintaining public support and partnerships."

Mulcaster notes that there were multiple opportunities for failure. That would have been disheartening, he adds, given that the FAA doesn't often invest nearly \$142 million in a small regional airport.

"The size of PUW compared to the money spent on this project is unparalleled across the country," observes Mulcaster. "Without support from Tony [Bean] and the two mayors, it could've easily gone sideways. The participation and cooperation from the federal and state governments and all the stakeholders is a huge part of this story.

"The larger challenge here wasn't coming up with engineering solutions for the new runway," he adds. "Instead, it was generating the political will for everyone to stick with this for more than a decade and see it through. It's truly a testament to the value these communities and stakeholders place on this airport—a feel-good story about what can happen when you come together as a group instead of standing divided." 



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# Jackson Int'l Uses LiDAR System to Measure Checkpoint Wait Times

BY RONNIE WENDT

## FACTS & FIGURES

**Project:** Checkpoint Queue Tracking

**Location:** Jackson-Medgar Wiley Evers Int'l Airport

**2019 Passenger Volume:** 942,375

**Video Analytics Software:** Infax Inc.

**Sensor Technology:** iinside

**Key Benefits:** Wait time estimates reduce stress for passengers; real-time queue data helps TSA adjust staffing levels to fluctuating volume

**Cost:** Airport pays a monthly fee for queue monitoring technology. Fee is based on number of sensors & authorized users.

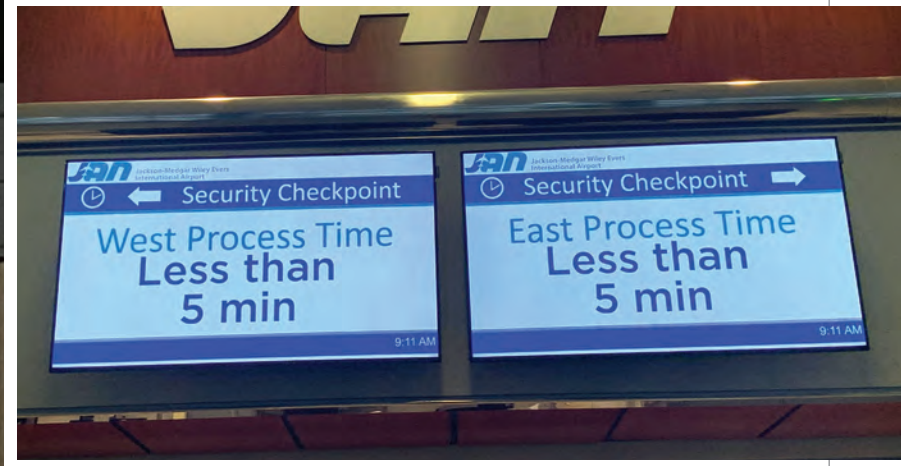


TravelPulse magazine recently named Jackson-Medgar Wiley Evers International (JAN) Mississippi's best airport in 2018; but management is not taking the title for granted.

As passenger traffic increases and new service is added, JAN officials continuously look for ways to offer a premium passenger experience. They recognize that more flights and passengers can increase congestion and lead to longer-than-acceptable wait times at security checkpoints. So JAN officials looked for a way to manage the situation—before continued growth could negatively impact the passenger experience.

Specifically, JAN wanted to measure checkpoint queuing and processing times, and then share information with travelers to help reduce stress about making it to their gates on time. Research led the airport to iQueue analytics service, by iinside and Infax. JAN's new system automates operational intelligence about passenger queuing at TSA checkpoints and continuously informs travelers of expected wait times.

"We chose this system because we wanted to improve the passenger experience," says Bryan Helaire, director of information technology at Jackson Municipal Airport Authority. "If we could improve our understanding of passenger



lengthen and subside. And, the system's historical information helps officials plan ahead for peak travel days and times. "We can assess historical incidents, events or out-of-the-norm peaks, and continually improve our processes," Helaire notes.

### LiDAR Makes the Difference

While most queue management systems rely on Wi-Fi and Bluetooth technology, the system at JAN uses LiDAR, which measures distance to a target by illuminating it with laser light and measuring the reflected light with a sensor.



BRYAN HELAIRE

tendencies arriving at security checkpoints, we could properly plan staffing at peak times, schedule maintenance windows and

future terminal development/capital enhancements."

The system forecasts security checkpoint wait times and estimates the time it will take passengers to get to specific gates using TRAX video analytics from Infax. The company uses queue data, flight volume data

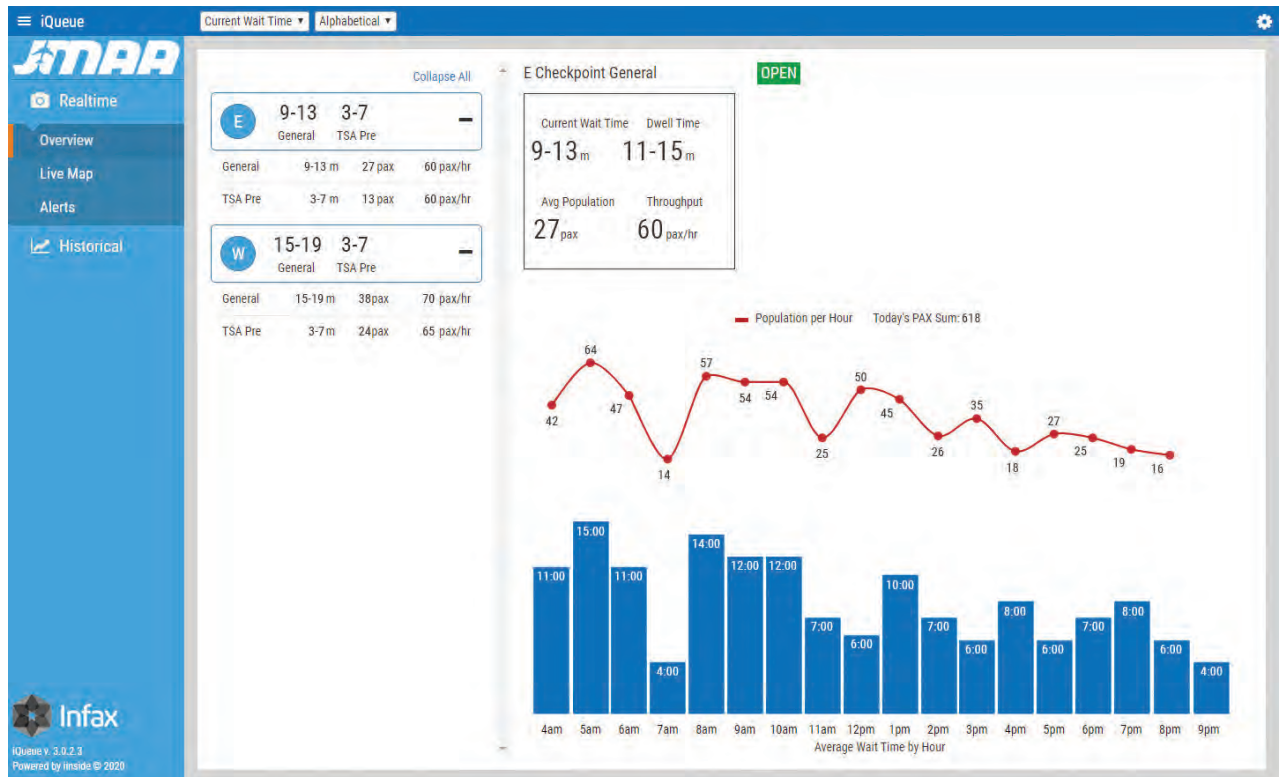
and TSA staffing models to project wait times within five minutes.

"The accurate data allows us to disseminate information to passengers so they can plan accordingly, whether viewing the information on our website or on monitors throughout the terminal," Helaire explains. "We also share metrics with our business partners, TSA, the airlines, etc. Together, we are more conscious about wait times and how we can collectively foster a premium experience for our customers."

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Initially, Infax tried using a Wi-Fi and Bluetooth system at JAN, but problems arose when crews began installing equipment at checkpoints. “The sensors were picking up devices outside of the queuing area, causing the data to be inaccurate,” explains Celso Rodriguez, director of business development, Digital Signage at Infax. “We tried to reduce the sensors’ range to improve accuracy, but they were still not as accurate as we wanted. We tried several sensors, and there was always a problem. Either they weren’t picking up enough devices, or they were picking up too many.”



CELRO RODRIGUEZ

So Infax reached out to iinside, a California company that provides indoor motion analytics to airports. The team from iinside suggested using LiDAR, and the two companies merged their technologies. Crews installed LiDAR sensors that tied into JAN’s video analytics sensors via a simple application program interface connection.

“Our test showed the LiDAR sensors worked better than Bluetooth,” says Rodriguez. “From that point on, we’ve used LiDAR—not just at Jackson Medgar, but at other airports as well.”

After testing the technology at JAN, installation took a few days. Infax ran power via POE+ cable to three LiDAR sensors installed on the walls in the two security checkpoints. Cabling was already in place, because the airport’s security cameras connect to it.

“It was a typical IT installation, involving a PC, server, network security, power prep and configurations,” says Helaire. “We then had calibration sessions with Operations, Customer Service and TSA to make sure our reporting captured the right data.”

Sam Kamel, chief executive officer of iinside, was not surprised that LiDAR provided the accuracy JAN needed. “Bluetooth has great capabilities, but it doesn’t offer the precision of LiDAR,” explains Kamel.



SAM KAMEL

“LiDAR *has* to be precise. Autonomous vehicles use it to keep track of kids, dogs and other objects, so they can navigate around them.”

In contrast, Bluetooth/Wi-Fi queue management systems depend on mobile phones. Kamel explains that every mobile phone has three antennas: one for calling/

texting, one for Wi-Fi and one for Bluetooth. To calculate queue wait times, Bluetooth sensors pick up radio frequency signals from Bluetooth antennas on passengers’ phones as they pass by.

“When we put Bluetooth sensors in the perimeter of a space, we can triangulate and approximate each device’s position,” he continues. “We can listen to the signature coming from a device and determine it’s on a person and moving through space. This passive sensor technology keeps track of how many devices are in an area and uses that information to calculate queue wait times.”

Kamel emphasizes that Bluetooth sensors are accurate to within 10 to 20 feet, but LiDAR sensors are accurate within an inch.

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LiDAR sensors from iinside use laser beams to detect objects in the terminal; software from Infax decides whether they are people to count or objects to disregard.

“LiDAR is active tracking technology that uses safe, invisible laser beams to detect objects in motion and at rest,” he explains. As a result, LiDAR can give airport operators 360-degree views of their facilities and monitor the flow of passengers in real-time.

Infax mounted LiDAR sensors that are about the size of one soft drink can in three locations at JAN. Each sensor spins and fires eight beams of laser light. When the beams bounce off people, luggage and anything else moving in the space, the sensors measure how long it takes for the light to return to them and uses the data to create a point cloud, or three-dimensional representation, of the light. The representation provides actionable intelligence about the area being scanned.

At JAN, LiDAR sensors from iinside determine the distance, volume and reflectivity of an object, and Infax’s analytics software decides whether it’s a person to count or an object to dismiss. Once the system identifies objects as people, it tracks them as they move through the queue.

“It’s a great system with high precision, because we can now track everybody,” says Kamel. “Unlike Wi-Fi and Bluetooth, you are not plus or minus 10 to 20 feet in terms of location accuracy. You can tell who really is in the queue.”

The system also leverages machine learning to become smarter over time. The LiDAR sensors learn to better evaluate passenger counts and patterns, and the analytics software learns to better understand and predict actual queue times. “For example, the system learns that if a queue has 35 people in it and is moving at X speed, the projected wait time will be Y,” Kamel explains. “Machine learning continually improves the accuracy of the calculations.”

Through machine learning, the system learns queue patterns, too. When the area near the checkpoint is crowded, the software determines whether a person is in the queue or standing next to it. “The system gets smarter and can tell that there are 45 people standing in the defined queue area and 30 standing in the corridor,” Kamel says.

Helaire and other airport officials are impressed with the system’s capabilities. “Using LiDAR increases the accuracy of our collected data,” Helaire comments. “Other solutions provide a sample of data, whereas the motion analytics tool we’re using provides a continuous stream of information for operations and passengers. The reporting provides us with a better depiction of what’s happening in our facilities.”

Importantly, the LiDAR-based iQueue analytics service safeguards passenger identities by providing a bird’s-eye/top-down

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view of people moving through the checkpoint. Other queuing management systems scan faces, says Kamel, noting that some U.S. municipalities ban facial recognition technology and other identification technologies within their city limits.

“Some systems use cameras to do what we do, but the cameras see your face and can track individual identity,” he relates. “You can put controls and protections around that, but it’s never perfect. Our LiDAR-based solution shows the form of a human being, but the resolution doesn’t allow us to understand if it’s a male or a female, an adult or a child.”

LiDAR systems also require airports to mount less equipment in their terminals. The system at JAN includes three sensors to cover two security checkpoints. Kamel notes that a camera-based system would need up to 20 times more units to provide the same coverage.

### Monitoring the Results

Infax provides the business intelligence platform that allows JAN officials to view real-time and historic data about checkpoint wait times. In addition, its TRAX Queue Management software automatically calculates and displays estimated wait times to passengers via the airport website and monitors at security queue entrances.

The dashboard allows airport officials to view real-time queue data and pull up specific video analytics sensors to observe the lines. When they confirm that a backup is occurring or brewing, they can ask TSA to open another line or make other changes to speed up the queue. They also can use the dashboard to analyze historical data and glean information about peak times and slow periods. Using the same data, JAN and TSA can work together to optimize staffing.

“As the airport works harder and faster to do more, this system helps them understand what’s going on,” summarizes Kamel. “They can change staffing when there’s an immediate need, or use the data to be more efficient or ramp up staffing during busy times.”


The dashboard allows authorized airport personnel to produce customized reports. For instance, they can compare throughput at various checkpoint lines, or run data about the volume of passengers screened and staff on duty at peak hours.

Infax trained Helaire, TSA leadership and security personnel to use the queuing software, and will provide more training as personnel changes occur.

### Future Applications



Helaire notes that JAN may eventually use LiDAR technology in other areas of the airport. For instance, tracking passenger traffic in concessions areas could help retail shops and food/beverage vendors staff up for peak times. Data about passenger flow into the baggage claim area could be used to alert taxis and shuttles when customers will be ready for rides.

“We are still exploring our options as we look at every angle to provide a premier experience for our customers,” says Helaire. “Innovative tools like this can go a long way. They are low-maintenance, and all you need is connectivity and line of sight. The possibilities are endless.” ✈️



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# Whitehorse Int'l Embraces Drone Technology for Airfield Surveys BY MIKE SCHWANZ

## FACTS&FIGURES

**Project:** Airfield Drone Surveys

**Location:** Erik Nielsen Whitehorse Int'l Airport, Yukon

**Areas Surveyed:** Airfield markings, surface obstacles, airfield drainage

**Image/Data Collection:** 5 days (individual flights took about 25 min.)

**Approximate Cost:** \$45,000

**Drone Supplier/Operator:** Aerium Analytics

**Models Used:** Microdrone mdLiDAR 1000; Sensefly eBee Plus

**Key Benefits:** Reduced downtime for airfield inspections; increased accuracy & amount of data collected



For years, airport operators categorically derided drones as a safety risk and general nuisance. Now, many are putting them to work for security surveillance, wildlife management and other operation-enhancing purposes.

Erik Nielsen Whitehorse International (YXY), in Yukon, Canada, embraced the technology for airfield surveys.

Last July, two small drones were used at XYX to collect images for a detailed runway markings assessment, obstacle limitation surface surveys and runway drainage analysis. The flights took about five days, and the project cost approximately \$45,000.

“We were very pleased with the results,” reports Airport Manager Robert Manlig. “The data we received will help us continue to maintain regulatory compliance, and will help us plan future improvements of our runways and taxiways.”



ROBERT MANLIG

The drones were supplied and operated by Aerium Analytics, based in Calgary, AB. Several weeks of planning, however, were needed before they were used on-site at XYX.

Manlig first engaged with Aerium at the 2019 Airports Canada Conference in Kelowna, BC. “They gave us an impressive demonstration, showing us how drones were used at Edmonton Airport as well as a few other facilities. It became readily apparent that there were several possible uses for them at our airfield,” he says.

XYX’s footprint is fairly straightforward. It has one main runway that is 9,500 feet long, plus a shorter parallel runway and a cross runway. Year-round commercial service is provided by Air North—its main carrier—and Air Canada. Condor and WestJet provide seasonal service. Commercial flights comprise 60% of operations; general aviation and military aircraft comprise the other 40%.

After discussions with Aerium, airport management requested drone surveys of all airfield markings, potential surface

obstacles and drainage areas. The drone flights were scheduled for July, when the weather was most likely to cooperate.

Manlig notes that the project required detailed coordination. “We first had to give the drone operators special access to the airfield. Each day, one of our employees escorted them to the launch area,” he explains. “We also gave them the schedule of regularly scheduled commercial flights. In addition, we made sure they were in constant touch with the control tower. In most cases, they had 30 minutes to an hour to fly the drones before the next flight would arrive or take off.”

The Aerium team divided each runway and taxiway surface into sectors, and each flight covered a specific sector point. Individual drone flights lasted about 25 minutes, and the entire image/data collection effort took about five days.

The drones used Light Detection Ranging (LiDAR) or standard red, green, blue (RGB) scans to analyze paint markings, identify potential obstacle limitation surface hazards and survey overall drainage. Airport management received nearly instant feedback throughout the drone flights via a monitor stationed on the ground. The airport also received a complete package of digital scans a few weeks later.

The scans showed slight imperfections on some of the airfield markings. “We were able to get to work late last summer and this past fall to improve many of those things,” says Manlig. “We still have some work to do this spring.”

The obstacle limitation surface scans revealed that some of the tree lines on both ends of the main runway were a bit higher than regulations allowed. “That detailed data showed us exactly which trees had to be trimmed, and we showed those scans to a local tree-cutting service when they did the cutting. Some of the trees at both ends had to be reduced 10 to 15 feet,” Manlig says.

**Mission Details**

One of the drones used at YXY (a Microdrone mdLiDAR 1000) was approximately 4 feet wide, 2 feet high and weighed about 13 pounds. The other, a



*Drone operators had an airport escort and maintained constant contact with the air traffic control tower.*

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The drones captured images and data for a runway markings assessment and other airfield surveys.

Sensefly eBee Plus, was even smaller (43-inch wingspan, 6 inches high, 2.4 pounds weight). Aerium shipped the units to the airport and provided personnel to operate them.

One of the main objectives was to gather images for an airfield markings assessment. Brandon Southgate, a remote sensing and geomatic specialist for Aerium, says that this is a fairly common airport use for drones. The aerial images they collect help airfield

maintenance crews pinpoint paint that has faded or is peeling off, markings in the wrong areas, and old markings that were not completely removed.

“Our drones help airports comply with Canada’s TP312 standard, which is similar to Part 139 requirements issued by the FAA,” says Southgate.

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Most drones used at airports fly about 150 feet high, he continues. “The drones used at Whitehorse flew at around that height, which is standard for the types of imagery the airport requested,” says Southgate. “For some types of imagery, they can go as high as 400 feet, which is the maximum allowed at most airports.”

The drones used at YXY also measured and scanned potential obstacles. “Our clients often request this service, because of the variety of potential hazards near and on the airfield,” states Lina Kunina, media and marketing coordinator for Aerium. “Common obstacles include hills, tree lines, houses, hills, office buildings, power lines and cellphone towers.”

Beyond gathering information about obstructions and airfield markings, drones have other applications at airports. Some use them for perimeter security or to track wildlife. Kunina notes that drones are also effective for spotting foreign object debris, gathering data for pavement condition indexing or runway displacement analysis, and inspecting perimeter fences and rooftops.

After data is collected, it is colorized and sent to clients digitally. Because the file sizes are large, Kunina advises airports to verify that their equipment and software are compatible, and can handle


the volume of data embedded in the scans. “We had a bit of a problem at Whitehorse when we sent just one large file, but then we simply divided it into smaller files. That worked fine,” she adds.

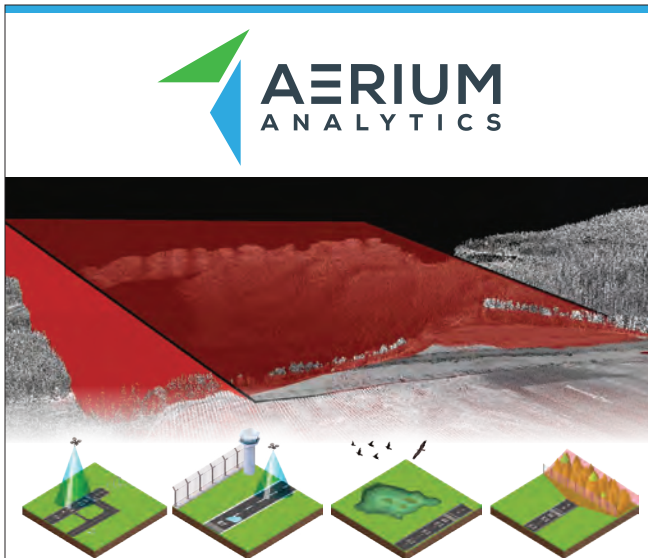
Manlig describes YXY’s drone project as a positive experience and is inclined to use the technology again in the future. “Before this summer, though, we want to make sure we follow up and implement the changes that last year’s drone survey indicated,” he says. “In the future, I am sure we will use them for other projects.”

### Other Tech-Forward Projects

Besides using drones, YXY embraces technology in other areas, too. For example, its windsocks are solar-powered. “We can do that because in the summer, we get 23 hours of daylight, and can store energy for the rest of the year,” Manlig explains.

The airport also uses portable lighting to save energy. “We use those on a case-by-case basis; they are used primarily on our secondary runway (14L-32R),” he says.

YXY recently purchased new precision approach path indicators with LED. However, due to the area’s short construction season, crews will wait until this summer to install them. 




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## FACTS & FIGURES

**Project:** Relocating Fuel Truck Reloading Station

**Location:** Dallas Fort Worth Int'l Airport

**Total Cost:** \$4.2 million (includes demolition of old station)

**Strategy:** Remove fuel truck filling rack from Terminal D; build new facility near Terminal A

**Catalyst:** Impending extension of Terminal D

**Timeline:** Project initiated in fall 2018; design completed Feb. 2019; key crane permit approved in late April 2019; facility fully operational in mid-Sept. 2019

**Design Features:** 2 refueler loading skids, each able to pump 400 gal./min.; 10,000-gal. spill containment; 20,000-gal. oil-water separation tank; emergency shut-off system

**Fuel Facility Owner:** DFW Fuel Co.

**Operator:** Allied Aviation

**Consulting Engineer:** Argus Consulting

**General Contractor:** Talon Industries

**Civil Contractor:** Scott Tucker Construction Co.

**Electrical Contractor:** JMEG Electrical


**Emergency Fuel Shut-off System:** Koetter Fire Protection

**Fuel Skid Fabricator:** Garsite

**Oil/Water Separator:** Highland Tank

# Expansion at Dallas Fort Worth Int'l to Relocate Refueler Station

BY THOMAS J. SMITH

 Dallas Fort Worth International Airport (DFW) is doing the Infrastructure Shuffle. You know the drill: In order to improve one area, you first have to modify another.

Originally located on the south end of Terminal D, the airport's sole fuel truck rack was relocated to a new base on the north end of Terminal A. The move was made last summer to free up space for the expansion of Terminal D, which is slated for completion next year.

While most of the airport's 164 gates are serviced by an underground fuel hydrant system, refueling trucks are used to fuel aircraft not parked at hydrant-accessible gates.

DFW Fuel Co., the airport's fuel consortium, spent \$4.2 million to build the replacement station and demolish the old one. Allied Aviation continues to operate the fuel facility.

"American Airlines continues to invest in airport facilities and infrastructure that will

strengthen our DFW operations and enable long-term growth," notes Matthew Duncan, the airline's senior manager for fuel operations and current head of DFW Fuel. "Fuel facilities are critical to any airport expansion."

Duncan joined DFW Fuel late in the relocation process, but Argus Consulting provided engineering continuity throughout the project.

The new facility, which opened last September, is practically a mirror image of the facility it replaced; however, its new location presented a fresh set of design challenges. The old station, also designed by Argus, was built in 2008. "We just needed to replace what was there," explains Seth Newbold, the company's project engineer for the DFW job.

The new station has two tanker truck filling skids, each able to pump 400 gallons per minute, and a secondary containment structure capable of handling a 10,000-gallon spill. A 20,000-gallon underground separation



# Drives Need

tank holds oil products for eventual pumping while allowing water to pass to the airport’s wastewater treatment plant. There are also parking spaces for eight additional refueler vehicles—all within the drainage-controlled area.

One upgrade from the previous facility is a state-of-the-art emergency shut-off system. It is a particularly important feature, as Allied monitors the new station from the off-airfield fuel farm. Sensors and closed-circuit cameras facilitate precise control from the remote location. Additionally, the new skids were equipped with a secondary means of overfill protection system that will be required by June 2021.



SETH NEWBOLD

## Tight Timeline

In fall 2018, DFW Fuel and the airport approached Argus to find a location, design the fuel rack and plan the demolition of the existing station. Newbold notes that time was of the essence, because the Terminal D project was moving along quickly.

By coincidence, there was an old refueler loading station near the corporate aviation terminal that had not been used for about seven years. Moreover, the abandoned station was connected

to the airport’s underground fuel pipeline. “We could excavate and tie into the existing 10-inch fuel pipe; but we could not re-use any of the equipment because it was outdated,” explains Newbold. The site had to be reconfigured to enable the parking of the eight refuelers within an expanded containment area.

Argus completed the design in February 2019; and Talon Industries, of nearby Arlington, won a three-way bid to serve as



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the general contractor. All three contractors that bid for the job had previously worked with Argus. Talon has completed a variety of fuel projects at DFW since 1997.

With the airport's goal for a September switchover looming large, Argus ordered a prefabricated fueling skid system from Garsite and the oil-water separation tank from Highland Tank. Newbold explains that the contractor would typically place such orders later in the process, but pushing ahead saved the team three to four months.

"We were under pressure from the airport to get done as soon as possible," he recalls. "We spent almost every day from April through June trying to figure out ways to expedite the project."

Talon created a nontraditional work sequence and added extra manpower to meet the deadline. Some crews worked 60-hour weeks to complete the job on time.

"In the best of worlds, this large tank would be installed well in advance. Then crews would put the utilities on top of that, and then start the civil work," explains Keith Muskrat, the project manager from Talon. "We had to totally



KEITH MUSKRAT

re-sequence the work to be able to accommodate our accelerated schedule. They did a fantastic job."

Crews started pouring concrete on the perimeter to facilitate timely installation of the underground oil separation tank. And the pre-fabricated fueling skids were put in place before the tank piping installation was complete. Once the tank was installed and pipelines were connected, the concrete crews had little time to finish before the deadline.

Newbold notes that the project got off to a slow start because it took the FAA nearly 65 days to approve the permit needed for crews to use a 100-foot crane on the airfield. Typically, the approval time is about 45 days, he adds. The delay was attributed to a backlog caused by the government shutdown in late 2018.

After the permit was secured in late April, work began full-steam. Allied started to use the new facility in early September on a limited, trial basis. Full operations were switched over by mid-September.

### Out With the Old

During the second phase of the project, crews demolished the existing refueler loading station and refueler parking area near



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Terminal D and turned over the site to the terminal extension project contractor. Key tasks included removing the old fueling skids and a 20,000-gallon oil-water separation tank.

After crews performed limited soil remediation to remove potentially fuel-contaminated soil, the site was turned over in early October. "It was fast-paced to stay out of the way of the Terminal D contractor," says Muskrat.

APR Aviation Partners is the Construction Manager at Risk for the Terminal D expansion. It is a joint venture of Archer Western Construction, Phillips/May Corp. and Reyes Group.

Unfortunately, as APR Aviation Partners excavated the site, crews found contaminated soil.

"We worked in tandem on the site," Muskrat explains. "The removal crews stayed ahead, so APR could keep moving with their excavation."

After the additional soil clean-up, the site was turned over to the airport on Oct. 29.

"The whole project was relatively small," Muskrat observes, "but with any airport job, there are always challenges."



Each of the new loading skids can pump 400 gallons per minute.

With the new fuel truck station running smoothly since last fall, construction continues on the extension of Terminal D. That project will support international and domestic operations by adding 150,000 square feet to the southeast corner of the terminal, with four new gates that are able to serve both domestic and international flights. Officials expect the new space to open in 2021. ✈️



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# Savannah/Hilton Head Int'l Updates Baggage

## FACTS&FIGURES

**Project:** New Outbound Baggage Handling System

**Location:** Savannah/Hilton Head Int'l Airport

**2018 Traffic:** Nearly 1.4 million enplanements (airport record)

**Project Cost:** \$6.7 million for Phase I; \$4.3 million for Phase II

**Funding:** Phase I funded with passenger facility charges; Phase II funded with TSA grants

**Architect:** RS&H

**Design Consultant:** JSM & Associates

**Timeline:** Phase I completed in 2018; Phase II completed in Aug. 2019

**Key Benefits:** Increased efficiency; enhanced automation; colocation of business entities; improved work environment

**Accolade:** 2019 Commercial Service Airport Project of the Year by the Georgia Airports Association



Anytime an airport outgrows part of its infrastructure, it's challenging to keep operations running smoothly.

When that component is the outbound baggage handling system, it can cause a cascade of other operational inefficiencies.

When luggage doesn't get loaded on time, it stresses bag screeners, operations personnel, airfield crews, airline partners, customer service agents and, ultimately, passengers.

Savannah/Hilton Head International Airport (SAV) lived this difficult industry reality during consecutive years of substantial growth in passenger volume. Eventually, it became untenable for the Georgia airport to cope with an outbound baggage handling system that was less-than-ideal from the start.

Fortunately, conditions have improved dramatically for SAV, its workers and customers. The airport completely replaced its former single-pier baggage handling system in a two-phase \$11 million project. The first phase, launched in 2015 and completed in 2018, consolidated and centralized the TSA baggage screening checkpoint. The second phase, which automated the newly installed system to make it even more efficient, launched in 2018 and was completed in August 2019.

Mark Denmark, assistant director of Engineering for SAV, reports that Phase I



MARK DENMARK



## System

BY PAUL NOLAN

system installed at SAV proved to be rather cumbersome: Each airline inducted luggage at the ticketing area and the items were transported to decentralized screening locations in the bag make-up areas via bag tug carts. After bags were screened, they were loaded back onto carts and towed back to be sorted by airline personnel for loading onto airplanes—a manual and inefficient process.

“The TSA screening area was sheltered, but there was no air conditioning,” explains Keith Nix, a senior engineer with RS&H and project manager for the baggage systems upgrades at SAV. “Not only could it get very hot in there, but workers also had to contend with the exhaust fumes from all the tug cart vehicles driving through. It wasn’t the best environment, and the process was extremely inefficient.”



KEITH NIX

Rapid growth in passenger volume further complicated the already difficult situation. Year after year, SAV’s enplanements increased by double-digit percentages. Feeling the strains, airport officials commissioned a third-party study

in 2014. The resulting report confirmed the need to replace the existing baggage handling system with something more efficient.

The airport performed its due diligence by visiting other similar airports to survey their systems, and SAV ultimately modeled its screening system after the one that had been recently installed at Piedmont Triad International in Greensboro, NC.

“They knew they wanted a centralized screening facility that was isolated and climate-controlled,” Nix explains. “They also knew they wanted to have a common system that would collect all the bags from all of the ticket counters and route it to a central point.”

Together, the changes would enhance conditions for workers and improve the handling process by eliminating the need to cart baggage back and forth for screening.

Although the RS&H study made it clear that a new system was needed, TSA funding for the project was not available. With passenger volumes continuing to rise, the airport could not wait any longer and designated passenger facility charge funds to pay for the project. Construction on Phase I began in 2016 and was completed in 2018.

cost \$6.7 million and was paid for with passenger facility charges; Phase II cost \$4.3 million and was largely funded by TSA grants.

A study by RS&H, an architectural, engineering and consulting firm with a full-service aviation practice, provided direction for both phases.

### Passenger Growth Spurs Updates

Like other U.S. airports, SAV faced formidable changes and challenges after 9/11. The growing airport had limited space at its disposal when the newly formed TSA scrambled to implement stricter, more uniform security screening processes. As a result, the checked bag screening

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TSA added a fourth explosives detection system during the recent project.



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The new centralized TSA screening area was created in space that once housed kitchen equipment and other items for airport concessionaires, but was no longer being used. Although the project required minimal new construction, extensive renovations were needed to carve a path for the luggage conveyor belts that now serve the airport's north and south wings. "Anytime you're trying to route a complex baggage handling system through an existing building structure, that in itself is a challenge," Nix comments.

As the baggage handling system design consultant, JSM & Associates provided conceptual and schematic design concepts, construction documents and construction administration services for the project. Later, it provided testing and commissioning support. "Getting the bags downstairs while maintaining specific rights of way, design criteria and keeping the airport operational was a challenge," says Brian Shomock, vice president of operations for JSM. For instance, large structural cross braces that could not be removed limited path options for the new conveyor belt system.



BRIAN SHOMOCK

"That's the nature of construction, right? You just have to work through that and design around issues. It was nothing that was heart-stopping," he states.

### Fortunate Latitude

Installing the new baggage system while passengers continued to stream through the airport was also tricky. But it was a challenge that RS&H and JSM had both experienced before. Their plan to

phase-in the new system took advantage of a vacant counter in the ticketing area. As the project team shut down each airline's baggage conveyor belt for modifications, the spare belt at the vacant counter was pressed back into service. "Our Operations staff did a tremendous job keeping track of those bags and moving them to the right locations when they got down to the lower level," Denmark reports.

Before Phase I was completely finished, crews began on Phase II. Automation was added to the new baggage handling system to eliminate work that was still being performed manually. This reduced the potential for handling mistakes and provided a more ergonomic and efficient operation, notes Shomock.

The fully automated system, known as a mini inline system, is among the last of its type to be approved by TSA, says Nix. The agency, which had been using three explosives detection system machines at SAV, added a fourth as part of Phase II.

"We changed it from stem to stern—from a decentralized, manually intensive operation to a modified standalone system finishing with a fully integrated mini inline system," Shomock reflects.

The sweeping improvements were immediately leveraged and appreciated. In 2018, SAV handled nearly 2.8 million commercial



*The new baggage system is more efficient and ergonomically safe for workers.*

passengers—a 13.4% increase over 2017 and an all-time record for the airport. With all signs pointing to continued growth, airport management and frontline employees are relieved to have a baggage handling system that is ready to handle it. ✈️

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TALLAHASSEE  
INTERNATIONAL AIRPORT

## FACTS & FIGURES

**Project:** Solar Farm Addition

**Location:** Tallahassee (FL) Int'l Airport

**Facility Name:** Tallahassee Solar II

**Size:** 320 acres, approximately 130,000 solar panels

**Annual Output:** 42 MWac  
(Tallahassee Solar I generates another 20 MWac/yr)

**Development:** Origis Energy USA Inc.

**Funding Entities:** Origis Energy USA Inc.; Global Atlantic Financial Group

**Project Management & Environmental Services:** Michael Baker Int'l Inc.

**Construction Management & Procurement:** Origis Technics LLC

**Environmental Studies & Permitting:** Cardno

**Solar Construction:** Blattner Energy Inc.

**Medium-Voltage Substation:** Beta Engineering

**Civil & Stormwater Design:** Half Associates

**Photovoltaic Panel Manufacturer:** First Solar

**Ongoing Operations & Maintenance:** Origis Services

# New Addition at Tallahassee Int'l Creates World's Largest On-Airport Solar Farm

BY JENNIFER DAACK WOOLSON

Building the world's largest airport-based solar farm doesn't come without challenges. There were lots of moving parts, an aggressive schedule and unexpected environmental and design complications. But the team developing the new 320-acre, 42-megawatt (MWac) solar farm at Tallahassee International Airport (TLH) prevailed—and also shattered previous records for renewable energy production for airport sited solar farms.

When the new facility became operational in January 2020, it joined TLH's other solar farm that came online in 2018. Together, the two solar farms span 400 acres and produce 62 MWac per year, vaulting the Florida airport well ahead of other industry standouts: Cochin International Airport in India at 40 MWac and Indianapolis International Airport with 17.5 MWac.

TLH's latest addition, Tallahassee Solar II, was completed after nearly two years of planning, design and coordination by a team that included the airport, the city of Tallahassee's electric utility department, Origis Energy, Michael Baker International and dozens of contractors and agencies.

"The city of Tallahassee's 62-megawatt airport-based solar facility, the largest of its kind, is a testament to our commitment to sustainability," says Tallahassee Mayor John Dailey. "As the capital city of the Sunshine State, we are dedicated to preserving our community's natural resources. Utilization of our airport property for the solar farm is part of our innovative approach toward reaching our goal of 100% net clean, renewable energy by 2050."

Although the team had learned a lot working together to complete Tallahassee Solar I, TLH's 20-MWac solar farm, several factors made this experience unique—and challenging.

For starters, the terrain of the site was vastly different. Instead of a relatively flat area, they had to contend with hills, two potential sinkholes and wetlands. They also had to tread carefully around protected flora and fauna including the bent golden aster, gopher tortoises and Southeastern American kestrels. The sheer size of the project required the team to add a substation on the property.

Tackling these problems proved to be tricky and time-consuming, but manageable. However, two other massive roadblocks took the team completely by surprise—and had the potential to greatly impact the schedule. One was the five-week partial federal government shutdown in early 2019, which led to significant permitting delays. The second was an unexpected vacancy in the FAA Orlando Airport District Office that occurred when one environmental program specialist retired and the other passed away. Instead of starting the FAA NEPA process in July 2018, they had to wait until the empty post was filled in November 2018. Plans to improve an existing access road for use by heavy construction equipment was one key aspect affected by the delay.

## Countless Moving Parts

Despite such setbacks, the new solar farm was completed on time. Project members credit the dedicated, collaborative team and one massive project spreadsheet.

It helped that many of the key players had worked together on Tallahassee Solar I, says David Pollard, director of aviation for TLH. "We had the benefit of that experience and the lessons learned during the building of the first solar farm," he says. "We were able to move ahead at a lot quicker pace than we might have otherwise."



DAVID POLLARD



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Mariben Andersen, senior associate and environmental manager at Michael Baker International, was in charge of the vital spreadsheet and many other elements of managing the project, including environmental assessments. When the timing complications came into play, Andersen worked with team members to morph sequential elements into concurrent tasks wherever possible to streamline the schedule and save money.



MARIBEN ANDERSEN

Those tasks included more than a dozen processes and permitting requirements, including the FAA Environmental Assessment, the Tallahassee Natural Features Inventory, the city Environmental Impact Analysis, and a permit from the Florida Fish & Wildlife Conservation Commission allowing the relocation of gopher tortoises, just to name a few.

Each task involved subconsultants and coordination with various agencies. That's when Andersen's massive spreadsheet often saved the day. "What we learned from Tallahassee Solar I was that there had to be a maestro who knew all the moving parts and who could coordinate," she explains. "The challenge was to make all of the schedules work together to meet the goals of the project. It was really a collaborative effort."

Pollard took the lead with the FAA requirements, especially from a safety perspective. He says that pulling FAA partners—local, regional and national, when necessary—into the process early and keeping them informed at every step helped facilitate permitting and ultimate project approval.

Meanwhile, Ben Cowart, manager of alternative energy with the city of Tallahassee, handled contract negotiations for three key contracts: the energy purchase agreement with FL Solar 4 LLC, the land lease between the city and TLH and an interconnection agreement, which allows an electric generation source to connect into the city's electric system.



BEN COWART

**Optimizing the Array**

Although the two solar farm projects at TLH occurred less than two years apart, panel

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efficiencies improved dramatically since the first project was completed due to rapid developments in solar technology. This particularly came into play for Jason Thomas, director of development for Origis Energy, as he ensured timely procurement of the long lead-time items such as transformers, inverters and panels. Advancements in panel technology resulted in a more efficient use of the land. This efficient design left more room for stormwater to evaporate or percolate into the soil and meet FAA requirements, explains Thomas.



JASON THOMAS

The other major design decision was determining how to angle the panels within each array. Before a single panel was placed, extensive studies were conducted to ensure that the array would not cause glare toward flight paths. The design team used a software program that simulates 365 days of sunshine to determine the safest angle for each of the 130,000 panels that make up the solar array.

A portion of the array faces due south, but not all of the panels are oriented at the optimal angle for energy production. Thomas explains that some portions face southwest to maximize afternoon energy production, which aligns with the utility's afternoon peak energy demand and also avoids causing glare.

Pollard focused on making sure that the array didn't add any visual obstructions between the FAA air traffic control tower and runway, and that there was no glare for pilots and/or tower personnel.

"We did a good analysis of that glare and got others to look at it and validate it," he says. "Until they could demonstrate zero impact, we were not willing to press forward."

Another safety consideration for on-airport solar facilities is mitigating the risks of an accident and recovery efforts associated with a live electrical field.

Pollard says that TLH is already enhancing its emergency preparedness for such an incident. In February, his team took part in a full-scale mock disaster exercise that included various scenarios involving safely accessing the solar farm. The airport also



Project managers regularly shared the "big picture" with contractors, so they knew how their individual tasks fit into the larger plan.

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The two farms at TLH span 400 acres and produce more energy than any other airport-based solar farm in the world.



PHOTO: HELIOLYTICS INC. & ORIGIS ENERGY USA

implemented familiarity training as part of its annual work plan to share essential emergency protocols with new firefighters or airport staff.

### Win-Win-Win Situation

The addition of the second solar farm benefits the airport, city of Tallahassee and the environment.

From the airport's perspective, the solar farm provides a great source of non-aeronautical revenue on what would otherwise be an unused parcel of land. (The city utility leases for the farm from the airport.) "It certainly helps with our overall budget as we try to keep our costs as low and competitive as we can for the carriers," says Pollard. "Ultimately, they pass costs along to travelers."

Cowart notes that the city electric utility comes out a winner because it gets an energy source at a fixed rate, which provides price certainty and fuel diversity.

When Cowart originally presented the plan from Origis for a second solar farm at TLH, the City Commission saw it as a "no-brainer" and quickly gave it the green light. It reduces the city's carbon footprint, supplies power to 9,500+ homes and further solidifies Tallahassee's standing as a low emitter at a national level, he explains. And ultimately, the additional airport solar farm supports the city's transition to 100% clean energy by 2050.

### Lessons Learned


Takeaways from Tallahassee Solar I certainly made the construction of the larger second project run more smoothly, and new lessons from Tallahassee Solar II will help guide other airports

considering their own solar projects. While each of the contributing entities had varying priorities, their takeaways share some common themes: coordination, collaboration, communication and contingencies.

Andersen, from Michael Baker, says that it was essential to share a big-picture perspective of the project plan and make sure that participants knew when and how their tasks fit into the master plan. "We scheduled several meetings throughout the project and updated an overall project schedule so that tasks that affected or were necessary for the next steps were identified, and the consultants working on them were aware of the importance of meeting their deadlines," she says.

Thomas adds that communicating on a regular basis was critical as the team approached what he considers the most nerve-wracking portion of the project. "You're about to get permits, and it feels like everything is going to be late and you have trucks that are going to show up on a certain date based on those projections," he relates. "As the permitting and engineering folks communicated with us, we were able to communicate those changes to our supply chain and make sure that we weren't delivering things to a site that wasn't ready or permitted."

The team also advocates for involving agencies early and often so they can help keep permitting processes on track.

Another important lesson: Always expect the unexpected. "In complex projects, I can tell you that if you have a Plan A and a Plan B, you better have a Plan C, because things happen," Andersen says. "Contingencies are always good." 

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Southwest

**James Holtz**

[james.holtz@byd.com](mailto:james.holtz@byd.com)

Mid-Atlantic

**Karl Wheeler**

[karl.wheeler@byd.com](mailto:karl.wheeler@byd.com)

Midwest

**Jason Yan**

[jason.yan@byd.com](mailto:jason.yan@byd.com)

NY Tri-State

**John Manzi**

[john.manzi@byd.com](mailto:john.manzi@byd.com)

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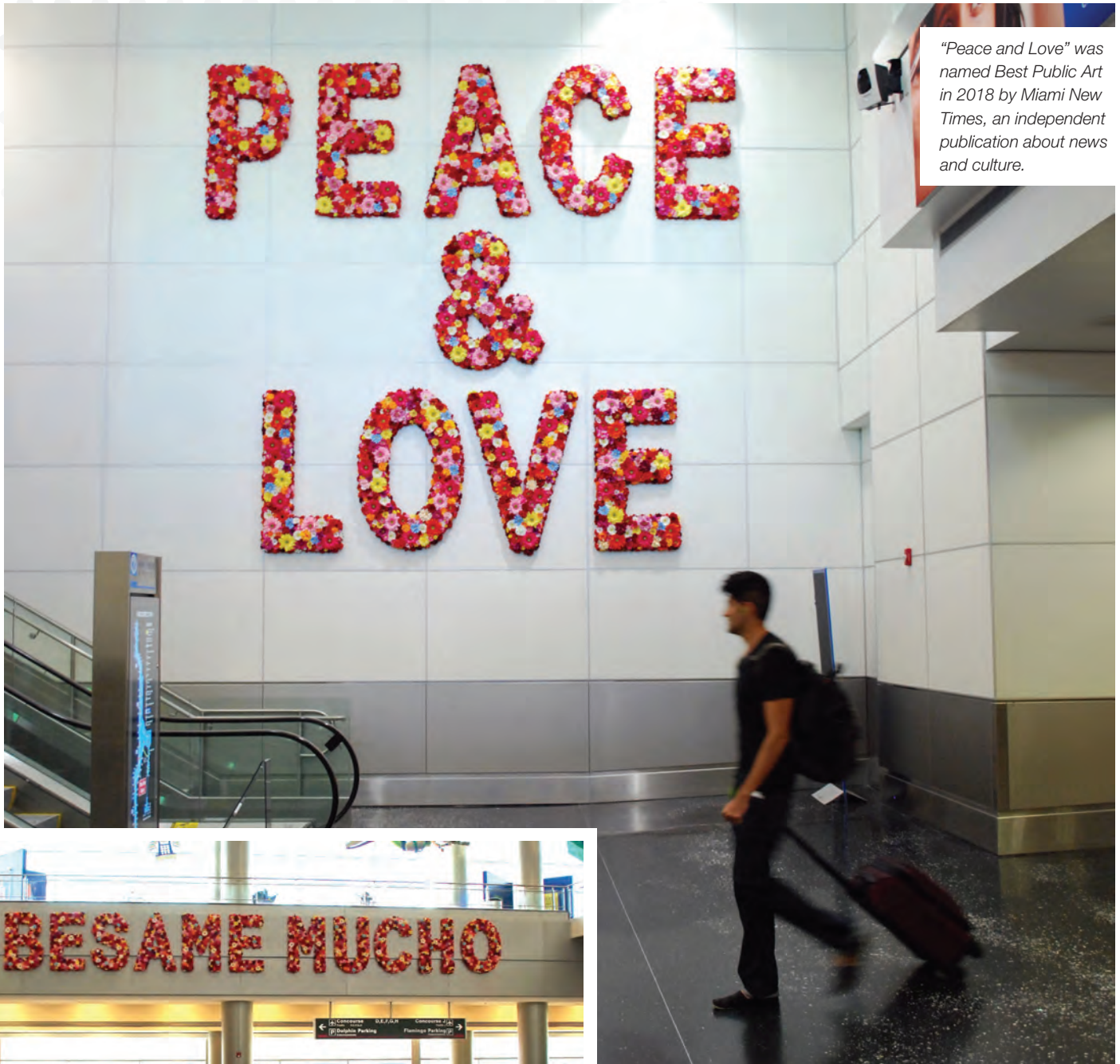
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"Peace and Love" was named Best Public Art in 2018 by Miami New Times, an independent publication about news and culture.

Four uplifting art installations at Miami International Airport (MIA) use Beatles references and flower power to deliver positive messages throughout the terminals and concourses. Created by the Miami architect/artist team of Rosario Marquardt and Roberto Behar, the works from R&R Studios brighten MIA's facilities with optimistic word sculptures created out of fabric daisies, mums and other colorful blooms.

*Peace and Love* acts as a universal welcome sign in Concourse D of the North Terminal; while *Besame Mucho*, in the South Terminal International Greeters Lounge, speaks more directly to the airport's large segment of Spanish-speaking passengers. (MIA offers more flights to Latin America and the Caribbean than any other U.S. airport and is the third-busiest

airport in the U.S. for international passengers.) "*Besame mucho*" loosely translates to "kiss me a lot" in English.

*All Together Now* enhances Concourse H in the South Terminal; and *All We Need is Love* issues a sunny reminder in the Customs corridor of the North Terminal.

Partners in life and design, Marquardt and Behar strive to erase boundaries between art and life and offer "imaginary solutions" for a better world.

Installations by R&R Studios appear throughout the world. A larger-scale version of *Besame Mucho* appeared at the 2016 Coachella Valley Music and Arts Festival. ✈️

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## Legalized Pot & Airports – Caught in the Middle?

 As more states legalize the use of marijuana for medical or recreational use, more U.S. airports have found themselves caught in the middle of contradictory federal and state laws.

On one hand, marijuana remains a Class I controlled substance under federal law, and possession or distribution within the U.S. is banned. On the other, many states have legalized, and regulate, the use of pot within the state.

Within the boundaries of states that have legalized marijuana use, the federal government has generally declined to exercise its rights to prosecute. But when travelers possessing marijuana fly from a state where it is legal, they face a dilemma: Federal law governs U.S. airways and prohibits the possession of pot.

When passing through federal security checkpoints, what are passengers to do? Moreover, what are airports to do?

U.S. cities and their airports have addressed this legal conflict in several ways. For instance, the city of Denver has simply banned possession of marijuana within Denver International Airport, even though it is otherwise legal in Colorado. Others, such as the city of Chicago, have installed “amnesty boxes” into which travelers with cold feet may deposit pot before passing through security. Some airports in states where marijuana has been legalized have not taken action at all, while others have embraced local legalization and allowed



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*is a partner with Kaplan Kirsch & Rockwell, a national law firm headquartered in Denver, with additional offices in New York City, Boston, San Francisco and Washington, D.C. Bannard concentrates his legal practice on representing airports in a wide variety of matters, including compliance with federal regulatory requirements.*

local pot shops to advertise within the airport.

The consequences for marijuana possession, of course, vary by state. TSA’s position, as stated on its website and in media interviews, is that it focuses on detecting security threats. TSA officers consequently do not search for marijuana at security checkpoints; but if any illegal substance, including marijuana, is found, TSA will refer the matter to local police.


What happens from there depends on local law and airport policy. Where marijuana has not been legalized, offenders are subject to arrest. Where marijuana is legal, however, possessors will often be told to dispose of the substance—either in an amnesty box or otherwise.

Recently, the most troubling issue has been travelers who carry marijuana onto planes that subsequently land where pot possession is prohibited and severe penalties for possession are imposed. At least one U.S. airport has been contacted by representatives of a foreign government and asked to take steps to

stop travelers flying through that airport from bringing marijuana to their country.

What is an airport operator to do? As noted above, several approaches exist. The simplest, and perhaps most conservative, is to adopt Denver’s approach and ban pot within the airport. This not only simplifies decisions for frontline personnel, it also helps assure compliance with applicable federal requirements, including the Drug-Free Workplace Act.

Amnesty boxes are also becoming more popular, but airport operators need to think through how they will be secured, maintained and emptied. Earlier this year, an amnesty box at Chicago Midway International was robbed.

The most important advice may be that if your airport is located in a jurisdiction where pot has been legalized, don’t ignore this issue. Each community will warrant a different approach; but until federal law is amended to repeal the ban or devolve the issue to each state, this conflict will continue to vex airport operators and their customers. 

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