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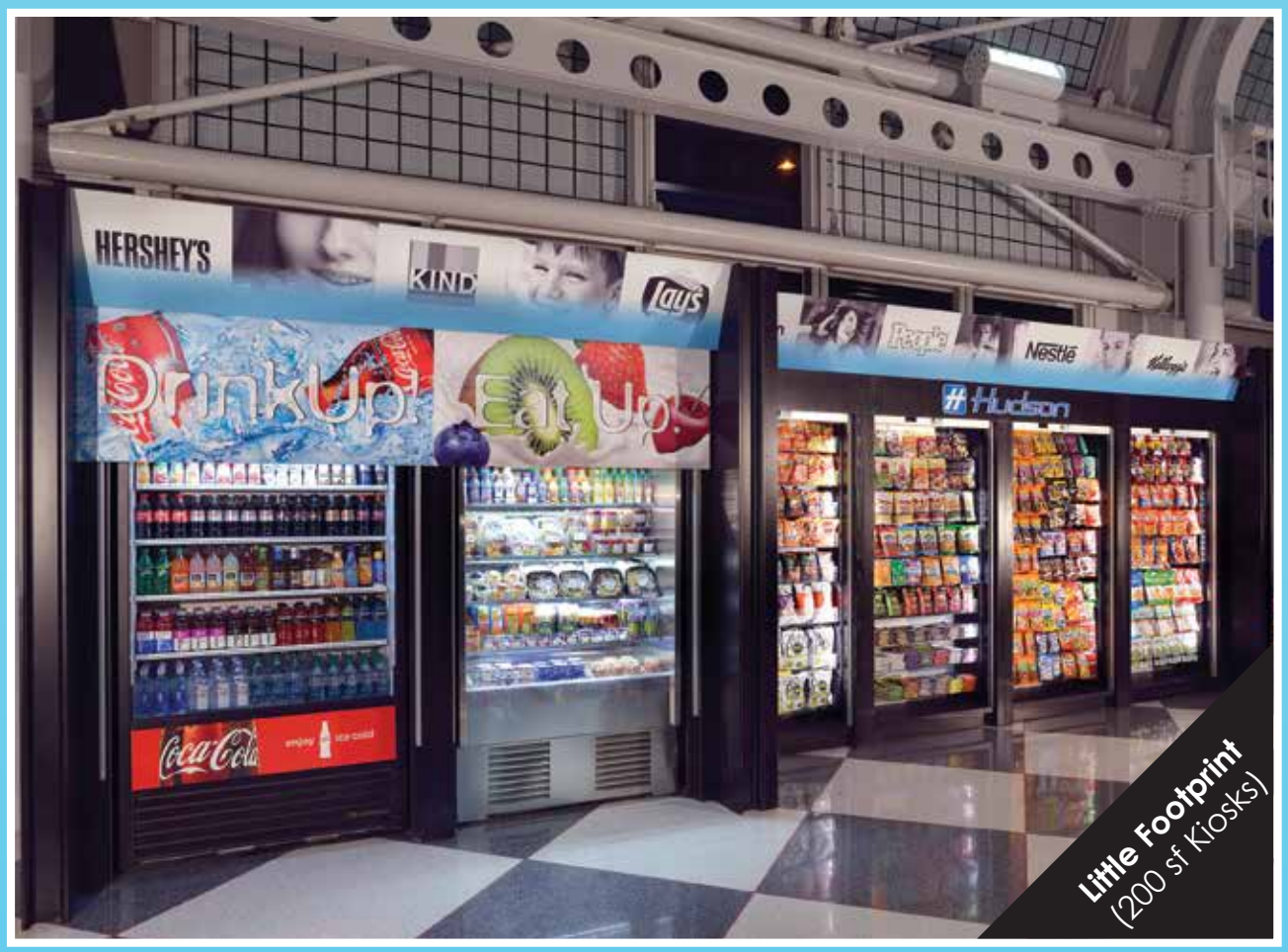

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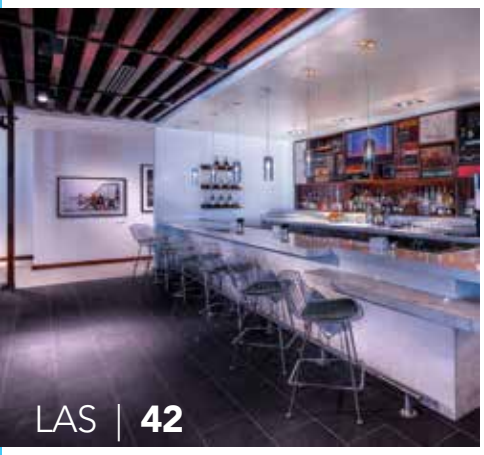

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These are heady days in aviation. Industry conditions remind me of 2000 and early 2001, when new passenger records were being set every month. Thank goodness business is good once again. Airlines are reporting jaw-dropping profits (must be a lot of checked baggage), recent statistics from Airports Council International show year-to-date increases that we haven't seen in awhile, and advertisers have made this issue of *Airport Improvement* our largest ever.

If you've been around aviation long enough to remember 2000 and 2001, you probably agree that airports and airlines today look much different than they did back then. Ancillary fees have saved many carriers, 9/11 turned airport security and concessions upside down, and the sources and sizes of airport revenues have changed dramatically. So it goes with airport publishing. Our industry has changed significantly as well.

Social media is something we all share in common. While most of our readers still choose to read printed issues of the magazine, social media has become a bigger part of how we communicate every day. Today, we are in an even better position to learn and share what's taking place with airports, government agencies, consultants and suppliers.

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We would like to follow you as well! Please send us an email at paulbowers@airportimprovement.com with your Facebook page and Twitter handle, so we can return the favor.

Also, we'll be at ACI-NA and SWIFT this month; hope to see you there!

Cheers,

Paul

Love Field "Wright-Sizes" With New Terminal

By Jodi **Richards**

LOVE FIELD MODERNIZATION

factsfigures

Project: Modernization Program
Location: Dallas Love Field
Budget: $519 million
Projected Cost: $500
Owner: City of Dallas
Project Manager: Southwest Airlines
Lead Architect & Designer: Corgan
Construction Manager: Hensel Phelps Construction Co.
Program Manager: AvAirPros
Apron Designer: Huitt-Zollars
Prime Contractor for Apron: Munilla Construction Mgt.
Boarding Bridges: JBT AeroTech
Concessions: AirStar; Dickey's BBQ; The Grove; HMS Host; Hudson Group; POP Four Love Field; Puente Ventures

October is a monumental month for Dallas Love Field (DAL). Officials expect the airport's sweeping modernization initiative to be substantially complete by the first of the month; and on the 13th, the Wright Amendment will officially expire, ending more than three decades of federal restrictions on DAL's outbound traffic. The two milestones are closely intertwined, because planners predicated airport improvements on traffic increases expected after the Wright Amendment expires.


Mark **Duebner**

Budgeted at $519 million, the Love Field Modernization Program may come in closer to $500 million, reports Mark Duebner, DAL's director of aviation. In total, the program encompasses nearly 900,000 square feet of terminal space — 637,000 square feet of new construction and 255,000 square feet of renovated areas. Key elements include a new ticketing hall and security checkpoint, a 20-gate concourse, new and expanded concessions space, and a new baggage handling system and baggage claim hall. Enabling projects, including roadway enhancements, fuel system improvements and $70 million of apron pavement work, are also part of the project.

The city of Dallas, which owns and operates DAL, and Southwest Airlines, the airport's dominant carrier, joined forces to transform the airport into a "convenient and modern facility." With some officials expecting enplanements to increase by 50% after the Wright Amendment expires, city, airline and airport executives wanted to be prepared. Southwest Airlines has in fact already announced plans to begin new nonstop service from DAL to Los Angeles, Chicago and Washington, D.C., beginning mid-October.

The $3.2 million art program at Love Field features works that are integrated into the ceilings, floors and walls.

Last year, the airport logged 4.2 million enplanements; once complete, the newly improved terminal will be configured to handle upwards of 7 million passengers per year.

The End of an Era

The Wright Amendment is a federal law that originally limited nonstop flights from DAL to airports in Texas and four nearby states; subsequent modification then expanded the allowed area to eight states. All other markets are legally off-limits — but not for long. When the final provisions of the amendment expire in mid-October, carriers operating out of DAL will be able to fly to any U.S. market.

Congress passed the Wright Amendment in 1979 to protect the commercial interests of Dallas/Fort Worth International Airport (DFW), which was built in 1974 to support traffic projected to surpass DAL's capacity.


Bob **Montgomery**

Before DFW opened, DAL was *the* airport in Dallas. It was also the original home and departure city of Southwest Airlines, notes Bob Montgomery, the carrier's vice president of Airport Affairs. Over the years, the airline grew, but because of the Wright Amendment, customers flying from DAL only had access to a five-state area, unless they "jumped through hoops", notes Montgomery. Some chose to land at an intermediate airport within the allowable region, claim their bags, check in again, re-check their bags and clear security, again.

With security changes implemented after 9/11, the workaround some referred to as the "Southwest Shuffle" became even more cumbersome and even penal, notes Montgomery.

In 2006, Southwest "really began to push" for change, Duebner recalls. "A number of metro areas the size of Dallas or even smaller could have two airports and both continue to be successful," he relates.

Montgomery describes Southwest's change of posture in more marketing-friendly terms: "We took the position that 'Wright is Wrong,' and launched a campaign to 'Free Love Field'."

Eventually, the law was repealed in 2006, but some of its restrictions remained in place until October 13, 2014. Long hailed as "anti-competition," the Wright Amendment is scheduled to fully expire on Oct. 13, 2014, following an agreement reached by DFW, Southwest Airlines (which is headquartered in Dallas and operates its main hub at DAL), American Airlines (headquartered in Fort Worth/hub at DFW) and the cities of Dallas and Fort Worth. Under the "Five Party Agreement," as it became known, Southwest was allowed to thru-ticket immediately, and airlines would be allowed to fly nonstop from

DAL beginning Oct. 13. A new restriction, limiting DAL to 20 gates, was also added. At the time, the airport had 32.

According to Duebner, the Five Party Agreement also included a great deal of input from a sixth part: airport neighbors. Because of DAL's proximity to downtown Dallas, it is surrounded by high-value residential real estate with a "very active citizenry," he explains. Homeowners concerned about vehicle traffic and aircraft noise made their opinions known.

Redefining Roles

With the end of the Wright Amendment close at hand, DAL's current terminal, built in 1958, desperately needed improvements, notes Duebner. The facility had only received sporadic cosmetic improvements throughout the years, and it was a dated, energy-inefficient terminal, he remarks.

"In 2014, we would have this new opportunity to have nonstop flights from Love, and we really needed a new facility that was modern, efficient and would really showcase the airport as a front door to Dallas," Duebner explains.

Southwest, which represents fully 96% of DAL's traffic, also recognized the need for a new terminal. By the same token, the key airline also wanted to ensure that any improvements were built cost-effectively and would create a pleasant experience for its passengers.

Under the terms of the Five Party Agreement, the city was not allowed to spend more than $250 million on airport improvements. "When we sat back after all the dust had settled and tried to figure out what customers want, what they need — the size of the project was much bigger than $250 million," Montgomery recalls. As a result, Southwest agreed to a larger capital project if it could control the project's schedule and budget. Southwest subsequently became an agent of the city and assumed management responsibilities for improvements at DAL.

The city created a local government corporation, which issued the debt that was used to finance the modernization project. Southwest pledged its corporate credit as the backstop on the debt, making the airline responsible for the debt service — an act of "true partnership," is how Duebner describes it. Additionally, the city executed a revenue credit agreement that allows it to collect fees and

revenues necessary to make the debt service payment, and then transfers those funds to Southwest to make the payment.

"That way, Southwest was allowed to manage the project, essentially, for the city," explains Duebner.

A steering committee, comprised of Duebner and Montgomery, ensures joint decision-making power. "We both had motivation to agree, so we found ways to work everything out," Montgomery relates. "We didn't have large committees that we had to deal with; we were just able to make quick decisions. A construction project demands quick decisions, so we couldn't create something too bureaucratic."

Project payments are signed off by both the city and Southwest. And although Southwest manages the project and holds the contracts, the city has remained active in the programming, planning and construction activities, Duebner reports.

"The city and Southwest were partners all the way through, including the decision making," he elaborates. "You don't just have an airline building a terminal, which is then handed over to the city to maintain; and it's not just the city building the project without regard to cost and what that would translate to in rates and changes. We're in this together — from beginning to end."

The city of Dallas estimates that its partnership with Southwest, and the attendant flexibility the airline has as a private entity, saved approximately two years of construction time and about 50% in overall project cost. "All of our governments have much more cumbersome procurement rules than does the private sector," Montgomery explains. "Through public-private partnerships, we can achieve the best of all worlds."

Rebuilding Love Field

Jonathan **Massey**

Corgan, lead architect and designer for the project, developed a variety of strategies for DAL. Options ranged from fixing the existing building's problems with a "bare bones level of investment" to building an ideal facility that meets the most current industry needs, says Corgan principal Jonathan Massey.

Nearly every area at DAL is affected by the Love Field Modernization Program.

In the end, building new rather than renovating made the most sense — financially and functionally, explains Duebner.

Southwest wanted a functional building that "wasn't over-designed," Massey recalls. Toward that end, the design team focused on "getting everything sized appropriately."

Duebner describes the result as a good, compact design that is comfortable, without being ostentatious. It's also very natural and "distinctively Dallas," he adds.

Massey uses words like streamlined, efficient, effective and elegant when discussing the new terminal. On the more practical side, he says it's a convenient building that will be easy to maintain and modify over its life. Corgan was given a "little bit of design freedom," but was instructed to use it "where it counted," Massey explains. "We worked with Southwest and the city to create a nice facility, but all the design decisions had good rationale behind them."

For example, DAL's rich history influenced space planning and material selection. Corgan designers used concrete columns and wood beams to recall the feeling of an older building, but wood was also less expensive than steel; so it made both economic and design sense, Massey comments.

The airside design allows carriers to load aircraft from both sides of the concourse, Duebner notes. Efficiencies are also

gained via shared main corridors and holdrooms on both sides. "We have a compact footprint, but it's easy to navigate, easy for people to find their way," he says.

With all gates on one concourse and all sized to accommodate 737-800 aircraft, the design also provides benefits for Southwest. "That's going to give us operational advantages in manpower, and it's also going to give us a lot of flexibility in our flying," says Montgomery.

Bringing all the players together early in the planning process helped achieve an optimum design by creating a "real team atmosphere," recalls Montgomery. This not only allowed team members to collaborate, but also to challenge each other, he relates: "The architects didn't design a facility that was difficult to build or maintain; and the architects challenged the contractor to look at things differently, so we didn't get just a square box and an uninspired building. We have a great building."

Convenience & Flow

The decision to build new rather than renovate was partially driven by the efficiencies that would be gained by redesigning passenger flow. The new approach solves a lot of problems, Duebner notes.

Previously, passengers leaving the building for the parking garage had to cross the lobby in order to access the escalator that leads to the skybridge. Now, deplaning passengers without checked bags can remain on the same level, bypass the lobby and go directly to the skybridge. "We eliminated a lot of contra-flow through the lobby," he explains.

The new terminal is designed for intuitive wayfinding, so visitors don't have to rely on signs to find their way, adds Massey. "The building informs you where you need to go by using tall spaces and lighting," he explains. "We took a lot of care to make the flow of people as simple and convenient as possible."

Outside the building, roadways around the terminal were improved to enhance DAL's exterior flow.

The new interior layout and amenities were also planned with expedience in mind. "People want to be able to get in and out of the airport quickly and easily," reasons Duebner. "They want it to be easy to navigate with a bright, open and clean environment with lots of concessions choices. I really think we hit on pretty much all marks with the new design."

Other passenger amenities include holdroom seating with electric outlets for charging personal devices and a new central seating area with comfortable chairs and tables to help passengers enjoy the expanded food and beverage offerings.

Airside, new power and air systems were added on the loading bridges to keep aircraft cooler for passenger comfort.

Certain aspects of the design also allow for future flexibility, Massey adds. Infrastructure under the floor in the ticketing hall allows self-service devices to be installed in different locations throughout the check-in hall. Preliminary accommodations were also made for a possible drive-through check-in facility.

Challenging Space

DAL's limited footprint of 1,300 acres made the project especially challenging, but the design team did as much as it could with the existing area, Duebner relates. "It would have been great if we could have built a brand new terminal on a big chunk of land somewhere else, but we had to phase all the activity while we were still maintaining all the service we had been providing," he muses.

Massey agrees that building a new facility on top of the old as it continued to operate increased the project's degree of difficulty. Three existing concourses were torn down in sequence and replaced with a single concourse. Then, heavy renovation of the lobby and other parts of the existing building followed. The main challenge was not being able to take any gates out of service, Massey recalls. "Southwest is a very aggressive operator," he explains. "They're a very high performance airline. It was a challenge to not only keep operations in place, but also reroute passengers as parts of the building were under construction."

Constructing the new terminal without inconveniencing passengers involved a great deal of careful phasing, notes Duebner. For example, the first 12 new gates were constructed before the old West Concourse could be torn down. Once the new gates were complete, Southwest moved in and construction continued. "It's been a little bit of musical chairs," he quips. "We've got to build a chair for someone to move to so we can tear down the old chair."

Customer service representatives and updated signage have helped reduce the impact to customers throughout the multi-phase construction, Duebner adds.

More Concessions, More Revenue

Concession space received a dramatic makeover and more than doubled in square footage. "We knew we had a concessions program that wasn't generating as much revenue for the airport as it could — and that was given to the space limitations in the existing facilities," Duebner notes.

The recently updated program offers new concessions options, and customers have responded with their wallets. DAL has seen a 25% increase in concessions sales with the same number of enplanements, he reports.

Hudson Group, in partnership with two joint ventures, was selected to provide "distinctively Dallas" retail and food services at the new terminal. Its contract with the city of Dallas includes eight retail and two food/beverage packages, totaling nearly 16,000 square feet. Its operations include three newsstands, a bookstore, 11 specialty retail concepts and five food/beverage locations.

New offerings from HMSHost and joint venture partner JavaStar include Dallas picks such as La Madeleine Country French Café, Paciugo Gelato & Caffe and Cool River Café. National brands like Starbucks and Chick-fil-A are also in the HMSHost lineup.

Air Star Concessions operates four regional favorites: Whataburger, Campisi's, Cantina Laredo and Chili's. Puente Ventures teamed with Dallas chef Stephen Pyles to create Sky Canyon.

"People really like coming to Love Field, and the concessions choices are driving both customer satisfaction and revenue," reports Montgomery. A better overall experience and decreased operating costs thanks to new systems translate into "huge increases" in customer service, he adds.

Love's LEED

Project participants report that the Love Field Modernization Program is on track to apply for silver certification from the U.S.

Phasing renovations was crucial to keeping gates in operation.

Green Building Council's Leadership in Environmental and Energy Design (LEED). Applicable elements include high ceilings, floor-to-ceiling windows that allow more natural light, new heating/venting/air conditioning systems and energy-smart lighting.

Formerly carpeted walkways and common areas that were difficult to maintain were covered with terrazzo flooring, which is more durable, easier to maintain and less costly than carpet, Duebner notes. The particular terrazzo selected is comprised of a high amount of recycled materials, including soda bottles and buttons.

In the basement of the building, a water leak from a natural underground spring that previously accrued maintenance costs was turned into a creative — and LEED-eligible — solution. Corgan designed a system that will capture the water, store it and reuse it as makeup water for the cooling towers of the building's mechanical system. "It was an innovative way to turn a problem into a benefit," Massey says.

Wood used in the major spaces was grown within 500 miles of the project, which also helps amass LEED credits. And the environmental and lighting systems feature a high level of control to balance comfort and need with energy consumption. "The systems are very advanced and help to minimize energy usage as much as possible," Massey relates.

Duebner acknowledges that the airport will incur some new costs associated with select LEED elements. For example, it previously spent about $80,000 per year on filters for the heating/venting/air conditioning system; filters for DAL's new, more sophisticated and environmentally effective system will cost $500,000 annually. Benefits that counterbalance those costs, however, are expected to build over time. "We believe that overall, we're in a better place from an O&M (operation and management) standpoint," he relates.

Next Time

Although Duebner reflects on the planning for the modernization program as "really sound," unanticipated elements requiring additional space have already emerged. "Needs grow as your business changes, as the airlines change," he explains. "As new markets are created, what customers are asking for (changes)."

For example, DAL did not plan for a passenger lounge, but it is proving to be a sought-after amenity. "Had we known at the time, we'd have planned for another 2,000 square feet that would be dedicated for a lounge," Duebner reflects. Based on customer feedback, a family bathroom is being renovated to provide private space for nursing mothers.

The airport will also likely need to add about 2,500 on-airport, covered parking spaces to accommodate the increase in traffic, he adds. Currently, DAL has two on-airport garages with about 7,000 spaces.

Without any such add-on projects, DAL's modernization program has resulted in some 9,000 construction jobs and more than $1 billion in economic impact to the region, Duebner reports. As of June, more than 40% of its contracts had been awarded to disadvantaged business enterprise firms.

"Love Field is a great asset to the city, and we're excited about the new terminal and the end of the Wright Amendment restrictions," Duebner concludes. "It gives our residents another choice for a nonstop option."

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Love Field Thinks Outside the Baggage Box With Temporary Bag Claim

By Jodi **Richards**

LOVE FIELD MODERNIZATION

factsfigures

Project: Baggage Handling System

Location: Dallas Love Field Airport

Owner: City of Dallas

Modernization Program Architect & Designer: Corgan

Project Manager (on behalf of city of Dallas): Southwest Airlines

Construction Manager at Risk: Hensel Phelps

Baggage System Design: Vic Thompson Co.

Temporary Inbound Baggage System Installation: BEUMER Glidepath

Baggage System Installation: Jervis B. Webb Co.

Explosive Detection Machines: L3

Outbound Checked Bag Inspection System: 409 motors; 5,700 linear ft. of conveyor; 4 inline screening devices; 3 makeup units

Inbound Baggage Handling System: 59 motors; 1,700 linear ft. of conveyor; 4 claim carousels

Motors: SEW Eurodrive

Power Belt Curves: Transnorm System

Noteworthy Detail: Construction of a temporary baggage claim facility using existing equipment accelerated project schedule by 1 year

A new baggage handling system designed to accommodate an expected traffic bump at Dallas Love Field Airport (DAL) is a key component of the airport's $500+ million modernization program slated for completion in October.

Chris **Norton**

Planning for the baggage system began in 2008, in conjunction with the rest of the Love Field Modernization Program, and design work commenced in 2009, chronicles Chris Norton, chief operating officer of Vic Thompson Co.

Jeff **Callaghan**

The initial planning phase involved forecasting to determine the size of the new baggage handling system, adds Jeff Callaghan, project manager with Vic Thompson Co. That included analyzing current and anticipated flight loads and schedules. The Oct. 13 expiration of the Wright Amendment is expected to trigger an increase in enplanements, as the federal legislation previously limited the markets airlines could fly to from DAL. (See Page 8 for more details.)

"We started with the assumption that we're not going to be bigger than 20 gates," Callaghan explains. Based on the type of aircraft using the gates and the forecasted passenger numbers, planners determined that the system would require three screening machines to handle approximately 2,000 bags per hour — a peak hour at DAL.

Saving Time & Money

According to the original schedule for the overall modernization program, renovation of the baggage claim hall would not begin until 2015 — after other major projects were complete. But the project teams collaborated and devised a way to create a temporary baggage claim hall in a different part of the facility. This allowed contractor Hensel Phelps to "go full-boar on the claim hall," Callaghan explains.


Bob **Montgomery**

Bob Montgomery, vice president of Airport Affairs at Southwest Airlines, estimates that using the temporary baggage facility saved roughly a year in the project schedule. Initially, baggage claim improvements were scheduled to begin after the Wright Amendment expired in mid-October. The original plan was to shut down half of the baggage claim for renovations, while the other half remained in operation. Once the new portion was complete, construction on the other half would begin. "That whole step-by-step process (would have taken) a couple of years," Montgomery relates. However, as the project team analyzed the program, they saw an opportunity to accelerate the process.

Ultimately, crews transformed DAL's former ticket counter and bag makeup area, and modified existing equipment to create a temporary baggage claim. Although the area ended up being larger than planned, it provided better customer service and allowed the project team to move ahead with demolition of the old baggage claim wing at the start of 2013.

"It was a useful way to repurpose that equipment," remarks David Mead, vice president of customer support with BEUMER Glidepath. It would have been easy to purchase new equipment that would have had a limited life, notes Mead. Instead, the team engineered an alternative that allowed the airport to get more value out of its original system.

"That approach of continuously looking for improvement throughout the project really benefited the project and the owner," notes Jonathan Massey, principal with Corgan, the project's lead architect and designer.

Jonathan **Massey**

The temporary baggage claim will allow the project to be completed in time for the end of the Wright Amendment — a full year ahead of schedule. "In construction, time is money," Montgomery says. "And that turned out to be a great program savings."


Mark **Duebner**

Choosing to use the temporary baggage claim was a "hard decision," recalls DAL Airport Director Mark Duebner. Officials knew that moving the facility would inconvenience travelers and the temporary area would be cramped; but they also knew it would save construction time and eventually benefit passengers and the airport.

"When you're doing a big public project like this, you really have to weigh short-term pain for long-term gain," Duebner says. "I think the correct decision was made to go with the temporary bag claim. Although it wasn't ideal, it shortened the duration of the construction and saved money."

New System

DAL's new outbound checked baggage inspection system, which has been operating since November 2012, includes four ticket counter inputs and two curbside inputs. The six inputs feed two mainlines that lead to four screening machines; the two mainlines run from the matrix out to the baggage makeup area, which includes three carousels for the airlines.

The outbound portion of the baggage system is similar to what was previously in place for about six years, notes Callaghan. The new system, however, is larger in linear footage (based on the new airport layout) and can process approximately 30% more bags, he adds. The outbound checked bag inspection system includes 409 SEW Eurodrive motors, 5,700 linear feet of conveyor, four inline L3 screening devices and three makeup units.

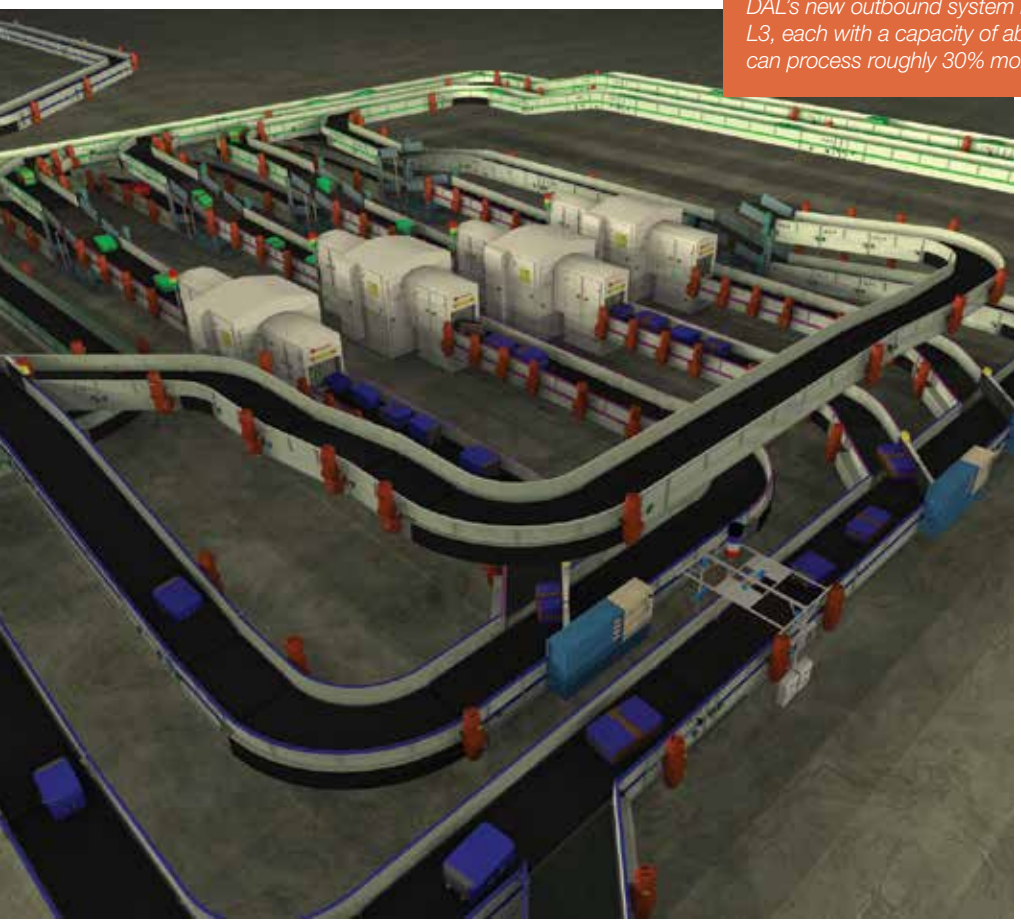
The screening matrix itself includes the TSA's checked baggage resolution area. It is the first system to use L3's inline screening devices with a capacity of about 700 bags per machine per hour, reports Callaghan. Previous models had a capacity of approximately 500 bags per machine per hour.

The inbound baggage handling system is comprised of 59 SEW Eurodrive motors, 1,700 linear feet of conveyor and four claim carousels. It is scheduled to go live Oct. 1.

The biggest change for the inbound system is the larger, more open baggage claim hall, Callaghan observes. The system will feature four slope-plate claim carousels vs. the four flat-plate carousels of the previous system.

Critical Phasing

Because of the constraints and challenges involved with building a terminal on top of an existing, operating terminal, planners divided the project into multiple phases. Communication was key in keeping stakeholders informed and minimizing impact to operations throughout the program, Norton notes.



DAL's new outbound system includes four inline screening devices from L3, each with a capacity of about 700 bags per hour. Overall, the system can process roughly 30% more bags than its predecessor.

Callaghan reports that the planning team reviewed a handful of designs and locations, including a vertical system on multiple levels of the airport. Ultimately, it determined that the basement was the best place for the screening matrix, in relation to the operation. "That opened up a whole other can of worms," he recalls.

Because of previous flooding problems, civil engineers conducted flood plain studies to determine how to best mitigate the situation. Ultimately, the area around the terminal was re-graded, and a system was designed to capture the water and store it for reuse as makeup water for the cooling towers in the building's mechanical system, Massey explains.

Like phasing, communication was also identified as a critical element of the baggage handling system project. The design and construction teams, along with DAL and Southwest, formed a working committee that met regularly throughout the project. In addition to making sure that temporary measures and conditions worked for passengers, the airport and airlines, Massey notes that the team continuously looked for ways to improve the passenger experience, operations and construction processes.

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Minneapolis-St. Paul Int'l Encourages Travelers to Sit Down & Power Up

By Robert **Nordstrom**

Authorities at Minneapolis-St. Paul Int'l Airport (MSP) understand that little things can have a big impact on passengers' overall travel experience. That's why they recently invested $1 million to update seating throughout Terminal 1 and plan to follow up with another wave of similar improvements later this year.

While travelers once had to search for outlets to power up their electronic and mobile devices, they now have outlets available almost anywhere they decide to sit. At some gates, there are even iPads available to use for free (see Page 22 for more details).


Allan **Howell**

"Over the past eight years or so, we've seen travelers plugging into any available outlet to run and recharge their devices," explains MSP Senior Airport Architect Allan Howell. "Perhaps they've been running their laptop for the past four hours and now they have a layover but they are running out of power. (They) sit on the floor next to any available outlet, which creates safety concerns with passenger carts and people walking by. We didn't want customers to have to hunt for an outlet; we wanted them to plug into an outlet near where they are sitting, a place they can easily find and makes sense to them."

Traditional sling seating, developed in the mid-1950s, was a good, functional product that served its intended purpose; but the ways travelers spend their time in airports have changed dramatically over the years, Howell reflects. Travelers now arrive earlier and have longer wait times, he notes. Long lines at security checkpoints and the associated juggling of shoes, belts, bags and sundry personal items test their patience. When passengers make it to the post-security areas, many are eager to work or play via one of the many electronic devices that keep them connected to the pre-security world.

Ahead of the Curve

In 2009, MSP established a capital improvement program to upgrade public seating throughout Terminal 1. The beam units ranged between 20 and 40 years old.

"It was time for us to replace it," Howell states. "We understood that whatever choice we make will likely be there for the long term; so it needs to be a good one."

Integrating power into the seating was a priority. But when MSP personnel began evaluating new product options in 2010, they couldn't find a manufacturer that offered beam seating with power connections. When they described what the airport needed, manufacturers brought in prototypes.

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factsfigures

Project: Seating Overhaul

Location: Minneapolis-St. Paul Int'l

Terminal: 1

Cost: $1 million (Phase 1)

Architectural Design & Consultation: Architectural Alliance, (now Alliance)

Construction Manager: Kraus-Anderson Construction

General Contractor: Morcon Construction

Mechanical & Electrical Design: Michaud Cooley Erickson

Concourse G Restaurant & Retail Management: OTG Management

Seating & Table Manufacturers: Allsteel; Coalesse; Davis Furniture; Elevate vis Furniture; Martin Brattrud; Vitra; Zoeftig

Noteworthy Detail: 1,700 iPads added for free passenger use near Delta gates in Concourse G

Originally, MSP officials wanted to provide power access in *all* of its seats, recalls Howell. Advances in battery technology over the past several years, however, changed their minds.

The airport is taking a phased approach to the project. During Phase 1, completed in August, crews installed 202 beam seats throughout the Mall, Concourse C and international arrivals meet-and-greet areas. Tables interspersed in the center of two-, three- and four-seat arrangements provide a pair of three-prong AC power outlets and a USB connection.

Nearly 90 lounge seats (44 new, 44 existing) also provide power at 44 granite-topped tables in the Mall, concourses C and D, and the international arrivals meet-and-greet areas. Crews also added tiered lounge seating and sofa seating in the terminal's short film and performance space and sofa seating in the restroom waiting areas on Concourse C as well as in the Mall and Concourse C tram station entrances.

In addition to providing new seating arrangements, MSP is in the process of redesigning the airport's service centers. A prototype featuring a countertop and conversational area has been installed on Concourse C. Telephone banks were removed years ago due to the proliferation of cellphones and mobile devices.

In the food court, new power connections along countertops allow travelers to use and charge their devices while they eat. Plans are in the works to test similar countertop seating in gate areas next year. "Rather than having just beam seating with available power, we'd like to offer work areas where people can still hear and see if their plane is boarding or delayed," Howell explains.

Phase 2 of the project will add 488 more beam seats with powered tables throughout Concourse E — in gate areas, near taxi and shuttle stands and in the rental car and ticketing areas. MSP officials expect it to be complete in February 2015.

Residential Touches

Architectural Alliance (now Alliiance) worked to infuse some "comforts of home" when redesigning the public seating areas in Terminal 1. "We created living room-like zones in the Mall area that reside on area rugs and feature a combination of soft lounge seating with power tables and various arrangements of powered beam seating," explains Susanna Strand, one of the firm's associates. "Along the C concourse, in between the moving walks, are relaxation nodes enhanced by pendant lights, powered beam seating and soft lounge chairs with powered side tables."

EAT, PLAY, WORK

Passengers heading to gates 1 through 6 in Concourse G at Minneapolis-St. Paul International Airport may do a double-take when they find themselves in the CIBO Express Gourmet Market. They quickly realize, however, that they didn't misread the signs. Delta Airlines and OTG Management, together with the Metropolitan Airport Commission, have reimagined the very concept of holdrooms by breaking down boundaries in the gate area and blending spaces for sitting, dining, shopping, working and playing.

After passengers pass through the market, they enter into a pod of six Delta Airlines gates, which is outfitted with a restaurant and mini-bar at the edge. The shared seating area includes a mix of high and low tables — all with USB and power outlets. Traditional beam seating lines the perimeter and includes numerous beverage holders and USB/power outlets.

The most unexpected bonus, however, is a generous supply of iPads — free for passenger use. At about 80% of the seats in the gate area, travelers can sit down, check their email or flight status, review social media postings, play games, etc. — with no obligations attached. If passengers choose, they can use the iPads to order and pay for concession items for tableside delivery; but they are also welcome to simply sit down and use the tablets without incurring any costs.

In total, more than 1,700 iPads were installed, reports Sean Aziz, director of communications for OTG Management. All of the high and low tables feature iPads as well as USB/electric outlets.

While the iPads connect passengers with MSP concessions (food/beverage and retail), they did not replace human employees. In fact, OTG doubled the number of servers on hand when it introduced the iPads, reports Aziz. "While the iPad facilitates the orders by shooting them straight back to the kitchen, servers, in addition to delivering food, help customers navigate the iPad experience. Rather than being the order taker, they serve a hospitality function," he explains. "And if passengers just want to sit at the table and wait for their flight, perhaps browse through their email or play a game, that's their choice."

Aziz considers the gate area the single largest piece of real estate inside an airport and one of the most desirable locations for customers to congregate. When designing the space in MSP's Terminal 1, OTG worked to maintain or increase the gate area's aisle space and seat count. The high and low tables selected allow passengers to slide carry-ons beneath the table, thus clearing more aisle space.

"Not only is it a great design in terms of customer amenities, it's functional," Aziz relates enthusiastically. "We've created new revenue opportunities for vendors and a more enjoyable experience for travelers, who no longer have to go to their gate and sit like they are waiting for a root canal."

April **Meyer**

April Meyer, an Alliiance principal, notes that MSP's vision for new seating exemplifies its commitment to the passenger experience. "People have different needs and desires while waiting for their flights," Meyer relates. "The public seating project identifies the varying aspects of traveler needs and accommodates them in a variety of ways. Whether travelers wish to read a book or work, we want to give them choices throughout the public spaces."

In earlier years, MSP passengers could recharge devices for a fee at vendor kiosks. Then airlines began providing free power through shared power-pole charging stations at various gates. Food courts and full-service restaurants followed suit, offering places for customers to plug in and charge up. Power seating was the next logical step.

"Our biggest challenge is understanding the long-term needs of our customers," Howell summarizes. "We know what we see today; we understand what we've seen historically; but it's hard to project the future. How do we develop public spaces that are flexible and amenable to the needs of travelers? We will continue to adapt. For now, we just want to make sure that the time folks spend in the terminal is productive and enjoyable for them."

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Airports Caught in Crossfire of War Between Taxis & Ride-Share Networks

By Kathy **Scott**

SFO San Francisco International Airport

DENVER INTERNATIONAL AIRPORT

factsfigures

Project: Managing New Ground Transportation Options

Locations Profiled: Denver Int'l; San Francisco Int'l

New Providers: Ride-share services/transportation network companies that use smartphone apps to connect passengers with drivers using private vehicles

Brand Names: Uber; Lyft; SideCar; InstantCab; Tickengo; etc.

Challenges: Unregulated, uncertified providers initiating service at airports

Patchwork Regulations: Colorado legalized transportation network companies in April; Las Vegas & Miami have municipal ordinances blocking ride-share services; CA has regulations that address driver background checks, insurance requirements, vehicle standards, etc. that are being emulated in other markets;

Of Note: In July, San Francisco Int'l was developing airport permit for transportation network companies

Ride-share services entered the transportation marketplace with barely an introduction, other than superlative promises to potential customers and drivers about revolutionizing the way people get around town. Passengers began using Uber's smartphone app in 2009 to connect with individual drivers willing to use their own cars to give strangers a lift, and buzz about the new concept spiked. When word spread about bargain prices, similar ventures such as Lyft and SideCar soon followed.

Not surprisingly, the taxicab industry answered with its own buzz — complaining vociferously that ride-sharing services presented unfair competition, since they didn't have to follow the same rules as taxis. Without driver required background checks, vehicle inspections, licensing fees and additional insurance, the cost of doing business *was* lower for Uber and its peers.

Airport executives soon found themselves caught in the crossfire. As hotspots for both taxi services and passengers looking for the lowest "fares" possible, airports have multiple factors to consider. On one hand, taxis provide a vital landside service to passengers, and they often pay airports for access to their properties. On the other hand, some worry about alienating customers by appearing to squeeze out new, competitively priced ground transportation options.

The public safety aspect is no small issue. Who's on the hook if a passenger experiences problems with a driver after being picked up at the airport? Uber asserts that it does nothing more than offer an app that connects drivers and passengers, making it the passenger's responsibility to "vet" the driver. So what happens if an Uber driver rear-ends a shuttle bus at the curb outside the departures area?

San Francisco International Airport (SFO), located in the very city where Uber was launched, is feeling the full effect of the war between taxis and "taxi-like services." Doug Yakel, SFO's public information officer, notes that federal law allows SFO to regulate the use of its roadways in order to obtain federal funds for upkeep and maintenance, but it requires airports to account for all vehicle traffic movement on their properties. "Taxis and limos have a specific section to queue for entry. [A transportation network company] would need to provide a method of tracking the amount of vehicles entering SFO, so we have a clear picture of the amount of volume this represents for space allocation purposes," Yakel elaborates.

Without permission to operate on airport property, multiple ride-share companies began servicing customers as if they were licensed vendors — leaving travelers unaware that drivers were unknown to airport management and had no business licenses, set fees or airport certifications. In 2011, the San

Francisco Municipal Transportation Agency and California Public Utilities Commission (CPUC) sent UberCab, SideCar Technologies, InstantCab and Tickengo cease-and-desist letters for operating unlicensed cab services. When the commission subsequently cited UberCab (Uber's original brand) for operating an unlicensed limousine service, the company denied the allegations, dropped the "Cab" portion from its name and filed with the CPUC for an exception. Uber also reached out to tech media to tell its story.

When CPUC classified Uber and similar services as "charter-party carriers," the companies balked, insisting that they simply use the Internet to connect private riders and drivers — and therefore shouldn't be subject to charter carrier rules. The city of San Francisco subsequently formed a "collaborative consumption taskforce" to address ride-sharing services and other new businesses like Airbnb, a website that connects people looking for lodging with private owners willing to rent rooms or entire homes — the common denominator being Web-driven industries not covered by existing regulations.

In its website coverage of the Uber issue, *Business Insider* noted that San Francisco has "generally proven friendlier to its local startups" than to opposing established interests.

CPUC eventually created a new category for Uber, et al. — transportation network companies (TNCs) — and established 28 rules for them. Many of the regulations are similar to those in place for taxicabs, such as required criminal background checks and training for drivers, a zero-tolerance policy on drugs/alcohol and 19-point vehicle inspections.

TNCs must also maintain a minimum of $1 million per-incident coverage for incidents involving TNC vehicles and drivers in transit to or during a TNC trip, regardless of whether personal insurance provides coverage. In July, the CPUC permit process remained in place, with ongoing discussions about insurance coverage. While TNCs have secured $1 million of insurance, the coverage does not apply to all phases of a transaction, and variations are not clearly defined. Limousines, in comparison, are required to have $750,000 of insurance, with provisions that ensure coverage whether or not passengers are on board. Legislators in the California Assembly took up the cause, with a bill that more clearly defines TNC insurance coverage during the various phases of customer transactions. SFO's permit calls for $1 million of insurance for any phase of a TNC transaction, notes Yakel.

The commission defines TNCs as: prearranged transportation services for compensation using an online-enabled application (app) or platform to connect passengers with drivers using their personal vehicles.

"The CPUC is at the forefront of leadership in crafting new safety based regulations for a rapidly emerging industry," said CPUC President Michael R. Peevey, in a statement released by the commission last fall.

Implications Nationwide

In April of this year, the Colorado legislature took CPUC's initiatives one step further and legalized TNCs in the Rocky Mountain State. It is also using some of the California commission's framework to establish regulatory oversight for TNCs operating in Colorado. With the state's taxi industry poised to challenge the new law, Denver International Airport (DEN) remains in wait-and-see mode.


Heath **Montgomery**

Heath Montgomery, DEN's media director, says the airport is not taking a position on the issue, but has been working with the city and various transportation network companies to

understand the customer service implications for the airport. "Any new technology that benefits the traveling public is of interest to us," Montgomery says diplomatically.

SFO's Yakel cites another customer service implication — specifically, an airport's need to protect the safety and wellbeing of its travelers. In late spring and summer, several TNC drivers at SFO were found to be operating without insurance or the proper license, reports Yakel.

"We have been meeting with TNCs to develop what might be the first TNC/airport permit in the U.S.," says Yakel. "We invited the TNCs to sign the airport permit; to date, no permit application has been approved."

The issue is coming to a boil elsewhere in the United States. The *Washington Post* reports that at least a dozen cab companies in Virginia and Maryland have already filed lawsuits this year against Uber. The cab companies maintain that it is illegal for Uber's driver to ferry passengers because they lack taxi licenses. Several taxi companies in Chicago have taken similar legal action.

When faced with legal and other objections, Uber maintains that it is *not* a taxi service, it simply offers passengers another way to get from Point A to Point B. Uber's marketing, however, often plays up its similarities with taxicabs. One of the company's numerous service levels is called UberTaxi, and it promotes its no-frills UberX option as "better, faster, and cheaper than a taxi."

Las Vegas and Miami have decided to tackle the issue on a local level by enacting municipal ordinances that block ride-share services from operating within city limits.

For now, though, Uber appears to be picking up speed. In June, it announced a funding infusion of $1.2 billion, bringing the value of the company to more than $18 billion — high even by Silicon Valley standards. In July, Uber was operating in 128 cities throughout 37 countries.

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Taxi Drivers Protest

As friction between taxis and ride-sharing services continues to increase, news from Europe may serve as a cautionary tale for U.S. airports that consider taxis an important landside service. In June, an estimated 30,000 taxi drivers participated in a coordinated, pan-European strike that disrupted traffic in France, England, Germany, Italy and Spain. Drivers caused gridlock in capital cities and tourist areas by parking their taxis, usually for an hour, to protest a lack of local enforcement against business infringement from Uber.

One French cabbie compared Uber drivers picking up passengers to someone selling bread on the sidewalk outside a bakery without paying taxes or welfare charges. "It's unfair competition," he summarized.

Across the Pond & at Home

The strike, however, may have actually helped Uber's outreach efforts. Jo Bertram, the company's general manager for the United Kingdom and Ireland, reported that more customers signed up for its services the day of the strike than had signed up since the app launched in London two years ago — an 850% increase compared to the same day the previous week.

In Barcelona, the capital of Spain's Catalonia region, El Prat Airport and the main train station were almost completely void of taxis during a 24-hour strike in July, reported regional daily *La Vanguardia*. The anti-Uber strike was not Barcelona's first, and it occurred despite a June announcement from Catalonia's Territory and Sustainability Department about plans to fine drivers using Uber up to €6,000 ($8,000) and possibly impound their vehicles. The announcement in Catalonia was made the day after Spain's Public Works and Transport Ministry decided *against* measures to fine Uber users up to €600 ($800). As an autonomous region, Catalonia sets and maintains its own laws.

To date, U.S. taxi drivers have generally not protested in the same fashion or magnitude as their European peers. But there have been isolated strikes in individual markets.

In June, more than 1,000 taxi drivers shut down Pennsylvania Avenue, NW, in Washington, D.C., with a protest in the middle of a business workday. The drivers were asking that Uber and other transportation network companies adhere to the same rules as cabs. Subsequent social media posts, however, cited numerous reasons why competition is sorely needed in the nation's capital.

In May, a throng of taxis from Boston and nearby cities honked steadily and disrupted traffic while circling the block of Uber headquarters in Boston. An additional 30 drivers were on foot, holding signs and engaging the crowds that gathered about stricter regulations for Uber and other similar services.

Shortly after the strike, a spokeswoman for Boston Mayor Martin Walsh announced that the mayor was assembling a transportation taskforce to address many of the strikers' complaints. She also mentioned a possible partnership with nearby cities to provide oversight of traditional taxi services.

In a prepared statement, Walsh took a decidedly neutral position: "We cannot turn a blind eye to public safety concerns around unregulated modes of transportation, but we also cannot condemn a popular, effective service that takes responsible steps to ensure the safety of their users."

Snow/Ice Strategies for Airports Outside the Snowbelt

By Mike **Schwanz**

factsfigures

Project: Snow Removal (at airports that don't often receive snow)

Tulsa International Airport

Location: Tulsa (OK) Int'l Airport

Annual Operations: 95,295

Maintenance Staff: 11

Vehicles Used for Snow Removal: 10

King County International Airport Boeing Field

Location: King County (WA) Int'l Airport

Annual Operations: 182,000

Maintenance Staff: 17

Vehicles Used for Snow Removal: 12

PAINE FIELD SNOHOMISH COUNTY AIRPORT

Location: Paine Field (Everett, WA)

Annual Operations: 199,000

Maintenance Staff: 17

Vehicles Used for Snow Removal: 15

The winter of 2013-2014 was a nasty brute. In addition to mercilessly slamming the Midwest and Northeast, it also picked on unwitting areas in the South and Southeast. Icy conditions in Atlanta led the national news for days, and snowfall records were set throughout the United States.

Airport maintenance crews accustomed to cutting grass and fixing heat-related runway cracks faced unusual amounts of winter's white stuff. Some hadn't seen a significant snowfall in years and were challenged with insufficient equipment, manpower and training. Others, however, seemed to relish the opportunity to flex their contingency plans and test their crews' mettle.

Caution Preferred

John **Horton**

In Oklahoma, it's typical for the wind to come sweeping down the plain; but it doesn't often bring snow and sleet. That's why John Horton, airfield manager at Tulsa International Airport (TUL), prefers to err on the safe side when it comes to winter weather. "If there is even a chance of snow, we have people here," explains Horton.

TUL's maintenance staff includes 11 full-time workers. "Combo trucks" — plows that also tow brooms — reduce manpower needs, he notes.

"Our main runway, which runs north and south, has to remain open," stresses Horton. "If snow is persistent with accumulation, we will go to '30 on and 30 off.' We get the runway for 30 minutes to make a couple of passes with our snow crew convoy. Airport Ops will then check friction readings; and if we are good, we will resume normal air traffic."

Horton gives high marks to local weather forecasters and the airport's separate paid weather service. "We usually know up to 48 hours in advance about a pending storm," he relates.

Even with reliable forecasts, freezing rain and ice storms are a challenge at TUL. Crews respond by frequently monitoring surface temperatures. "It may be freezing at one spot on the airport, and above freezing in another," Horton explains. "This happens a lot in our part of the country."

The airport's deicing truck is consequently used for corrective and preventive purposes, covering 60-foot sections of pavement in a single pass. "We try to pretreat runways and taxiways," Horton notes. "When the temperature is on the bubble, some parts of the airport will freeze, especially when the sun goes down."

While last winter was relatively typical for snow — three or four events delivering a total of about 6 inches — one ice event was especially inopportune. Freezing moisture hit the airport at 3 a.m., and the main runway immediately froze over. "We made a pass with the deicing truck — down and back on each side of the runway centerline," he recalls. "Our first flight out that morning was at around 5:30 a.m. We were able to get good friction readings in time to get them out without any delays."

Like many other airports, TUL experiences steady employee turnover in the airfield maintenance department. "We are always training people every year," he relates. "We have training every fall, which is a couple of hours long. We usually devote a morning to do that."

New plow drivers are closely supervised and usually "get the idea" by the end of a 12-hour shift, reports Horton.

When Unpredictable is Standard

The Pacific Northwest — home to King County International/ Boeing Field (BFI) in Seattle — is notorious for its unpredictable weather. Fog, freezing rain and snow are all common, but most of the precipitation is cold rain. "Weather is very tough to predict here," says Raleigh Salazar, the airport's building, trades and fleet manager.

As a cargo hub for UPS and DHL, BFI has a more extensive airfield than most general aviation airports. Keeping the primary 10,000-foot north/south runway open at all times is critical, Salazar stresses.

"Here, even two hours of snow will wreak havoc," he notes. "Typically, a snowstorm may last 8 to 12 hours. And the snow can start off wet, then transition to freezing rain or turn to slush."

Sometimes, conditions vary within the airport itself. "We can get light snow at one end of the airport, and the other end will have sunshine," Salazar explains.

Beginning in late fall, BFI seeks frequent weather updates from both the National Weather Service and its private provider. "From 8 to 12 hours before a snowstorm, we put folks on standby as conditions warrant," he notes. "A duty manager monitors conditions at least every 2 hours for changes and updates."

Salazar emphasizes training — and cross training — within his crew of 17 full-time employees. "We have a multi-trade staff composed of equipment operators, utility workers, building trades and mechanics … and all of them can perform several jobs in a snowstorm," he comments. "We invest a lot of time to train mechanics and equipment operators."

As the main hub for Boeing, Paine Field works diligently to keep its main runway open despite unpredictable winter weather.

If a storm is predicted, maintenance workers know they will likely need to report several hours before the snow flies. "They are on call and have to be ready," Salazar explains. "During a long storm, we split into two teams working 12-hour shifts for coverage. Our bare minimum is to have two equipment drivers, an airport operations duty manager and a mechanic at the facility to handle a small snow event."

Last winter was fairly benign at BFI. Only two weather events required equipment, and five cases had staff on standby, he reports.

The Seattle airport doesn't always get off that easy, though. "About six years ago, we had a snowfall that lasted four days," Salazar recalls. "That was the hardest in my memory. We had to shelter people here at the airport; they couldn't get out."

Most winters, BFI receives freezing rain. "We are just south of the Puget Sound convergence zone, so we get a lot of rain and fog," Salazar explains. "However, when we do get ice, we use chemical, mechanical or a combination of means to treat and move it. Last winter, we only had two ice events, so we were lucky."

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"Snow season" at Paine Field lasts from October through late April.

Before each snow season, product manufacturers familiarize BFI staff with various anti-icing and deicing products and review proper application techniques. Training is also stressed for the airport's two mechanics. "Both have been factory-trained by the manufacturers," notes Salazar. "One has a background in heavy equipment. The other is former military, fixing vehicles in combat zones."

Whenever the airport purchases new equipment, Salazar makes sure that the purchase price includes training for drivers and mechanics. Local maintenance support from the manufacturer is another important criterion. "We need to be 'priority one' customers," he adds.

As a backup, Salazar also uses vetted local shops that specialize in hydraulics and fabrication (welding) for certain jobs that require extended downtime for equipment.

For preventive maintenance, all pieces are serviced both before and after each snow season. "During the snow season, we get frequent reports, which include feedback from drivers on equipment problems. We also do initial and recurrent familiarization training at the beginning of the season, followed by formation dry-run training twice a week in season," he concludes.

Mercurial Conditions

Bill **Penor**

The weather at Paine Field/Snohomish County Airport (PAE) in Everett, WA, creates unique challenges for Maintenance Manager Bill Penor. "This airport is in a convergence zone between mountains and Puget Sound. We can get white-out snow, while a mile away it can be blue sky," Penor explains.

Winters are also long, with the "snow season" stretching from October through late April.

"The storms circulate in bands, which leads to accumulation, then stall out over the airport," Penor continues. "This can go on for hours. The storms come down from the north, through the Olympic Mountains, over Puget Sound and funnel right to us."

Geography challenges notwithstanding, PAE is the main hub for Boeing, which builds aircraft on land immediately adjacent to the airport. "Dreamlifter cargo planes haul in parts for the new 787 from all over the world, and these parts have to be delivered on schedule," he explains. "Therefore, the runway has to remain open, with a Mu of 40."

Penor's strategy is to dispatch equipment at the first trace of snow. "Our snow blowers can remove 3,000 tons of snow an hour," he relates. "We will have up to six runway brooms in operation at a given time. The snow is wet and slushy, with drier snow on top."

But snow isn't PAE's only winter problem. "Last winter, we had mild temperatures … with lots of icing," Penor recalls. "Boeing does its own deicing on its planes going out, but we have deicing trucks in our fleet as well — dedicated to just runway deicing."

In all, PAE utilizes about 15 pieces of equipment, rotating units in and out throughout the winter. "We obtain some equipment from the federal government through GSA (General Services Administration), such as Air Force vehicles. We pay shipping. We received six Oshkosh plows with a value of $500,000 each," Penor reports. "We also purchased two used Sweepster runway brooms from another airport in Colorado."

Penor's crew includes 17 full-time maintenance employees, and most can operate all the trucks in the fleet. An in-house mechanic performs almost all repairs, with periodic assistance from airport fire department mechanics as backup.

"We can handle nearly anything Mother Nature tosses our way," he says confidently.

Located between mountains and Puget Sound, Paine Field dispatches removal equipment at the first trace of snow.

Last year, the staff at PAE enjoyed a relatively uneventful winter. "We had a few snowstorms with three or four inches of snow, but no huge snowstorm hit the property," Penor reports. "We were lucky."

The same, however, could not be said about many other areas of the country.

Industrywide Issues

"Last winter, many parts of Texas, Louisiana and Arkansas got hit particularly hard," says Steve Karlin, senior vice president of M-B Companies, a manufacturer of snow equipment. "Some of the small airports in those states have to use old street plows, inherited from their cities. Those plows are designed to be used in one lane of traffic, to cover maybe 11 or 12 feet.

"With a 150-foot-wide runway, they don't have a prayer," Karlin continues. "The plow operator will have to do so many passes, that even on an 8,000-foot runway, he will be out there for hours."

Another common challenge is budget restrictions. "We often get asked about leasing, but that does not work for us," he explains. "If we give a city a $500,000 machine in November, and they return it in April, it is worth only $300,000 at that point. And if they lease it for $60,000 a month, it really is not worth it to them, either."

M-B does, however, sell used machines to airports. Karlin considers the training that is included with such purchases an important element. Educating operators is a big challenge for some small airports that don't receive many winter storms, he notes: "They don't practice for snow removal … They just don't know what to do when a snowstorm hits."

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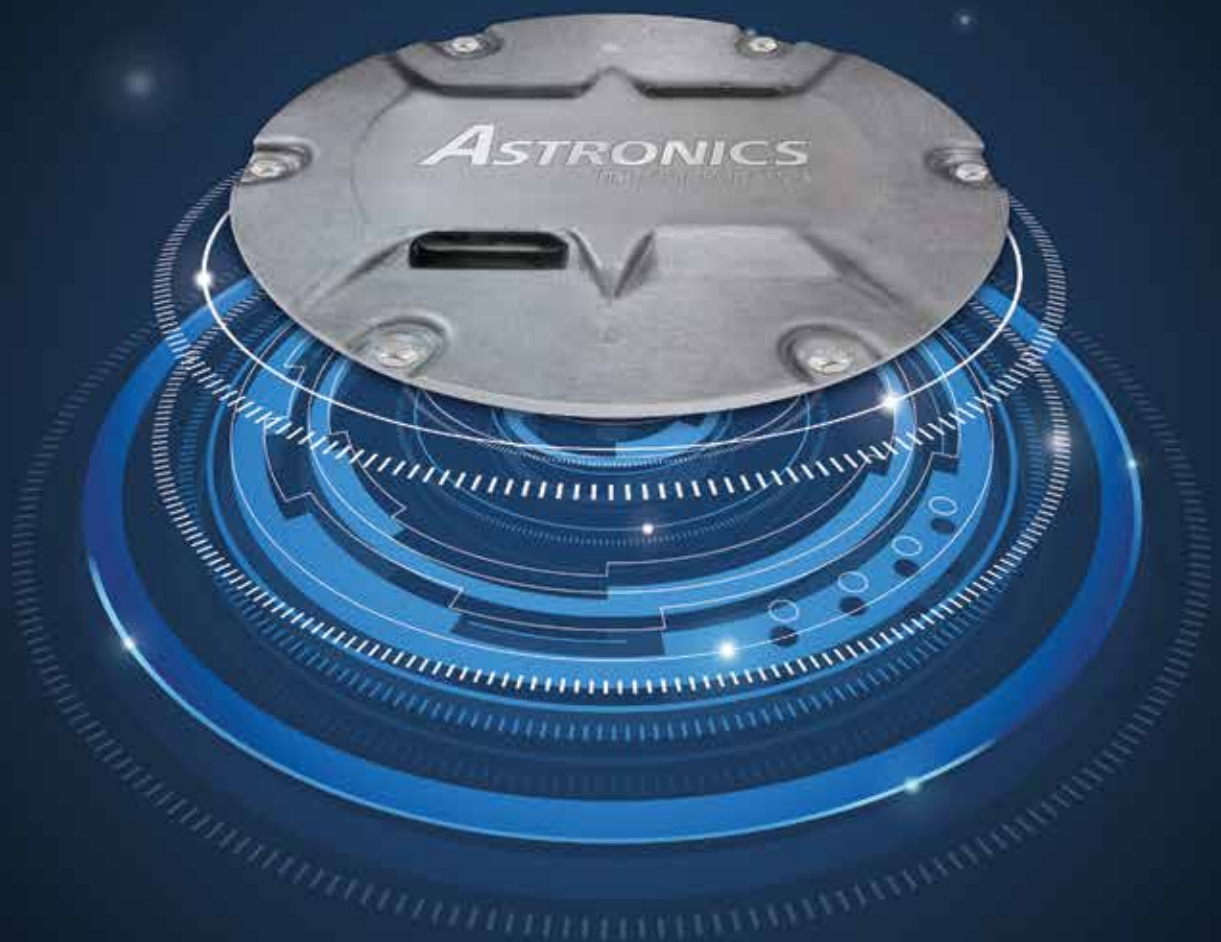

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San Francisco Int'l Cuts Costs & Construction Time With Partnering

By Jennifer **Bradley**

SFO San Francisco International Airport

factsfigures

Project: Boarding Area East Remodel
Location: San Francisco Int'l Airport
Terminal: 3
Contractor: Hensel Phelps
Architects: Gensler; KPA Group
Project Budget: $140 million
Total Cost: $138 million
Project Duration: 18 months
Workers' Compensation Claim: 0
Partnering Support: OrgMetrics; International Partnering Institute
Of Note: Project was completed under budget & within original timeframe, despite considerable expansion to scope of work; airport credits collaborative partnering strategy for reducing costs, increasing worksite safety & shortening overall schedule

Twenty percent below standard industry cost — that's how San Francisco International Airport (SFO) is completing major infrastructure projects these days. It's also often finishing them early and with stellar jobsite safety records. For instance, the Bay area airport didn't have a single workers' compensation claim (or general litigation) during the $800 million of work recently completed on its long-term $4 billion terminal renovation program.

SFO's impressive stats didn't occur by accident, but through a 20-year commitment to partnering that started, and continues, with Airport Director John Martin.

Geoffrey Neumayr, deputy airport director of Design and Construction for SFO, describes partnering as a pro-active approach that integrates all of a project's key participants on the same level.

"It's a trusted leader model," he explains. "It creates an environment that allows people to bring up issues without fear of retribution. The first step of partnering is to make an environment that's conducive to the identification of issues, and then working together to solve them."

Schedule reductions, cost decreases, labor savings and other impressive performance measures are the proof in the pudding, says Sue Dyer, president of OrgMetrics and SFO's partnering consultant ever since Martin launched the initiative.

"Airport projects are unique: They are highly complex, involve lots of systems and lots of people; and that's why they are so tough," says Dyer. "This process brings everyone together."

Sue **Dyer**

Dyer also founded the International Partnering Institute, a non-profit corporation that teaches organizations about partnering and is pushing for cultural change in the overall construction industry. SFO is a founding member of the institute and supports its research and outreach efforts; and Martin and Neumayr currently serve on its board of advisors, Martin as its chair. Several airport consultants and contractors, including Parsons Brinckerhoff, Skanska and Helsel Phelps, are also members of the institute.


Ivar **Satero**

Tried & True

SFO began implementing partnering basics in the 1990s, during its $3 billion capital improvement program, recalls Ivar Satero, the airport's chief operating officer. "We knew given the risks of such a major program and a lot of exposure to other major airport programs, it was going to be very important to take a partnered approach with our stakeholders, agencies we relied on to be successful, as well as our contractors."

Partnering worked well then, and again in 2007 with another major capital project, Satero reports. The practice has been used throughout major projects ever since, each time with more people and strength, as more lessons have been learned. It is now wholly integrated into the way SFO bids and executes construction projects, notes Satero.


Geoff **Neumayr**

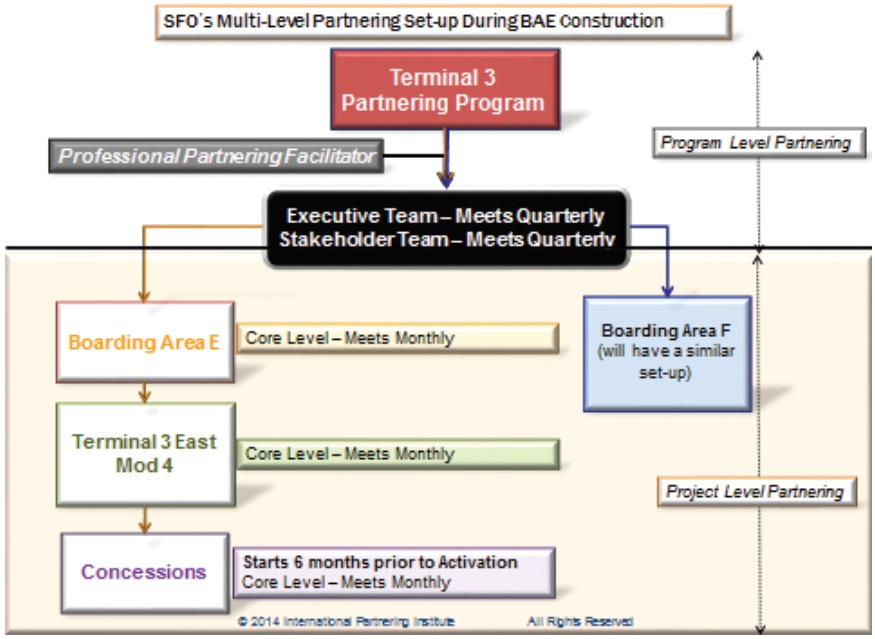
Neumayr has a knack for putting the cost of partnering — usually .1% to .2% of a project's total budget — into perspective: "The investment is worth a hundred times what you would put aside for an unforeseen condition contingency."

Airport officials cite SFO's Terminal 3 Boarding Area East project, which opened to the public earlier this year, as its latest partnering success. The project began as an uncomplicated $30 million "patch-and-paint" endeavor, recalls Satero. But SFO was also finishing Terminal 2 at the same time, and airport officials decided to carry its new, modern theme into Terminal 3. In order to accomplish a host of additional goals, the project cost rose to $140 million — "quite different than we envisioned when we started," Satero muses.

The 10-gate United Airlines terminal was stripped to the bones. A total of 100,000 square feet on two levels was completely renovated with new architecture, interiors and systems. Using the principles of partnering, SFO completed

the major remodel in 18 months — the time allotted for the original, much smaller project. By industry standards, it should have taken five years, notes Dyer. It also finished $2 million under budget.

The reason for such efficiency? No lingering issues among key project participants, says Neumayr. Partnering enables all players to sort through problems immediately, in an open manner, he explains. "In our case, we really never missed a beat. It was always clear the exact direction of what we were doing; everyone on the team knew where they were going, because the issues were all identified and put on the table."



The Partnering Process

"What other industry on earth would start a multi-million or billion dollar business venture without a board of directors?" asks Sue Dyer, president of OrgMetrics and founder of the International Partnering Institute.

The leadership of San Francisco International Airport (SFO) began asking itself the same question about 20 years ago, and has been taking a partnering approach to its construction efforts ever since.

Its program, as taught by the International Partnering Institute, includes three groups of participants:

1) Executive
- Includes owners, contractors, architect and other key project influencers
- Meets quarterly
- Defines policies and procedures; allocates resources

2) Core Team
- Includes key field personnel (designer, managers, owner, etc.) and representative(s) from department(s) affected by the project
- Initially meets monthly, then weekly as projects progress
- Identifies immediate issues in project execution

3) Stakeholders
- Includes those engaged by the project (airlines, city, etc.)
- Meets every three months with Core Team

Collaborative partnering integrates all three groups on the same level. SFO personnel credit the approach with decreasing the airport's construction costs by 20%, increasing jobsite safety, shortening project timetables and expediting the resolution of problems.

In general, airports spend a lot of money protecting themselves from any possible risk during construction, Neumayr observes. In contrast, partnering allows SFO to re-emphasize a common end goal —"that exceptional project outcome," in Neumayr's parlance. "Instead of pushing, everyone is pulling for the project," he remarks. "And it changes the whole paradigm of how a team works together."

Dyer adds that partnering also allows each player personal "ownership" in a project, and the strong effect that can have was obvious at the opening celebration for SFO's Boarding Area East. "(Team members) were high-fiving each other, and really loved and owned that building," she recalls. "It makes for a very different atmosphere and most importantly, they are having fun."

Top-Down Commitment

"We started at the strategic level, a long time ago, to create really the culture and values of collaboration," says Dyer, noting that partnering is now the airport's standard approach to construction.


Robert **Reaugh**

Robert Reaugh, executive director of the International Partnering Institute, emphasizes that successful partnering takes commitment at the executive level; value for the approach, and faith in it, then trickle down the organizational chart.

Reaugh and SFO personnel alike credit Martin with driving the partnering culture at SFO. "He believes strongly in it," says Satero.

Most professionals involved in partnering are high-level players in their own right, observes Dyer. Tapping into their individual wisdom is what makes this way of working so profound, she explains. "When you have a very high-performing team, they do lots of things that may be smarter," she continues. "What keeps me so excited about this is how it taps into the collective wisdom of the entire team."

The frequency SFO's core team meets with project stakeholders (airlines, concessionaires, the city, etc.) is a unique aspect to its partnering approach, says Reaugh. The group gathers every month to discuss issues and solutions, and to make sure the project is in line with the stakeholders' expectations.

For many years, the success of SFO projects was gauged by time and cost, recalls Neumayr. And while those benchmarks are still important, he feels that the ultimate success of a project depends on the perceptions of stakeholders and airport users. "We braved the idea that if we are going to be successful, we have to engage our stakeholders and listen to them from the very beginning," he explains.

Expectations & Trust

Satero recalls experiencing a few challenges during the airport's early partnering days. A concerted effort had to be made to "sell" the idea to the construction community, and it became important to show why SFO was still the agency of choice to work with, he explains.

"We (stressed that) when you work here, you not only get to do really cool projects, you are going to be treated fairly, and do things in an honest, consistent way," adds Neumayr. "Having an equal voice is a big deal; people want that."

Failing to set expectations up front for subcontractors was initially an oversight, Satero acknowledges. "(But) we overcame

SFO officials say partnering helped save millions of dollars and years in time during recent renovations to Terminal 3.

that once they saw the opportunity to work at a transparent level and develop trust," he remarks.

A "neutral facilitator" is a must in any partnership, emphasizes Reaugh. As SFO's neutral facilitator, Dyer considers it her role to make sure projects proceed smoothly. She uses monthly scorecards filled out by core team members to determine if issues are emerging and/or an extra meeting needs to be held.

Reaugh says that using a neutral facilitator is the only way to balance power and allow truth to emerge. "Ultimately, that's the biggest problem with large, complex projects," he explains. "The people in the field know what's wrong; but unless you have a culture where they trust that they can tell the truth, they will not. A highly trusted environment allows people to share bad news openly and become problem solvers rather than problem diagnosers."

Because SFO understands that design/build teams need to budget for partnering, planners write provisions for it directly into request for proposal documents. It's important for companies to understand the stakeholder engagement process, as it will have a significant impact on their resourcing — and also save them time and money over the long term, Reaugh notes.

Roddy **Boggus**

A good project will also enhance their resumes, adds Roddy Boggus, senior vice president/national aviation director at Parsons Brinckerhoff and advisory board member

for the International Partnering Institute. When all of a project's players are on the same page and working together, it's a shared risk, but also a shared victory, Boggus relates. The ability to demonstrate partnering experience offers contractors and consultants added value beyond single projects, he adds.

Boggus cautions airports that it might be tough to convince their contractors and consultants about the benefits of partnering, and some may need to be forced to conform to its methods.

"The owner has to understand what the possibilities are and put in the work to make it work," he remarks. "You have to have somebody driving it, and as people get into it and see that it works, conformance turns to belief."

What's Ahead

While SFO has become a poster child for partnering in aviation, Boggus notes that it's a model any organization can, and should, emulate. Research from the International Partnering Institute documents total installed cost savings of around 10% across all industries.

Dyer describes SFO's success with partnering as "astounding and repeatable."

After seeing noteworthy results on airport projects, the California Department of Transportation followed SFO's lead and began partnering. Now, it's experiencing schedule reductions of up to a third and huge reductions in claims and arbitrations, reports Dyer.

Because Boggus appreciates the magnitude of SFO's success with partnering, he cautions other executives not to expect the same immediate results. After all, Martin has spent the last 20 years refining SFO's project delivery approach to what it is today. That said, he reminds airport leaders that any organizational change requires a first step, and they are the only ones who can take it.

These days, SFO's construction meetings typically focus on solving day-to-day technical concerns, notes Neumayr. "That's a very comfortable place to be," he reflects. "We're talking about the business we all love and solving the exact problems we signed up to. How good is that? No one wants to focus on contract disputes."

Satero agrees: "We believe that people who are having fun and happy will do a better job."

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American Express Opens Upscale Lounges at McCarran & Dallas/Fort Worth Int'l

By Victoria **Soukup**

McCarran INTERNATIONAL AIRPORT

DFW DALLAS/FORT WORTH INTERNATIONAL AIRPORT

factsfigures

Project: American Express Cardholder Lounges

Name: The Centurion Lounge

Current Locations: Dallas-Fort Worth Int'l; Las Vegas McCarran Int'l

Future Locations: LaGuardia Airport; Miami Int'l; San Francisco Int'l

Lounge Size: 9,000 sq. ft.

Capacity: 125 guests

Complimentary Amenities: Gourmet food by local chefs; premium liquor; quiet areas; children's playrooms; televisions; shower suites; spa services (DFW only); business areas; Wi-Fi service; conference rooms

Daily Access Fee: $50 for standard American Express cardholders; complimentary for Platinum & Centurion cardholders

General Contractor: Turner Construction Co.

Design & Branding: Big Red Rooster

DFW Design Architect: Corgan

Benefits: Allows airport to provide premium lounge for passengers on all airlines

Just like the commercials insist, membership *does* have its privileges. And now those privileges include access to upscale lounges at two well-traveled U.S. airports.

Currently, American Express Corp. operates members-only Centurion Lounges at Dallas/Fort Worth International (DFW) and McCarran International (LAS) in Las Vegas, but the credit card mainstay intends to create a network of similar facilities across the country. With amenities such as spa treatments and gourmet food that showcases each city's unique culinary flavors, the lounges are designed to cater to what American Express calls "discerning" travelers.

DFW officials welcomed the chance to add a new kind of amenity in the airport's D terminal. "Opening up The Centurion Lounge was an opportunity to broaden our offerings outside of the airline clubs and a chance to further align with another premier brand," explains Zenola Campbell, DFW's vice president of concessions. "Travelers are finding greater value in selecting DFW as their choice for layovers or when connecting through an airport."

Zenola **Campbell**

Officials at LAS echo that sentiment. "The American Express deal provided something we believed our customers were asking for," relates Scott Kichline, assistant director of aviation – commercial/business development at LAS. "American Express is a very good partner with our airport, because 70% to 80% of the people traveling through Las Vegas have that card in their wallet or in their purse."

American Express decided to enter the highly competitive lounge business to give its card members a "differentiated U.S. airport lounge," explains Lisa Durocher, senior vice president of consumer charge cards and benefits for American Express. "American Express is recognized for its extraordinary service, and the lounge is one way we can demonstrate this commitment."

McCarran Int'l was the first U.S. airport to open a lounge strictly for American Express cardholders.

With a number of proprietary airport lounges already in operation overseas, expanding to the U.S. market was a "natural extension," says Durocher.

Where to Go, What to Do

The company selected its new U.S. locations according to where card members travel most, explains Kimberly Litt, American Express public affairs manager. The LAS lounge opened first, in February 2013, and the DFW location followed in October 2013.

Another lounge is scheduled to open at New York City's LaGuardia Airport in September and there are plans for facilities at Miami International Airport and San Francisco International Airport.

Entry to Centurion Lounges is open to all American Express cardholders. Members with standard cards pay a $50 daily fee; those carrying a Platinum or Centurion card enter without charge. Inside the wood-paneled walls, all services are complimentary.

The lounges feature large flat-screen televisions; magazines and newspapers; family rooms equipped with videogames, books, movies and toys; semi-private workspaces; Wi-Fi, printers and computer bars; conference rooms; and shower suites. Private chefs prepare hot and cold gourmet buffets; and the bars are stocked with top-shelf products and feature signature cocktails.

The DFW location also includes a spa that offers guests 15-minute treatments such as massages, manicures, pedicures and facials.

Tale of Two Cities

The Centurion Lounge at LAS is located in Concourse D, in space the airport created in April 2005 for an airline lounge. The space had remained empty until early 2012, when American Express approached the airport with its member lounge concept, Kichline recalls. The timing couldn't have been better for both entities.


Scott **Kichline**

"We were hearing from our customers that they wanted a first-class lounge, yet we didn't have an airline partner that was willing to step in and provide that," Kichline recalls. "The American Express deal provided something we believed our customers were asking for."

In addition, the exterior walls, plumbing and electrical were already configured for a lounge when American Express began interior construction. The completed facility's menu features items inspired by Executive Chef Scott Conant, owner of Scarpetta restaurants in Las Vegas, New York City, Miami and Toronto, and a frequent judge on Food Network's *Chopped*.

No Card Needed for Premium Lounge in JFK's Terminal 4

Like McCarran and Dallas/Fort Worth International, Terminal 4 at New York's John F. Kennedy International Airport (JFK) is banking on the appeal of premium common-use lounges. Last August, it converted one of the terminal's airline clubs into a $50-per-day lounge that caters to passengers flying any airline.

The switch literally occurred overnight. One day, the space was an airline-specific club, and the next it was a Wingtips Lounge, operated by Airport Terminal Services. The quick-change was engineered by JFK IAT, the private, non-airline company that operates Terminal 4.

"We wanted an experienced operator who was very knowledgeable in all airline services, including lounges, to provide our common-use lounge product," says JFK IAT Chief Financial Officer Michael Sibilia. "(Airport Terminal Services) was selected based upon their experience and their history of providing excellent services. We wanted the best, and we wanted them to concentrate solely on the airline passengers that have the ability to use a lounge and assist them in enjoying a premium experience."

JFK IAT contacted Airport Terminal Services shortly after it learned that one of Terminal 4's airline clubs would be closing. Changing operators in just 24 hours allowed JFK IAT to continue offering the popular passenger amenity with barely a blip in service and prevented an interruption in lease payments for the 7,000-square-foot space.


Ingrid **Braeuninger**

Airport Terminal Services gladly accepted the contract to begin operating the club-ready space. "We had been involved in third-party lounge management experience in the past, under someone else's brand and establishment," explains Ingrid Braeuninger, vice president of sales and business development for Airport Terminal Services. "Wingtips breaks us out of that limitation and allows us to create our own experience. It was a good opportunity, and the result has been fantastic."

factsfigures

Project: Common-Use Lounge
Location: John F. Kennedy Int'l Airport (NY)
Terminal: 4
Name: Wingtips
Lounge Size: 7,000 sq. ft.
Terminal Operator: JFK IAT
Lounge Operator: Airport Terminal Services
Daily Access Fee: $50
Benefit: Allows airport to provide premium lounge for passengers without requiring specific credit card or airline membership
Of Note: Operator will begin comprehensive renovations this fall

WINGTIPS
NEW YORK CITY

The agreement between the two companies precludes Airport Terminal Services from performing any ground handling services at Terminal 4 to ensure that it remains "airline agnostic" and concentrates on creating a "passenger-focused experience," Braeuninger explains.

Amenities at the 24-hour lounge include a buffet of hot and cold food, snacks and alcoholic beverages. Wi-Fi access is also included, as is a business center, newspapers and publications, restrooms and showers. "We look at it as a full-service experience and not just a sitting room where we offer cookies, a hot and cold beverage and a magazine," relates Braeuninger.

Sibilia explains that the new Wingtips Lounge makes Terminal 4 the "terminal of choice" for many JFK travelers, because it fills a void for passengers who do not have an airline lounge affiliation. He also notes that the lounge's no-membership-needed operating philosophy matches the common-use strategy JFK IAT uses for aircraft gates and check-in stations elsewhere in the terminal. "An airline lounge usually only allows certain carriers to operate within their lounge," he relates. "Wingtips allows all airlines equal opportunity and provides equal services to all."

Airport Terminal Services plans to leverage its experience at JFK to create a network of similar lounges at airports throughout the United States and Canada. "Our intention is to establish Wingtips as a brand," explains Braeuninger. "We want to have certain features of all future lounges tied together through our branding, yet localize each lounge specific to that airport, city and passenger demographics."

Based on its success to date, the company will begin a major renovation of the JFK lounge this fall, she adds. With work expected to take 9 to 12 months, a temporary lounge offering the same food and beverage options will be open elsewhere during construction.

The newly renovated lounge will be about the same size as its predecessor but will include additional amenities. "It will be more representative of the experience we are trying to create," says Braeuninger. "We have a beautiful view of the ramp where we can see airplanes coming in and taking off. We have a 24-hour hot and cold menu that changes throughout the day. We'll still have all of that, but we're just reconfiguring it and making it even more enjoyable."

Work on the DFW lounge was more involved. Corgan, the project's design architect, began with an existing space on the upper level of the airport's South Concessions Village, which is divided by a pedestrian bridge. Previously, the south side contained a duty-free shop, the north side contained food/beverage establishments, and the two were connected in the middle by an open-air service bridge.

Corgan's redesign for the new American Express lounge placed the food/restaurant/bar and general relaxation area on the north side and everything else, including the Exhale Spa, business area, showers and children's play area on the south side. The service bridge linking the two areas was framed and enclosed to create an intermediate lounge area with open views to the concourse below.

Mark Lobel, Corgan's project manager, notes that the enclosed bridge was an important part of the project, because it creates a buffer between the two areas. "It adds to the perceived spaciousness of the lounge, despite the fact that it's 9,000 square feet – not really a lot of space for the amount of traffic they receive on a daily basis," says Lobel. "It also created a very nice transitional space for passengers moving between the two sides of the lounge."

Mark **Lobel**

Workspaces are separated from television and lounge areas to ensure privacy and productivity.

The Centurion Lounge at Dallas/Fort Worth Int'l opened last fall.

Guests access the second-floor lounge via public escalator or dedicated elevator. The cuisine is overseen by well-known chef Dean Fearing, of Fearing's Restaurant at the Ritz-Carlton in Dallas, which received "Restaurant of the Year" and "Table of the Year" honors from *Esquire* Magazine.

Bringing heavy steel framing to the second-floor project was a particular challenge, recalls Lobel. "DFW asked for very minimal disruption to operations and passenger experiences, so we had to work a very limited nighttime schedule until we were fully enclosed," he explains.

Turner Construction was the general contractor for both the DFW and LAS projects. Each lounge is 9,000 square feet, with capacity for 125 guests.

Distinctly AmEx

American Express partnered with Big Red Rooster for design and branding services. In addition to ensuring that local chefs design menus that highlight local cuisines and ingredients, the company recommended materials, textiles, furnishings and fixtures for the lounges.

"Our team pulled iconic design furnishings and multi-sensory elements together in a modern, memorable environment that transports guests away from the concourse's hectic atmosphere," says Aaron Spiess, the company's president and co-chief executive.

To create a strong brand identity, designers outfit each location with a standard blue entryway, vertical planters known as "live green walls," and signature sounds and scents.

Bars with top-shelf liquor are a standard element in the luxury lounge model.

Aaron **Spiess**

"This was a very important strategic venture for American Express," notes Spiess. "We dimensionalized the art of service with the American Express heritage of travel, and developed it into a very enriched customer experience. The lounges really position themselves around the creative and diverse expectations of the American Express brand."

American Express reports that its two current lounges are filled to near capacity every day and feedback from visitors has been very positive. "Our goal is to create a more seamless curb-to-curb experience for our card members in the airport – the Centurion Lounge is one of the ways we do that," Durocher says. "We've even heard from card members that they are more likely to book travel through an airport where we have a Centurion Lounge, driving more traffic into the airports in which we're located."

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Denver Int'l Improves Efficiency, Reduces Costs With Building Information Modeling

By Ken **Wysocky**

DENVER INTERNATIONAL AIRPORT

factsfigures

Project: Building Information Modeling

Location: Denver Int'l Airport

Funding: Airport revenue

Timeline: Began in 2010; efforts are ongoing

Software/Model Development: Parsons Corp.; HNTB Corp.

Benefits: Improved efficiencies & reduced costs for construction, facilities maintenance & asset management

Building Information Modeling (BIM) is nothing new at Denver International Airport (DEN). Colorado's busiest airport has used the advanced computer-modeling method for years, investing millions of dollars to collect countless bits of data about its facilities and assets. But these days, it's taking BIM to a whole new level by using the process to develop an incredibly detailed 3-D virtual model of the airport.

Dave **LaPorte**

"We've been building a BIM model of the entire airport infrastructure since 2010 … but it was just a skeleton, showing mainly just door locations and rooms," explains Dave LaPorte, DEN's deputy manager of aviation. "Now we're going back to put flesh on the bones."

Airport officials and technology vendors alike expect the strategy to help dramatically improve efficiencies and reduce costs for construction, facility maintenance and asset management. Further, they say DEN is the first major U.S. airport to integrate so much data using BIM.

It's an ambitious undertaking for the 53-square-mile airport with 9 million square feet of facilities. As the fifth-busiest airport in the United States, DEN has endured much wear and tear since it opened in 1989. Last year alone it served more than 52 million passengers. As such, remodeling and construction are the norm, not the exception. And BIM is helping streamline those projects, including a $544 million hotel and transit station currently underway. (The hotel is scheduled for completion in October 2015 and the transit center in early 2016.)

The cost of the BIM implementation is difficult to pin down because it's constantly evolving, LaPorte notes. "There's really no end date to it," he explains. "BIM is not a project here; it's a way of doing business. But we wouldn't make this kind of investment if we weren't going to save money down the road."

Scott **Steckler**

Scott Steckler, aviation studio leader for HNTB Corp., says that DEN is developing the most updated airport BIM system in the country. "A lot of airports will be looking at what Denver is doing here," Steckler predicts.

HNTB Corp. is working as a BIM specialty sub-contractor for Parsons Corp., the overall engineering, construction and management consultant.

Faster, More Cost-Effective Construction

With its virtual airport model more fully "fleshed out," DEN is beginning to reap some of the biggest benefits of its BIM investments. The amount of change orders needed has dropped dramatically, because contractors are receiving better jobsite information up front, explains LaPorte.

Mortenson Construction, one of three contractors working on the hotel/transit center project as part of MHS Triventure, has already documented significant reductions in time and cost by using BIM on other projects, reports William Lineberry, a design technology manager for HNTB who serves as the project's on-site BIM manager.

"You can figure out how things like ductwork, fire sprinklers and plumbing all fit together in the ceilings before you go out in the field," remarks Lineberry. "Before, one person drew the HVAC ductwork, one person drew the sprinkler system and one person drew the plumbing, and you hoped it all fit together."

As a result, it was common for crews to deviate from blueprints when they encountered unexpected problems, such as an electrical contractor finding a wall where electrical lines were supposed to be installed. If common in-the-field changes are not properly documented, they lead to more unexpected surprises down the road during remodeling or maintenance, LaPorte explains.

"Change orders in construction can get very expensive … we could have literally hundreds of change orders in a large project, which runs up the administrative costs associated with processing all those changes," he continues. "But with BIM, we can resolve those rights-of-way contractor clashes before we even start construction. That's probably where we get the biggest savings."

New BIM-related efficiencies are expected after construction is complete as well. Maintenance personnel will no longer run into unexpected obstacles when making repairs, such as having to work around a pipe they didn't know existed. In short, they'll spend more time making repairs and less time figuring out how to circumvent surprises, LaPorte says.

"In some cases, our frontline techs can even diagnose a problem from a computer tablet before they even go out to the field," he notes. "Or an HVAC tech can walk into a room with the virtual model of that room on a 'toughpad' (heavy-duty tablet computer) and can see exactly where he needs to go to fix a problem. We can even remotely control things – adjust the temperature of a room or turn a fan on or off."

Reducing timelines for construction, remodeling and maintenance ultimately benefits DEN passengers by keeping the terminal running smoothly, adds LaPorte.

Next-Generation Technology

For many involved in DEN's projects, BIM represents the latest iteration in a series of building design methods that started seemingly eons ago with hand-drawn blueprints and evolved into computer-aided drafting (CAD).

Lineberry recalls the days of 2-D graphics, which didn't provide a true 3-D viewpoint. But BIM has since revolutionized that.

"We can get as detailed as seeing furniture in a room, if we want to," LaPorte relates. He compare DEN's airport model to current videogames like *Call of Duty*, which allow players to guide characters through surprisingly convincing virtual environments. "That's exactly what BIM is like," he raves.

BIM, however, adds another twist. "It's built in layers, from the foundation to the studs in walls to the plumbing layer, electrical layer and so on," he describes. "We can turn layers on and off. If you want to see just plumbing, you can see a virtual layout of just the plumbing … you can just keep scrolling and walking through the facilities."

Steckler also values the layering aspect: "It can show all the underground utilities, too. If you want to know where a drain runs or an underground electrical duct bank or communication duct bank is located, you can find it. All as-built changes are reported back into the system, so the model always verifies how things are actually installed."

Building on BIM

Given DEN's years of experience with BIM, personnel don't simply use the technology to track and log the static location of assets; now they also leverage it to help manage and control those assets. "We're using the BIM model as our foundation to tie all our other systems together, like Maximo, our (IBM) work-order management system; our geospatial information system; and any kind of building automation, like HVAC or electric or plumbing controls," LaPorte explains. "And we can do it all in a virtual environment."

The BIM system also alerts maintenance officials when an elevator isn't working or an air-conditioning unit breaks down.

"When our BIM model for asset management is fully implemented in the next couple of years, it will send out alerts about equipment malfunctions," LaPorte adds. "We'll then be in a position to monitor the BIM model on a huge screen in our maintenance control center."

Facilities personnel anticipate cutting maintenance costs even further by transitioning to a predictive rather than preventive mode where possible. In the latter, assets such as gearboxes are replaced on specific time cycles, despite their condition. In contrast, BIM technology allows crews to replace items only when necessary.

"We can run an asset up to the point where we believe it's about to fail before we replace it," LaPorte says. "We can trend where and when failures will happen … it gives us much more flexibility in diagnosing the health of our building and enables us to more efficiently allocate manpower."

DEN's virtual system also offers other capabilities, such as tracking asset warranties,

Lineberry adds. Historically, that information was manually entered into software programs from paper documents – a time-consuming process prone to human errors. "With BIM, all that information is extracted directly from the main BIM database, which saves a lot of time and improves data integrity," he remarks.

One in, All in

Construction of the new transit center and hotel served as a catalyst for DEN to integrate its smaller, individual BIM projects into a more sophisticated and comprehensive facilities-management initiative. "We finally realized we were duplicating efforts … and got some great synergy out of combining our efforts with what the hotel and transit center were doing," says LaPorte.

A five-person group is leading the BIM conversion — a project that includes wading through an estimated nine million CAD drawings to determine which are accurate and relevant.

The difficulty and scope of the task underscore an important point: A BIM system is only as accurate as the information used to create it. It's consequently critical to motivate all the contractors involved with a construction project to "buy into" BIM — especially during a project as big as the hotel/transit center.

DEN secured participation by following a BIM execution plan and holding many meetings with all stakeholders, Lineberry reports.

"The BIM execution plan essentially is a roadmap for how things have to be done, in very specific detail, so that all stakeholders have a thorough understanding of the requirements and are on-board," he explains. "Because of the nature of contracts, it gets very complicated … making sure everyone is on board can be a challenge. It's like that old campfire game, where by the time the message gets passed around, things get lost in translation … there tends to be potential for a lack of full comprehension of what's required."

HNTB's Steckler agrees: "It tends to be difficult, even though it (BIM participation) is mandated in their contracts. It requires coordination with all the subcontractors, who each have their own BIM modeler that submits (design) updates. It's a big effort. If a pipe gets moved six inches, that gets documented. That's one of their daily tasks."

Such challenges aside, there's little doubt that BIM technology is a game-changer, Lineberry emphasizes. "Just think about the concept of designing something and building it based on blueprints versus figuring everything out in a computer model, then having all that data you created translate through all the way to facilities management for the owner," he notes. "It used to be that the deliverable for a contractor was a physical building. Now we're talking about a whole lot more data transferred to the (building) owner in the end. This represents a whole paradigm shift in the industry."

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Raleigh-Durham Int'l Transforms "Big Blue Box" into New Terminal

By Robert **Nordstrom**

factsfigures

Project: Terminal Renovation
Location: Raleigh-Durham (NC) Int'l Airport
Cost: $68 million
Funding: Airport capital improvement funds
Architect: Clark Nexsen
Program Management: Parsons
Construction Manager At Risk: Balfour-Beatty
Concessions Management: HMS Host; Marshall Retail Group; Uptown Airport Group

Subcontractors:
Electrical: Bryant Durham Electric Co.
Interior & Exterior Sheathing: Precision Walls
Mechanical Plumbing: Kirlin Carolinas
Baggage Handling: Daifuku Logan
Structural Steel: Lyndon Steel
Curtain Wall: Glasstech

When Raleigh-Durham International (RDU) opened its completely renovated Terminal 1 in mid-April, the North Carolina airport also marked the end of its 15-year, nearly $1 billion capital development program (for more information, see Page 56). The $68 million terminal includes a new nine-gate concourse, 11 new concessions, a four-lane security checkpoint with expanded queuing area, updated ticketing and baggage claim areas and large windows featuring panoramic airfield views.

With 166,000 square feet of freshly configured space, the new terminal is designed to accommodate up to 3 million passengers per year. It replaces the "Big Blue Box," as locals referred to the previous facility, which was built in the early 1980s as an add-on to RDU's small 1955 terminal. Originally designed to serve only temporarily as a terminal and eventually as a hangar, the previous facility far outlived its intended lifespan.

"The Big Blue Box was not very customer-friendly," acknowledges RDU President and Chief Executive Officer Mike Landguth. "The spaces were tight, with a lot of congestion in the ticketing and security checkpoint areas. It lacked an open, airy feeling and windows to allow travelers to look out over the airfield to see planes taking off and landing. The mechanical systems were old and needed to be completely restored. We gutted the entire exterior and interior of the building down to the four corner posts and rebuilt it."


Mike **Landguth**

Currently, Southwest Airlines and AirTran Airways are the only airline tenants in the new facility. Together, they operate out of four gates. The new terminal's other five gates remain available for Southwest expansion and/or new airline tenants. Southwest plans to fold AirTran into its operations by the end of the year.

Sequestering the Worksite

The old terminal was a hodgepodge of three interconnected structures: a small mothballed structure on the south end, the Big Blue Box in

the center and the original 1955 structure on the north end, which remained operational throughout renovations. To facilitate airport operations during construction, contractors secured the area around the Big Blue Box.

"The first thing we did was put in a security fence," recalls Landguth. "We didn't have to deal with security issues, because we fenced them out." Separating the worksite from operational areas simplified matters for contractors, he explains: "They didn't have to worry about background checks and badging … (or) try to figure out which doors they could or could not go through."

Fencing off the ramp also eased material delivery, he adds.


Dave **Campbell**

Dave Campbell, lead project manager for construction manager at risk Balfour-Beatty, describes the biggest challenge on the project as "working on everything at the same time."

After workers stripped the exterior skin and gutted the interior, crews applied interior architectural finishes while new siding was installed. "We essentially gutted the building, then moved immediately to work on the exterior and interior," Campbell explains. "Keeping the interior dry was a major challenge."

To do so, contractors used a special tarp system from Global Wrap that created a temporary envelope around the structure. Campbell estimates that installing the interior framing and sheet rock while working on the exterior skin of the building shaved four to five months off the production schedule.


Mason **Kenyon**

As interior and exterior construction proceeded simultaneously, still other crews evaluated, removed and replaced the building's mechanical systems. The challenge here, explains Balfour-Beatty Senior Project Manager Mason Kenyon, was ensuring that critical utilities

Scheduling crews to perform interior and exterior renovations simultaneously shaved months off RDU's project schedule.

and mechanicals serving the north end of the terminal remained operational.

Sorting through the systems to "separate the Blue Box from the world" was no easy task, notes Kenyon. "The building had been there for 30-plus years and was renovated multiple times," he explains. "For the first 60 days, we did light demolition, trying to figure out what was up there, then carefully shutting systems down in an effort to isolate the building while keeping the active terminal operating … We never shut down a critical system or impacted travelers. I'm pretty proud of that."

Utilities, data lines and telephone lines were temporarily reconfigured to maintain services to the operating terminal while new conduit and data connections were installed; and plumbing lines were rerouted. Crews carefully probed the mishmash of conduit and pipes one at a time, using red paint to designate services that had to remain in place and green for lines that could be removed during demolition. Switchovers generally occurred at night, when passenger traffic was slowest.

Severing the connections of the heating/cooling and fire suppression systems to the renovation site while maintaining their operations in the active temporary terminal presented notable challenges, Landguth recalls.

Vincent Del Nero, principal project manager for Parsons Corp., recalls numerous surprises during demolition. "Early on in the project, every day was kind of like Christmas: We got a present," he quips.

Vincent **Del Nero**

New Aesthetic Standards

Renovating Terminal 1 to the standards of Terminal 2, which opened in 2011, was a major challenge, notes Clymer Cease, principal with architect of record Clark Nexsen. RDU officials wanted to ensure that travelers encountered the same experience — aesthetically and functionally — in both facilities.

Clymer **Cease**

"Terminal 2 is a very successful building; people like being there," Cease informs, noting that it was also a ground-up construction project with few architectural constraints. Creating similar results in Terminal 1 required creativity, since architects and designers had to work with the structural bones of an existing building, he adds.

For example: The exterior roof shapes of the two terminals were completely different. So designers used the same canopy

CREDIT: MARK HERBOTH PHOTOGRAPHY

Time to Exhale

Seven airlines initiated service at Raleigh-Durham International Airport (RDU) between 1995 and 1999 — primarily due to increased demand for air service associated with tremendous growth in the area's Research Triangle Region.

Mike **Landguth**

"Today, RDU no longer has to react to growth in our region," reflects Mike Landguth, the airport's president and chief executive officer. "Because of the capital investments we have made over the past 15 years, we are now positioned to support passenger and air service growth for the next 20 to 25 years."

Throughout the years, RDU's capital development program included projects totaling almost $1 billion. Highlights include:

Parking Garage A $140 million parking garage added between the airport's two terminals in 2003 provides 10,779 spaces within walking distance of both facilities. The airport also provides 7,000 spaces in park-and-ride lots.

General Aviation A $56.6 million general aviation redevelopment program, completed in 2005, added 51 new T hangars, six executive hangars, four corporate hangars, a new fixed base operator office and hangars, a new taxiway and a new 21,972-square-foot general aviation terminal.

Terminal 2 RDU opened its new $573 million passenger facility in 2011. The 920,000-square-foot terminal accommodates 11.4 million annual passengers; six airlines operate out of 36 gates along two concourses.

Terminal 1 The final $68 million piece of the airport's long-term redevelopment project ended in April, delivering a fully renovated 166,000-square-foot terminal designed to accommodate 3 million annual passengers. Southwest Airlines and AirTran Airways operate out of four new gates; five gates are available for expansion.

With the Terminal 1 renovation complete, Landguth likes to tell his staff "the big dig is over." In other words, it's time to exhale.

"Quite a bit of work has been accomplished over the past 15 years," he notes, chronicling the rebuilt runways, taxiways, connectors and roadways not mentioned above. "The last time I looked at the balance sheet, we have $1.2 to $1.5 billion of assets on the ground that have been built over the past 20 to 25 years. We'll continue to build — just not on that scale."

An updated ticketing area, with more windows and open space, is just one notable change of the $68 million Terminal 1 renovation.

materials and "lifted them in an exciting and invitational way" to bridge the aesthetic gap. "Although it's not identical to Terminal 2, the experience is similar, whereby people feel excited and welcomed by the canopy design," he explains.

The color scheme of Terminal 1 is also consistent with Terminal 2. "The grays and whites will stand the test of time," Cease assures, noting that they also allow signage, advertising and Southwest Airlines logos to "pop out."

Inside, the goal was to brighten the dark and uninviting spaces of the old terminal with natural light. Translucent panels that allow sunlight to stream into the ground floor ticketing hall and baggage claim areas replaced steel wall panels. Three new baggage claim carousels and a new inline baggage screening system were also installed.

In the concourse area, raised ceilings and larger windows were added to create a more engaging and visually entertaining space for travelers. Walls and columns were moved to provide more open space throughout the building. Passengers can now access free Wi-Fi service throughout the terminal, and new seating includes power connections for recharging electronic devices.

Six new restaurants and five new retail shops in the pre-security and concourse areas offer more diverse options for the traveling public. In addition to two Starbucks and the local Char-Grill, Terminal 1 features ACC American Café, La Tapenade Mediterranean Café and Salsarita's Fresh Cantina. Shoppers can browse through Flight Stop (two locations), Marshall-Rousso, Ruby Blue and Techshowcase.

The Raleigh-Durham Airport Authority purchased three permanent art installations for the overhauled terminal. A laser-etched glass of blue water reflecting the sky and trees adorns the glass wall that separates the second-floor security checkpoint from the concourse. Titled *Ripples*, the artwork appears to move as viewers pass by.

Metamorphosis, a painting inside two laminated pieces of glass, presents bold colors and intricate details of nature scenes, a map of the world and an abstract road map of North Carolina on a two-story wall that frames the escalator and staircase between the ticketing and security checkpoint levels.

Suspended above the baggage claim area is a sculpture Cease describes as a "friendly piece of public art." *Highwire Travelers* whimsically depicts seven abstract figures, several balancing luggage on long poles while walking a highwire. "People like it," he relates.

Landguth reports enthusiastic response about the rest of the recently renovated terminal as well: "The new amenities and services, the open airy spaces and the abundance of light — the feedback we're getting from our customers is incredible. They love it."

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New Intermodal Center at Bob Hope Airport Doubles as Emergency Ops Center

By Rebecca **Kanable**

factsfigures

Project: Regional Intermodal Transportation Center/ Consolidated Rental Car Facility

Location: Bob Hope Airport

Owner: Burbank-Glendale-Pasadena (CA) Airport Authority

Total Cost: $112 million

Appox. Size: 520,000 sq. ft.

Ground Breaking: July 2012

Opening Ceremony: June 2014

Primary Components: Transit center served by Metro, Burbank Bus & Amtrak Bus; rental car facility/ customer service building; elevated walkway to/from terminals; replacement parking structure

Funding: Bonds; grants; customer facility charges; passenger facility charges

Bond Team: Citigroup; Copelan Consulting; Orrick Herrington & Sutcliffe; Public Resources Advisory Group; Ricondo & Associates; Richards, Watson & Gershon; Stradling Yocca Carlson & Rauth

Future Addition: Empire Avenue Pedestrian Bridge

Bridge Design/Construction: Los Angeles Co. Metro Transportation Authority (with funding from CA Transportation Commission)

Intermodal Center & Walkway Construction: McCarthy Building Cos.

Bid: $72.7 million

Parking Structure Construction: Bomel Construction Co.

Bid: $8.5 million

Architect of Record: PGAL

Other Design Team Members: Blymyer Engineers; John W. Cruikshank Consultants; Miyamoto Int'l; PBS Engineers; Anil Verma Associates

Program Manager: gkkworks/STV Int'l, with assistance from Elkin Construction Services; Heritage Tree Films; Del Richardson Associates

Environmental Document Preparation: Ricondo & Associates

Multi-modal Transit Connections Study: AECOM; STV Int'l

Program Highlights: More transportation options to & from airport; decreased traffic on nearby roadways; seismic isolators provide added earthquake protection

Rental Car Facility

Began Operations: July 2014

Rental Car Brands: 11

Funding: Rental car companies

Size: 3 levels; 1,000+ vehicle spaces

The new $112 million Regional Intermodal Transportation Center at Bob Hope Airport (BUR) shows that access to the Burbank, CA, airport is an important priority. What's not so evident is that in the event of a major earthquake, it can serve as a regional command center for emergency operations.

Another less-obvious advantage is its positive effect on airfield safety. Moving BUR's former rental car pick-up and drop-off facility made room to expand the airport's previously undersized runway safety area.

Dan **Feger**

The center's primary and day-to-day function, however, is to improve connectivity for airport passengers, train and bus riders, rental car customers and even bicyclists. BUR's executive director, Dan Feger, sums it all up in one word: convenience. "Bob Hope Airport 'sells' convenience," Feger explains. "Having options that people can use to get to the airport other than getting into a car and fighting L.A. traffic is another form of convenience."

BUR is one of the few western U.S. airports with train service directly to the airport. Metrolink, which serves 55 stations throughout Southern California, and Amtrak both have stops there. Metropolitan Transportation Authority bus routes from the airport go to downtown Los Angeles and the San Fernando Valley. Burbank Bus covers various points throughout Burbank and connects with the Red Line subway system at North Hollywood Metro Station, which goes to Hollywood and downtown Los Angeles.

"We're not the center of Los Angeles, we're the center of everything L.A.," Feger likes to quip.

The airport's location — near Los Angeles, but on notably stable ground — is also a strategic place for first responders to converge if a major earthquake hits Southern California. That's why BUR's new intermodal center was engineered to not just survive, but also remain operational, after a very large major seismic event.

In short, there are few other facilities in the United States like BUR's new Regional Intermodal Transportation Center.

What's Inside

The new 520,000-square-foot structure includes a three-level consolidated rental car facility, a customer service building for 11 car rental companies and a bus transit station. Passengers get to and from the multi-purpose center via a covered, elevated walkway that spans the 1,200-foot distance to the terminal — and eliminates the need for shuttle buses.

Overall, the center is the largest capital project ever undertaken by the Burbank-Glendale-Pasadena Airport Authority.

The Bob Hope Airport Train Station, which is served by Amtrak and Metrolink, is directly across the street. Funding to begin the design of a pedestrian bridge connecting the train station and intermodal center was recently authorized by the Metropolitan Transportation Authority and announced at intermodal center's grand opening in late June.

A new five-level parking structure located between the terminal and intermodal center replaces about 1,050 parking spaces that were displaced by the intermodal center and elevated walkway.

Two Birds, One Stone

Two primary factors prompted the intermodal center project, explains Feger: the partial intrusion into the runway safety area by the former rental car ready/return lot and a lack of parking at the airport train station.

With construction of a new consolidated rental car facility inside the intermodal center, BUR is now able to comply with the Congressional mandate for Part 139 airports to improve their runway safety areas by 2015. Previously, FAA had determined (and the airport authority concurred) that it was impractical to construct a full runway safety area at BUR because of nearby urban development and high improvement costs. In order to meet the 2015 deadline of improving BUR's runway safety area "to the maximum extent practical," the Burbank-Glendale-Pasadena Airport Authority directed the airport to move its rental car facility somewhere else, despite prevailing space constraints.

Looking for solutions, the airport approached the city of Burbank. In addition to reviewing the requirement to move its rental car facility, it addressed the need to improve access to the train station and shared thoughts about addressing the two issues in one integrated facility.

The city, in turn, advised the airport that it had grant funding and an available site to build a bus station near the airport, but not immediately near the train station. Instead of building there, though, the city offered its grant to the airport authority, so BUR could incorporate a bus station into the rental car facility it planned to build near the train station. With the support of Congressman Brad Sherman, grant funds in the amount of $1.171 million (including a required 20% local match) were obtained through two federal transportation grant processes, administered by the Federal Transit Administration, in 2004 and 2005.

Because the people using the elevated moving walkway would primarily be airport passengers going to and from the terminal, FAA approved the use of more than $16 million in passenger facility charges to build it.

When the airport received initial construction bids for the intermodal/rental car center in May 2011, they exceeded available funding by $47 million. As a result, designers scaled back original

plans for the building by one full level and moved the third-floor bus transit center to ground level.

The airport authority financed the project through multiple sources, including general airport revenue bonds, passenger facility charges, customer facility charges, federal grants, Los Angeles County Metropolitan Transportation Authority grants and airport authority funds.

Executing $112 million of design and construction with so many different funding sources proved to be the project's biggest challenge, notes Feger. Each of the principal U.S. Department of Transportation agencies involved — the Federal Transit Administration, Federal Highway Administration and FAA — awards grants on a "funding silo" approach, he explains. Grants they disperse can only be used for their respective sphere of "modal influence" and responsibility. Highway grants, for instance, can only be used for roadways or access to other modes of transportation via roadways. Federal transit grants are primarily for bus and rail projects; and the FAA has very strict rules about using airport-derived revenue for off-airport purposes.

"The challenge was trying to find funding sources that do not step on each other or prevent an intermodal facility serving all modes of transportation from being built and improving connectivity," relates Feger. "We're hopeful that over time, the U.S. DOT will make intermodal projects easier to do; and it may take an act of Congress to make it happen. In fact, a recent report by the General Accountability Office highlighted the need for a new federal policy approach to facilitate plane-to-train linkages. That's probably one of the things that the industry should be looking at."

Ready for "The Big One"

The airport authority set high seismic standards for its new intermodal center and contracted Miyamoto International, an earthquake and structural engineering specialty firm, to realize them.


Kit **Miyamoto**

"A place like an airport needs to be operational following a major earthquake event," notes the company's chief executive officer, Kit Miyamoto, Ph.D. "The airport is an important hub for emergency response and reconstruction."

A facility that meets International Building Code requirements for earthquakes provides minimum life safety protection, but the building itself may not be useable or repairable after a large earthquake, Miyamoto explains. That's why his firm used a "better-than-code" approach for BUR's new transit facility.

The Regional Intermodal Transportation Center is designed to withstand a maximum credible earthquake — the largest earthquake capable of occurring under the known tectonic framework for a specific fault or seismic source, based on geologic and seismologic data. Also known as "the big one," it has a probability of occurring once every 2,500 years. International Building Code addresses earthquakes with an occurrence interval of once every 450 years. Earthquakes that have a higher probability of happening typically have less magnitude and ground movement.

The intermodal center at BUR includes more than 100 triple-pendulum-bearing isolators — modern devices based on a decades-old engineering technique, notes Miyamoto. Buildings constructed directly on the ground move with an earthquake's jarring motion and often sustain extensive damage as a result, he explains. When a building is constructed away (or isolated) from the ground using base isolator technology, it is effectively decoupled from the ground and will move less or not at all during an earthquake. The isolators essentially act as rollers, Miyamoto explains: Before the force from the ground reaches the building structure, it is reduced in the isolators due to friction that occurs there. To see a video illustrating the technology, go to https://www.youtube.com/watch?v=hETZfGSlOKU.

In addition to using seismic technology, BUR benefits by the location of its runways. Because they lie on ancient riverbeds, where the water table is more than 250 feet below surface, liquefaction and runway breakup are unlikely to occur during an earthquake, explains Miyamoto.

After an earthquake, BUR officials are counting on the new intermodal center to sustain airport operations and serve as a disaster command center for the California Emergency Management Agency, Federal Emergency Management Agency, local responders and others.

Airport Police Chief Ed Skvarna details why the plan makes sense: "In a catastrophic earthquake, all the major overpasses will probably go down, so you won't be able to take people in or out by roads. A lot of the evacuation of injured people and a lot of the delivery of emergency supplies are going to have to be done by air. That will make this airport very integral to that response."


Ed **Skvarna**

Emergency command post vehicles can be kept under cover on the first floor, and the center's backup generators will provide emergency power, he continues.

The new intermodal center at Bob Hope Airport is designed to remain operational after a major earthquake.

BUR's new beyond-code building could also potentially be used in other mass emergencies— functioning as a medicine distribution facility during an anthrax event, for instance. Its primary backup mission, though, is to serve as a massing point for earthquake first responders, advises Skvarna.

More Moves Ahead

Access to and from BUR remains a priority for airport officials, as they continue trying to build a new passenger terminal. Built in 1930, the existing facility has simply outlived its usefulness, says Feger. In particular, it's too close to the runway and doesn't meet modern earthquake standards, he specifies.

Selecting a site for a replacement terminal has become a long-term frustration — for the airport authority, which owns and operates the airport, and the city of Burbank, which has jurisdiction over most of the airport area. In two decades, the two entities have yet to reach consensus about how to build a modern terminal able to serve current and future traffic, while protecting city residents from potential noise and traffic increases. When the existing terminal was built more than 80 years ago, the surrounding area was not completely developed, as it is today.

With the airport authority agreeing to build only 14 gates (the same amount that's in the current facility), Feger detects a positive change in community sentiment regarding a new terminal. The authority is consequently in the process of seeking approval from the city of Burbank to build a replacement terminal in the northeast corner of the airport, next to the main runway.

If the project is approved, BUR plans to use about half of the 100 acres it purchased from Lockheed Martin, when the aerospace/defense giant left Burbank. Interestingly, Lockheed owned the entire airport from 1940 to 1978, until the current multi-city airport authority purchased it.

Like the existing facility, the new passenger terminal will be intermodally connected. In early 2015, Metrolink plans to open a new station that stops at the north side of the airport, which will become the anchor for transportation connectivity to the new terminal building. Feger and other officials expect the new train line to be popular with passengers, since it will serve growing communities such as Palmdale, Lancaster and Santa Clarita.

Because the new Metrolink station will be located farther from the current airport terminal, BUR will provide buses that coordinate with the train schedules until the new airport terminal is built.

As BUR continues improving access to rail and bus lines, airport officials hope to encourage more passengers to forgo their cars for public transportation, Feger notes. Currently, the airport authority is researching a variety of options with an FAA grant that was secured decades ago but never "de-obligated." Strategies being investigated include adding new bus and rail service, modifying current bus connections and extending an existing subway connection to the airport.

Spurring Change

Like many of his executive peers, Feger believes that airports can be powerful catalysts for redeveloping entire areas and regions. He cites the intermodal center that opened at BUR this summer as a prime example.

When reciting the familiar rationale about connectivity and access breeding commercial development, Feger emphasizes BUR's role as a catalyst rather than a sponsor or underwriter. "This is not something the airport does directly out of its own coffers, because it does not have the charter to do so," he stresses.

With redevelopment needed in many U.S. markets, Feger hopes that fellow airport directors will help create commercial momentum in their own backyards. "We believe more airports need to take on the role as a catalyst," he relates. "You can't just sit back and hope that others will fix the access problem … Competition is very high for a limited number of dollars."

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Tampa Int'l Uses Technology Trifecta to Predict Checkpoint Wait Times

By Nicole **Nelson**

Tampa International Airport

factsfigures

Project: Predicting Security Checkpoint Wait Times

Location: Tampa (FL) Int'l Airport

Technologies Used: Bluetooth & barcode tracking; thermal detection

Vendors: Com-Net Software; SITA

Testing: 2 yrs; 2,500+ performance checks

Expected Public Launch: 3rd quarter 2014

Delivery: Estimated wait times will be communicated to passengers on flight information displays

Inspiration can strike anywhere, anytime — *if* you're paying attention.

Joe **Lopano**

An idea for improving customer service (and possibly increasing concession revenue) came to Joe Lopano, chief executive officer of Tampa International Airport (TPA), while eating lunch with his son.

The two were dining on TPA's main transfer level before catching a flight, when Lopano began wondering if they had time for a slice of pie. He knew how long to allow for the shuttle ride to their gate; but the amount of time needed to clear security was not nearly as clear.

To be safe, they skipped dessert. And Lopano later consulted Doug Wycoff, the airport's manager of innovation and infrastructure support, about developing a system to quantify the unknown, but highly relevant, detail of checkpoint wait times.

Because TPA's four airside areas are separated from its main terminal by a train ride, passengers don't get any visual clues about the length or pace of TSA screening lines until well after they've left the landside terminal. But that will soon be irrelevant. Later this year, the airport plans to begin posting estimated checkpoint wait times on flight information displays throughout the terminal.

"When our customers are shopping or eating in our main terminal, our desire is to get them as much information as possible," says Wycoff. It's important for passengers to know whether they need to get going immediately or they have time to spare, he explains: "We are trying to keep them in our main terminal as long as possible while still making them comfortable."

A multi-tiered system that uses thermal detection, barcode tracking and Bluetooth technology will calculate the checkpoint wait times.

Developing the Solution

The challenge of estimating how long it will take passengers to clear security initially prompted the airport to use Bluetooth technology. Com-Net Software and SITA, two of the airport's existing contractors, were able to glean real-time queue data by tracking passengers with Bluetooth-enabled devices such as cellphones and iPads.

SITA Senior Product Manager Kevin Peterson compares the approach to using an electronic stopwatch. The stopwatch starts when a passenger carrying a Bluetooth-enabled device passes through the landside checkpoint; it stops when the same passenger exits the security area. The difference is calculated, and an average wait time is determined with the help of additional bits of intelligence, explains Peterson.

The address of each mobile device is translated into a unique tracking number to keep customer information truly anonymous, he adds.

While the method has its merits, TPA personnel soon realized it wasn't providing enough information. "Bluetooth in itself doesn't give you a high enough hit rate," Wycoff explains, noting that only 5% of passengers enable their devices' Bluetooth capability at the airport. "Also, we didn't know what the wait time was until *after* the passenger had left the checkpoint."

To provide meaningful predictive information, TPA needed to measure the volume of passengers approaching its checkpoints as well as the amount of time it took to pass through them.

Wycoff again conferred with Com-Net and SITA, and the airport ultimately entered into a two-year pilot using customized versions of SITA's proprietary core products: Airport iQueue, Airport iTrack and Airport iValidate. Together, the products measure and predict checkpoint wait times by combining Bluetooth and barcode tracking with separate validation technologies.

Tracking passengers via barcodes on their boarding passes is a key element in the trio of integrated technologies. Because every passenger carries a boarding pass pre- and post-security, TPA's data yield increased exponentially.

"We needed more consistency on the hit rate, so we added (technology) that counts the number of passengers from the time they enter our shuttle lobby to the time they exit the back side of the TSA scanning equipment," Wycoff explains. "When you take that in conjunction with the Bluetooth-measured data to validate the predicted wait times, it allows you to manage high volumes of traffic and still provide accurate timeframes, because we know they are coming."

Temperature Check

Jeff **Collins**

Data is captured at multiple points between the train's boarding platform and the area where passengers put their shoes back on after clearing security, notes Com-Net Sales Manager Jeff Collins.

"Tampa is a unique situation, because the current wait times through the security checkpoints are highly dependent on the number of passengers on the shuttles, not just the travel time on the shuttle, thereby rendering the use of historical wait time data somewhat irrelevant," Collins explains. "To accurately estimate current wait times, an alternative passenger volume-based approach was required."

Generating information that would predict rather than record wait times requires a multi-step, multi-technology approach. In addition to counting passengers by scanning the barcodes on their boarding passes at document inspection stations, TPA also uses thermal "people counters" that detect passengers' body heat. After cross-referencing passenger counts collected by the different technologies, algorithms predict wait times based on how many people are in and approaching a checkpoint at any given time.

"The primary technology in determining wait times is people counts, but since thermal people counter technology is (only) 95% to 98% accurate, Bluetooth comes in as a re-sync mechanism," explains SITA's Peterson.

Last year, the airport ran more than 2,500 tests to ensure the integrity and performance of the system's results, reports Wycoff.

"We didn't want to expose ourselves to error," he relates. "We have worked on it for a couple years now, and we feel like we are reaching a point where we are very comfortable."

Currently, the system is monitored through TPA's network operation center, and officials are satisfied with its performance, Wycoff notes. Upon full deployment, the airport plans to pass wait time information from the system to Com-Net for dissemination to customers on flight information display system monitors.

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Events on Approach

Event	Destination	Date
Public Safety & Security Fall Conference	Arlington, VA	October 6 – 9, 2014
International Aviation Issues Seminar	Washington, D.C.	December 4 – 5, 2014
Customer Service Seminar	Reno, NV	January 27 – 29, 2015
CEO Forum & Winter Board Meeting	Sarasota, FL	February 3 – 6, 2015
Business Information Technology Conference	Vancouver, BC	March 22 – 25, 2015
Environmental Affairs Conference	Vancouver, BC	March 22 – 25, 2015
Public Safety & Security Spring Conference	Vancouver, BC	March 22 – 25, 2015
Operations & Technical Affairs Conference	Vancouver, BC	March 22 – 25, 2015
CAC Annual Conference	Vancouver, BC	March 25 – 27, 2015

Easing Travel Stress for Children with Autism

By Kristin Vanderhey **Shaw**

factsfigures

Project: Airport orientation for children & young adults with autism

Location: Minneapolis-St. Paul Int'l Airport

Program: Navigating Autism

Strategy: Provide tours & practice clearing security, boarding aircraft, etc. *before* actual travel

Program Frequency: Once per month, year round

Families Served: 10-12/month

Partners: TSA, Fraser Institute, Autism Society of Minnesota, Delta Air Lines, Southwest Airlines, OTG, Host

Project: Travel preparedness course for children with autism

Location: Boston Logan Int'l Airport

Program: Wings for Autism

Strategy: Allow families to practice airport/airline processes — twice

Program Frequency: Twice yearly (in April and Nov.)

Families Served: 1,000+

Developing Partners: Charles River Center; JetBlue Airways; Massport; TSA

Exciting as it is, air travel is also often stressful for kids. Disruptions to regular sleep schedules and unfamiliar food can turn cheerful children cranky in no time. For those with autism, though, an airplane trip can become downright traumatic.

Difficulties may begin long before takeoff — at the airport, where bright, flashing displays and a cacophony of flight announcements and unrelenting ambient noise bombard an autistic child's senses while waves of impatient adults jostle anyone in their paths. With too many variables up the air (literally and figuratively), a long-awaited trip can become memorable for all the wrong reasons.

Some airports, however, are helping children and young adults with autism address their fears and uncertainties about air travel *before* their trips. To date, several U.S. airports have well-established programs that help prepare them for what to expect; and Montreal-Trudeau International Airport launched the first such Canadian event in April.

There's also a non-profit organization that offers its proven program to any interested airport (see sidebar on Page 70 for more details).

Thanks to a variety of these programs, families and airport staff alike are seeing how much it can help children with autism to tour their local airport and practice various travel processes (check-in, security screenings, boarding, etc.). With the most likely challenges addressed in advance, more and more family trips are getting off to a great start.

Navigating Autism

Minneapolis-St. Paul International Airport (MSP) offers its preparedness program — Navigating Autism — once per month on Saturday afternoons, when airport traffic is typically lightest. One week before the event, families that registered for the program receive tickets and directions to a designated parking lot, where they park for free and meet a program volunteer who brings them to the terminal. Participants receive security passes and are introduced to the TSA screening process in the family lane at the airport's Checkpoint 6. Families are encouraged to bring carry-on bags and anything else that helps simulate their real travel process as closely as possible. Next, volunteers lead each family on a custom tour of the airport based on their particular needs — families with young children often like to see play areas, while those with teenagers may be more interested in restaurant choices.

Delta supports MSP's Navigating Autism program with both aircraft and volunteer crew members.

After the tours, participants are welcomed at the gate by a uniformed gate agent and practice handing over their tickets and boarding a plane. Inside, a flight attendant greets the participants, waits until everyone is seated, and presents the standard safety demonstration. Airline volunteers do everything but start up the engines — much to the disappointment of some participants.


Shelly **Lopez**

Shelly Lopez, MSP's administrative and emergency programs coordinator, was the driving force behind launching the program in 2013. After hearing about a fledgling program at another airport, Lopez pitched the idea to Steve Wareham, her boss at the time, who encouraged her to start a program at MSP.

Building off the airport's existing practice of providing airport tours on a case-by-case basis, Lopez sought clinical guidance for a more comprehensive program from the Autism Society of Minnesota and Fraser Institute, a Twin Cities nonprofit that serves people with autism. Delta Air Lines, MSP's dominant hub carrier, enthusiastically agreed to help and provided access to airplanes, so families could experience boarding and pre-flight procedures.

"I was floored to discover how many parents weren't flying, because they were afraid their kids would not be able to handle it," recalls Wareham, who now works as a consultant with Trillion. "I had seen *Rain Man*, in which Dustin Hoffman's character refused to get on a plane, and I knew this program would be helpful for so many."


Rich **Kargel**

Rich Kargel, a first officer for Delta and father of a son with autism, was quick to offer his unique qualifications when he read about the program's trial run in an employee newsletter. "I thought it was a great idea," recalls Kargel. "We travel extensively with our son, and we realize there are some serious challenges. If I could help from a pilot's perspective, a father's perspective, and a Delta employee's perspective, I thought that would be worthwhile."

Even though Kargel is based in New York, he has been the point pilot for Navigating Autism since its inception and often engineers his schedule so he can talk to parents and their kids during MSP's Saturday programs.

Dawn Brasch, education and training specialist for the Autism Society of Minnesota and mother of a child with autism, led efforts to create the training program for the volunteers, airport employees, and TSA officers at MSP. Brasch and her staff continually tweak procedures and strategies in an effort to create the best possible experience for participating families. For example, they discovered it was very important to tell, and then remind, the children that they are *not* actually traveling anywhere on their training day. They also learned to be very careful about visits to the cockpit, so participants don't expect one on every flight. In any case, families are thankful for a chance to acclimate to the airport environment and practice various steps needed for air travel, notes Brasch.

"Some parents think they might not ever be able to take their child on a plane," she relates. "I know I was terrified for years, because you don't know how they're going to react. An airport can be sensory overload, so knowing where the quiet areas are located is helpful. Parents and caregivers need to know everything they can to give the child relief. It takes so much stress off the family."

Practicing Trust

One of the most difficult challenges for some children is giving up a favorite toy or comfort object at the security checkpoint. Many assume that if they allow a beloved item to be loaded into an ominous-looking X-ray machine, it will be gone forever. Practicing the process, however, gives them a chance to see how it really works.

Minneapolis-St. Paul Int'l offers a program that allows children with autism to clear security at their own pace.

"Once, it took a child 40 minutes to put his toy car on the belt," Brasch recalls. "When it came to the day of the real trip, he was ready and he understood."

The MSP training program also teaches volunteers to tell families that contrary to some advice, boarding the airplane first isn't always best. Some children with autism may be better served remaining physically active for as long as possible and boarding last.

Chris Bentley, head of training development at the Fraser Institute, also helped develop the program and now market it to the local community. Fraser provides a range of support for children, adolescents, adults and families, including autism evaluations and services. Bentley or one of her staff personally participates in each session at MSP, offering help with logistical challenges or families who need extra support.

"For some families, they know that they have some travel coming up, and it helps them work through the logistics of what might be a challenge, what to prepare for," she notes. "The volunteers have tons of tips that are helpful, and it opens up the opportunity to travel."

The amount of behind-the-scenes effort required for each event would surprise most

Opening the Door to Air Travel (& Perhaps the World)

Airports interested in helping accommodate young passengers with autism don't have to create their own preparatory programs from scratch. Open Doors, a non-profit organization dedicated to helping people with various types of disabilities enjoy travel and tourism, offers its proven program — Autism Inclusion Resources (AIR) — for duplication throughout the industry.

Currently, four U.S. airports are scheduled to run the program before the end of the year: Los Angeles International, Newark Liberty International, O'Hare International and San Francisco International.

Open Doors Executive Director Eric Lipp hopes that list will soon be much longer. "All an airport has to do is call us to get started," says Lipp, noting that the format and curriculum were specifically designed to be repeatable. "We want this program anywhere and everywhere."

The program, created in 2008 by Founder/Director Dr. Wendy Ross, pairs a local clinician with each participating family. The 2½-hour program starts at ticketing and brings the family through security and boarding, all the way to the gate and onto the plane — thus allowing children with autism to get familiar with the airport environment and practice key steps in the travel process. Participants are asked to bring packed bags — including liquids separated from their carry-ons — to simulate real travel as much as possible.

Ross was named a 2014 CNN Hero for the innovative program, which seems to have inspired similar efforts by individual airports.

Currently, AIR partners with United Airlines to provide aircraft for events scheduled through the end of the year; but Lipp notes that any airline and any airport can participate. It's a model that can, and should, be replicated throughout the United States, he emphasizes.

Lipp estimates the cost for airports to offer the program at $1,000 to $1,500. "The largest cost is time," he relates. "Open Doors pays for parking for the families, and we pay for the clinicians. We want this to be as easy as possible for anyone to implement."

For more information, visit www.opendoorsnfp.org.

The chance to practice boarding an aircraft often helps alleviate fear for children with autism.

families that participate. "While the tours are taking place, the pilot is finding a Delta plane that is going to be sitting for a couple of hours," Lopez explains. "The plane and the gate are available at the last minute."

Other airlines also help, but they simply don't have as many planes available at MSP as Delta. Lopez cites Southwest as an example: "When possible, they will load a family (from the program) who is planning to fly Southwest quickly, before a flight is boarded for its next destination."

According to Wareham, airline participation is critical. "Actually having a pilot and flight attendant in uniform spend their time with the kids — that is key," he emphasizes.

When MSP's program is complete, families are escorted back through the airport by their assigned volunteers, and receive bags stuffed with gifts from airport tenants including OTG, Host and McDonald's. Participants also take home instructional packets that help parents and caregivers repeatedly role-play and rehearse travel processes with their children until just before their actual travel dates. In addition, they receive a "social story" — a written document with pictures and easy-to-understand sentences that outlines travel processes as closely as possible.

Grateful Customers

Parents who have taken part in MSP's Navigating Autism program are effusive in their praise.

"Our son really struggles with new experiences, and I feel like the pace was set to what he was comfortable with and the explanations along the way were great," wrote one parent. "I didn't expect to experience so many things about the airport (actually riding on the tram, seeing the observation deck, locating the quiet places around the airport) and all of the details made us so much more confident about traveling in the future."

Another parent mentioned how helpful it was for the program to include service animals and stressed its overall emotional value: "The crew, TSA, volunteers … everyone was so accommodating and seemed to understand what my son's issue was. It was comforting to know we could go through a program like this and not be judged."

Lopez often hears from appreciative participants after they return from successful trips. “Family after family tells me, ‘Now we can fly’,” she relates. “The program has really paid off.“

“It’s so worth it to volunteer for this program,” adds Kargel. “Every now and then, a family gets off the airplane, and the parents’ eyes well up, saying that they never thought they would be able to travel via plane … We’re helping dreams come true. “

Wings for Autism

Three years ago, Boston Logan International Airport (BOS) teamed up with TSA, JetBlue Airways and the Charles River Center (a local autism support organization) to launch a twice-yearly program called Wings for Autism. Since then, Massport has held six Wings for Autism events, benefiting more than 1,000 attendees.

Like MSP’s program, Wings for Autism provides tours of the terminal, practice with basic airport procedures, etc. But the program at BOS also adds the element of repetition, an important teaching element for children with autism.

“We offer two practice runs,” explains Brad Martin, deputy director of Aviation Customer Service. “The more repetitiveness for the children, the more comfortable they are.”

The program at BOS was inspired by a family with two children – one with autism – that contacted the Charles River Center, relates Martin. “(They had) to cancel a vacation to Disney when the child with autism had a meltdown at the airport and they were unable to board the plane,” he explains. “A few months later, we put together Wings for Autism with the Charles River Center to address the need, and it has been a huge success. It’s a great community effort at Logan.”

Nearly every domestic airline at BOS has supported the program with staff and/or aircraft, he adds. Often, flight attendants based elsewhere fly to BOS so they can volunteer for the April and November sessions. Once, Delta Air Lines flew in an empty aircraft when another plane couldn’t be scheduled on the ground, Martin relates.

Despite heart-wrenching appreciation from attendees, BOS continues to work on improving the program and building awareness for the issue it addresses. Martin looks forward to a time when airport and TSA staff immediately notice when a passenger is wearing a Wings for Autism sticker and adjust their approach. “They will know there is a ‘handle with care’ message attached to the sticker,” he explains. “That’s our goal.”

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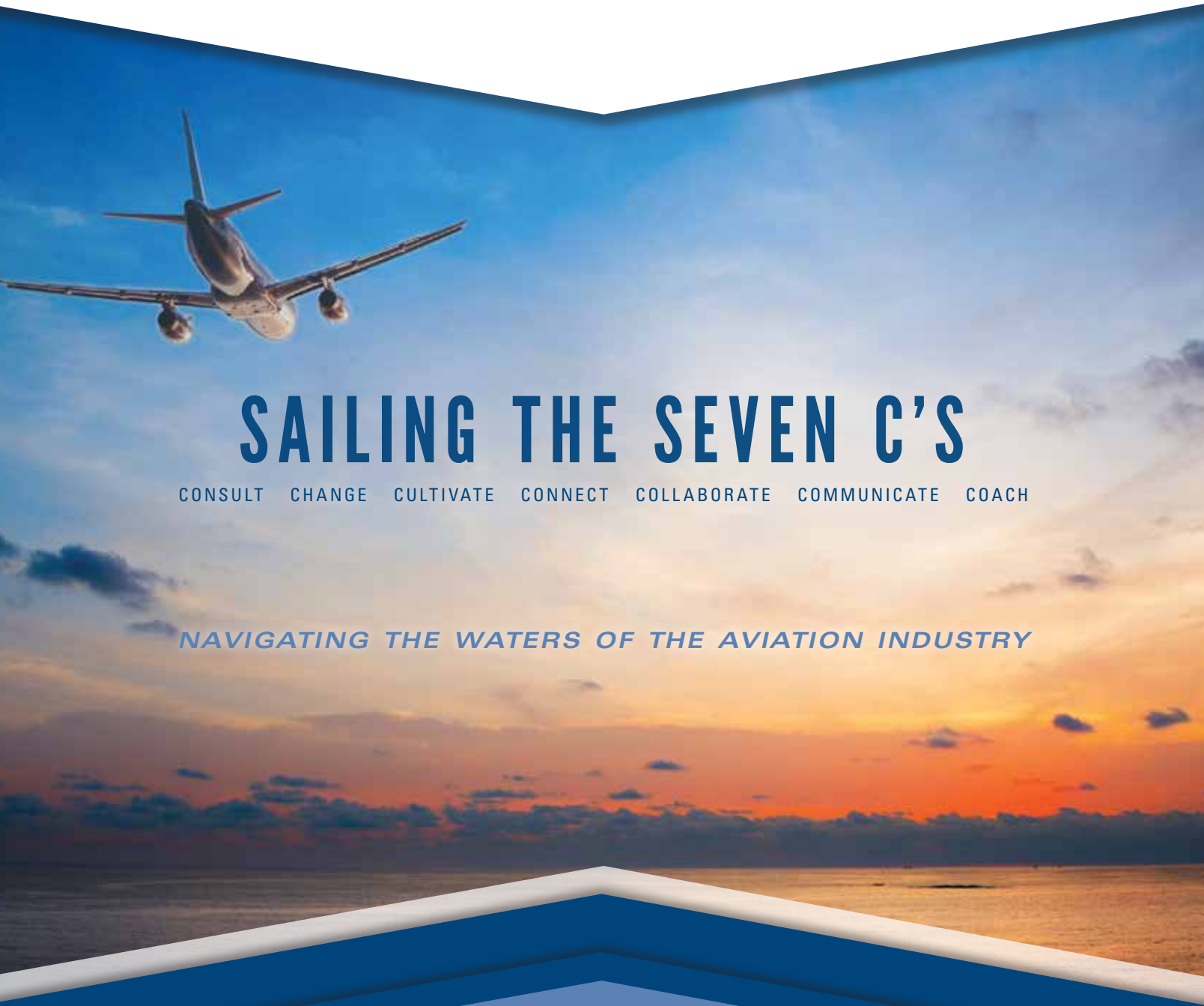

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Winning the Airport Waiting Game

Craig Richmond

Craig Richmond is president and chief executive office of Vancouver Airport Authority, the operating authority of Vancouver International Airport (YVR). Skytrax's annual passenger survey recently named YVR the Best Airport in North America for the fifth consecutive year. Under Richmond's leadership, YVR continues to focus on innovation, sustainability and teamwork.

We are a population that hates to wait. In fact, the age-old notion of "waiting your turn" has taken on associations of inefficiency and incompetence.

The demand for instantaneous results is one of the single biggest challenges facing the transportation business – where there will *always* be elements beyond our control. Customers expect more out of their air travel experience than ever before. And while there is more technology innovation available to meet these increasingly complex demands, even the briefest application error adversely affects customer loyalty.

So how can we, as airport operators, gain an edge in an increasingly difficult waiting game?

Prioritizing Passenger Experience

International airports, major airlines and airport authorities across North America have begun to see enormous potential in improving the overall passenger experience. In 2009, Vancouver Airport Authority, the not-for-profit organization that manages Vancouver International Airport (YVR), set out to discover our biggest areas of inefficiency and congestion and analyze how they were affecting the airport experience.

Following an in-depth analysis of passenger flow and bottleneck points, we discovered that the border clearance process required a significant amount of time and personnel. Furthermore, it wasn't producing very good results. What followed was a series of business decisions made with our international passengers and U.S. counterparts in mind.

Beyond the Border

We initially designed a self-service border solution for use only at YVR. We expected a faster process for Canadian residents returning to Canada. The response was swift and dramatic: Reports from the front lines indicated that foreign travelers also benefited, thanks to overall shortened lines. Within just a few months of installing the kiosks at YVR, our airport was in compliance with the International Civil Aviation Organization's target to process 95% of arriving international passengers in 20 minutes or less.

That success quickly led to the development of a self-service solution for U.S. and Canadian passport holders arriving into the United States. BorderXpress is our Automated Passport Control system for U.S. Customs and Border Protection. The idea that the Customs waiting game could, in fact, be won at home and abroad was a story we wanted to tell, and U.S. airports — 13 to date — have taken notice.

Early adopters reported significant competitive advantage and happier international travelers. In the first 40 days of operation, passengers using the kiosks at Chicago O'Hare took an average of just four minutes to proceed through Customs, while non-kiosk users spent 38 minutes. In addition, peak wait times were reduced by 33% for all passengers. Compared to 2012, waits of more than 60 minutes were reduced by 58% overall, and missed connections were reduced by 62%.

Strategizing for the Future

Weighing the financial implications of technology purchases against airport needs will continue to be a difficult task for airport operators. But as consumer adoption of technology grows exponentially and consumer expectations for a pleasurable travel experience continue to increase, there is opportunity for airports to simultaneously improve their bottom lines *and* our industry's reputation.

The opportunities to use technology to improve the entire passenger lifecycle are limitless, and the time to act collectively to end the airport waiting game has arrived.

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