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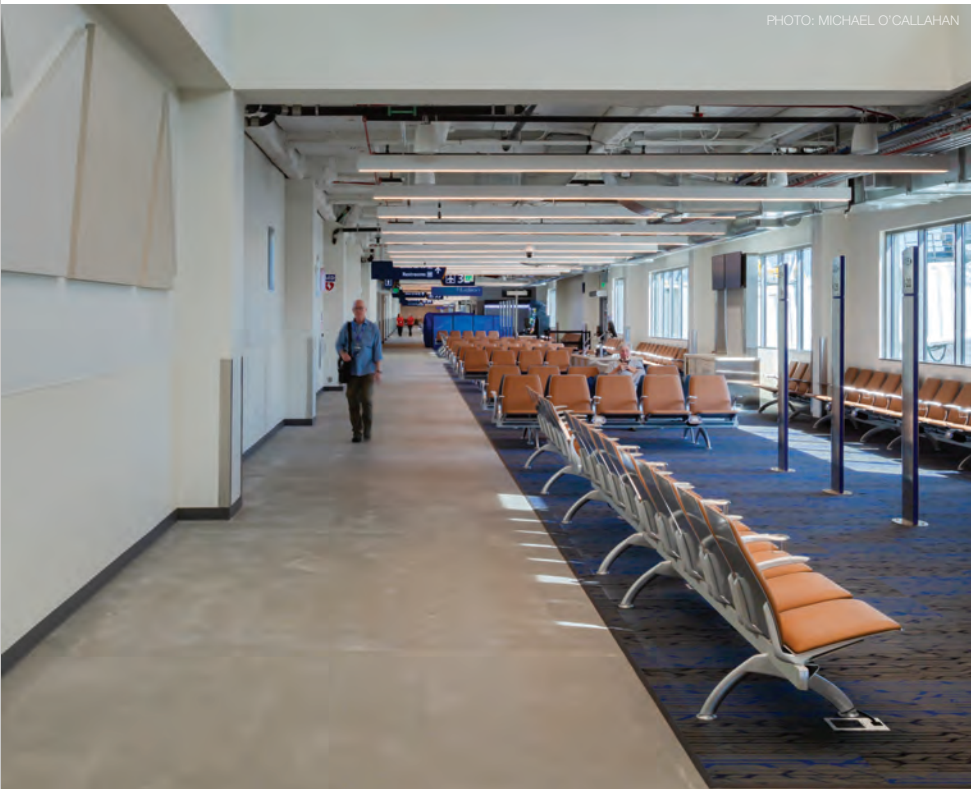


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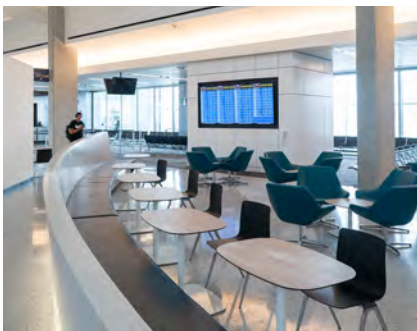
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**Publisher**  
**Paul H. Bowers**  
 paulbowers@airportimprovement.com  
 262.510.7832

**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**  
 lisamunday@airportimprovement.com

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

**Contributing Writers**  
 Jennifer Bradley, Mindy Hamlin,  
 Paul Nolan, Robert Nordstrom  
 Jodi Richards, Mike Schwanz,  
 Kristin Vanderhey Shaw, Thomas Smith,  
 Victoria Soukup, 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**  
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## Artscapes

We've all heard the phrase, "When you've seen one airport, you've seen one airport."

The same can be said for airport art. By its very nature, artwork is unique. Kind of like snowflakes...or terminals. The right piece can be the perfect finishing touch for new construction or a newly renovated space; but it can also breathe new life into existing facilities.

There is some incredible artwork on display at North American airports. And it's not art for art's sake; it's art for passengers' sake.

That's why we've decided to introduce a new feature in 2020: Artscapes. Our objective is simply to present airport art for your personal enjoyment and inspiration. Perhaps something will even stimulate discussion or thought about what's possible at your own facility.

Our "first olive out of the jar" is a whimsical choice: the *Funk Muffins* exhibit at St. Louis Lambert International Airport. I think it's quite delightful. Turn to Page 76 to see what you think. After all, art is subjective. That's one of the great things about it.



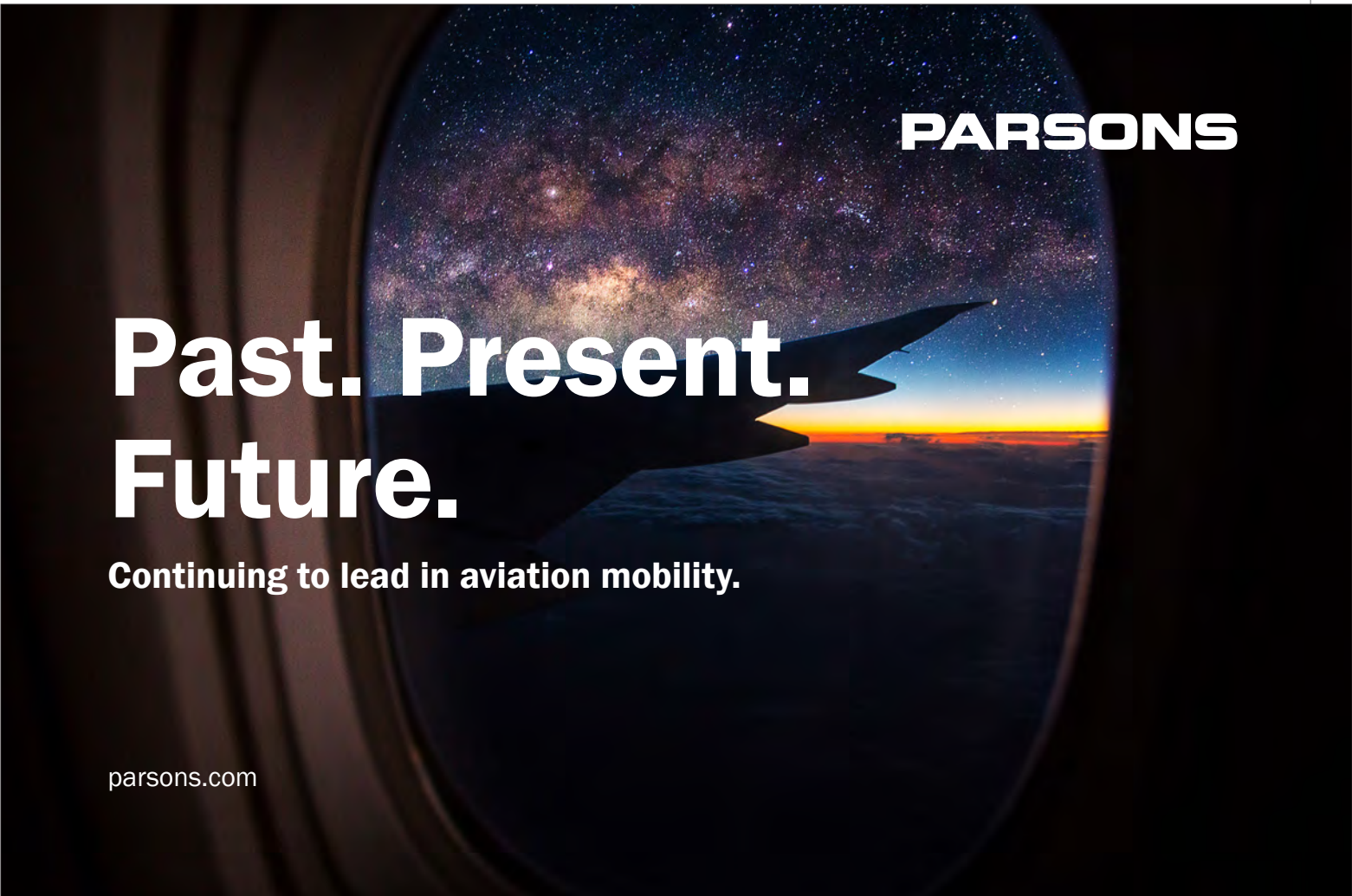
PAUL BOWERS, PUBLISHER

If you have a piece of art or an installation you're especially proud of, please bring it to my attention. You can email me at [paulbowers@airportimprovement.com](mailto:paulbowers@airportimprovement.com). I look forward to seeing what your airport has chosen to showcase. Who knows? It may be just the kind of Artscape we'd like to feature in the magazine.

As always, thanks for reading.

Cheers,

*Paul*

A large advertisement for Parsons featuring a circular window view of a night sky with the Milky Way galaxy and a sunset over clouds. The Parsons logo is in the top right, and the text "Past. Present. Future." is in large white letters on the left.

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**PARSONS**



# San Jose Int'l Adds Temporary Gates to Meet Unprecedented Traffic Demand

BY ROBERT NORDSTROM

 In 2010, Norman Y. Mineta San Jose International Airport (SJC) opened its brand-new Terminal B. Silicon Valley had survived the dot-com crash, and the greater Bay Area was just starting to come out of the 2008 Great Recession. Established giants like Google and Apple were rebooting, and new high-tech companies were growing like wildflowers. In short, the local business community was thriving and ready for SJC to expand.

As it turned out, the new terminal, a host of other modernization projects and the subsequent addition of two more gates in 2017 still wasn't enough to support the airport's unprecedented passenger growth.

So the city-owned airport built a \$58 million interim facility to serve its rising passenger volume until more permanent gates could be added. Five temporary gates opened in summer 2019, and a sixth opened a few months later.

Southwest Airlines, SJC's largest carrier, leases all six of the interim gates as well as eight others in the permanent Terminal B concourse.

Over the past five years, SJC has been one of the country's fastest-growing airports. In 2018, it served 14.3 million passengers, a 52% increase from 2014. By year-end 2019, SJC expected to serve 15.7 million travelers, almost 10% more than the previous year.

Given the airport's unprecedented growth and the addition of several international carriers, passenger gates were at capacity. Some airlines, Southwest and Alaska in particular, were operating out of two terminals, which created operational inefficiencies, not to mention long walks for some connecting passengers.

"It was very inefficient and confusing for our passengers," says Judy Ross, assistant director of Aviation at SJC. "We needed gates, and we needed them fast."

With air carriers clamoring for more capacity, airport and city officials agreed that adding an interim gates facility to Terminal B was the quickest and most efficient solution. The new gates are



JUDY ROSS





PHOTO: MICHAEL O'CALLAHAN

designed to handle up to 10,800 travelers per day (4 million per year)—about 50% more than Terminal B's original 12 gates can accommodate.

### Fast-Track Solution

The original plan called for four temporary gates, but the airport and city ultimately entered into a design-build contract with general contractor Hensel Phelps and Fentress Architects to build six. Contracts were signed in June 2018, and construction began in July. The first five gates opened for business 11 months later in June 2019; and the last gate was ready in November, just in time for the Thanksgiving holiday.

SJC plans to replace the interim gates with permanent gates in five to seven years. At less than 30 feet wide, the facility fits between the future site for the permanent

building and the associated passenger boarding bridges. As such, it can remain in use while the permanent building is constructed.

AERO Systems Engineering provided airside planning/engineering services; and AERO BridgeWorks furnished and assembled the boarding bridges and associated equipment. "Six new aircraft parking positions serviced by new boarding bridges were designed to service a range of ADG-III aircraft, including the Boeing 737, the dominant aircraft in the Southwest Airlines fleet," informs David Meyers, project manager with AERO Systems Engineering.



DAVID MEYERS

## FACTS&FIGURES

**Project:** Interim Gates Facility

**Location:** Norman Y. Mineta San Jose Int'l Airport, Terminal B

**Owner:** City of San Jose

**Cost:** \$58 million

**Scope:** 6 gates

**Strategy:** Fast-tracked interim facility will serve growing number of travelers & airlines until permanent gates can be added in 5-7 years; new boarding bridges will not need to be moved; progressive design-build guaranteed maximum price delivery methodology used

**Funding:** Capital improvement funds

**Construction:** July 2018-Nov. 2019

**General Contractor:** Hensel Phelps

**Architect of Record:** Fentress Architects

**Structural Engineering:** Walter P Moore

**Structured Collaborative Planning Consultant:** Org Metrics

**Civil Engineers:** AECOM

**Airfield Planning:** AERO Systems Engineering

**Terminal Planning:** Landrum-Brown

**Code & Life Safety Consultant:** Jensen Hughes

**Fire Protection:** Transbay Fire Protection

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**Metal Panels:** BT Mancini

**Framing, Drywall & Plaster:** Magnum Drywall

**Boarding Bridge Manufacturer:** JBT AeroTech

**Boarding Bridge Engineering & Design:** AERO Systems Engineering

**Turn-Key Boarding Bridge Provider:** AERO BridgeWorks

**Utilities, Earthwork & Paving:** Graniterock

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**Seating:** Arconas

**Food Service Consultant:** The Marshall Associates

**Food & Beverage Concessions:** Café X; Yo-kai Express; HMSHost

**Retail Concessions:** Hudson News

**Digital Signage:** Clear Channel Airports

**Of Note:** Facility includes high-tech features such as robotic food/beverage concessions & all-digital advertising signage



The six new parking positions and boarding bridges were designed to service a range of aircraft, including 737s



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Meyers and Steve Henry, project manager with AERO BridgeWorks, agree that the project exemplified the benefits of the design-build approach — specifically early and continual collaboration. “Near the end of the project when SJC opted to add a sixth gate, we were able to quickly lock in the added gate for fabrication and delivery in a few short months,” says Henry.



STEVE HENRY

The design placed all the jet bridges in their permanent positions, so the airport won’t have to relocate them when it adds permanent gates. “We will just have to raise their height by adding a pedestal,” Ross explains. “To a great extent, we will be able to construct the permanent extension without interrupting operations on these six temporary gates.”

Fai Ali, a civil engineer at SJC, notes that the interim facility was designed in modules, with each bay separate from the others. SidePlate® construction methods allowed structural plates to be welded at the factory then bolted together on site. “This process made the project much more environmentally sustainable by allowing us



FAI ALI

eventually to remove and reprocess a lot of the steel structure,” explains Ali.

All told, the project required about 350 tons of structural steel, 47,000 square feet of exterior steel panels and 1,750 cubic yards of concrete.

Given the project’s tight schedule, the design-build team continually looked for opportunities to expedite construction. For example, contractors started concrete work on one end of the facility while steel bolting work began on the other end. “We came up with innovative ways to move forward in the field as we went along,” Ali remarks. “It saved a lot of time; everyone was accountable.”

Knowing the facility would be temporary, Fentress Architects embraced a “minimalistic aesthetic” when designing the interior. To achieve uniformity, the interim facility’s paint colors and warm tones are similar to those used throughout Terminal B. Polished concrete floors and an open ceiling design with exposed structures and building systems help mitigate future materials waste.

Holdrooms include seating, with power, for up to 613 travelers. Hudson News has a small retail concession, and HMSHost operates Island Brews, which offers travelers grab-and-go-salads



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Robotic concessions are right at home in the Silicon Valley airport.

and sandwiches as well as coffee and alcoholic beverages that can be taken and enjoyed at their boarding gates.

Café X and Yo-kai Express are delighting travelers by using robotic devices to serve gourmet coffees and ramen, respectively—a notably high-tech concessions approach for a U.S. airport.

Clerestory windows and LED light pendants linked to photometric sensors that dim lights during daylight hours are green features that also serve as wayfinding elements for travelers. Compared with Terminal B, the interim gate facility reduces lighting power density by 68%. Acoustical panels placed near the clerestory windows mimic skylight patterns throughout Terminal B.

Two sets of restrooms were installed, with low-flow fixtures that use 40% less potable water than standard fixtures. Hand washing stations allow users to soap, wash and dry their hands without leaving the sink area.

**Building Trust**

David Valentine, project development director for Hensel Phelps, credits the design-build contract for providing the team with enough flexibility to design the project and have materials



DAVID VALENTINE

fabricated, delivered and installed within a very short timeframe. “We were able to go from the original four gates to a fifth gate and ground-loaded sixth position, which was then changed to a jet bridge gate, and finally to a sixth gate—and made those changes under an extremely tight schedule,” he remarks. “With a more traditional contract, the design process alone could have taken 11 months before it was complete enough for contractors to bid on.”

Curt Fentress, design principal at Fentress Architects, agrees: “The design-build delivery method and mutual trust between owner, architect, contractor



CURT FENTRESS



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*The interim facility includes two new sets of restrooms.*

With the new gates in place, SJC’s airlines are finally getting the relief they have needed. “The interim gates allow us to concentrate our sizable operations at SJC into a footprint of contiguous gates and holdrooms,” says Andrew Watterson, executive vice president and chief revenue officer for Southwest. “Centralized operations make baggage delivery and turn times more efficient. Plus, our customers who have to change aircraft don’t have a long walk to board their next flight.”



ANDREW WATTERSON

The added gates provide breathing room for *all* the airlines operating at SJC, Ross adds. ✈️

and subconsultants enabled this project to be delivered on an incredibly tight schedule. There were times when the collaborative process enabled consensus-based decisions to be made, documented and deployed to the field within the same day.”

Ross notes that the commitment of various trades working on the project was also pivotal. “They worked double shifts six, sometimes seven, days a week,” she remarks. “It was a very aggressive schedule, and we had to establish trust in one another.”

The project team hired Org Metrics to foster that process and lead structured collaborative partnering throughout the project. “Having a formal facilitator from the outside helped keep us focused and on task,” Ross explains. “When we left meetings, everyone had their directions and responsibilities and were empowered to make things happen.”

## Parking Design to Enhance the Passenger Experience at Long Beach Airport



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## High-Tech Ads for High-Tech Market

Google, Apple, Oracle, Facebook—all of these storied Silicon Valley companies, plus a plethora of high-tech startups, are close neighbors of Norman Y. Mineta San Jose International Airport (SJC).

“I could probably kick a soccer ball really hard and hit any one of those companies’ campuses,” jokes Scott Riddle, the airport’s acting supervising property manager.

That said, what better location than SJC to launch the nation’s first all-digital airport advertising program?

“As the tech capital of the world, San Jose made perfect sense as the place to reinvent airport advertising,” says John Moyer, senior vice president of Development for Clear Channel Airports. “More than 100 tech companies are located within 18 miles of SJC. It is the country’s fastest-growing airport, with nearly 80 months of consecutive year-over-year passenger traffic growth.”

Clear Channel Airports, a unit of Clear Channel Outdoor Holdings Inc., committed \$6.5 million to the signage buildout. Google Cloud and Alaska Airlines went live on the all-digital platform in mid-November. These inaugural foundation sponsors, as well as other companies, will be able to engage with more than 15 million passengers who pass through the airport annually. “The immersive digital experience provides exclusive brands with high flexibility for relevant speed and content to tell their story and to surprise, delight and wow the highly desirable SJC audience,” Moyer elaborates.

Moreover, the new program potentially doubles advertising revenue for SJC and Clear Channel Airports, setting a new bar for revenue-per-passenger from airport advertising. Importantly, the airport garners 55% of gross revenues—“no small number,” Riddle points out.



SCOTT RIDDLE



JOHN MOYER

### Going Big

Moyer describes SJC’s new program as the most advanced airport advertising program in the U.S., and possibly the world. The media network includes 82 new digital LCD and LED screens located in high-traffic areas such as security sections, gathering spots in the terminal, gates areas and baggage claims. The installation features large, uniquely shaped digital mesh screens placed against walls; 32-foot LED soffit screens with integrated flight information displays; 12-foot-tall, 360-degree LED column wraps; and 86-inch LCD screens. All told, nearly 5,000 square feet of new digital signage has been installed in landside and airside spaces through the facility.

The new program replaces paper and cardboard advertising with a “data-driven digital canvas,” notes Moyer. “The combination of iconic digital signs and smaller eye-level digital networks allows advertisers to tailor messaging for specific SJC consumer groups.”

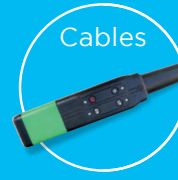
The program also marks the introduction of Clear Channel Outdoor RADAR, the company’s suite of data-driven strategies for planning, amplification and measurement.

Riddle notes that the all-digital approach has practical and environmental advantages. “Content can be updated remotely in a matter of hours versus having to organize security escorts so advertisers can tear down and reinstall static displays,” he explains.

For the first time ever, leading global companies are able to saturate an entire airport with their messages, Moyer adds. “The exclusive foundation sponsorships and campaign advertising programs represent an industry pivot, transforming airport media from a screen-by-screen, terminal-by-terminal or even network-by-network basis to an airport-wide takeover.”

“It’s a paradigm shift,” agrees Riddle. ✈️





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## FACTS & FIGURES

**Project:** Cybersecurity

**Locations:** Louisville (KY) Muhammad Ali Int'l Airport;  
Bowman Field

**Owner/Operator:** Louisville Regional Airport Authority

**Catalyst:** Ransomware attack in May 2019

**Ransom:** Approx. \$22,000, demanded in bitcoin

**Outcomes:** Airport operations were not affected due to strong backup systems, firewalls & network fragmentation; breach was limited to non-critical airport authority files; airport authority did not pay ransom

**Follow-Up Action:** Authority upgraded security measures to provide protection from current & future threats



# Louisville Regional Airport Authority Survives Cyberattack Unscathed

BY VICTORIA SOUKUP



Last spring, David Prince was enjoying a Sunday afternoon barbecue with his family when he received a troubling phone call from work. Employees at Louisville Regional Airport Authority were suddenly unable to open shared files.

Prince, the airport authority's information technology director, soon suspected that something was not right. "I called my network and systems manager, and we both went to the airport immediately," he recalls.

They quickly realized that file shares had been corrupted with ransomware, and hackers were demanding an amount of bitcoin equivalent to about \$22,000.

Fortunately, only administrative files at the airport authority were involved. No files were affected at the two Kentucky airports it governs: Louisville Muhammad Ali International Airport (SDF) and Bowman Field (LOU).

Although the situation was quickly resolved, it reemphasized the critical importance of having regular cybersecurity training for employees and automatic system backups.

"I was very pleased with the response of our IT Department when this incident occurred," says Dan Mann, the airport authority's executive director. "While we are not yet perfect, the process we had in place worked, and we were able to contain the issue relatively quickly to avoid any major disruptions."



DAN MANN

## Pinpointing the Problem

After arriving at the airport, the IT specialists determined that the problematic files appeared to be coming from one source. "Once we found that computer, we took it off the network to halt the corruption from going any further," says Prince. "At that point, we began the restore process."

That involved deleting the corrupt files and returning to the latest system backup, which took place the evening before. The process took 10 to 12 hours.

"We stopped it from spreading any further," Prince relates. "But realistically, there wasn't much further it could have gone, since we



DAVID PRINCE

had firewalls and network segmentation in place. Once the attack began, it was isolated to just that file share environment."

The team used a triage approach for file restoration. "We sent an email to staff asking them to let us know if they were working on something important, and we restored those files first," Prince explains. "Then we worked on all the general files."

Fortunately, only non-critical airport authority files were affected—newsletters, historical data, administrative documents and Excel spreadsheets. Personnel information and airport operations data were not breached; neither airport's aircraft operations were affected.

"We went through evaluations with our compliance team and were assured that private employee information was not obtained," says Prince.

The ransomware included a bitcoin demand equivalent to about \$22,000 at the time. "We did not pay the ransom," Prince reports. "We had a strong backup system in place, so we did not need to pay the ransom to have them decrypt the files—which is what they were after. If we didn't have the backup in place and needed

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the files, then realistically the only option we would have had was to pay the ransom. But due to those backups in place, we didn't have to and just ignored that request."

### An Ounce of Prevention...

While Prince didn't give specifics about what started the airport authority's ransomware problem, the most common trigger is someone opening an unsafe email attachment.

More specifically, he notes that security software can usually stop a virus, and viruses don't branch out as badly as ransomware does. "With ransomware, there are untold millions of strains out there. A business falls under attack every 14 seconds," he warns. "And when bad actors are moving that fast, there are going to be threats that are not in your software protection just yet."

The IT Department's system of daily backups proved highly valuable for the Louisville Regional Airport Authority. "Backups are your best friend in these events," Prince emphasizes. "That is what saved us from having to pay the ransom."

Establishing and teaching best practices for computer usage are also crucial, he adds. Airport employees should be trained about cybersecurity the same way tug and baggage cart drivers are trained about ramp safety. "Many people are on their

computers for the bulk of the work day. Sometimes things get routine and employees need a refresher."

Airport security is no longer limited to TSA checkpoints and perimeter fencing, Prince observes. "Going back in time, the classic focus was on physical security: Who is coming in your door? Who is actually here in person?" he says. "In the past, if you wanted to break in somewhere, you'd have to get in your car, drive somewhere and then break in."

"But the landscape has changed," he continues. "There are more remote workers now. Paperwork and secure files have moved from file cabinets to file servers. And almost everything we have connects to the Internet in one way or another. While that benefits us in our day-to-day lives and jobs, it also leaves our personal and business information more exposed than ever."

These days, cybercriminals can mount attacks from their basements, using readily available tools. "It's a new battle now," Prince muses. "They can have ransomware up and running in a matter of minutes. They don't have to get out of their chair to do something like this."

### Upgraded Protection


After restoring all the data and ensuring safety networks were in place, Prince and his team reviewed the airport authority's



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cybersecurity system. They added new software and subscription services that allow the organization and its airports to stay more protected from emerging online threats. Prince declined to say what specific products were implemented.

“The ones we selected are good,” he remarks. “Such products offer similar functions, but a better vision and are more innovative about staying up-to-date with the changing landscape of cybersecurity and ransomware threats.”

Prince encourages airports to fully leverage the cybersecurity measures used in the business sector, including software upgrades, replacement plans, backup strategies, user awareness training and disaster recovery plans. “Once those things are in place, they should be reviewed yearly, if not more frequently, because technology changes in the blink of an eye.”

As an airport authority executive, Mann agrees about the importance of prevention. That said, he notes that both Louisville airports learned from the incident last spring and now have even stronger security measures in place. “It’s very telling that our world of security now goes beyond a fence line or physical barrier, and it’s crucial we are proactive and prepared to protect ourselves,” says Mann. “The internal reviews and improvements our team did afterward will help us be better prepared should we be faced with any future incidents.” ✈️

*IT Director David Prince (right) and IT Systems and Network Manager Mike North (left) stress the importance of daily backups and cybersecurity training.*



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# Common-Use Lounge at Pittsburgh Int'l Expands to Keep Pace With Passenger Needs

BY JODI RICHARDS

## FACTS & FIGURES

**Project:** Lounge Expansion/Renovation

**Location:** Pittsburgh Int'l Airport

**Format:** Common-use/open to all passengers; standard admission price is \$40/day - \$34/day for AAA cardholders; access for Priority Pass members, which includes Priority Pass, LoungeKey & Lounge Club

**Lounge Operator:** Airport Dimensions (formerly Airport Lounge Development)

**Master Concessionaire:** Fraport

**Lounge Size:** 4,657 sq. ft.

**Seating Capacity:** 102

**Construction/Renovations:** June 2019



An updated common-use lounge at Pittsburgh International Airport (PIT) is now even better equipped to offer first-class treatment to more passengers. In June, The Club at Pittsburgh International doubled in size and gained 60% more seating capacity.

"It's so rewarding to be able to offer a premium experience at an affordable price to every single passenger," says Kim Kitko, the airport's vice president of business development. "Anything we can offer that can help travelers relax and enjoy their time at the airport is a win-win for everybody. We want passengers to look forward to their

time at the airport and consider it a good start to their trip, not a stress point on their journey."

Airport Dimensions, which operates the lounge under a 10-year lease with master concessionaire Fraport, funded and executed the recent expansion and renovation project.

When the private operator first opened a common-use lounge at PIT in June 2017, it was a 34-seat facility in a temporary location



KIM KITKO





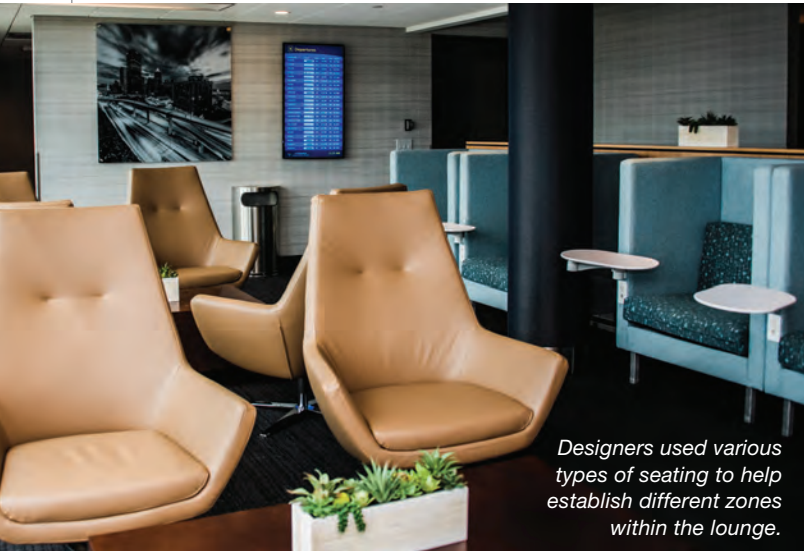
previously occupied by a British Airways lounge. With Condor Airlines beginning service at PIT, the airport needed a larger lounge faster than one could be built. So a few months later, Airport Dimensions (then known as Airport Lounge Development) opened a new lounge with 41 seats; but that also quickly proved to be undersized.

Kitko describes the interest in and use of the common-use lounge as explosive. “Growth in traffic for The Club exceeds our growth in passenger traffic,” she comments. “People are discovering this amenity, liking it and using it at a higher rate than we initially thought.”

In May 2019, prior to the expansion, the lounge averaged 9,100

An aerial architectural rendering of the O'Hare Multimodal Facility. The image shows a large, modern building complex with a parking lot, a transit station, and surrounding urban development. The TranSystems logo is in the top left corner, with the tagline "EXPERIENCE | Transportation". To the right, the headline reads "BRINGING THE HORIZON CLOSER" followed by a descriptive paragraph: "From the terminal to the runway, retail shops to executive lounges, TranSystems provides architectural design and engineering solutions to create an elevated transportation experience, no matter the destination." In the bottom right corner, the text "O'Hare Multimodal Facility" and "www.TranSystems.com" is displayed.





*Designers used various types of seating to help establish different zones within the lounge.*

monthly users—about double the amount predicted by Airport Dimensions. Since the new space opened, it has averaged 9,800 users each month. “It’s a nice amenity to have access to,” Kitko remarks. “The demand is there, and our numbers certainly show that.”

Nancy Knipp, senior vice president with Airport Dimensions, notes that guest volume has increased more than 390% since the lounge originally opened in summer 2017. “We are delighted with the significant growth in demand for The Club at Pittsburgh International Airport,” says Knipp.



NANCY KNIPP

“The airport’s continued enplanement growth combined with the increasing demand from the world’s largest lounge membership audience, Priority Pass, has validated the importance of the The Club for travelers at the airport.”

In 2018, PIT served 9.7 million passengers—about 7.5% more than in 2017. Through the end of October 2019, air traffic was up 1.5% over the previous year.

### Premium Experience

The recent project doubled the size of the previous lounge to 4,657 square feet. The newly renovated facility features sweeping views of the airfield and seating for 102 people. All-inclusive amenities include a self-serve buffet with hot and cold entrees inspired by a local chef and a full-service bar.



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“I think all airports are looking for ways to enhance the travel experience—in particular to reduce the anxiety for passengers,” remarks Kitko.

While relatively new to the United States, common-use lounges are very popular abroad, she notes. “Travelers coming in from other places in the world expect to have a shared-use offering.”

Management at PIT requested specific upgrades for the lounge: additional bathrooms and showers, more television screens and a greater variety of seating options for different types of travelers using the lounge.

In addition, Airport Dimensions used seating and amenities to establish specific areas to accommodate guests’ varied uses and preferences. For instance, the productivity zone, designed with the business traveler in mind, includes desks with power for laptops and other electronics; while the replenish zone features food and beverage options. The privacy zone, which is outfitted for guests who want to read or relax, includes a space similar to a phone booth for conducting private calls. Elsewhere, there’s a cell-free zone.

“We designate these areas not so much by walls, but by different seating, which guides guests to their preferred area of

the lounge,” Knipp explains. Tall-backed “privacy chairs” provide seclusion and noise barriers; banquettes facilitate dining; and a combination of high bar seating and dining tables is designed to be decidedly social.

“People have so many different expectations and needs on their journey through the airport,” Kitko notes. “For business travelers, the ability to conduct a conference call or meeting is a tremendous benefit to productivity. For leisure travelers, vacation can begin as soon as they get to the airport.

“Our lounge is a great way they can have a luxury experience for only \$40 per day—\$34 with a AAA membership card,” she says.

The Club at Pittsburgh International operates from 4 a.m. to 9 p.m. daily, and is available to Priority Pass members, which includes Priority Pass, LoungeKey and Lounge Club.

“Each of our lounges is uniquely different and reflects the city and community as well as the airport itself,” Knipp adds. “We offer similar amenities and signature areas in each location, but the look and feel of the amenities are unique to each city.”

Local photography helps set the stage. At PIT, the lounge is decorated with works from Pittsburgh artist and photographer J.P. Diroll.

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*Dramatic photos of the Pittsburgh skyline help establish a local sense of place.*

### Easy Expansion

Thanks to careful programming, the expansion and remodel had little impact on existing lounge operations. “I never received a complaint throughout the process,” Kitko reports. “It was smooth and seamless, and [Airport Dimensions] stuck to a very good schedule.”

PIT relocated its Kidsport children’s play area before the lounge project began. Because of an existing wall that separated the lounge and Kidsport areas, much of the construction occurred without impact to the existing operation. Work crews dismantled the wall after hours to integrate the new space into the existing lounge.

“We do all possible to ensure that expansion or refurbishment to an existing lounge has the least impact on our lounge guests,” notes Knipp. “Working with the Pittsburgh International Airport staff, we were able to complete our expansion without interruption or inconvenience to our lounge.”

Prior to the project at PIT, Airport Dimensions rolled out a new cocktail program across its entire U.S. network. Featured drinks include Brew City Margarita, The Lounger and The Vineyard G&T. “Planning for the expansion of the lounge at Pittsburgh International, we recognized that we could enhance the guests’ experience with a bar that featured our signature cocktails,” explains Knipp. “Guests love the ability to relax at a bar if they don’t want to work or rest; and it allowed us to showcase our new cocktails.”

### Concessions Collaboration

“We want to identify the best practices and best passenger experiences from around the world,” says Kitko. To do so, she studies wider hospitality trends, not just airports.

“I think saying that passengers are a captive audience is absolutely false,” she emphasizes. “We have to provide the right things to the passengers at the right time.”



Airport Dimensions urges airport operators not to underestimate how much passengers value a shared lounge. “We conduct significant analysis to forecast out guest volumes,” says Knipp. “We draw upon over 13 years of experience operating shared-use lounges at U.S. airports to develop our projections. We have gained a solid reputation for outperforming our guest projections because of the unprecedented growth of the Priority Pass membership audience.”

Working closely with airports to track enplanement and passenger trends is critical to the process. “As the lounge operator, it is important that we have clear sight into what the airport believes its growth will be in flights and airlines in the coming years, in order to project the appropriate size and seating requirements of the lounge,” says Knipp.

Digging deeper, the Airport Dimensions team considers each airport’s traveler demographic to determine space allocation and design for its lounge. “A market like Pittsburgh has quite a bit of business travelers, so we tend to put more seating in an area where people would be traveling alone and might want to do more work,” she says. “We plan the lounge seating to adapt to the behavior of travelers.”

Airport Dimensions, owned by Collinson, specializes in the design/construction, operation, management and marketing of independent shared-use airport lounges. It currently operates 19 locations in the U.S. and four in the U.K.

In 2020, the company plans to expand into other airport amenities such as sleep pods and video gaming lounges. ✈️





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# Austin-Bergstrom Int'l Adds 9 Gates & More Local Vibes

BY KRISTIN V. SHAW



In a construction trailer at Austin-Bergstrom International Airport (AUS), Gensler Senior Associate Vineta Clegg's desk area is strewn with birthday decorations. Across the office, the desk of a colleague is also festooned, even months after the event. Snacks and photos of children abound.

"We have four women in this office," Clegg says with a smile. "It's exciting and unusual."

As project architect for the nine-gate expansion at AUS, Clegg has overseen the design team since the project began in 2014. She and the three other women in the trailer—one from Sunland Group and two from Gensler—led the design and construction of the airport's \$350 million east terminal expansion, which was nearing completion at the end of last year. Clegg is from Ireland, her Gensler colleagues are from India and Mississippi, and the Sunland representative is from Texas.



VINETA CLEGG

The consultants and contractors worked closely with Lyn Estabrook, manager of the airport's Planning and Development Division, who also oversees tenant projects.

"This expansion allows our partner airlines to expand their services," Estabrook says. Specifically, it increases the size of the

terminal 29% and passenger capacity by 36%. "As a result, we anticipate more direct flights," she notes.

Together, Estabrook and the project team from the construction trailer focused on delivering a warm and welcoming airport environment that mirrors the people of the city itself. With an overall Texas dance-hall design, numerous spaces designated for art, and a whimsical pet relief area, the expansion is uniquely Austin and focused squarely on the future.



LYN ESTABROOK

## Plan Hatched a Decade Ago

Austin, as anyone from the city will tell you, is growing fast—too fast for some long-term residents. The city has grown from a small, livable place famous for its eclectic and welcoming attitude to a bustling, rapidly expanding metropolis.

Fortunately, the planning team at AUS predicted associated increases in passenger volume and started planning a gate expansion more than 10 years ago. In 2019, that nine-gate addition became a reality.

"The gate expansion was included in the master plan back in 2008," says Estabrook. "We knew there was a good space





within the terminal to add more gates to the concourse, but we waited out the recession and started the design and implementation in 2014.”

For the last several years, Austin has been on the fast track. The latest U.S. Census Bureau statistics rank Austin as the fastest-growing major metropolitan area in the country. Ellen Brunjes-Brandt, the project manager in AUS’ Planning and Development Division, says that the airport begins its planning process by studying overall community growth. Then, planners track monthly enplanements to create traffic projections.

“I have some fascinating growth models,” says Estabrook. “The math behind it is very complicated: loads, gate utilization, ticket sales, regional sales—it all averages out to what we’re doing.”

Even with real-time information, the models are being stretched at the seams. For the past few years, passenger growth at AUS has been much higher than anticipated. In

fact, the new expansion was designed for 15 million passengers, but the airport hit 15.8 million at the end of 2018. Currently, it’s tracking at 17 million and growing.

With that in mind, the airport set three goals for its terminal expansion:

- add room to accommodate a 36% increase in passenger volume;
- expand the airport’s international presence;
- enhance the facility’s sense of place

To accommodate this continued growth, the new AUS 2040 Master Plan is designed to prepare for 30 million passengers in 2030 and 40 million in 2040. The airport is currently working on the first phase implementation of the 2040 Master Plan, with the design of a new front terminal and a parallel 20-gate concourse to begin in 2021.

“It takes about five years to plan, design and build something,” says Estabrook. “We are continuing to look for that Austin feel while planning for the future.”



Austin-Bergstrom  
International Airport

## FACTS&FIGURES

**Project:** Terminal Expansion

**Location:** Austin-Bergstrom Int’l Airport, TX

**Scope:** 175,000 sq. ft. of new space, 9 new gates in the Barbara Jordan East Terminal

**Cost:** \$350 million for apron & terminal improvements (\$311 million for construction)

**Funding:** Airport bonds; FAA grants

**Timeline:** Design approved in 2014; 90% finished by Nov. 2019

**Noteworthy Features:** Texas dance-hall design; outdoor deck space for passengers; pair of helix staircases; clerestory glazing; central tower

**Design Architect:** Gensler

**Associate Architect:** Carter Design Associates

**Programming:** LeighFisher Associates

**General Contractor:** Hensel Phelps

**Structural Engineer:** AEC

**Environmental & Civil Engineering:** Doucet & Chan

**Quality Assurance/Control:** Encotech Engineering Consultants

**Security:** AECOM

**Environmental Engineering:** Baer

**Public Address System & Acoustics:** Bai LLC

**Baggage Handling System:** BNP Associates

**Mechanical/Electrical/Plumbing Engineer & Special Systems/Radio:** Burns & McDonnell

**MEP/Fire Protection Engineer:** Jose I Guerra Consulting Engineers

**Roofing/Waterproofing:** Engineered Exteriors

**Lighting Designer:** Fisher Marantz Stone

**Main Holdroom Seating:** Eames Tandem Sling T Beam Seating, supplied by Workplace Resources

**Geotechnical Engineering:** HVJ Associates

**Fire Life Safety/Code:** Jensen Hughes

**Information Technology/Audio Visual:** Moyer Consulting

**Landscape Architect:** MWM Design Group

**Civil/Airside Apron Engineers:** RS&H

**Civil/Landside & Associate Architect:** Sunland Group

**Passenger Boarding Bridge Subcontractor:** Thyssen Krupp

**Public Relations:** Beverly Silas & Associates

## Dance-Hall Design

Old-fashioned honkytonks are common in Austin, sometimes tucked between high-rise condos and upscale, modern restaurants. It's this eclectic mix of old and new that inspired the look of the airport's terminal expansion. Gensler proposed using a Texas dance hall as the model for a retail boulevard-style concourse with plenty of room to move. The idea was to give AUS a distinct footprint that evoked a sense of familiarity and intentional calm, explains Clegg.

Architects and designers modeled the new concourse after Gruene (pronounced "green") Hall, the oldest and most famous dance hall in Texas. Exposed ceiling trusses and deep gate areas with low ceilings create an environment that may give passengers the sudden urge to line dance. With the addition of 175,000 square feet, the new concourse has plenty of room for a Texas Two-Step flash mob.

The team is demonstrably excited to be completing the expansion. "It is rewarding to be a part of a project that will be used by our families, friends and colleagues for many years," says Priscilla Norosky, project manager for Hensel Phelps. "We're building



PRISCILLA NOROSKY

a facility that not only provides value to the local community, but internationally, with added flight destinations to connect Austin to the rest of the world."

## Distinctive Architecture

The new concourse includes several details that passengers might not notice overtly but are bound to feel subconsciously.

To maximize natural light, the Gensler team designed what Clegg refers to as clerestory glazing. In architecture, clerestory windows have been used as far back as ancient Egypt to direct light into large rooms from high above the ground floor. In Austin's modern concourse, clerestory glazing gives the roof a "floating" appearance and provides diffused lighting.

Two helix staircases on either side of the center tower are more obvious design features. Crafted in a three-dimensional spiral, the large staircases include 14 tons of steel and are anchored with two curved stringers for support.

The Oculus Tower, inspired by Austin's vintage moonlight tower lighting structures, serves as a focal point and houses an all-new Delta Sky Club. The lounge features a covered outdoor patio, custom temperature-controlled glass wine tower, and an extensive selection of tequilas and mezcals that can be sampled

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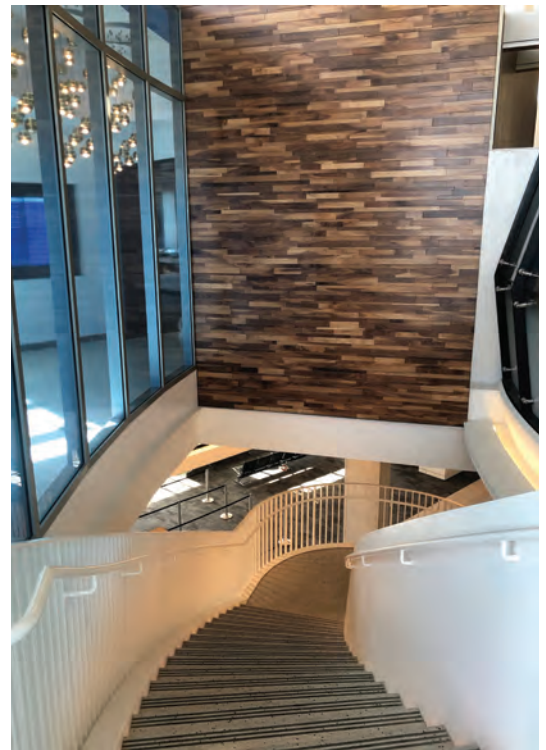


as individual pours or in tasting flights. Continuing the focus on local culture, the Sky Club features work from well-known and up-and-coming artists with connections to Texas.

To showcase Austin's fondness for outdoor living, the design team incorporated an open-air patio on the second floor of the new concourse. One portion of the East Terrace is reserved for Sky Club members, but the rest is open to all passengers. Together, they provide nearly 5,000 square feet of space for travelers to get a breath of fresh air and enjoy the Southwest sunshine—a particular treat for passengers on long layovers.



*A pair of helix staircases makes a bold architectural statement.*

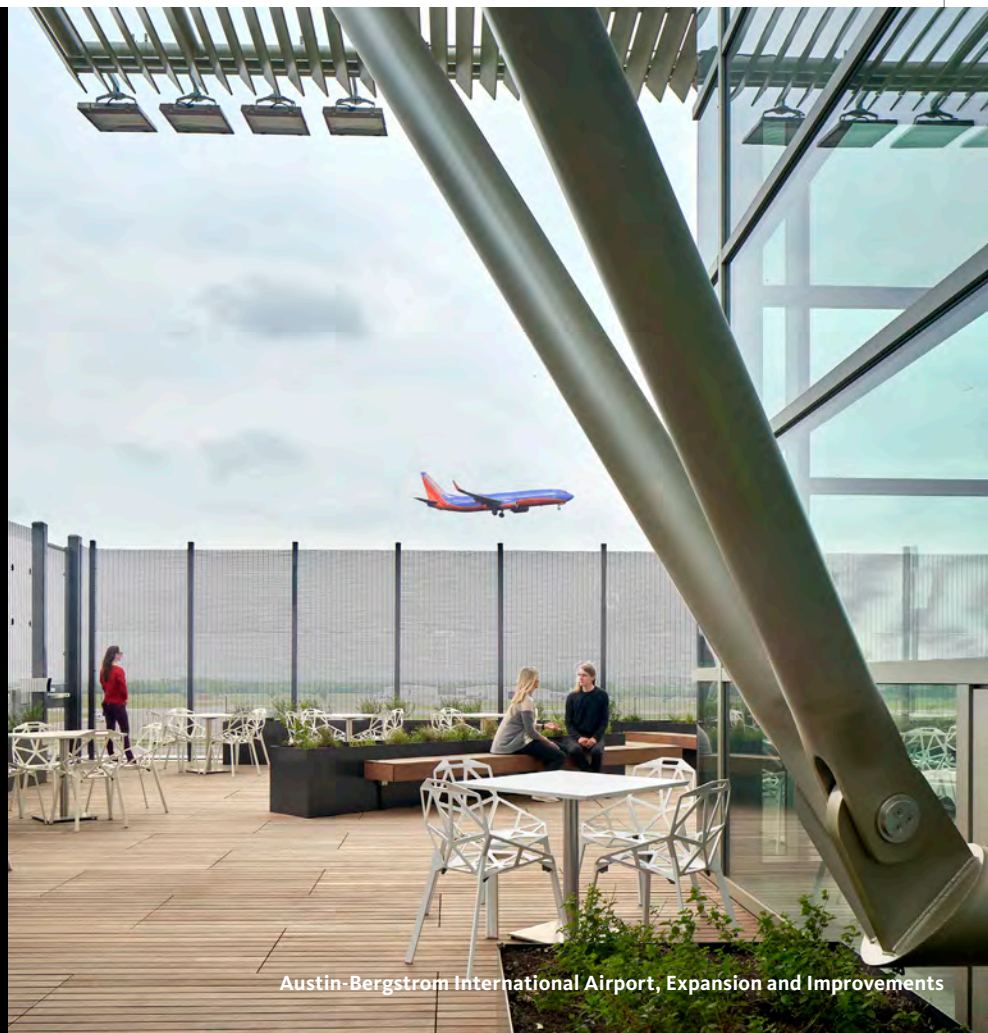


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Austin-Bergstrom International Airport, Expansion and Improvements





*A new open-air patio on the second floor allows travelers to get a breath of fresh air.*

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“It’s a great place to take your kids and relax before your flight,” Clegg says. “It’s a nod to a Texas porch and the outdoor spaces in front of bars and restaurants here in Austin.”

While few U.S. airports have outdoor spaces, AUS has two. The other is located on the ground floor of the South Terminal.

A single, large restroom bank makes efficient use of space in the new addition. It includes centralized all-inclusive restrooms as well as a separate companion care room that includes a washdown area for guests that are severely disabled. Men’s and women’s restrooms both include changing stations for babies. New nursing rooms have outlets for breast pumps and are large enough for mothers to bring in other children with them.

“Airports are judged by their restrooms, and this one is more mindful about them,” says Clegg. “The Austin Aviation Department wanted to be more amenable to everyone.”

**International Expansion**

A sterile corridor on the mezzanine level provides arriving international travelers a bird’s-eye view of the concourse. When passengers and crew deplane from international flights, they are funneled up to the transparent hallway, where they cross over to the secure Customs area and then to baggage claim. The bottom half of the glass is frosted for privacy.

Estabrook reports that the airport’s international volume has tripled in the last two years. As such, six of the new gates are equipped to handle international flights, including Group V planes such as Boeing 777s and 747s from British Airways and Lufthansa. Starting in May 2020, Norwegian Airlines will offer direct service



from AUS to Paris (Charles de Gaulle Airport). As of November 2019, the airport has six international gates.


Facilitating more international travel will support the city's special events and add to its growing economy, notes Norosky.

The airport also expanded and relocated its aircraft deicing area, and added a new jet blast fence at the end of the recently expanded east apron.

### Happy Guests, Happy Team

Inside the terminal, passengers are enjoying new retail and food/beverage options—a total of 29,000 square feet of concessions in all. Starbucks is one of just a few brands not based in Austin. The retail lineup includes the airport's first duty-free shop.

Estabrook reports that friends and acquaintances rave about the airport's recent updates. "When they walk off the plane, they don't realize they're back in Austin because it's more open and brighter, with a more casual feel," she says. "But then it does feel like Austin, because of the finishes we chose."

"Austin is our home," adds Norosky. "We've witnessed, and contributed to, its emergence as a buzzing, fast-growing city. What better way to make an impact than to have a hand in the first thing people see when they visit?" 



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# Charlotte Douglas Int'l Improves Wayfinding to Enhance the Travel Experience

BY PAUL NOLAN

## FACTS&FIGURES

**Project:** Wayfinding & Signage Improvements

**Location:** Charlotte Douglas (NC) Int'l Airport

**Master Plan Consultant:** Gresham Smith

**Component of:** \$2.5 billion-\$3.1 billion capital improvement plan

**Flight Information Displays:** Infax

**Special Systems Design:** Arora Engineers

**Customer Survey Support:** Phoenix Marketing Int'l

**Primary Objectives:** Enhance the passenger experience; create consistency & clear messaging; help convey Southern hospitality, Charlotte-style.



Frequent flyers take great pride in their ability to overcome travel hurdles. They have finely honed strategies for moving efficiently through security, managing tight connections and scrambling to book other flights when theirs are delayed or canceled. It's almost a science.

Apps that provide wait times for security checkpoints and automatic text alerts about flight changes help a lot. However, there is a true science that kept travelers on course

and on time long before smartphones existed, and it continues to be the backbone of successful airport navigation. Wayfinding systems use signage and other graphic communication, architectural cues, audible communication and tactile elements to help visitors navigate to and through airports.

But the science faces two stubborn challenges: airport campuses are often sprawling and complicated; and many visitors using it are late, over-stimulated and/or already travel-wearied.





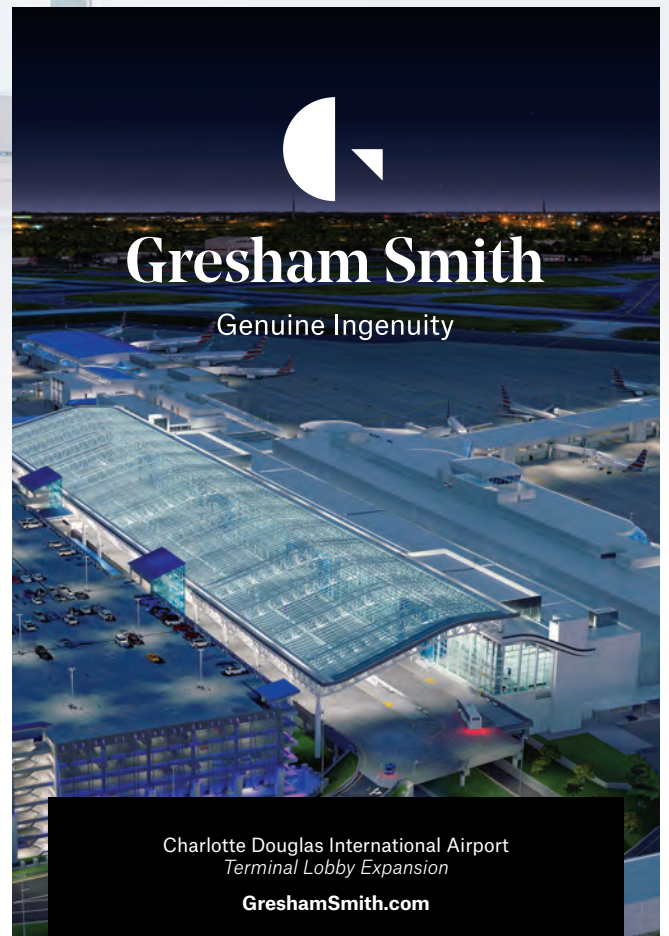
PHOTO: RICH TAYLOR PHOTOGRAPHY


LAirA, a partnership of European municipalities and other travel-related organizations, described the challenges this way in a 2019 report: “Airports are large and complex facilities, where operators need to communicate a vast amount of information to users. They need to provide this information in a clear, timely and relevant way to users who are often disoriented, in a hurry or distracted.”

### Wayfinding During Construction

Communicating effectively with an inherently diverse population of visitors is a challenge for any airport. But a steady stream of major expansion and remodeling projects has made the task even more complicated for Charlotte Douglas International (CLT) in North Carolina.

In 2016, the airport launched Destination CLT, a multibillion-dollar capital improvement initiative. By the time the program is completed in 2025, it will have altered virtually every part of the airport. Projects include airfield improvements; expanding or renovating (in some cases both) all the concourses; constructing an elevated roadway and terminal curb front; and expanding the terminal lobby.



  
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As each project is tackled, updating CLT's wayfinding system has been a key factor. The process has been guided by a wayfinding and signage master plan developed by Gresham Smith. In addition to enlisting help from the outside architecture, engineering and design firm in 2016, the airport also hired Regina Czerr, its first-ever wayfinding and signage manager in 2017. Czerr, who graduated from North Carolina State University in industrial design, worked for 13 years at an urban design firm before coming to CLT.



REGINA CZERR

"Survey results indicate just how important signage is to our customer experience, and consistency is a key part of effective signage," says Czerr. "Changes to one area of the facility reach far outside of that project boundary. You have to understand the potential impact that one small change can have on the rest of the airport both in terms of the physical signage as well as virtual touchpoints with our customers."

The wayfinding and signage master plan contains signage design standards for the terminal, curbside, parking and roadway to ensure that the language, symbols and colors on signs are standard throughout the airport property.

"Establishing visual cohesion for our customers has been one of my primary goals—from the time they look at our website on their phone, or they download our app, to when they actually look at the architecture or signs. There needs to be visual continuity," Czerr explains. "It may be the color palette, typefaces or imagery... but by the time they walk into the building, there should already be a comfort level and familiarity with what they're seeing. That builds trust and helps people feel at ease in what can be a stressful environment."

This emphasis on cohesion is demonstrated through the strategic renaming of key areas inside and outside the terminal in a pending change from letter identification to numbers. The change will affect curbside pickup zones, front doors at the drop-off and pickup levels, and TSA checkpoints. The airport has already color-coded the curbside zones to assist wayfinding for pedestrians and vehicles.

### Identifying Priorities

Before the airport had a wayfinding and signage master plan, signage for each renovation or expansion project was addressed on a per-project basis. "When we got to the point where they were ready to pull the trigger on the capital improvement plan, [airport executives] recognized we were ideally positioned to step back and think about how we could handle the signage systematically and holistically," Czerr explains.

Quarterly customer surveys by Phoenix Marketing International indicate that the terminal facility experience is one of the top three drivers of overall customer satisfaction at CLT. Travelers identify the effectiveness of signs in the terminal and the availability of dynamic flight information displays as two of three top drivers for their satisfaction or dissatisfaction.

Currently, CLT has five security checkpoints that are identified with letters A through E. Moreover, it has five concourses that are also identified with letters A through E. Customer surveys indicated that 25% of passengers incorrectly believed they had to use the checkpoint that corresponded to the same-lettered concourse. That led to unnecessary congestion at some checkpoints and underutilization of others. The first step was to clarify that all gates and concourses are accessible from any checkpoint and are clearly labeled with "All Gates" signage.

The switch from letter identification to numeric will occur toward the end of the terminal lobby expansion project, which is scheduled to wrap up in 2025. This project also includes plans to downsize from five checkpoints to three higher-capacity checkpoints, finally breaking the association between the checkpoints and concourses.

### The Voice of the Customer

One of the first steps Gresham Smith took when developing CLT's wayfinding master plan was to walk the entire airport to experience it from the traveler's perspective. The team also studied surveys of more than 2,000 passengers

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# Sign, Sign, Everywhere A Sign

Standards for new signage at Charlotte Douglas International (CLT) went through a multistage review process before they were approved by airport officials. The approved standards contain guidance for five key areas: airport entries/gateways, roadways, surface parking and decks, curbside areas and the terminal.

As a whole, the signage program is designed to simplify wayfinding for customers. More specifically, it strives to:

- convey “Southern hospitality, Charlotte-style” in a sophisticated and authentic manner;
- reduce visual clutter and limit information on individual signs to essentials, based on specific location and viewing audience;
- establish priorities for placement of signs, graphics and other visual communication;
- create uniform graphic standards with specific guidelines for sign formats, layout, typefaces, arrows, symbols and colors;
- establish consistent message nomenclature and hierarchy of information;
- incorporate dynamic messaging where appropriate and upgrade existing static directories to digital platforms; and
- coordinate signage, graphics and architectural features for a comprehensive wayfinding approach.



JIM HARDING

who use the airport. Jim Harding, director of experiential design and wayfinding at the firm, calls this the “look, listen and learn approach.”

“We work in a lot of airports across the country, and each of them has its own dynamic,” Harding comments. “One thing we’ve learned is we can glean a lot just by walking around and seeing what we see. We talk to the airport stakeholders, because they know their airport better than anybody. But until you talk to the customers and learn what’s important to them, there’s a piece of that puzzle that’s always going to be missing.”

Because CLT has a high percentage of connecting passengers, its wayfinding system is particularly important. In 2018, the airport established a new record by serving 46.4 million travelers—and more than three-fourths were connecting passengers. CLT is the second-largest U.S. hub for American Airlines.



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## The 3 Cs, 3 Vs of Wayfinding

The Wayfinding and Signage Master Plan for Charlotte Douglas International (CLT) calls for wayfinding elements to support a logical decision-making process for users. In order to do this successfully, signage is designed with three guiding principles in mind:

- **Continuity** – In order to navigate the facility, guests must make choices in direction or mode of travel (for example, walk or ride). It's crucial to provide the right information at the right time and place to guide various user groups to their destinations.
- **Connectivity** – Successful wayfinding design requires an understanding of the physical space, user groups and destinations, plus analysis to determine the best way to move people safely and efficiently. After optimal routes and modes are identified, signage plays a key role in communicating this information to airport visitors. In some cases, physical barriers may require people to follow a nonlinear or nonintuitive pathway—backtracking to

take a shuttle, for instance. An effective wayfinding program provides good routes and reassurance to help them along.

- **Consistency** – To the greatest extent possible, signs should be uniform in appearance, messaging and placement. Visual consistency helps guests quickly recognize, understand and use the information provided.

The master plan also outlines three primary ways wayfinding information can be communicated:

- **Visually** – This includes all static signage, graphics, art, branding and architectural cues that help users navigate.

- **Virtually** – This rapidly evolving category encompasses anything in the digital realm such as websites, dynamic displays, interactive directories, art, car count parking systems, smartphone apps, etc.
- **Verbally** – Verbal communication includes interactions with information desk staff and other airport employees, who are often able to provide additional layers of information not easily conveyed on static signage. Customer surveys conducted during the first phase of CLT's research revealed that 21% of customers asked for verbal assistance at the airport. With about 55 million annual passengers, that means roughly 11.6 million customers seek verbal assistance at CLT each year.

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Harding notes that connecting passengers can often choose where they fly through. “If travelers consistently have a poor experience at a connecting airport, it won’t take long for them to choose other airports to connect through,” he explains. “That part of the customer experience—what it takes to get from gate to gate—becomes a really important issue.”

Customer surveys also revealed that passengers often overestimated how long it takes to walk from one point to another, which is a key piece of information for those catching connecting flights. As a result, CLT incorporated estimated walk times into all of its backlit overhead directional signs. “What happens if you can equip that traveler with knowledge that sets forth expectations? They feel they have more control over their journey,” says Harding.

Czerr boils it down to the basics: giving passengers information so they know if they have time to use the bathroom or get something to eat. “You’ve helped put them at ease and make more deliberate decisions, and you’ve opened up more possibilities for businesses in the airport,” she remarks.

Currently, the airport is working to add estimated walk times to flight information displays and digital directories throughout the terminal. The team is also exploring opportunities to integrate walk times into the interactive map on the airport website and smartphone app.

### Reducing Visual Clutter

The master plan also helps CLT determine where signage should *not* be placed. “We want to reduce the visual clutter and save signage for the most important things travelers need to see,” says Czerr.

It was a huge advantage to address this issue at the same time architects were drawing up plans for remodeling and expansion projects. “Gresham Smith helped us understand how to organize all of the elements that are in the space: how we designate specific areas for signage; for advertising and art to be placed where they actually complement each other versus creating crazy visual clutter that makes it confusing,” says Czerr. “It’s a big deal not to think about signage as an afterthought, but actually make sure we are working with the architect at the beginning to optimize the use of signage.”

Uniform graphic standards provide specific guidelines for sign formats, layout, typefaces, color, etc.



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Early collaboration also created more opportunities for the architecture to support intuitive wayfinding, by using visual and physical clues that help pull visitors through the facility without the need for intensive signage. Features such as patterns in the floor and ceiling can help reduce the need for and number of signs.

“The design of the space becomes an iterative process, where the architecture informs the wayfinding and the wayfinding informs the architecture,” Czerr explains. “Practically and technically speaking, it helps reduce conflicts with lighting, cameras, sprinklers and other building fixtures.”

### Wayfinding As A Marketing Tool

Another important reason to help passengers navigate is that research by Phoenix Marketing International shows happy travelers spend up to 40% more at airports than grumpy ones. Toward that end, Harding points out that a wayfinding plan should focus on more than just directional signage. Art, advertising and airport marketing needs to co-exist with informational signage. “We want to establish a visual harmony where these different elements work together to create a better customer experience,” he explains.

From a marketing angle, CLT executives wanted the new signage to communicate “Southern hospitality, Charlotte-style.” Czerr says the project team challenged itself to think of signage as more than a means of providing information. “We wanted to celebrate who we are and create a sense of place that is specific to Charlotte,” she relates. “The typeface and symbols we chose have a personality to them. They’re friendly, and we hope they communicate our warm and welcoming culture in a subconscious way.”

Just as the voice of the customer helped guide planning for wayfinding improvements, it is also confirming results of changes for airport officials. Response on social media as well as in quarterly focus groups and other surveys has been favorable. One passenger even posted a picture of CLT’s new wayfinding signage at the rebuilt lower-level parking/curbside pickup area and tweeted, “I’m more excited about this than I should be!”

“Thinking about this from the customer experience perspective has been our focus from the start,” says Czerr. “Getting that validation just makes me giddy.” ✈️

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Gresham Smith helped the airport integrate signage with other elements such as art and existing architecture.

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# An Inside Look at How Colorado Supports its Airports

BY MIKE SCHWANZ

CDOT Aeronautics Division | 2018



## FACTS & FIGURES

**Project:** State-Sponsored Support Programs


**Location:** Colorado

**Specific Initiatives:** Subsidized student internships; Airport Sustainability Toolkit; annual surplus equipment sale with 50%-80% reimbursement for buyers; remote air traffic control tower test program

**Benefactors:** General aviation & commercial airports

**Sponsoring Organization:** Colorado Dept. of Transportation, Div. of Aeronautics

**Key Benefits:** Programs help airport operators improve efficiency & boost profitability, reduce environmental impact, enhance safety/work conditions & improve community relations

 Successful airports tend to operate at peak efficiency when they partner well with the state agency that supports them. This is especially true in Colorado, where the Colorado Department of Transportation (CDOT) Division of Aeronautics offers several programs to help member airports prosper.

Four programs, in particular, have been well received by airport operators and industry analysts alike:

- Airport Sustainability Toolkit
- Student Internship Program
- Annual Surplus Equipment Sale
- Remote Air Traffic Control Tower Program

### Airport Sustainability Toolkit

This program was initiated by CDOT in 2015, in partnership with the FAA. It is designed to help airports maximize operational efficiencies in four core categories: social, environmental, financial and operational.

The toolkit is designed to help operators:

- increase competitiveness through lean operations;
- optimize the use of airport assets;

- reduce environmental impacts;
- work with and earn greater support from the community;
- improve employees' work environment; and
- reduce health and safety risks.

The pilot program was tested at three facilities: Centennial Airport, Rifle-Garfield County Regional Airport and Fremont County Airport. David Ulane, CDOT's aeronautics director, reports that it



DAVID ULANE

has been very well received. "The toolkit is an online document available for free to any of our members," Ulane specifies. "Airport managers can adapt the document to their particular needs. The basic idea is to help airport managers keep track of all of their operations."

Although the program was initially designed for general aviation airports, larger airports are using it as well. "We recently worked with Colorado Springs Airport on





The annual surplus equipment sale is especially popular with small airports.

Each airport sets the agenda for its intern(s). “We don’t get into criteria,” says Ulane. “We do prefer the students take courses that eventually will help them get into the aerospace field.”

CDOT Aeronautics also offers its own internship, in which a student can work with the Division team to learn about state aviation agency operations. “Our program is more government-oriented,” Ulane explains. “Students interested in a public-service career path can apply with us, and have great exposure to a variety of aviation stakeholders.”

**Surplus Equipment Sale**

This event is held once a year in August or September, and has occurred for at least 15 years. It started when CDOT agreed to help Denver International Airport (DEN) help sell its surplus snowplows, pickup trucks, lawn mowers and other airport equipment. This used but well-maintained equipment has reached the end of its life at DEN, but still has significant life left and value for a smaller airport.

The event is not an auction. Airports set prices for their equipment, and CDOT compiles a master list of items available for sale. The final cost for equipment is typically quite low, because CDOT reimburses airports for a hefty portion of the purchase prices. “We cover 80% of the first piece of equipment and 50% of the second and third piece,” Ulane specifies.

He offers the following transaction as a representative example: About two years ago, DEN listed one of its Oshkosh H-series 22-foot runway brooms, which cost about \$500,000 new, for sale at \$20,000. Since CDOT covered 80% of the asking price, the San Luis Valley Regional Airport in Alamosa was able to buy the machine for \$4,000. “These smaller airports could never afford this machine on their own,” Ulane remarks.

The process starts in early summer, when DEN sends CDOT a list of machines it wants to sell. Then CDOT posts the list on its website and holds a “draft lottery” to determine the order

the development of their toolkit, which is still in progress,” Ulane continues. “In addition, Rocky Mountain Metropolitan Airport also has implemented a sustainability plan using our toolkit.”

Other states are welcome to request the toolkit. “We use the Salesforce platform, so a given state’s software should be compatible with that to optimize its effectiveness,” he advises.

**Internship Program**

CDOT Aeronautics partners with several Colorado airports to provide educational internships that offer select students real-world experience with aviation and airport management.

Participating airports include Aspen/Pitkin County Airport, Centennial Airport, Colorado Springs Airport, Durango Airport, Eagle County Regional Airport, Greeley-Weld County Airport and Northern Colorado Regional Airport.

“Promoting aviation and education is part of our mission statement,” Ulane says. “A high percentage of our interns do end up working in our industry.”

CDOT provides grants to airports employing interns and pays 50% of students’ salaries, up to \$20 an hour. Participating airports must cover the remaining costs. Individual internships vary in length from a semester to a full year. “This program, which has been going on for more than 20 years now, is a great way for airports to give college students exposure to the profession. In fact, five out of the eight people on our staff started as interns,” Ulane remarks.

Participating airports must supply a detailed syllabus, including a list of specific duties for interns. “We don’t just want them shoveling snow,” Ulane emphasizes.

Later, students can use the syllabus to show prospective employers exactly what they did during the internship, which enhances their chances of landing permanent jobs.

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that airports interested in buying may make their selection(s). Participation varies year-to-year based on equipment needs and availability, but about 16 airports usually make purchases.

The sale is held at DEN, and interested buyers can arrive a day early to preview available items. Last year, Colorado Springs Airport and Rocky Mountain Metropolitan also offered equipment for sale. Airports interested in their items made onsite inspections at the respective seller's airfield.

Airports purchasing equipment must pay the full listed price at the annual event in DEN. They then receive reimbursement for the portion CDOT covers (either 80% or 50%) in about one week. "We just need a detailed invoice of the sale," Ulane elaborates.

### Remote Tower Project

This may be the state's most ambitious effort to support its airports. Some industry watchers predict that the high-tech approach CDOT is testing for air traffic control could have long-term implications for airfields throughout the country.

Installing remote air traffic technology will eliminate the need for some airports to build, maintain and staff a physical control tower. "The concept is to avoid the cost of having to build a new air traffic control

tower," Ulane explains. "The FAA will not reimburse smaller airports for a new tower, which can cost an average of \$12 or \$13 million."

The remote tower program is a follow-up to the Aeronautics Division's previous partnership with FAA on the Colorado Mountain Radar Project. That project deployed wide area multilateration technology to Colorado's high country to provide FAA air traffic controllers radar-like air traffic information without the need for costly radar installation. The Colorado Remote Tower Project features ground-based video technology, combined with an FAA radar data feed, to provide a comprehensive view of air traffic on the surface of an airport, and in the surrounding airspace.

The technology is currently being tested at Northern Colorado Regional Airport (FNL) in Loveland. It was chosen based on several factors, including air traffic mix, aircraft operational levels, proximity to a major airport and local support. "FNL is the busiest nontowered airport in the state," says Ulane. "It has about 100,000 operations a year."

In a unique funding about-face, CDOT provided the FAA with funding (\$8.8 million) to perform testing for the program. The FAA is expected to bring a mobile air traffic control tower—essentially a small traditional control tower on a trailer—to FNL in January



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2020. The airport’s traffic will be controlled from that tower, while other controllers monitor and “follow along” from the remote facility. This will help develop standard procedures, and allow adjustments and enhancements to the remote tower system.

The system is comprised of three camera tower installations. The primary one in the center stands 77 feet high, with 17 cameras that provide 360-degree coverage. The other two, positioned at opposite ends of the main runway, have 180-degree views, and are 22 feet tall. All three camera installations provide a high-resolution view of air traffic within the FNL airspace. They are heated and weatherproof, with wiper blades to clean the camera lenses.

The control room is on FNL property, located in a repurposed terminal building. “With this technology, the control room can be placed just about anywhere,” Ulane exclaims. “In Sweden, one is several hundred kilometers away. But the airport that uses this, Sundsvall Timra, only has five or six flights a day.”

Testing on remote tower technology will continue for the next two years, and is expected to be fully implemented at FNL sometime in 2022.

**Broader Potential**

Pam Keidel-Adams, a vice president with the consulting firm Kimley-Horn, says that Colorado’s airport programs could serve as excellent models for other state agencies. As part of the firm’s Aviation Leadership team, Keidel-Adams works with aviation agencies in several states.



PAM KEIDEL-ADAMS

“Colorado was the last state to have an Aeronautics Division, so that has given this particular agency a lot of flexibility, which I think helps them quite a bit,” she says. “Their charter is pretty broad, which encourages creativity. Many of their programs could be utilized in other states.

“For example, their internship program has been very successful.

“Many of the interns are now working in the industry. From pilots to airports to aviation consulting, there is such a huge need for great candidates, and this program is making a difference,” Keidel-Adams says.

In fact, Kimley-Horn recently hired an intern who was working at CDOT Aeronautics as part of the team working on the Colorado Aviation System Plan and Economic Impact Study.

She also gives high marks to the Sustainability Toolkit and surplus equipment sale for their impact on smaller airports.

Keidel-Adams is paying keen attention to the remote tower project. “If the testing goes well, this type of operation could really expand not only in North America but around the world. It will be fascinating to see how it all works out.”

After working with CDOT Aeronautics for several years on various projects, Keidel-Adams believes that the state’s airports are in good hands. “I think many of these projects have improved the overall economic health of Colorado’s airports.” ✈️

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# Fort Lauderdale Int'l Makes the Most of 120-day Runway Closure

BY JODI RICHARDS

## FACTS&FIGURES

**Project:** North Airfield Rehabilitation

**Location:** Fort Lauderdale-Hollywood (FL) Int'l Airport

**Owner:** Broward County Dept. of Aviation

**Cost:** \$95 million

**Scope:** Complete rehabilitation of Runway 10L-28R, including replacement of 75-foot keel section with concrete, electrical, signage & drainage systems upgrades; FAA-funded taxiway enhancements & updated runway status lights

**Construction:** General Asphalt Co.

**Engineer of Record:** Kimley-Horn

**EMAS Beds:** Safran Aerosystems—formerly known as ESCO

**Security:** Allied Universal

### Timeline

**Phase 2 Taxiway A Work:**  
March 25, 2019-June 2, 2019

**Phase 3 Runway Closure:**  
June 3, 2019-Oct. 1, 2019

**Phase 4 Taxiway B & C Work:**  
Oct. 2019-March 2020

**Final Completion:** March 2020



Last summer was all about opportunity for Fort Lauderdale-Hollywood International Airport (FLL) in Florida. Its primary runway, 10L-28R, needed to close for 120 days while crews performed a complete rehabilitation; so management took the opportunity to improve several other airfield assets as well.

Airport officials note that the \$95 million North Airfield Rehabilitation program sets the stage to support continued growth. The 18th busiest U.S. airport in total passenger traffic, FLL saw 35.9 million enplanements in 2018, up 10.6% vs. 2017. In fact, FLL has been the fastest-growing airport in the country for the last two years, according to FAA statistics.

“We think we’ll continue growing, but not at the same rate,” says FLL Public Information Officer Gregory Meyer. “Things are slowing down a bit, but projections are we will continue to add additional service and passenger traffic.”

Commonly known by staff as the “North Runway,” 10L-28R is 9,000 feet long, with portions dating back to 1943, when the airport was built as a Naval training base. Throughout the years, the county-owned airport performed regular maintenance to keep the runway in operational condition. This is the first time it performed such extensive improvements.

The asphalt runway had been on a 15-year rehab cycle, explains Gasser Douge, engineering unit supervisor for the Broward County Aviation Department. But when it approached the latest 15-year interval, airport officials



GREGORY MEYER



GASSER DOUGE





PHOTO: COURTESY OF KIMLEY-HORN AND ASSOCIATES, INC. © C. WALKER PHOTOGRAPHY, INC.

significant, given FLL’s increasing passenger volume.

Ultimately, the airport opted to replace the 75-foot-wide keel section with concrete, but mill and overlay the outboards with asphalt. Traffic growth heavily influenced the decision, notes Douge.

“Using concrete on the keel, we think we have a solution for about 30 years with good maintenance practices,” he explains.

Michael Carey, vice president of aviation at Kimley-Horn, notes that initial costs to mill and overlay asphalt are less than concrete; but when maintenance costs, impact of runway closures and total lifecycle are factored in, concrete is a better investment for FLL.



MICHAEL CAREY

“It takes a client that has foresight to be willing to do something other than the cheapest and easiest short-term solution,” says Carey. “It will pay off when they’re not having to do major rehabilitation projects.”

### Opportunity Knocks

Despite heavy traffic that continues to grow, FLL scheduled a 120-day runway closure for the runway rehab project. “We were able to carve out 120 days, and that allowed us the opportunity to do things that we normally

would not have had from a time perspective,” says Carey. While a standard asphalt mill-and-overlay job could have been completed in less than 60 days, it would not have yielded the same benefits, he explains.

During the runway closure, the airport seized the opportunity to:

- upgrade airfield electrical systems and signage;
- convert airfield lighting from quartz to light emitting diode (LED) technology, a move designed to reduce energy and maintenance costs;
- replace engineered material arresting system (EMAS) beds at each runway end, which were installed in 2004 and had reached the end of their useful life;
- extend the east end of the Runway 10L-28R EMAS, in compliance with FAA requirements;
- change the profile of 10L-28R to address drainage issues caused by a former crosswind runway;
- address “hotspots” to help improve the airfield’s geometry and optimize runway use;
- realign several connecting taxiways that did not meet current FAA design standards; and
- relocate a terminal parking apron connector to meet FAA safety standards and minimize the potential for runway incursions.

decided to take a closer look at what repairs were needed.

A pavement condition index performed by Florida Department of Transportation’s Statewide Airfield Pavement Management Program indicated it was time for a rehabilitation.

Consulting firm Kimley-Horn, engineer of record for the project, provided FLL with several options for how to proceed; and airport officials created a decision matrix to rank them. Key factors were cost, duration of construction, benefits, maintenance and impact to operations.

One option was to continue the 15-cycle of milling and overlaying the asphalt runway. However, since asphalt requires more frequent rehabilitation than concrete, the impact to flight operations would be






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Crews reconstructed the west end of Taxiway B with concrete.



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“We took the opportunity to do our best toward bringing the runway up to full compliance with current standards,” Carey summarizes.

While the airport completed its runway and other airfield work, FAA upgraded its runway status lights and navigational aids.

### Commitment to Neighbors

The 120-day closure of FLL’s primary runway meant that all traffic would need to use the South Runway. Further complicating matters, the airport has a voluntary interlocal agreement with the neighboring city of Dania Beach to restrict use of the South Runway between 10:30 p.m. and 6 a.m.

Because shifting traffic to the South Runway would impact Dania Beach, FLL amped up its community relations. “We had communications and outreach plans in place before they put the shovels in the ground for the project,” relates Meyer. “We went to greater lengths than we have in the past about construction projects.”

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The strategy included weekly status calls among the public information office, consultant, internal project team and noise information office about the project's progress, frequent meetings with elected officials, outreach efforts to homeowners associations and the business community, broad-base social media campaigns, news releases and media events.

"The public outreach was extensive," Douge says. "I think a communications plan is an essential component when you have this type of a project."

The team worked to keep internal and external stakeholders informed. Meyer notes that it was important to keep external stakeholders such as elected officials informed, because they would receive questions and complaints from constituents. "You have a very large audience with a project of this magnitude," he reflects.

This aspect was also critical to the airport's chief executive officer, Mark Gale. "He's very sensitive to the concerns of the community," explains Meyer. "While we don't control the aircraft and flight patterns, there are things we can do to make sure the community is made aware of what's happening, why and when. He [Gale] didn't want the community to be surprised by this four-month closure."

A bi-weekly newsletter with updates about the airfield project was posted on the airport's website. It also regularly shared photos and video captured by drones to detail construction progress.

In addition, the public information office produced a four-minute video detailing the need for the project and what passengers should expect. It was shared via social media and on the airport's website and YouTube channel.

"Knowledge is king," emphasizes Carey. "The county did its best to keep people informed."

Internally, the project team held weekly progress meetings. It also convened daily coordination meetings with contractors, FLL's chief executive officer and chief operating officer, project manager, operations director, air traffic control tower chief, the airlines and airport tenants to keep everyone updated on the status of construction. "Coordination was a constant factor during the project—adjusting, reacting to the needs of the construction and also to the needs of the airport in general," Douge relates.

Because the closure meant FLL was a single-runway airport for roughly four months, it was imperative for the operations team to develop a new plan to minimize operational impacts in the

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event of an aircraft incident. “We had a team on call that could be mobilized quickly to bring out the equipment we needed,” says Meyer.

### Reality Check

Prior to putting the project out to bid, the airport held a pre-bid workshop with industry partners to ensure that the project’s scope was reasonable within the allotted timeframe. Once the design was at 75%, potential bidders were brought in to evaluate the plan for constructability and schedule. “We showed them what our intentions were, and we got some constructive feedback,” explains Carey. “We wanted to know that even if we had a perfect design, was 120 days a reasonable amount of time to build it?”

Airport officials were encouraged when prospective participants validated the plan and timetable. “That helped us solidify our plan to put this document out for construction,” Douge recalls.

“The workshop was very valuable,” Carey agrees. “We tried to be reasonable to the contractor in giving something that could be accomplished within the timeframe, but still be aggressive so there was a sense of urgency.”

The contract for the 120-day project included incentives as well as liquidated damages, he adds.

Scheduling the project was tricky. As the 18th busiest commercial airport in the U.S., “slowest time of the year” is relative, notes Carey. Moreover, summer is hurricane season for the area. To make allowances, FLL included 16 days for possible weather delays in its agreement with General Asphalt Co., the construction contractor.

“You can never—especially in a subtropical environment like ours—underestimate the impact weather has on your project,” Carey emphasizes.

Hurricane Dorian did, in fact, cause the construction site to demobilize for four days. But FLL did not take a direct hit, and crews were able to resume work promptly.

The team constructed an onsite concrete batch plant to increase efficiency, maintain the aggressive schedule and minimize impact to the surrounding community. “We had direct access from the plant to the construction site, which was very helpful,” relates Douge. “The contractor didn’t have to purchase the concrete or have trucks on the roadways.”



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Maintaining mobility for airport users was also an issue. Because tenants located on the north side of the airfield needed to maintain access to the south side, the project team could not fence off the worksite to make it a landside project for security purposes. The airport initially planned to maintain a single entry point for airside access, but it ultimately established three access gates when it became apparent how much traffic the project would require.

All access points were staffed by the airport's contract security firm, Allied Universal. And Broward County Sheriff officers provided additional support when construction reached the east end of the runway, closer to the terminal.

After the North Runway opened on Oct. 1, there were nightly closures between midnight and 6 a.m. for 45 days to complete supporting taxiway work. Overall, the North Airfield Rehabilitation project is scheduled to wrap in March 2020. ✈️

*The project team convened daily coordination meetings with the airlines and other key stakeholders.*



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# Bozeman Yellowstone Int'l Builds Rental Car Garage to Meet Growing Tourist Demand

BY MINDY HAMLIN

## FACTS & FIGURES

- Project:** Rental Car Garage
- Location:** Bozeman Yellowstone (MT) Int'l Airport
- Size:** 440,000 sq. ft.; 4 floors
- Parking Capacity:** 1,100 spaces (include 100 for public parking)
- Cost:** \$34 million
- Funding:** General airport revenue; 90% will be recouped via customer facility charges
- Project Timeline:** Nov. 2016-July 2019
- Car Rental Tenants:** 8
- Engineering Design:** Morrison Maierle
- Architecture:** A&E Architects
- Parking Consultant:** Walker Consultants
- General Contractor:** Sletten Construction Companies
- Concrete Supplier:** Knife River Concrete Supply
- Conveying Equipment:** KONE Inc.
- Fire Suppression:** Bozeman Fire Protection LLC
- Masonry:** Aune Masonry Inc.
- Metals:** Terry Bannan Construction; Arch Metals Inc.
- Plumbing/HVAC:** Central Plumbing & Heating
- Signage:** Signs of Montana
- Luggage Cart Rental:** Thompson Contract



Winter is a busy time at Bozeman Yellowstone International (BZN). Parka-clad passengers from around the world fly into the southwestern Montana airport with snowboards, skis and other outdoor gear to enjoy the rugged Rocky Mountain region.

Many drive on to Yellowstone National Park, Big Sky Ski Resort, Bridger Bowl Ski Area and other popular tourist spots. This year, BZN passengers are picking up their rental vehicles from a new four-level garage with direct access to/from the main terminal.

The airport spent \$34 million to build the new facility and will recoup 90% of its costs through concession facility charges the rental companies collect from customers.

As the area grows in popularity with tourists, so does the number of passengers flying into and out of BZN. “We are one of the fastest-growing airports in the country,” reports

Airport Director Brian Sprenger. “Last year (2018) we grew by 11.9%. So far in 2019, our passenger numbers are up 17.4% compared to the same period last year.”

With traffic volume outpacing airport forecasts, BZN officials have been tackling major projects sooner than expected to meet the growing demand. A new facility for the airport’s eight rental car companies was at the top of the list.

“As we were looking at different challenges in parking, the one that kept coming up was tremendous traffic growth in our rental car area,” explains Sprenger. “We looked at building a paid parking facility as well as a dedicated rental car garage. In the end, we decided to build primarily a rental car garage.”

The airport, which has 2,000 short- and long-term parking spaces, also decided to use the project to gauge the viability of covered public parking—an amenity BZN or any other airport in Montana had not previously offered. The new rental car garage includes 100 public parking spaces on the first floor to test the community’s



BRIAN SPRENGER





interest in paying for more convenient, but more expensive, parking. A spot in the new covered garage costs \$18 per day vs. \$9 or \$12 per day in airport's surface lots.

"We want to know what people who live here are willing to pay for the increased convenience," says Sprenger. "Ultimately, we think we will probably grow into a second parking garage, so we wanted to take this first step."

### Market-Specific Design

BZN turned to Morrison-Maierle, its long-time engineering and design firm from Helena, MT, for help executing the project.

"One of the biggest challenges we faced was building a new parking garage on land that the rental car agencies and the airport were currently using, while minimizing the impacts on passengers," says Project Manager Mark Maierle.



MARK MAIERLE

In addition to relocating roads and rental car ready lots, the team created a covered walkway about the length of a football field to protect passengers from snow and rain.

The airport was clear that it wanted to keep the distance between the parking garage and terminal short, notes Maierle.

"We really weren't enthusiastic about having shuttles," explains Sprenger. "As a strong leisure market, we have twice



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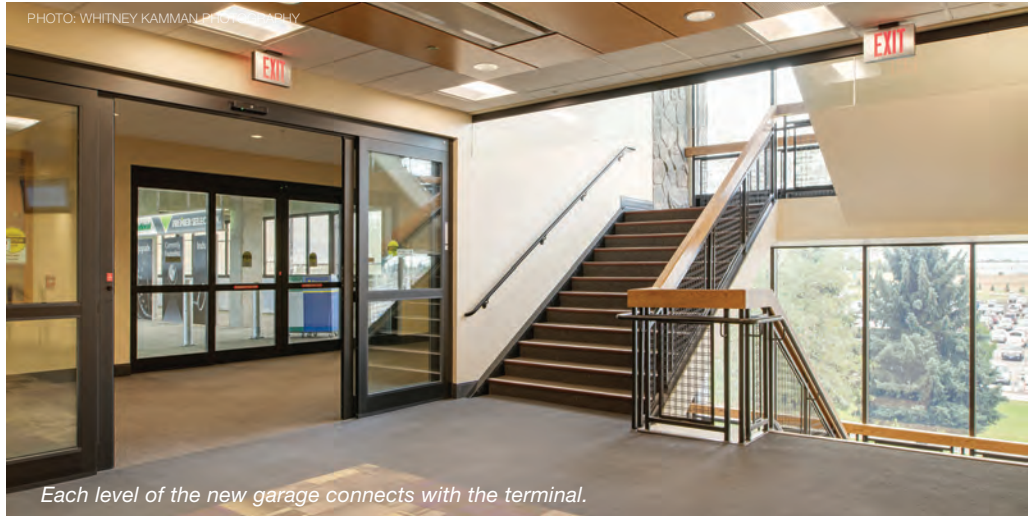
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*Each level of the new garage connects with the terminal.*

as much luggage as a business market. It would have created a lot of issues for passengers to have to load all of their luggage onto and off of a shuttle van.”

To help BZN navigate these challenges, Morrison-Maierle brought Walker Consultants onto the project team. Together, the firms worked with the airport and rental car agencies to determine the best design for the garage.

“Based on the airport and rental car agencies’ needs, we evaluated multiple parking layouts before landing at the preferred alternatives,” says Kirk Taylor, director of Design in Walker’s Denver office.



KIRK TAYLOR

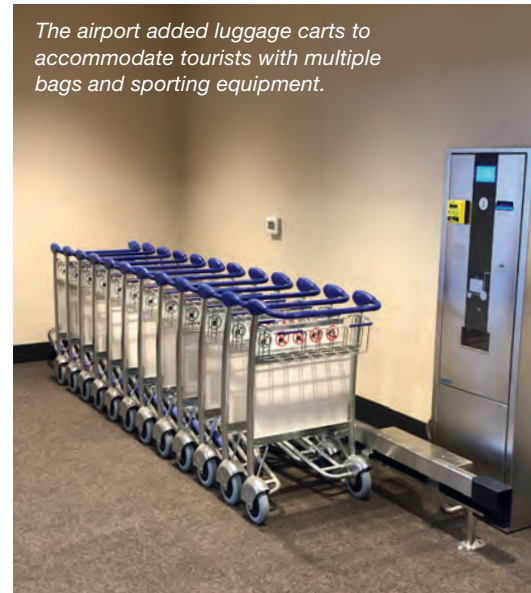
Because the rental car company locations were not pre-selected, the garage design had to ensure flexibility.

“Everyone wanted the first floor, because it was seen as the most convenient to the terminal,” notes Taylor. To ensure convenience on every level, the Walker team recommended an express ramp design.

“The express ramp makes it so drivers only have to take one and a half turns to get to the main floor,” he explains. “We wanted the quick turnaround process to be as fluid as possible, so we used one-way flow to make it intuitive. Drivers don’t get lost in the facility.”

Many parking garages, Taylor points out, employ a single-threaded helix, which

*The airport added luggage carts to accommodate tourists with multiple bags and sporting equipment.*



requires a 360-degree revolution to get from one level to the next.

“The way this ramp is set up, you go up in a straight line and turn,” he explains. “In one 360-degree move, you have gone up three levels. This design moves vehicles in and out more efficiently.”

An express ramp is not the building’s only unique feature. In addition to being Montana’s largest parking garage, the new airport facility also features something unusual for parking garages: a top floor that is covered. The roof provides protection from winters that deliver up to 100 inches of snow, notes Sprenger.

The back façade of the garage is draped in wire mesh. “It provides an aesthetic appeal and prevents people from jumping over the airfield fence and entering the sterile area,” explains Maierle.



PHOTO: WHITNEY KAMMAN PHOTOGRAPHY



The new garage features an express ramp to facilitate traffic flow.

The garage was also designed and built fiber-ready, to ensure that infrastructure is in place for future technology investments. “Rental car agencies have the flexibility to install their preferred systems,” notes Maierle.

### Testing Customer Preferences

While 90% of the spaces in the garage are dedicated to rental cars, the airport set aside 100 “premium” spaces to test customers’ interested in paying more for covered parking close to the terminal.

“Covered parking is not something local passengers have been asking for,” says Sprenger. “Montanians are hearty. They are used to cold and used to snow, so paying more for covered parking may not be attractive to them. For us, this is a good way to dabble in it and see what the demand is for a parking garage.”

With the “rental car/test garage” complete, the airport has begun work on its next major project: a terminal expansion budgeted at \$25.5 million and an apron expansion budgeted at \$4.5 million.

“The parking garage was a good project,” reflects Sprenger. “We are happy with how it turned out. It was our single focus, but then we moved on and it is like it always existed.” ✈️



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# Miami Int'l Manages Increasing Bag Volume with New High-Tech Screening System

BY JENNIFER BRADLEY

## FACTS&FIGURES

**Project:** New Baggage Handling System

**Location:** Miami Int'l Airport

**Cost:** \$324 million

**Funding:** \$101.2 million TSA grant; Miami-Dade Aviation Dept. bonds; Florida DOT grant

**New Reconciliation Area:** 18,000 sq. ft.

**Key Technology:** 12 CTX 9800 SEIO ISD machines from Smiths Detection; 102 Mobile Inspection Tables from Daifuku Airport Technologies-Jervis B. Webb Co.

**Processing Capacity:** Up to 7,000 bags/hour; system will serve 50+ airlines when fully operational

**Construction Manager:** Parsons/Odebrecht Joint Venture


**BHS Main Subcontractor:** Daifuku Airport Technologies-Jervis B. Webb Co.

**BHS Control System:** Brock Controls

**BHS Design/Planning:** Burns & McDonnell

**BHS Electrical:** Miller Electric

**Conveyor Installation:** Jordim Int'l



With unprecedented growth of 1 million annual passengers, Miami International Airport (MIA) hit a record 45 million passengers in 2018. Moreover, 2019 appears to be on the same track.

Much of the volume comes from routes to Latin America and the Caribbean; and the area's thriving cruise industry is also fueling the surge. Either way, the passenger growth translates into more suitcases, duffle bags and golf clubs for the airport to process.

When officials announced MIA's largest capital improvement initiative ever, it was no surprise that the program included a new state-of-the-art baggage system for the Central and South Terminals. The \$324 million system contains the latest X-ray machines available and autonomous mobile inspection tables.

Members of the project team note that the system's new checked bag resolution areas can operate independently, but they share a new common facility that features the industry's largest installation of mobile inspection tables to date.

A TSA grant funded \$101.2 million of the overall project cost, as the new system will improve screening efficiency, enhance passenger safety and improve working

conditions for its staff. The mobile inspection tables, for instance, reduce physical strain for TSA officers performing secondary baggage inspection.

## Integration Takes Time

A soft opening this past summer helped ease the airport into using the higher-tech components; and airlines continue to transition onto the system gradually.

"Building out a new baggage system is stressful enough," says MIA Director Lester Sola. "Adding new technologies adds a significant layer of difficulty. Our staff has done an excellent job keeping the airport up and running, ensuring the safety of our flying public."

With more than 45 million people passing through MIA each year, shutting down areas of the baggage system to renovate was not an option. Instead, Parsons/Odebrecht Joint Venture (the project's construction manager)



LESTER SOLA



TOMMY VALENTINE





tackled the job step-by-step, shifting each part of the baggage process over to the new system in 29 phases.

“That’s why we’re going to finish in 2020,” says Tommy Valentine, construction manager for the joint venture. “On July 29, we activated the new building with the new system, and integrated a few airlines at that time.”

Eventually, the system will be used by more than 50 airlines. In early December, 21 had already made the switch.

By 2040, the airport is projecting an annual influx of 77 million passengers and 4 million tons of freight. “The system is designed for another five to 10 years of growth,” notes Valentine.

Burns & McDonnell worked closely with project stakeholders to develop the phased plan that allowed the baggage system to remain fully operational throughout the project, says Project Manager Joe Pericich. It also worked with other team members to convert the concept design into construction drawings.

### System Highlights

Upgraded technology is the keystone of the new system. For instance, 12 new CTX 9800 explosives detection systems from Smiths Detection will do the job of the 25 older models they replaced. The new machines provide high-level 3-D imaging that can detect certain components, such as metal, inside bags.

Sola notes that the new imaging technology is a considerable improvement for the airport, because many of MIA’s passengers pack items to conduct business throughout the U.S. and across country borders. “One of the bags opened recently was full of costume jewelry,” he explains. “This level of screening is now done by the system, which can highlight an area of concern.”

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The mobile inspection tables by Daifuku Airport Technologies-Jervis B. Webb Co. are another notable feature. The tables carry bags for secondary screening autonomously—no one “drives them,” notes Sola. It may look like the tables are moving all over the place, but the system sends each one to the next available TSA inspector, he adds.

“Efficiency increases because the bags move quicker, but also because the production time for agents is constant when they are not having to go anywhere [to retrieve or return bags to a conveyor],” explains Sola.

“The technology is unbelievable,” agrees Valentine, noting

that Daifuku Airport Technologies-Jervis B. Webb Co. has a rich history with conveyor technology for automotive manufacturing. “The guys with Brock Controls are unbelievable, too. There are a million wires in this thing, and the technology they brought in to control miles of conveyor systems is amazing.”

The new mobile inspection tables enhance the airport’s ability to trace individual bags through the system, adds Tim Hipp, Daifuku’s project manager at MIA. Moreover, they reduce ergonomic strain, improve room accessibility and reduce noise levels for TSA bag inspectors.

“Unlike rigid conveyors, the mobile inspection tables can facilitate a flexible layout to conform to the space available,” notes Todd Alderman, a Daifuku vice president. “Columns and other building structures can be avoided without the need to add additional equipment, which is traditionally the case with conveyors.”

He also stresses that the tables save energy, making them an “ideal green solution” for other airports to consider.

### Checked Bag Resolution

The new system at MIA can process up to 7,000 bags per hour, and a high percentage of them need extra inspection, notes Valentine. That’s where the technology upgrades really shine.

New conveyors take checked bags through the new facility for standard screening. Bags that are cleared go directly to sortation piers, where they are picked up and loaded onto planes. Bags that are deemed “suspect,” are processed again through a secondary system and, if cleared, end up in the same location.

Previously, TSA agents would manually lift suspect bags from the conveyor to a table, where they opened and examined the contents. They then carried cleared bags back to a separate conveyor that moved them out of the inspection room and back into the handling system.

Today, MIA’s mobile inspection tables are changing all of that.

Agents no longer have to physically pick up each bag. Conveyors drop each suspect bag onto its own cart, which is moved autonomously to one of 52 staffed inspection stations. Advanced X-ray images are analyzed at the station and a TSA worker inspects the bag. If cleared, it is taken away by a mobile table with the push of a button.

For Sola, the human factor—treating people better and giving them more efficient



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Autonomous mobile inspection tables reduce ergonomic strain for TSA bag inspectors.

tools—is an important part of MIA’s recent baggage system project. Eliminating the need to repeatedly pick up bags that often weigh 50 pounds or more is a huge improvement. “It also brings major savings for the federal government and taxpayers in terms of injuries and time,” Valentine adds.

Other airports have been using the mobile carts for a while, but in a smaller footprint, he notes. MIA had to make slight modifications to the architectural design of its new facility to incorporate them.

### Best Practices

Valentine urges airport operators to understand what they’re getting into when investing in a new baggage handling system. “Preplanning is key,” he stresses. “Not many contractors have installed a baggage system. It’s not a building; it’s a living, breathing animal that is constantly moving and changing.”

Sitting behind a desk and reading system reviews isn’t enough, he adds. To prepare for the MIA project, Valentine visited airports across the country to ask questions, observe their technology in action and talk directly with personnel running the systems.

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The airport is gradually integrating airlines into the new checked bag screening system.



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As a result, he was better able to anticipate and understand the challenges various participants (airlines, control staff, conveyor providers, etc.) could encounter.

Pericich agrees that baggage handling systems are highly complex and technical, and notes that it's crucial to have team members who are up to date with current security requirements and technological advancements.

Sola emphasizes the need for airports to give their airlines the chance to weigh in about baggage system projects. This became clear when a change order to include more advanced technology was proposed late in MIA's project (2018).

"If the users are saying they want it done that way, that makes any negative position of a change order go away," he explains. "We need to make sure we're doing things in partnership with our business partners, the airlines, and everyone who has a job associated with the airport."

Sola describes TSA as an amazing partner during MIA's recent project. He also notes that the Miami-Dade Aviation Department was highly effective working with federal and state partners. "I have never been in an agency that interacts as well as this airport does on a daily basis with mission-critical things," says the more than 20-year industry veteran. "They all had an integral part, especially TSA, in the development and deployment of this system."

He says teamwork among contractors, government agencies, airport staff, consultants and technology providers produced a system that will allow millions of trips to begin at MIA without a hitch. What passengers won't see, however, are the high-tech screening machines, autonomous carts and miles of conveyors that make it all happen. ✈️



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# Elmira Corning Regional Expands Terminal, Adds Calming Courtyards

BY THOMAS J. SMITH



Approaching the TSA checkpoint at the recently renovated Elmira Corning Regional Airport (ELM) is now like a walk in the woods. Travelers pass through a gently curving corridor with floor-to-ceiling glass walls that showcase courtyards filled with greenery. The checkpoint itself is not visible until passengers reach the last bend in the bright corridor.

Once through the checkpoint, travelers funnel into glass-walled departure lounges that overlook courtyards with trees, shrubs and rocks portraying the local landscape of south central New York. They can even wait in the gardens until boarding time.

A \$60.4 million project completed in fall 2018 expanded and transformed the ELM's plain box terminal into a modern facility designed to help travelers relax. Prior to that, the last major renovation to the 1960s era terminal was in the 1980s to improve energy efficiency.

The recent project added 33,000 square feet of new space to the terminal, which now stands at 88,000 square feet. Existing space was also renovated and clad in Lake Placid blue granite to make the entire building appear new. Now, the terminal includes six gates instead of four, with three boarding bridges that can





## FACTS & FIGURES

- Project:** Terminal Expansion & Renovation
- Location:** Elmira Corning Regional Airport, NY
- Owner/Operator:** Chemung County
- Expansion:** 33,000 sq. ft.
- Key Elements:** 3 departure lounges; 6 gates with 3 boarding bridges; new baggage claim area; geothermal system for heating/cooling; new post-9/11 configuration
- Cost:** \$60.4 million
- Funding:** \$40 million, state grant; \$15 million, Airport Improvement Program; \$6 million, local
- Construction:** Aug. 2017–Oct. 2018
- Architect & Interior Designer:** Fennick McCredie Architecture
- Engineers:** McFarland Johnson
- Construction Manager:** Welliver
- General Contractor:** Streeter Associates Inc.
- Landscape Consultant:** Hargreaves Jones Landscape Architecture DPC
- Electrical Contractor:** John Mills Electric Inc.
- Mechanical Contractor:** Piccirilli-Slavik & Vincent Plumbing & Heating Inc.
- Passenger Boarding Bridges:** Ameribridge
- Baggage Handling System Design:** BNP Associates Inc.
- Baggage Handling System Installation:** Five Star Airport Alliance
- Seating:** Herman Miller; Geiger; Keilhauer; OFS
- Of Note:** Prize money from statewide design contest provided majority of project funds
- Design Objectives:** Encourage calmness/relaxation in TSA checkpoints & gate areas; reallocate space according to post-9/11 standards; rethink traditional elements, such as seating materials & orientation

PHOTO: WILLIAM HOFNIE

service regional jets and Airbus 320/Boeing 737 class aircraft. It also includes a new baggage handling system, post-security concessions and a full-service restaurant located before the TSA checkpoint. A geothermal system with 72 wells, reaching depths of 450 feet, was installed to heat and cool the terminal.

The comprehensive overhaul was largely funded with \$40 million from the state of New York. ELM secured the funds as one winner of a \$200 million design contest launched by Gov. Andrew Cuomo to spur redevelopment and expansion of airports outside the New York City metro area. Upstate airports throughout the region competed for five grants, each up to \$40 million. The state was looking for “transformative designs” to create “airports of the future;” and ELM’s submission fit the bill.

To receive the prize money, winning airports had to complete their respective improvements by Oct. 31, 2018. That gave ELM 18 months to renovate and expand

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its terminal. And, the project team had to stick to the drawings approved by the governor's office. ELM met both criteria.

(For details about winning projects at other New York airports, check out our April 2018 issue at [airportimprovement.com](http://airportimprovement.com).)

### Design Objectives

"A walk in the woods" was the mantra that guided every part of the design and construction process, says Jonathan McCredie, a principal at Fennick McCredie Architecture.

"That was the idea we were constantly going for—from the initial concept to making sure contractors put trees in the right spot," explains McCredie.

The terminal's three departure lounges are surrounded by an 18,600-square-foot garden, complete with a security wall to prevent airside access. Two courtyards in the garden are accessible from the departure lounges, so passengers can wait outside before their flights. A third and separate courtyard is only accessible from the pre-security restaurant area.

Inspired by the rolling hills and abundant hiking trails in southwest New York, designers opted for natural elements when re-thinking how the terminal could look and operate. The idea was to place the most stressful aspects of flying—security screening

and waiting to board—in a serene courtyard, explains McCredie, a graduate of upstate Cornell University.

Glass is another dominant element of the design to reflect the region's glass-making history and modern innovations. In fact, the longtime headquarters of multinational glassmaker Corning Inc. is located just a few miles from the airport.

### Secure-Side Changes

When reconfiguring concourse areas, the Fennick McCredie team focused on "thinking differently." Instead of positioning gate seating so passengers look out at the airfield, designers oriented them toward the courtyards. "It's like you are sitting in the garden," McCredie remarks, noting that passengers can still see the gates to keep track of the boarding process.

In another departure from industry norms, ELM installed soft seating rather than traditional straight leather seats attached to fixed steel frames. Again, the change was to encourage relaxation.

Prior to recent renovations, each gate had about 100 seats—not enough when the airport had multiple flights at the same time, explains ELM Aviation Director Tom Freeman. In addition to adding 300 new gate seats, the airport widened the concourse and increased restroom capacity near the boarding lounges. Previously, the concourse was only 10 feet wide in some areas.



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Holdroom seating is oriented toward landscaped courtyards rather than the ramp.



PHOTO: WILLIAM HORNE

The old terminal had two boarding bridges, and neither could be manipulated to reach the A320s that Allegiant Air uses. Such larger aircraft had to be ground boarded.

With project funds, ELM purchased three boarding bridges (one new, two renovated) that can accommodate regional jets and A320 class aircraft.

The facility expansion added two gates with ground boarding in case ELM attracts service from carriers that use turboprop aircraft.

### Fortuitous Timing

When Gov. Cuomo announced the airport design competition in 2016, ELM already had a fresh masterplan completed by McFarland Johnson.

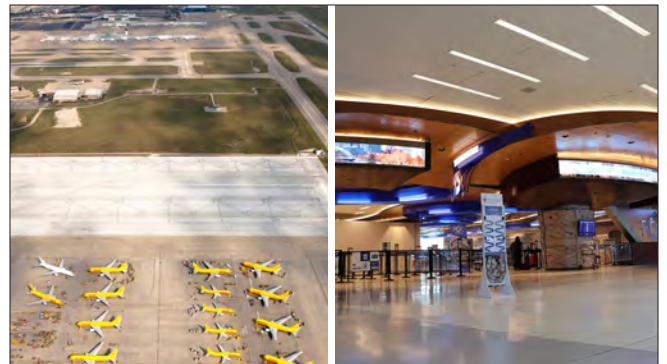
Chemung County, which owns and operates the airport, had not invested any significant money in the terminal for decades, notes Jeff Wood, a project manager with the firm. The terminal was deemed to be the right size for enplanements; but was still configured according to pre-Sept. 11 design standards—a lot of pre-security space, with little room post-security. “It was all backwards,” Wood comments.



JEFF WOOD

McFarland Johnson consequently hired Fennick McCredie to assist in designing a new terminal and with ELM’s contest application. To apply, the team had to submit “crude budget estimates, a lot of justifications and some very conceptual drawings.”

That said, the firm’s initial sketches set the tone for the entire project.



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Mike DeVoy  
Aviation Market Leader  
317.694.9672  
[mdevoy@chacompanies.com](mailto:mdevoy@chacompanies.com)

“We knew that we had to do something special, and it needed to stand out because we were competing with other communities,” Wood recalls. “Elmira was an underdog compared to the others.”

In the end, ELM was one of the first airports to win a grant. Wood suspects the team’s entry stood out because other applications were not nearly as aggressive in transforming their terminals.

The word from Cuomo’s office was that airports couldn’t submit enticing designs and then build something easier and ultimately more mundane.

“This made our job more challenging on a daily basis, but it kept everyone driving toward the shared goal,” Wood explains. “It did produce the best results.”

The county viewed winning the contest as its only hope to upgrade ELM’s terminal. In the end, it supplemented the \$40 million from the state with \$15 million in Airport Improvement Program grants and \$6 million in local funds.

“There is no way, through the normal course of AIP funding, the county could ever be able to undertake a project like this,” Freeman explains. While ELM is not self-sustaining, operations

have improved enough to shrink the deficit to several hundred thousand dollars, he reports.

Once it received the grant, the county had 18 months to complete the terminal project. McFarland Johnson hired Welliver, of nearby Montour Falls, to act as the construction manager.

“This project was very rigorous,” observes Nick Robertson, Welliver’s project executive. “Normally, a project like this would take 18 months to construct. We had 18 months to design and construct.”

### Lean Construction

To get the project team on the same page, key participants from McFarland Johnson, Welliver and Fennick McCredie met for several days in a hotel to “hammer out” the concept design and construction phasing.

At the time (2017), the approach was unusual; but multi-discipline planning meetings are now more common, notes McCredie.

The group employed planning tools from the lean construction approach, including the “big room” concept, where all parties meet periodically to coordinate construction phasing and progress.



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“It worked out well,” McCredie reflects. “Getting everyone in one room early on does help everyone get started.”

He notes that his firm had used the process for several years in other sectors; and Massport was using it at the time for projects at Boston Logan International.

Although the masterplan originally envisioned expanding the west side of ELM’s existing terminal, the compressed schedule shifted expansion to the east. The initial plan called for a multi-year timeline, with crews first removing and relocating several existing buildings (including a dilapidated aircraft rescue and firefighting station) before expanding the terminal. But the east side space was empty and construction-ready, so that’s where the airport expanded.

Site, building foundations and envelope construction work began while engineering systems were still in design. The glass walls were ordered immediately because of long manufacturing lead times, particularly for curved glass walls, notes Christopher Kopec, project engineer for McFarland Johnson.



CHRISTOPHER KOPEC

Construction began in August 2017 with foundation work for the new departure lounges and baggage claim area.

“We were building as the designed progressed,” recalls Robertson. “The two processes were running parallel, with just enough information flowing to stay ahead of the work. That resulted in a lot of coordination and a lot of added challenges you don’t normally see on a project.”

Due to the condensed planning time, the design team drew on its prior experience on other airport projects to place and properly size the security checkpoints, baggage handling area and boarding lounge seating.

“We had moments when we had to contact the designers to get the plans and answers within the next day or we would be at a standstill,” recalls Robertson. “The design team worked diligently collaborating with us to keep the flow of information ahead of the construction.”

Ground transportation and baggage claim areas were consolidated into the terminal’s original ticketing hall to facilitate the necessary demolition for the expansion. The original restaurant, actually just a deli, and a meeting room were also demolished.



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Designers leveraged natural elements to transform the TSA checkpoint into a more serene environment for passengers.



### Asbestos Curveball

In the first week of construction, contractors found asbestos in some of the original walls that were being demolished. “It was dealt with very quickly,” reports Wood, noting that the asbestos was not documented on any of the original drawings or flagged during initial inspections. It was a scheduling “curveball,” and it added \$80,000 to the costs.”

To keep passengers and airport employees away from the area while crews removed the unexpected material, ELM set up restrooms in a temporary trailer out in the parking lot. That arrangement lasted about six months.

“There was not much complaining,” says Wood. “The people ‘got it.’ The community knew what was coming.”

“The passengers had to put up with a lot of ground boarding,” adds Freeman, “but everybody knew that’s what they had to do to get a terminal like this.”

Once the new space was constructed, crews renovated the existing space to make it look new, too. The ticketing area received a makeover, but no substantial changes.

Late in the project, the airport’s four-story control tower and offices received a cosmetic facelift with new windows and a new exterior. Infrastructure for the new geothermal system



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was extended to the tower. Kopec notes that the system has enough capacity to eventually handle the tower's heating and cooling needs.

While building the addition, contractors ran a single shift, often with extended hours and overtime. However, crews worked multiple shifts toward the end to finish on time.

At peak, there were 30 contractors onsite, with up to 150 total crewmembers working in close quarters.

"The contractors and engineers worked really well with the airport to enable us to carry on with business as usual even with a lot of temporary facilities," Freeman reports.

### One Year Later

Despite adding about 50% more space, ELM is not experiencing substantial increases in operating costs. Airport officials attribute this to new efficiencies that were built into expansion and renovation plans.


In addition, initial concerns about the durability of soft seating have been allayed. "I did go back one year later and found that the seating held up extremely well," says McCredie. "The manufacturers have caught on."

"The terminal was built for the 21st century with a lot of forethought about the long-term needs of the airport," adds Freeman. "This will suffice for years to come, as I don't see operations outgrowing the facility anytime in the near future."

While the local population has stabilized, ELM has experienced a steady increase in annual enplanements for the last several years. In 2018, it logged 160,000 enplanements, up 12% from 2017.

Allegiant, Delta Air Lines and United Airlines currently serve ELM with nine flights a day to five locations: Orlando, St. Petersburg/Clearwater, Punta Gorda, Detroit and Washington, D.C.

Since the terminal project was completed, Delta has upgraded the size of regional jets it flies into ELM, and Allegiant concluded its transition from MD80s to new Airbus 320s.

"It is really becoming a regional airport," Freeman notes. "We have become the airport for northern Pennsylvania, with service and fares drawing travelers from Williamsport, Wilkes-Barre and even Pittsburgh. We are also attracting travelers from Binghamton and Ithaca (NY), since their airports are not serviced by Allegiant." 

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# Runway Rebuild at St. George Regional Requires Airport Closure & Massive Excavation

BY KEN WYSOCKY



The newly rebuilt runway at St. George Regional Airport (SGU) doesn't look at all unusual. But its routine appearance belies what's hidden below: a clever feat of engineering and earthwork designed to stop the pavement heaving that doomed the original runway.

Ironically, the \$26 million project that reconstructed the 9,300-foot runway leveraged the same material that caused the runway to start heaving in the first place. The villain and hero was blue clay, which is common in southwestern Utah, where SGU is located.

Airport Manager Rich Stehmeier notes that the pavement issue first arose several years after SGU opened in January 2011. "Some areas on the side of the runway swelled more than 12 inches, which is pretty significant heaving," says Stehmeier. The culprit was the clay, which expands when it gets wet. Even though crews had removed 5 feet of clay and replaced it with structural fill before building



RICH STEHMEIER

the original runway, later analysis revealed that moisture-filled clay still posed a problem.

"As water ran off the edges of the runway and down to drainage ditches, some of it still penetrated the ground," he explains. "Furthermore, as the asphalt got hot during the day, it then pulled moisture under it, where it eventually penetrated into the blue clay below. And when that clay gets wet, it expands like a giant sponge."

In 2017, engineering consultants from Rood & Associates concluded that the design and construction of the first runway wasn't to blame. "Their assessment was that the airport was built to—and in some places, better than—the project specifications," Stehmeier says. "That was an important conclusion, because without it, the FAA wouldn't pay for fixing the runway."

In the end, FAA contributed \$13 million for the runway reconstruction. A federal grant from a fund created for major infrastructure projects chipped in another \$11 million, and revenue from passenger facility charges paid for the balance.





## FACTS & FIGURES

**Project:** Runway Reconstruction

**Location:** St. George (UT) Regional Airport

**2018 Passenger Volume:** 277,000

**Project Cost:** Approx. \$26 million

**Funding:** \$13 million FAA grant; \$11 million federal infrastructure grant; \$2 million airport revenue

**Construction:** May 29–Sept. 25, 2019

**Project Engineer:** Jviation Inc.

**Geotechnical Consultants:** Landmark Testing & Engineering; Applied Geotechnical Engineering Consultants Inc.

**Engineering Consultant:** Rood & Associates

**Excavation Contractor:** J. P. Excavating Inc.

**Paving Contractor:** Western Rock Products

**Geomembrane Liner Manufacturer:** Axter Coletanche Inc.

**Electrical Contractor:** Tri State Electric & Utility Inc.

**Public Relations Support:** Harmony Public Involvement

**Key Benefit:** Safer, smoother runway

**Ancillary Projects:** Terminal ramp expansion; TSA area renovation; parking lot repair, reseal, restripe

**Cost:** About \$700,000

**Funding:** General airport revenue



### Dirty Work

The airport hired Jviation Inc., an engineering consultant firm, to quarterback the project. With assistance from two geotechnical consultants—Applied Geotechnical Engineering Consultants Inc. and Landmark Testing & Engineering—Jviation developed a runway design to resolve the heaving issue.

The design required crews to excavate 5,400 feet of the existing runway’s footprint to a depth of 17 feet. After that, the excavated clay was “conditioned” on site, and then used to build a 5-foot-thick “plug” to block moisture from penetrating. “It’s similar to the clay liners they build at the

bottom of landfills to keep liquids from leaching out,” explains Kirt McDaniel, project manager from Jviation.

Workers conditioned the clay by mixing it with water in large pits until tests showed it had reached optimum moisture content.

On top of the initial layer of clay, crews from J.P. Excavating Inc. installed 12 feet of structural fill that was removed from other sites at the airport. That layer was topped with a geomembrane liner made in the Netherlands by Axter Coletanche Inc.

“It’s the same kind of liner often used on dams to keep water from leaking through,” comments Kevin Scherr, a construction manager at



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Workers moved 2.45 million cubic yards of material, including about 93,000 cubic yards of conditioned clay.



Jviation. “It basically serves as another point that stops water from penetrating down to the native clay below the 17-foot-deep reconstructed area.”

The 3/16-inch-thick, petroleum-based liner was new to the Jviation team. “We’ve never used one like this before,” notes Scherr.

The project required 360,000 square yards of the special liner, which comes in large rolls that weigh more than 1 ton each. Crews used blowtorches to melt the ends together to form one large

liner that extends 200 feet from both sides of the 150-foot-wide runway.

To add yet another moisture barrier, the project design called for more than 31,000 linear feet of perforated drainlines on top of the membrane, and then topped that with 6 inches of coarse rock. The drainage system features two main lines that run along each side of the runway, with perpendicular extensions every 500 feet.

“The drainlines help keep water from getting under the runway,” explains Scherr.

After installing a fabric liner above the layer of coarse rock, crews installed 6 inches of base course followed by 4 inches of asphalt. Western Rock Products performed the paving work.

### Excavation Efficiencies

During the course of the project, crews moved a total of 2.45 million cubic yards of material. That included roughly 193,000 cubic yards of conditioned clay—enough to fill nearly 920,000 standard bathtubs, according to Jviation’s estimates.

The project also required 30,660 tons of asphalt; 24,000 linear feet of electrical conduit; 2,300 linear feet of fencing; and 160 cubic yards of concrete.

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“We were incredibly lucky to get J.P. Excavating as our contractor,” Stehmeier says. “They’re one of the best contractors I’ve ever worked with. Within the first two months, we were two to three weeks ahead of schedule. At that point, we took our foot off the gas pedal a little bit and started working 12-hour shifts instead of 24/7 in order to save some money.

“It was like watching a ballet to see the tractors, dump trucks and huge earthmovers zipping around,” he continues. “You had to keep your head on a swivel if you went out there...but we never had any safety issues.”

The excavating contractor maximized the use of on-site materials to reduce costs for transportation and structural fill. Soil borings revealed 50- to 60-foot-deep deposits of good structural fill on the northwest side of the airport grounds. Using it for the project eliminated multiple 20-mile round trips to pick up and deliver fill material, Stehmeier notes.

Dump trucks hauled “bad” clay from the runway excavation area to the clay-conditioning site, and then carried “good” clay on the way back. “Judd Palmer, who owns J.P. Excavation, thought it all out beforehand,” says Stehmeier. “He had full trucks going both ways. It was incredibly efficient. They worked inside the airport almost the whole time.”

Unconditioned “bad” clay was used to fill a low-lying area north of the runway’s safety zone. The project team estimates that eliminating fees associated with disposing that clay saved the airport \$1 million to \$2 million.

At any given time, there were seven to nine separate crews working on various aspects of the project. For instance, the team that installed the geomembrane liner worked from about 3 a.m. to 3 p.m., when it became too hot to work with the black liner and blowtorches.

“We also had our two geotech firms monitoring and checking FAA requirements for compaction and clay suitability,” adds Stehmeier. “One firm would do a test, and then the other firm would check their test.”

### 129-Day Closure

The project team scheduled the runway reconstruction during summer, when local tourism drops due to extreme heat. The airport, which handles about 65,000 operations per year, was closed from May 29 to Sept. 25, 2019.

Management made good use of the downtime by scheduling nearly \$700,000 worth of smaller projects during the closure. Crews extended the terminal ramp by 100 feet, remodeled TSA’s



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section of the terminal and updated the parking lot pavement. General airport revenue was used for those projects. The city of St. George paid for a repaving project at the fuel farm.

"We tried our best to make lemonade out of lemons," Stehmeier comments. "It's a horrible thing to have to close down an airport, but it also gave us the opportunity to do some work without inconveniencing our customers."

"We also dumped \$26 million into the local economy for four months, which is pretty awesome," he adds. "The only company that wasn't based locally was the paving contractor, Western Rock; but they run an asphalt plant here."

On the other hand, SGU lost nearly \$500,000 in revenue during the closure. Even so, Stehmeier believes the airport's 2019 budget may still balance. Before the closure, passenger traffic for the first five months of the year was up 30% compared to 2018.

"So we generated that much more income than expected," he says. "It would be pretty phenomenal if we even came close to meeting our budget."

### Report as Usual

No airport employees were laid off during the closure. "We actually got stretched pretty thin in terms of staffing," Stehmeier says. "We were crazy busy."

Although the runway was closed, airport staff monitored radio traffic 24/7, instead of from 6 a.m. to midnight like usual. "We were worried that people might try to come in at night and land in a big hole," he explains.

In addition to completing multiple projects during the closure, maintenance crews had to periodically clean construction dust from



signs and the helicopter pad, which remained open during the runway work.

Furthermore, two rental car companies remained open, as did several maintenance operators that lease space at the airport. Some stockpiled work, like rebuilding engines or doing annual aircraft maintenance, to stay busy during the shutdown; others leased space at other airports.

Nearby airports including Hurricane Municipal, Cedar City Regional and the privately owned Sky Ranch Airport pitched in during the closure by offering displaced hangar owners free tie-down spots.

"Hurricane rebuilt their airport about four months before us, and we offered their people free tie-downs," Stehmeier explains. "And Cedar City is redoing their runway in 2020. We work together as a community."


### Getting the Word Out

The airport mounted an intense outreach campaign to spread information about the runway closure as widely as possible. Part of the strategy was hiring a public relations firm, Harmony Public Involvement, which leveraged Facebook and other social media platforms. Despite all that, about 10 pilots still radioed in asking for permission to land.

"There's always a few that fall through the cracks," Stehmeier quips.

Aside from that, he says the project couldn't have run any smoother. Even the weather cooperated. "Aside from one day when it sprinkled a bit, we had no rain, which is so unusual for that time of year it's not even funny," he says. "We usually get monsoon-like rain in August and September, so Mother Nature definitely helped."

"We had a strong team all the way through," adds Scherr. "It's always important to have good contractors on board, because you're dealing with a lot of unknowns. You're only taking soil bores every couple hundred feet, so once you open things up fully, conditions can change quickly...and you need good contractors who can make adjustments on the fly to build the best possible product.

"Generally speaking, things went pretty much the way we expected, thanks to years of preparation and planning." 

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# Detroit Metro Installs New Recycling Bins

 Travelers have their minds on many things, but separating their trash and recyclables is not always among them. To get more customers participating in its recycling program, Detroit Metropolitan Wayne County Airport (DTW) is trying to make the process almost automatic.

In May, the Wayne County Airport Authority increased its commitment to sustainability at DTW by investing in 45 colored recycling receptacles for the North Terminal, which serves all carriers other than AeroMexico, Air France, Delta Air Lines and KLM Royal Dutch Airlines. The new containers replaced less-visible recycling receptacles that were generally not being used properly.

The new system uses three separate but conjoined receptacles, each with clear identification for what it is designed to hold—trash, cans and bottles, or newspaper and magazines. The airport’s previous recycle bins combined all recyclables together, and they were not labeled as well. Sara Kaplan, the airport authority’s sustainability program administrator, says passengers tended to mix trash with recyclables in the old receptacles.



SARA KAPLAN

“Contamination is one of the biggest challenges with any recycling effort in a public place,” Kaplan says. “The old receptacles were not one unit, so they got moved around a lot and they weren’t easily distinguishable. Now that we have three cans in one place, people are more likely to use them properly.”

The airport placed 42 receptacles throughout the North Terminal, with at least one at each terminal gate. The remaining three containers will be positioned at three gates that will open when DTW’s North Terminal gate and apron expansion project is completed.

The improved recycling effort was kicked off with help from the airport’s trash hauler, Waste Management Inc. A small 5% to 10% increase was incorporated into its contract renewal to cover costs associated with the new equipment/program, notes Kaplan.

## A New Look

The new recycling containers are labeled with words as well as pictorial graphics to accommodate travelers who do not read English. When the receptacles were dispatched in May, the airport posted extra signage and set up information tables to provide information about its sustainability effort, including information from the state’s



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## FACTS&FIGURES

**Project:** Improving In-Terminal Recycling

**Location:** Detroit Metropolitan Airport

**Strategy:** Adding 45 new recycling receptacles with improved labeling in North Terminal to encourage more use

**Cost:** Existing contract with Waste Management Inc. increased 5%-10% to cover additional costs

**Initiated:** May 2019

**Of Note:** Fully 20% of the 1,550 tons of waste removed from North Terminal in 2016 was recyclable; in 2018, recycling in airport authority offices saved 61 tons of material from local landfills





September 2020, and will allow passengers to dump liquids that do not meet TSA requirements but keep the bottles for reuse or recycling. The airport plans to place two or three liquid disposal stations at each of the two passenger checkpoints in the North Terminal, depending on customer traffic.

“We’re always looking for ways to better manage our waste around the airport, including working with our tenants on identifying opportunities to recycle more and reduce our waste,” says Kaplan.

Chad Newton, chief executive officer of the Wayne County Airport Authority, reinforces the importance of DTW’s sustainability efforts: “We believe environmental stewardship is part of being a good neighbor. Accordingly, we are committed to creating a more sustainable airport.”



CHAD NEWTON

In addition, Newton reports that in 2018, more than 122,000 pounds of recyclable materials were removed from airport authority offices alone—saving 61 tons of paper, metal, cardboard and plastic from being discarded into local landfills. ✈️

recycling office. Kaplan reports that passengers and airline employees have stopped to learn more.

While it’s too early to know just how well the new system is faring, it was clear the old system was not working well enough. Airport officials say 20% of the 1,550 tons of waste that was removed from the North Terminal in 2016 was recyclable.

“We have received a lot of positive feedback from passengers who are glad to have recycling opportunities,” Kaplan says. Positive comments are also popping up on DTW’s website and social media channels.

### Green Goals

The airport authority expresses a commitment to sustainability through its People, Places and Planet program. The initiative focuses on air quality, noise, waste management, water management, energy management and natural resources. In addition to in-terminal recycling, DTW has programs that compost coffee grounds and donate excess food from concessionaires. Parking facilities include equipment for charging electric cars; and water fountains are supplemented with bottle-filling stations.

If the enhanced recycling program continues to be successful in the North Terminal, the airport plans to work with Delta Air Lines to improve recycling in the McNamara Terminal, which serves all flights from Delta and its partners. Kaplan explains that the McNamara Terminal currently has traditional recycling containers in place, and there was a more pressing need for an upgrade in the North Terminal.

In a related matter, the airport authority recently received a state grant to add liquid disposal stations at passenger security checkpoints. The new units are scheduled to be installed by

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Small and unusual creatures are eyeing guests in the Terminal 1 Ticketing Hall at St. Louis Lambert International Airport (STL). There's a bear and dragon, but the others are purely born of local sculptor Will Rimel's imagination.

His small case exhibit titled *Funk Muffins* will be on display across from the Delta Air Lines ticket counters through June 10. It's one of nearly 30 works or collections of art currently featured at the airport.

Rimel used a foundation of polymer clay and ceramics to create a unique cast of characters with broad appeal.

"Everyone can relate to toys, whether you buy them for your kids or played with them growing up," says the sculptor. "This allows the art to be disarming and approachable for all age groups and backgrounds. Even if you don't take the time to closely examine the pieces, they are based on bright colors and toy-like features, which always engage viewers and bring a smile to their faces."

The bright, lighthearted display is part of the Lambert Art and Culture Program, which is supported by the Regional Arts Commission. For more information about STL's art program, visit [www.artoftravelstl.com](http://www.artoftravelstl.com). ✈️

*Sculptor Will Rimel with his work "Bears in Mind".*





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# OK Is Not Good Enough

 I'd like to think that I am smart. Unfortunately, every time I start to feel that way, I find myself in a "learning moment." These learning moments have a way of humbling me, but also exposing me to new ways of thinking and bigger ideas to explore.

One example that always comes back to me—and the one I try to emulate most—is a lesson I learned while working at San Francisco International Airport. It is a simple concept, one that we all try to do innately, but many times do not think about actively. I am talking about **Exceptional Project Outcome**.

Think about the current AT&T commercials on television, where everything is just "OK."

"How is my surgeon?"

"Oh, he's OK."

Do you really want a doctor operating on you who is just OK? I would *hate* if my employer viewed me as just OK.

As a patient, you want the best surgeon. As an employee and employer, you should strive to be the best.

It is with this in mind that I work to provide each client an **Exceptional Project Outcome**, or **EPO**. I often wonder if our clients ever have the "They're OK" conversation while sitting around the boardroom considering their capital needs and talking about what company to hire. Do they say, "Hey, this firm is OK. They've done several terminals, and they came out OK."

Shouldn't our clients expect more than just OK? Even though many passengers who move through our terminals are



## RODDY BOGGUS (NCARB, AIA)

*is a vice president and the Aviation Buildings Service Group leader at RS&H. He has 30+ years of aviation-specific experience in multidisciplinary practices for organizations in the U.S. and throughout the world. Writing, speaking and moderating on the global stage, he continuously challenges the industry to innovate and look forward when developing air service facilities. Boggus was the 2017 board chair of the Airport Consultants Council, a former ACI Global World Business Partner board chair, and sits on the board of directors for the International Partnering Institute and the International Association of Airport Executives*

attracted more by airline fares than the facility itself, shouldn't we strive to create something exceptional?

When our clients walk into their new facility, is their response, "This is really nice"? Wouldn't it be great if they walked into their new or renovated facilities and said, "Damn, this is fantastic!"?

I don't know about you, but I would like to hear the latter. I would like to hear my clients say, "We want him because he always gives us a little something more, something that surpasses our expectations. Something exceptional."

We often say, "When you see one airport, you've seen one airport." And that's true: No two airports are the same.

But many are *kind of* the same.

Are we developing facilities with immersive experiences that provide the opportunity for every passenger to have an individualized experience? Are we staying true to Sullivan's Maxim, "Form follows function," or are we generally delivering form that follows form?

We live in an age when Moore's Law, which says that the speed of computer processing doubles every 18 months, is now an antiquated idea. These days, knowledge doubles every 12 hours as we build out the internet of things. With

this type of mind-blowing expansion, are there expectations that things are going to be different?

In short, yes.

EPO looks for exceptional results in design, construction, participation, economic, sustainability and management outcomes. This includes components such as the passenger experience, end-user satisfaction, disputes and claims, safety, Disadvantaged Business Enterprise goals, job creation, exceeding revenue, reduced operation and maintenance costs, environmental stewardship, social inclusion, schedule and budget performance, just to name a few.

I feel the same way about dealing with each other. This is something that younger industry professionals, the ages of my kids, are bringing forward as Social Justice. Sometimes, as hard as that is to swallow, I also find an inconvenient truth in it.

As we fly in 2020, I think there is room for us architects, planners, engineers and consultants to do better and be better—not only to our clients, but also to each other. Here's to a renewed effort of *Finding EPO!*

This article? It's OK ;) 



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