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8 Salt Lake City Int'l Constructs 21st Century Terminal



18 Baggage Handling Takes Center Stage at Salt Lake City Int'l



24 Huntsville Int'l Completes Comprehensive Security Upgrade



30 Regina Int'l Boosts Concessions Sales With Interim Renovations



PHOTO: FRANCIS ZERA

36 Paine Field Saves Time & Money by Fast-Tracking Ramp Repairs



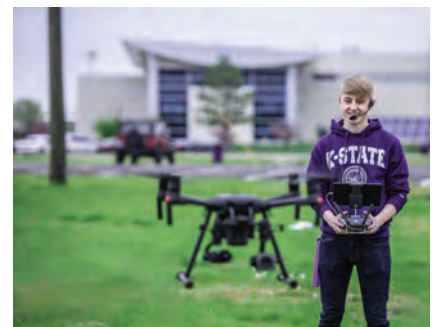
40 New Concourse Positions Eagle County Regional Airport for Growth



46 Dulles Int'l Adds Separate Pickup Area for TNC Traffic



50 Improvements to Bulk Fuel Farm at JFK Int'l Include First New Tanks in Almost 50 Years



54 Symbiotic Relationship With State University Helps Propel Salina Regional Into the Future



We're Not Sure if We're Bragging or if We're Just That Proud

Brownsville, Texas has a brand new airport terminal designed for 21st century aviation. There are a lot of words that come to mind when describing the state-of-the-art terminal, like unique, stylish, classy, and artistic. For those of us who are fortunate to call Brownsville home, we use words like outstanding, wow, and proud to describe how we feel about our new terminal.

To the people of Brownsville and surrounding communities it's more than a 91,000 square foot, 50-million-dollar terminal. It's our way of saying, "Welcome to Brownsville / South Padre Island Texas." The airport is here to enhance your journey and make you feel welcomed.

The design is user-friendly and modular and includes technology such as biometric and integrated systems for efficient operations and administration. It's engineered with additional comforts such as auto-tinted glass for temperature and energy control and intuitive wayfinding for an improved passenger experience. It's the most contemporary and advanced airport in South Texas.

So we're not sure if we're bragging or just smiling with pride.

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56 Central Nebraska Regional Builds New ARFF Station for New Fire Truck



64 Collaboration, Flexibility Help Sacramento Int'l Meet Critical Deadline to Reopen Key Runway



60 Fitchburg Municipal Courts Bizjets With Longer Runway & 24/7 Fuel

columns

Publisher's Column 7
Let's Not Get Ahead of Ourselves

Artscapes 68
COVID-friendly artwork at San Diego Int'l

Industry Insider 70
A candid account of how the pandemic is affecting a medium-size Canadian airport

advertiserindex

ACI-NA	32	Chrysalis	13	Mead & Hunt	44
ADB Safegate	11	Confluence Solutions	23	NASi	35
Aerosweep	21	Daktronics	14	Neubert	29
AGATI	19	Delta Airport Consultants	61	Park Assist	15
Airport Improvement	29	eezeetags	17	Pond & Company	25
Airport Seating Alliance	27	Ennis-Flint	33	RS&H	10
Argus Consulting	52	Ex-Cell Kaiser	10	Regal Beloit	20
Arora	12	Ford AV	16	Ross & Baruzzini	28
Asphalt Systems	66	Fullfab	62	Schwarze	59
AutoGate	27	Gensler	42	SEW	BC
AVCON	63	Hog Technologies	7	Sherwin Industries	45
Aviramp	22	ITW GSE	69	Team Eagle	38, 39
Baker	26	Kimley-Horn	34	The JW Group	12
Becker 505	53	Larue	65	Twist Aero	6
Brownsville South Padre Int'l Airport	4	Lavi	43	Tymetal	57
BYD	71	Leonardo/Selex ES Inc.	67	VidTroniX	16
Chief Buildings	58	MAG USA	2	WSP	49



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Let's Not Get Ahead of Ourselves

Over the past few weeks, we've received many press releases from airports announcing the start of projects. In this pandemic-filled year, this is very gratifying to see. What strikes me, however, is what *else* airport leaders say in these releases. When justifying the need for their projects, airports reference pre-pandemic passenger levels. They acknowledge the 2020 numbers, but most assume that the long-term traffic growth that previously existed will return.

Yes, the pandemic elephant is in the room, and everyone sees it. But airport leaders also remember the consistent growth our industry has experienced over the last few decades. That overall upward trajectory still drives the need to prepare for the future.

What *isn't* helping is all of the assistance/insistence (I say this tongue-in-cheek) from those who feel that today's highly usual

circumstances will continue forever—that what we currently see is the “new normal.” Tomorrow's world—and airports—will not require masks, temperature checks, social distancing and hospital-style cleaning/disinfecting. So, we shouldn't build new facilities or retool existing terminals as if they will.

There's a natural tendency to offer solutions. It's good for sales and business, and, frankly, it makes for good copy from members of my own profession. However, we need to keep the big picture in mind.

We don't need to exponentially expand the typical airport footprint to satisfy the current need for extra physical distance. And we don't need to completely reinvent passenger lounges, baggage claims, concessions, security checkpoints and other key areas. That would just create a future with wasted space and spent budgets.

Don't get me wrong. Of course we need to take the necessary precautions to safeguard our facilities, employees and passengers while COVID-19 is still raging. I'm a huge proponent of masks, social distancing, hand washing, Plexiglas barriers, touchless technology, etc. But this is a temporary hump we need to navigate. What we *really* need to do is prepare for the day when this pandemic is behind us, and the industry as a whole faces record levels of passenger traffic. Naturally, I can't give you a specific date when that will happen, but I don't want to see us squander our limited resources in the meantime.

Cheers,

Paul



PAUL BOWERS, PUBLISHER



#1

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Salt Lake City Int'l Constructs 21st Century Terminal

BY JODI RICHARDS



In mid-September, Salt Lake City International (SLC) unveiled the first phase of its \$4.1 billion redevelopment project, a comprehensive series of much-needed operational and aesthetic upgrades throughout the entire airport. Last year, SLC served 26 million passengers in facilities designed 50 years ago to handle just 10 million passengers.

Airports Director Bill Wyatt explains that the redevelopment program is creating a “new SLC” that meets the needs of 21st century passengers with an efficient and functional facility. It was also very important for the new facilities to reflect the feel and culture of Salt Lake City and Utah.



BILL WYATT

“Because we’re a hub, many people who use the airport don’t actually set foot outside,” says Wyatt. “We want passengers to

know where they are, and the airport to look like the surrounding environment.”

The long-term project is replacing three aging terminals with a single central terminal that contains four concourses.

Key elements of Phase 1 include:

- a new 908,754-square-foot terminal with separate check-in areas on two levels;
- two new linear concourses, one solely occupied by Delta Air Lines and another shared by six other carriers;
- a 3,600-stall garage with visitor parking and rental car facilities;
- a new elevated roadway for departures traffic; and
- a new central utility plant.

Phase 2, which is currently in the works, includes the completion of the new concourses A and B and construction of a pedestrian



PHOTO: SALT LAKE CITY INT'L AIRPORT

FACTS&FIGURES

Project: Comprehensive Redevelopment Program

Location: Salt Lake City Int'l Airport

Cost: \$4.1 billion

Funding: Airport reserves; airport revenue bonds; passenger & customer facility charges; Airport Improvement Program funds (baggage handling system)

New Terminal: 908,754 sq. ft.

Timeline: Phase 1 opened Sept. 15, 2020; Phase 2 is slated to open in 2024 or 2025

Architect: HOK

Civil Engineers: HNTB

Electrical Engineers: HOK; Envision Engineering

Mechanical Engineers: HOK; Colvin Engineering

Structural Engineers: HOK; Reaveley Engineers + Associates; Dunn Associates

Interior Design: HOK

Consulting Artist: Gordon Huether

Concourse B Construction: Austin Commercial-Oakland Construction Joint Venture

Construction of Central Terminal, Concourse A, Car Rental Facilities, Central Utility Plant, Parking Garage & Economy Lot, Elevated Roadway, Connector Tunnel: Holder-Big D—A Construction Joint Venture

Airfield Paving: Holder-Big D—A Construction Joint Venture

Integrated Systems Project Team: KR Barker Associates

Special Systems Planning, Design, Implementation & Oversight: JW Group Inc., working as part of the Integrated Systems Project Team

Seismic Engineering: RUTHERFORD + CHEKENE

LED Displays: Daktronics

Baggage Handling System Design: Vanderlande

Baggage System Bar Code/RFID Arrays: SICK

Boarding Pass/Bag Tag Printers & Cardstock: VidTroniX

Airport Operational Database & Resource Management Systems: Amadeus

Flight Info Display & Queue Management Systems: Amadeus

Common-Use Passenger Processing System & Self-Service Kiosks: Amadeus

Seating: Zoefftig

Automated Aircraft Docking System: ADB SAFEGATE

Digital Paging & Conference Room Audiovisual Systems: Ford AV

Automated Parking Guidance System: Park Assist

Concessions: HMSHost; Hudson Group; Paradies Lagardère

Operations Readiness & Airport Transfer: Chrysalis Global

Asset Management Consultant: Electronic Data Inc.

tunnel to connect the two. Although the COVID-19 pandemic continues to hammer airlines and airports alike, SLC is making the best of the situation by accelerating Phase 2 with the support of its carriers. Airport officials estimate that decreased passenger traffic will allow the project team to reduce the overall redevelopment schedule by two years and save as much as \$300 million. Phase 2 is now slated to be complete in 2024 or 2025.

Regarding Phase 1, Wyatt points to the new 28,000-square-foot Delta Sky Club (the largest in the airline's entire worldwide system) as an example of the outstanding cooperation that exists between SLC and its carriers. The new members-only lounge was originally planned

to be 18,000 square feet, but Delta decided to increase its size and add an outdoor deck when construction was already underway. "We could never have done this without the deep bond that we have built with Delta," Wyatt says. "You can't do projects like this without that kind of partnership."

SLC officials are proud of the airport's affordable rates and charges for airlines, something they plan to maintain despite substantial investments in the redevelopment program. Prior to construction, the airport had socked away \$1.5 billion in cash. Wyatt emphasizes that despite borrowing for construction, SLC will still be one of the lowest-cost airports in the U.S.

Long-Term Effort

Planning for the current redevelopment goes back to the airport's 1996 master plan. At that time, SLC's configuration was not compatible with its role as a hub facility because its finger concourses did not allow for bank movement of aircraft.

But huge increases in passenger volume required the airport to move forward with expansion plans, Wyatt explains. Specifically, SLC was growing at an average of 5% annually, despite forecasted growth of 1.5% each year. A large redevelopment project wasn't the easiest sell for SLC officials after the 2008 Great Recession, but they knew something had to change.

"We were just bursting at the seams," says Wyatt.

In 2014, the airlines committed to supporting the redevelopment program, and plans moved forward.

While some components of SLC's 1996 master plan changed throughout the years, the importance of a linear concourse configuration has remained a guiding force. "For the last 25 years or so, we've been making choices about the roadway and any additions to the airport that would not impact the construction," Wyatt relates. "It's been a thoughtful, long-term process."

The two new linear concourses will allow simultaneous movement of aircraft without interruption—an especially critical aspect for Delta Air Lines, which typically flies up to nine banks

each day at SLC. Under normal market condition, the airport has 100 nonstop destinations, and roughly 70% of Delta's volume at SLC is connecting traffic.

After the demolition of terminals 1 and 2 is complete, the remainder of the dual taxi lanes will be constructed, further improving airfield operations.

Function & Affordability

In 2008, the airport hired HOK to take inventory and assess the architecture, structural and engineering condition of its facilities. The redevelopment team used the information to help determine what portions of the master plan it could implement without busting the budget.

"The client was very concerned about spending too much money and overbuilding," relates Matt Needham, an HOK principal.

Ultimately, the architecture firm developed a design for new facilities that achieved the main goals of the Salt Lake City Department of Airports. The "new SLC" had to be functional, affordable and timeless.



MATT NEEDHAM

Wyatt highlights the airport's two check-in locations as a unique design element. Check-in counters and kiosks in the new Gateway Center, which attaches to the parking garage on

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the second level, will be particularly convenient for passengers returning rental cars or parking their own vehicles. Passengers being dropped off at the airport will likely use the more conventional ticket lobby on the third level.

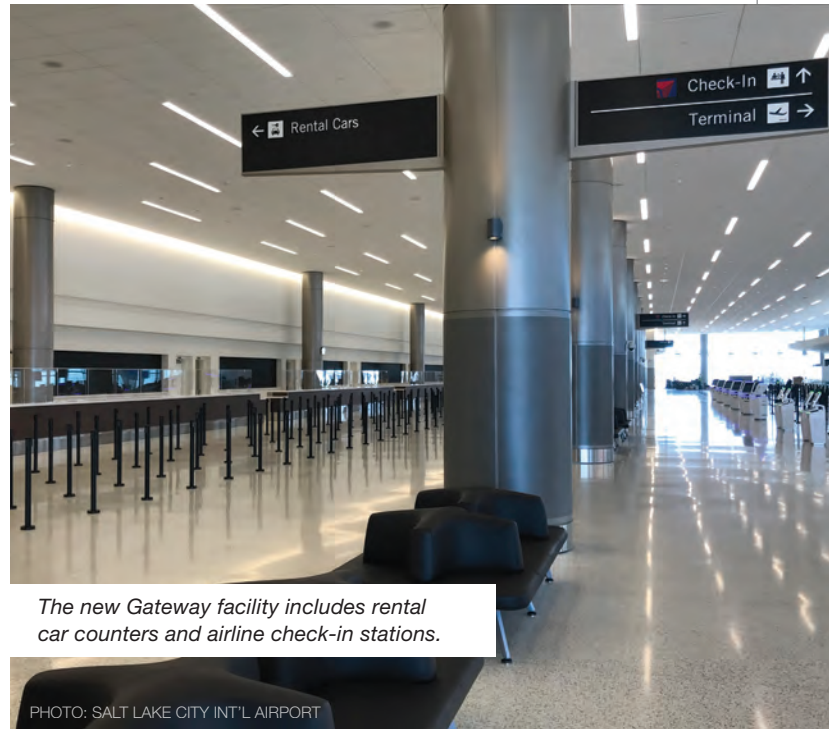
Officials have always considered SLC's location, just five miles from downtown Salt Lake City, a valuable convenience for local and visiting passengers alike. Wyatt notes that having a bi-level roadway with multiple lanes on both levels will further increase the airport's convenience, safety and capacity.

"When you talk to local people, they love that you can park in the garage and be at your gate within 15 minutes, which is amazing," he relates.

The challenge for HOK's architects and designers was to maintain that treasured convenience in the new terminal. "That's what the Gateway will do," explains Wyatt.

"That kind of layout is highly functional and highly responsive to what the folks of Utah really wanted," agrees Needham. "They wanted the ease of transport without multiple level changes."

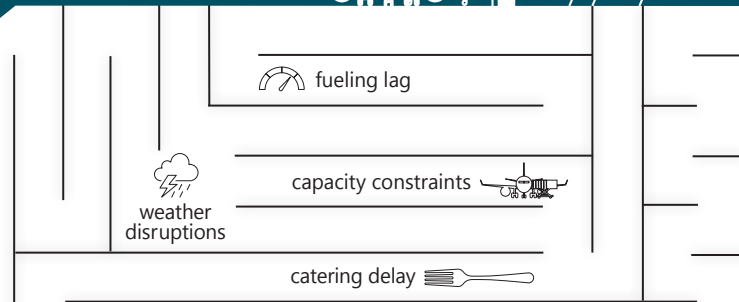
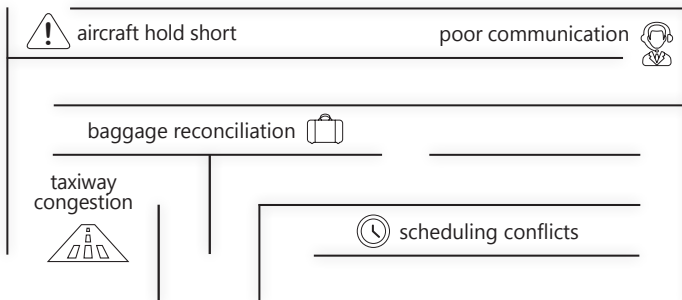
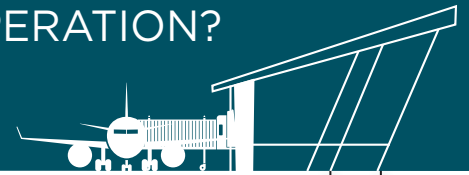
With the new terminal configuration, space planners predict that fully half of SLC passengers will not need to change levels at all.



The new Gateway facility includes rental car counters and airline check-in stations.

PHOTO: SALT LAKE CITY INT'L AIRPORT

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PHOTO: SALT LAKE CITY INT'L AIRPORT

The new 3,600-stall garage includes space for visitor parking and rental cars.

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The new Gateway Center, which includes rental car counters as well as check-in facilities, is designed specifically for SLC's operational flow of non-overlapping peaks. The airport experiences its main departures peak in the morning, and the main arrivals peak occurs in the afternoon. Instead of having a common circulation path in the middle, with queuing for ticketing to the north and queuing for rental cars to the south, HOK placed a line of columns in the middle. During the morning peak, circulation for ticketing is south of the columns, and in the afternoon, circulation for the rental cars is north of the columns. "By having a shifting circulation path, we actually reduced the size of that building by roughly 20% and the construction cost by millions of dollars," Needham explains.

The airport's new 3,600-stall garage houses rental car facilities, including a ready return area, on the first floor. The second level is for passenger/visitor parking and connects directly to the Gateway. Elevators and escalators are positioned to allow passengers who do not need to check a bag to enter the Gateway and head right to the security checkpoint. "It's all organized for ease of passenger movement—as minimal walking distance as you can have," says Needham.

In the garage, an automated guidance system from Park Assist uses camera-based sensors to direct drivers to vacant spaces with color-coded LED lights.

The lights turn from red to green when spaces become available, which helps decrease search times and traffic. When travelers return to the garage, they can use the Find Your Car app or kiosk to locate their vehicle with just a portion of its license plate number. The airport also offers complimentary assistance to customers with dead batteries, flat tires and empty gas tanks.

Park Assist also offers a software extension to help airports increase security in parking garages. The airport sets automated rules and norms, and the system automatically alerts parking management of any policy violations. Currently, SLC does not subscribe to this extra service.

Passenger Processing & Services

While the previous terminals had three separate checkpoints, the new SLC has one consolidated checkpoint with 16 screening lanes. Each lane includes four divesting stations and automatic bin returns. "It's a vastly improved experience for passengers," Wyatt reports. "It's going to operate so much more smoothly than the previous facility, which, of course, was never designed to sustain the volume of people or the type of screening that currently has to occur."



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The space allotted for the new checkpoint allows for several different queuing configurations—a valuable advantage while social distancing is so important.

Needham notes that the efficiency of concessions was also a high priority. “We really wanted to have a coordinated, holistic design,” he says. Practical matters included ensuring that each concessionaire has the necessary infrastructure and operations do not interfere with passenger flow.

Nearly all of the new concessions spaces have back-of-house access to elevators and service docks for supplies, storage and refuse disposal. “You don’t want to walk down a concourse and see the janitorial staff pushing refuse next to you,” he says. Additionally, designers coordinated restaurant layouts to keep sublevel storage areas as close as possible, and beverage rooms were positioned so lines for soda canisters run directly up to the kitchen or bar.

When both phases of the redevelopment program are complete, SLC will have more than 75,000 square feet of concessions space with local and national concepts from HMSHost, Hudson Group and Paradies Lagardère. The previous terminals had slightly less than 50,000 square feet combined. The Central Terminal and Concourse A-West alone have 21 food/beverage options and 24 retail stores.

Because so many SLC passengers travel with skis and bikes, the airport added provisions that allow them to check oversized bags and boxes at any point in the system instead of designating just a few stations. The new baggage handling system from Vanderlande features 4-foot-wide belts to accommodate the larger items. (For more about the baggage system, see Page 18.)

New communications infrastructure, including cabling systems and local area networks, supports a wide variety of operational functions and passenger amenities, including the common-use passenger processing system, common-use self-service kiosks, electronic visual displays, the resource management system, parking guidance system, passenger and operational Wi-Fi networks, in-building distribution systems for cellphones and employee radios, visual surveillance and integrations with access control, and electronic passenger wayfinding signage.

A new digital paging system from Ford AV has improved the quality of audio announcements in Concourse A.

Design Goals

Airport officials were not interested in building a ubiquitous structure with a generic interior. They wanted something that was unique to Salt Lake City and the Utah region. “We took that as inspiration for the facility’s organization—not just the design, but how passengers actually move around—and laid out the functions of the terminal,” Needham remarks.

The main organizing element of the terminal is a slot canyon design that facilitates intuitive wayfinding. When passengers enter the canyon, they are lead toward the TSA checkpoint. Once they clear security, they pass directly through a retail



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area and into the plaza, which features a 50-foot-high ceiling illuminated by indirect light.

“We took advantage of the site to have an incredibly deep terminal, and that allowed us to use the slot canyon concept,” says Needham. Natural light and artwork in the canyon create a “strong desire to walk along that path,” he explains.

Wyatt describes the design as dramatic and inspiring. And it’s certainly different from SLC’s previous terminals. Windows on both sides of the concourses provide travelers with views of the Wasatch Range and Oquirrh Mountains that surround Salt Lake Valley. “The views are spectacular,” he says.

The terminal’s exterior façade includes textures and copper tones that evoke the local landscape. Several pieces of industrial-scale art bring recognizable elements of the area’s landscape indoors. Wyatt notes that artwork by Gordon Huether add a sense of place and helps guide passengers through the airport. “Art is very much a part of the architecture,” he remarks.

Needham predicts that the integration of art and architecture will prove to be timeless. “When we integrate art and architecture, the public really benefits,” he remarks.

A seven-story, 5-ton piece titled *The Falls* welcomes passengers into the new terminal with dichroic glasswork that changes color with changing light conditions. Moving through the security checkpoint and into the plaza, *The Canyons* is a series of curved tubes and microfiber panels that bend and sway to evoke the feeling of Utah’s signature geological formations. Portions of the large piece are illuminated with digital lighting that can be programmed based on the time of day and season. Passengers who pass through the Central Tunnel on their way to the Concourse B will see an installation called *The River* that features similar tubes and fabric in blue.

The Greeting Room includes a high-resolution photograph of the world map that was originally displayed on the floor of one of SLC’s previous terminals. Airport officials incorporated the map into the new facility because it was a sentimental favorite for arriving and departing passengers, especially missionaries. “There must be hundreds of thousands of photographs of people standing on a section of the map where they served on a mission at one time or another,” Wyatt explains. Although the airport was unable to save the map itself, a 10- by-10-foot photograph of it adorns the new waiting/greeting area just outside the sole exit lane used by domestic passengers.

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Art was even integrated into the architecture of the facility's restrooms. The stonework design specified outside the restroom banks evokes Utah's famous red rocks. Each restroom node also includes a Whimsy Wall, a vinyl application of vibrant, colorful art. "They're quite lovely," Wyatt says. "It really helps to soften the often industrial nature of bathrooms."

Each bank of women's restrooms includes a lactation room and twice as many stalls as the men's banks. And all restrooms include a baby changing station and stalls large enough to accommodate luggage. Fixtures such as faucets, soap dispensers and paper towel dispensers are touchless—a feature that has taken on new importance in the era of COVID-19. To ensure the facilities were easy to maintain, the airport gathered feedback from janitorial staff about the first set of restrooms that was constructed before building more.

Sustainable SLC

Wyatt notes that sustainability weighed heavily in the layout and design of the new terminal. The linear concourses and dual taxi lanes will allow for multiple pushbacks and movements. Overall, the new layout is considered to be 30% more efficient than the previous pier configuration because it reduces the time aircraft

spend taxiing and idling while waiting for a gate. This is expected to reduce greenhouse gas emissions by 4,800 metric tons per year.

SLC also prohibited diesel- and gas-powered ground service equipment, a measure expected to reduce greenhouse gas emissions by another 8,000 metric tons annually. "Anything that is under the wing will have to be electric—with the exception of pushback tugs, because there really aren't electric equivalents," Wyatt specifies.

Landside, the new parking garage includes 56 charging stations for electric vehicles.

Harvesting of natural daylight occurs throughout the new facilities, including the parking garage, which has two major light wells. Project planners oriented the terminal east/west and included a south-side clerestory to help pull more sunlight into the facility. The building automation system saves energy by using sensors that take advantage of natural daylight while providing consistent light levels despite the time of day or weather.

The airport is using renewable natural gas to heat and chill water throughout the terminal, and it also purchased 2.1 megawatts of off-site green power from Rocky Mountain Power.

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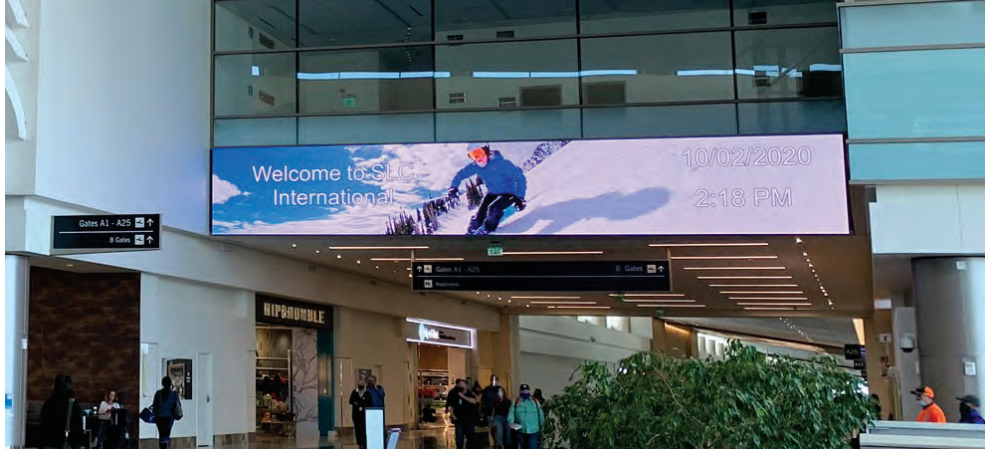


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Updated communications infrastructure supports new LED displays.

At many airports, the baggage handling system draws a tremendous amount of electrical power. The new system at SLC includes stop/start motors that shut down miles of conveyor belts when there are no bags present.

Other sustainability goals for the redevelopment program include: procuring at least 20% of the building materials locally; specifying materials with recycled content; ensuring that 95% of the wood used is FSC certified; and diverting more than 95% of construction waste from landfills. All of these efforts support the airport's goal of earning Gold certification for Leadership in Energy and Environmental Design from the U.S. Green Building Council.

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Construction Obstacles

Because SLC is located on the site of an ancient lakebed, the airport had to stabilize the ground beneath the new terminal to meet seismic requirements. Crews installed more than 7,000 stone columns to prevent settling, and structural supports rest on more than 5,000 driven piles. The columns are coordinated along the lines of the structural columns to further support the structure.

Needham notes that the design packages allowed contractors to build just-in-time and take advantage of moderate summer weather for foundation work and site preparation. Project partners worked together to make sure the construction phasing worked for airlines and airport operations, he adds.

The project team divided the giant initiative into two major phases to minimize the impact to operations. "Gate count became a critical component of the phasing every single step of the way," Needham relates. "We could not go below a certain number of aircraft gates."

Because the new terminal is located far enough south and west of the previous terminals, SLC did not have to issue security badges to all 2,000 crewmembers working at the 196-acre construction site. Moreover, the linear layout of the new terminal will facilitate future expansion when/if it is needed. "We have given ourselves a lot of physical space and created the ability to expand without disrupting operations," Wyatt comments.

On the infrastructure side, mechanical, digital and fiber elements are also ready for subsequent expansion. A building information modeling system details hundreds of miles of cabling and every piece of conduit and pipe to facilitate planning and construction of future projects. 

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FACTS&FIGURES

Project: New Baggage Handling System

Location: Salt Lake City Int'l Airport

Total Cost: \$170 million

Cost of Phase 1: \$110 million

Timeline: Phase 1 opened Sept. 15, 2020;
Phase 2 slated to open in 2024 or 2025

Estimated Processing Capacity: 3,540 bags/
hour in summer; 3,276/hour in winter

Component of: \$4.1 billion airport-wide
redevelopment program

Architect: HOK

Civil Engineers: HNTB

Electrical Engineers: HOK; Envision Engineering

Mechanical Engineers: HOK; Colvin Engineering

Structural Engineers: HOK; Reaveley Engineers +
Associates; Dunn Associates

Concourse B Construction: Austin Commercial-
Oakland Construction Joint Venture

**Construction of Central Terminal, Concourse
A, & Other Redevelopment Elements:**
Holder-Big D—A Construction Joint Venture

Baggage Handling System Design:
Vanderlande Industries Inc.

Bar Code/RFID Arrays: SICK

System Controls: Brock Solutions

System Engineer: Vanderlande Industries Inc.

Material Handling Bearings: Regal Beloit

Start/Stop Motors: SEW

Conveyors: Vanderlande Industries Inc.

Key Benefits: Faster inbound & outbound processing;
significant energy savings anticipated from running
motors only when baggage needs to be moved; special
systems for skis & other oversize items that make
checking & claiming processes easier for passengers;
new components eliminate need for manual inspection
of most skis

Baggage Handling Takes Center Stage at Salt Lake City Int'l

BY JODI RICHARDS



When Salt Lake City International Airport (SLC) opened the first phase of its \$4.1 billion redevelopment project in mid-September, one of the most critical aspects had been commissioned about six months earlier. It was imperative for the new baggage handling system to be ready to serve passengers on day one, and SLC officials report that it came through in spades.

“It’s terrific in terms of efficient operations,” says Airports Director Bill Wyatt. “Your bag is going to come at you a little faster if you’re arriving in Salt Lake, and it’s going to get to your plane a little faster if you’re departing. We basically built the airport around this very efficient bag handling system.”

The new system includes six miles of outbound and inbound conveyor systems for processing checked baggage in

the new 908,754-square-foot terminal. John Palmer, SLC’s area manager for the airport redevelopment project, explains that Phase 1 of the subproject includes the new terminal and Concourse A West portions of the baggage handling system, at an investment of \$110 million. When Phase 2 is complete, sometime in 2024 or 2025, the total investment will be \$170 million. TSA contributed approximately \$24 million of the total cost, including the explosives detection system (EDS) equipment and reimbursement to the Salt Lake City Department of Airports for the checked baggage inspection system area.

Palmer explains that airport officials were not looking for bleeding edge technology, but they needed a system capable of accommodating larger items like skis, golf clubs and bicycle boxes that travelers often bring through SLC. “One of the goals early on was to make sure that the system could induct and handle [larger items] in an automated process,” he specifies.

All 11 input points for the new outbound system are capable of accommodating oversize items. In addition, two of the 11 points for putting baggage into the domestic



BILL WYATT



JOHN PALMER

inbound subsystems and one of the three international inbound subsystems can also accommodate large items.

In a typical year, SLC welcomes 26 million passengers, and many are traveling with large recreational equipment. The new baggage handling system includes 45-inch-wide conveyor belts and large-radius turns to allow large items to move more easily through the checked baggage screening process. The system was also designed to reduce manual handling and inspections by TSA agents, and to decrease the distance passengers need to cart large items through the terminal.

“This is ski country,” Wyatt says. “During a traditional winter, you see skis everywhere, and it really can impede passenger transit around the airport.”

Now, passengers can induct their skis, golf clubs, bike boxes and other oversize bags at any of SLC’s bag check stations. Oversize pushers ensure that large items are directed to the oversize shoots. This largely eliminates the need for personnel to transport them via carts and therefore reduces the potential for mishandling.

Officials from SLC studied other airports with similar baggage needs for design inspiration—especially other popular ski destinations such as Jackson Hole Airport in Wyoming. “They’re handling skis on a much smaller scale than we do here, but it showed the ability to convey them down the conveyor lines and pass them through the scanning machines,



NOEL SPRAGGINS

which eliminates a lot of TSA handwork,” explains Noel Spraggins, baggage systems project manager for the airport redevelopment project.

Before SLC’s redevelopment program, all skis and bicycle boxes had to be hand-screened by TSA. Now, all skis less than 86 inches can pass through the EDS equipment. If there are no alarms, manual inspections are avoided. If there is an alarm, the item is automatically routed to a staffed TSA inspection area.

According to project officials, SLC is the first U.S. airport to have automated inspection of large checked items. Items more than 50 inches long, 34 inches wide and 30 inches high, such as bicycle boxes, are directed to inspection and then to an exclusive oversize baggage make-up area.

The TSA checked baggage inspection system includes six CTX-9800 EDS machines (including one spare for backup purposes) and is centrally located on Level 1 of the terminal. All cleared bags are sent for sortation directly under the concourse, a configuration designed to improve delivery time to departing aircraft. Palmer reports that screening capacity is roughly 3,540 bags per hour in the summer and 3,276 per hour in the winter.

Multiple make-up devices with dual feed lines provide specific sort destinations for each flight or airline. Two oversized run-out conveyor lines with diverters and baggage chutes provide sort destination points for large items.

The system scans tags on outbound baggage and sends detailed processing messages to airlines. Individual carriers then

Baggage System Components

- 12 inbound claim devices
- 3 inbound oversize lines (including 2 specialized ski carousels)
- 8 ticket counters (including 2 in the Gateway)
- 2 curbside lines
- 1 FIS check line
- 4 outbound checked bag inspection system feed lines
- 2 security feeds
- 2 out-of-gauge lines
- 6 security shunt lanes
- 12 security vertical merge feed lines
- 7 alarm lines
- 10 clear lines
- 2 reinsertion lines
- 14 crossover lines
- 4 mainlines
- 19 make-up units with redundant fee lines
- 2 ski run-outs
- 6 CTX-9800 EDS machines
- 72 high-speed diverters
- 23 oversize pushers
- 8 vertical sorters
- 6 vertical merge devices
- 23 scanner arrays
- 4 dimensioning arrays
- 63 fire and security power doors
- 2 ski carousels



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decide whether to pass along such information to their passengers. Barcode readers and RFID scanning equipment allow a high level of accuracy for tracking baggage throughout the system, Palmer notes. Delta Air Lines utilizes 100% RFID tracking and has the capability to alert passengers about the location of their bags.

On the claims side, two special carousels deliver skis in open vertical lockers to make it easier for customers to find and retrieve their equipment. One is located in the east baggage claim area, the other in the west area. Each has room for 50 pairs of skis.

A computerized monitoring and reporting system provides information to operators both from and for inbound and outbound

baggage. Additionally, an automated sort control system for the outbound make-up area interacts with the monitoring system to send graphic and text-based information back to the baggage handling system.

Baggage Takes Priority

Palmer notes that the baggage handling system design was a driving force early in the programming phase of SLC's redevelopment project. "The airport had an emphasis on making sure the baggage system was taken care of as far as the space in the building and not having to endure any design-arounds," he explains.

Because the system is under the terminal and concourse, designers built the structural, mechanical and electrical needs of the entire facility around the baggage handling system. Access to equipment, in terms of future maintenance, was also a key consideration, Palmer adds.

He explains that it made sense to design the terminal around the baggage handling system to ensure smooth operations, since moving passengers and baggage are key factors for customer satisfaction.

Personnel at Vanderlande Industries Inc., the firm that designed and installed SLC's new system, agree wholeheartedly because by their very nature, baggage handling systems twist and turn throughout the entire footprint of the terminal. Account Executive Jonah Thompson notes that it's



JONAH THOMPSON

counterproductive to ignore the importance of a baggage system early in the design process for a terminal. "If you do, you'd end up designing a building and then trying to put the baggage handling system in and it might not fit," he cautions.

At SLC, the project team mapped out the entire \$4.1 billion redevelopment project with building information modeling software, which helped coordinate the baggage handling system's mechanicals with the rest of the facility. "We have the entire system in the model, so we can see if we would have an issue with installation," explains Spraggins. "That helped save us a lot of time down the road when we actually went into the field to build this."

When SLC awarded Vanderlande the baggage handling system project in 2015, Concourse B had not received the green light but was part of the airport's master plan. "So



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flexibility to expand was very important,” notes Thompson. Once SLC determined it would move forward with the Concourse B portion and Vanderlande won that project as well, the flexible design made it easily expandable, he adds.

Operational Benefits

Before and after the project was awarded, Vanderlande held numerous workshops with SEW to determine whether its motors were the correct fit for SLC’s new baggage handling system. Investing that time on the front end has paid big dividends, reports Thompson.

Additionally, Vanderlande worked closely with Brock Solutions to overcome the challenges at the controls level associated with tracking and photo eye placements for processing oversize items through CBIS and sortation.

Spraggins explains that the airport’s previous baggage system ran continuously and therefore consumed a tremendous amount of power. In contrast, the new system is equipped with permanent magnet motors from SEW that run only when a bag is present. “From an energy efficiency standpoint, we expect to see a lot of savings,” he remarks.

Thompson predicts that the energy savings will be substantial because permanent magnet motors are more energy efficient than traditional motors, and SLC’s system contains more than 2,000 of them. “Baggage handling systems draw some of the largest—if not the largest—energy footprint in an airport just because of the amount of motors,” he comments.

While SLC is not the first airport to leverage permanent magnet motors, it is the first large-scale installation of them, notes Thompson.

The “stop/start motors,” combined with numerous other sustainable features throughout the new facility, are expected to earn the airport Gold certification in Leadership in Energy and Environmental Design from the U.S. Green Building Council.

Beyond stressing energy-efficiency, SLC officials also placed heavy emphasis on meeting or exceeding seismic requirements.

Customer convenience was another big focus. For example, travelers can check their bags in the airport’s new Gateway facility before they enter the terminal to avoid rolling



The new screening system for checked baggage includes six EDS machines, including one backup unit.

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or carrying heavy luggage or equipment through the facility. "They are able to drop those bags off and become a passenger as quickly as possible," says Vanderlande Executive Project Manager Doug Alewelt.

Sharing the Construction Site

With so much construction happening concurrently, workspace within the terminal was at a premium. Palmer reports that frequent meetings and close coordination among contractors kept projects moving along, and frequent communication with stakeholders such as the airlines and TSA was key.


"One of the successes of our project is our experienced, integrated team," he reflects. "We were managing the installation day in and day out as a team."

Coordinating construction activity along with the baggage system was an area of focus throughout the project. "It's also the challenge we spent some of the most time on upfront," Thompson remarks.

Alewelt notes that the project team tried to prepare as much as possible for the unknown because anything can happen on a

project of this size and nature. Specifically, Vanderlande stored a month's worth of building materials at a local warehouse in case circumstances beyond their control required the project to pivot. "We had materials available in Salt Lake to switch gears with minimal impact," says Alewelt.

TSA screening equipment was installed almost one year before the terminal was scheduled to open. Testing and certification occurred roughly six months before the big day. "That was primarily to ensure that we had a certified baggage system that would screen bags to the TSA's criteria," Palmer relates. The system was then retested and recertified at the end of August, in preparation for the Sept. 15 terminal opening. This advance work took the stress out of ensuring the system would be working properly on opening day, Palmer says.

Close coordination with construction teams working on other redevelopment projects as well as contractors associated directly with the baggage project was critical throughout. "All the planning paid off," Thompson says. 

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Huntsville Int'l Completes Comprehensive Security Upgrade

BY RONNIE WENDT

FACTS&FIGURES

Project: Facility-wide Security Upgrade

Location: Huntsville (AL) Int'l Airport

Owner: Huntsville-Madison County Airport Authority

Cost: \$9 million

Timeline: Oct. 2013-Jan. 2020

Key Components: New system that integrates security cameras, access control & perimeter control; new communications center layout with upgraded systems & improved ergonomics

Advanced Features: Smart locks & keys that are programmed to grant specific access privileges & track when/where key holders enter; upgraded cameras & video analytics systems that leverage machine learning and artificial intelligence to track a person's path through the facility and distinguish unusual events or movement; thermal imaging cameras that can monitor airfield in total darkness

Project Manager/Engineer: Pond & Company

Contractor: Johnson Controls

Lock Installation: Peifer Security Solutions

Security Cameras: Avigilon

Systems Integration: Verint Systems

Perimeter Gates: AutoGate

Badging System: Intellisoft

Card Readers: Morpho Card Readers from Safran

Electronic Locks: CyberLock

Huntsville International (HSV) didn't plan for its new security system to go live during one of the greatest periods of unrest the U.S. has seen. But that's how the project schedule unfolded. The new \$9 million integrated security system was commissioned in January, reaffirming the Alabama airport's commitment to protect the flying public no matter what is going on.

Passengers and employees can rest easy knowing that HSV offers the best in airport security, reports Operations Manager Ryan Gardner. The updated system includes a new communications center layout, vertical-pivot perimeter gates, an advanced access control system and a sophisticated surveillance camera network with video analytics.

Both integrated and scalable, the system leverages the latest in artificial intelligence and machine learning to track a person's path as he or she moves through the airport. The new communications center is equipped with a large video wall that allows security

personnel to view video feeds from more than 300 cameras that provide 640 views, receive alerts when unauthorized access occurs and dispatch authorities to respond.

The innovative system provides complete security coverage across the campus, from the airfield perimeter to inside the terminal.

"Our goal is to keep people safe," says Chris Scott, chief of Public Safety at HSV. "Updating the system helps us maintain public trust. People know that when they come to the airport, it's a safe and secure place."



CHRIS SCOTT



RYAN GARDNER

Establishing the Plan

The project began in 2013 when the Huntsville-Madison County Airport Authority selected Pond & Company to perform a security threat and vulnerability assessment.

Pond began by studying the existing security components across the airport, including the communications center, closed-circuit TV systems, airport access, operations and system infrastructure. Next,

it prioritized areas of concern and teamed with airport staff to implement the top 10 items on the list.

“We used a commercial airport resource allocation tool, developed by the Homeland Security Institute, which is basically a spreadsheet algorithm that assigns costs to each of our findings,” says Chris Farnie, a senior vice president at Pond. “The software helps balance the security gains with the costs.”



CHRIS FARNIE

The need to enhance the communications center, access control system and surveillance cameras topped the priority list. HSV funded the project with a combination of FAA Airport Improvement Program grants, airport funds and passenger facility charges.

Room to Work

Although it was functional, the airport’s previous communications center contained aging infrastructure and outdated technology, and its quarters for monitoring personnel were cramped.

“We needed a computer-aided dispatch system that integrated with all security systems on the dispatcher’s monitor,” Gardner says. “Whether it’s access control, security cameras or fire alarm systems, we wanted to bring them into a central point to make it easier to respond to emergencies or incidents in real time.”

Personnel also needed more ergonomic workstations to improve their efficiency. “We wanted security personnel to see all systems at once and not get overwhelmed,” he explains. “We did this by incorporating systems into a singular platform.”

The updated communications center is located in the same space, but includes a dispatcher desk that allows employees to work standing up or sitting down. An L-shaped wraparound video wall provides views of the entire facility on more than a dozen 55-inch monitors. Together, the 14 screens can present up to 200 views simultaneously.

Dispatchers can monitor multiple displays on the wall for a quick overview or pull up a single screen to take a closer look. They can also access a separate desktop display.

“It is a much cleaner workspace, and they can do more with it,” Gardner adds. “The center offers an ergonomic layout and has all the background systems dispatchers need.”

Designers also included a supervisor observation station and break area. “Once workers are on duty, they stay on duty,” explains David Woods, Pond’s architect/project manager.



DAVID WOODS

Inside the communications center, the server rack system room requires a sophisticated heating and cooling system. Designers reworked the center’s HVAC systems to ensure that the server room stays cool without freezing out dispatchers working nearby.

Because the communications center needed to remain fully operational while crews gutted and rebuilt the facilities, the project team built a temporary center next to the project site.

The lighting and display configuration in the new communications center are designed for greater comfort and efficiency.



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“Every project presents some kind of challenge, but this was a very complex project,” stresses Jim Flowers, the airport authority’s project manager. “We had to change out entire systems while maintaining complete functionality.”



JIM FLOWERS

Get the Picture?

Airports face many security challenges from theft and vandalism to trespassing, active shooters and potential terrorist attacks. Surveillance cameras help prevent intrusion, facilitate operations, monitor activity and secure the entire property.

The previous analog surveillance system at HSV performed these functions, but the airport could no longer maintain or replace its aging cameras. Officials also wanted the more robust capabilities of newer systems. “Technology becomes obsolete about every seven years,” Woods says. “We had to replace all the cameras on the airfield, inside the terminal, in the parking lot, and at access gates. Every camera on site was replaced, and additional cameras were added to provide HSV with additional surveillance.”

Crews installed nearly 400 Avigilon cameras, providing dispatchers a much broader simultaneous viewing capability

than they had previously. Fixed-position cameras that look in one direction monitor some areas, while pan-tilt-zoom cameras capable of remote directional and magnification control capture footage in others.

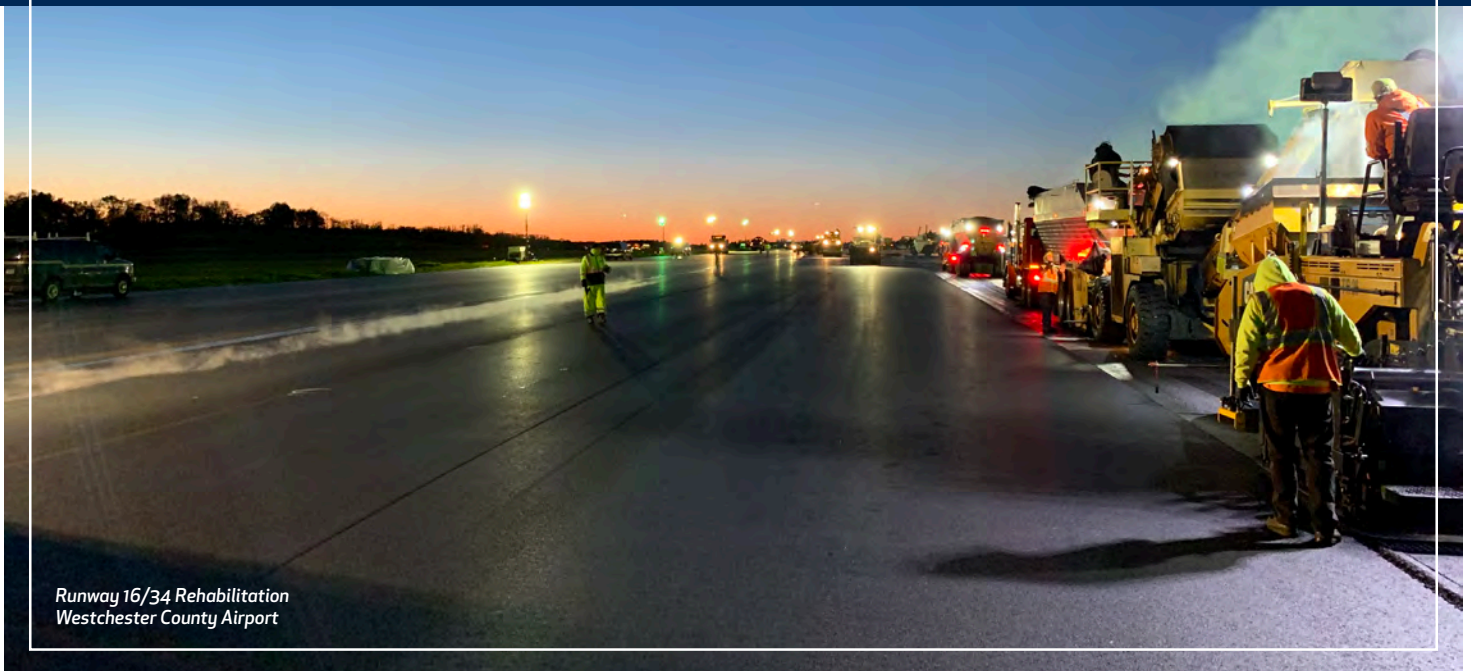
The new closed-circuit TV system includes forward-looking infrared (FLIR) cameras placed strategically on the airfield. These cameras capture video as aircraft land and move to the gate area, and can monitor the area even in total darkness.

Gardner notes that advanced video analytic capabilities make the system unique. Video management software from Verint Systems leverages machine learning and artificial intelligence to learn from various scenes around the airport. Once the system “knows” a scene, it can quickly identify pixel changes within it.

Post-video analytics enable operators to select specific people or objects of concern on video footage and follow them through the airport. For example, if a passenger reports that someone stole his red backpack, a dispatcher can select an image of the backpack where the incident occurred, and then follow it as it moves through the airport.

“This capability lets dispatchers see what happened to the item or person in question,” Woods explains. “The system knows when

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the scene changes, so you can track the object from camera to camera as it moves through the airport.”

This important feature eliminates the need to manually sift through multiple cameras and views to learn what happened to a person or an object, adds Scott.

The new system also lets operators watch a person of interest in real time as he or she moves through the airport. “This capability is not to be confused with facial recognition,” Woods emphasizes. “It does not provide identification; it just lets you watch objects or people as they move along.”

Verint’s video management software brings all of the airport’s security systems into a single platform. For example, if a fire alarm goes off, operators can pull up a map that shows them where the alarm is, select and view footage from a camera in that area, and then dispatch accordingly.

“The primary benefit is improved situational awareness,” Farnie summarizes. “This is a state-of-the-art video surveillance system.”

Beefing Up Access Control

The project also advanced access control at airfield perimeter gates and doors throughout the facility. The airport installed an Intellisoft badging system that adds biometric security to identification cards. The change lets the airport distinguish areas requiring both biometric and card authentication from areas that only require card authentication.

Every door received a security upgrade. Some received technology upgrades, such as Morpho Card Readers from Safran that work with biometric-capable badges, while others received hardware upgrades.

The new equipment and system required the airport to re-badge every employee, a process that took three months. The new badges worked on both the old and new systems while employees were trained to use the new access control system. “Once we finished, we began switching out old devices with the new ones,” Gardner says.

The new system also required a new database. “We had to migrate all data to the new system, and that took a while,” Farnie says.

The new badging system keeps an access audit trail that allows security officials to track who enters and leaves each area. With future updates, the system will be able to notify employees when it’s time to update security training and other educational requirements for employment and badging.

Getting Inside the Perimeter

During the project, crews replaced 12 horizontal-rolling perimeter gates with AutoGate vertical-pivot gates. The new, more robust gates are expected to reduce long-term maintenance costs. The airport also installed additional security cameras and lighting.

Peifer Security Systems upgraded certain traditional keyed locks and padlocks with high-tech alternatives. “We put CyberLocks on every perimeter gate and in other key areas,” says Glen Peifer, owner of the company.

Crews installed the new electronic lock cylinders into locks with existing mechanical cylinders to enable them to use smart keys that are programmed to grant specific access privileges to

key holders and track when and where employees use their keys.

“We also ran fiber optic cable throughout the terminal all the way to the gates and back,” says Woods. “The communications center is in a separate building, so we ran fiber optic cable to that as well.”

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The recent security upgrade spanned all areas of the airport.

Upgrading the gates and locks required significant coordination with airport stakeholders. “Every area affected by construction requires the airport to coordinate with the TSA,” Scott says. “We needed to constantly communicate. We had to know when and where the work was being done to maintain the necessary level of security and access control at all times.”

Ready for the Future


In retrospect, Farnie says that keeping the old systems operating while crews installed and integrated new systems presented the biggest challenges for the project team.

“We couldn’t just shut things down for two to three months while we upgraded the security system,” he remarks.

Every component in the new security system had to undergo testing before going live. “Commissioning the integrated system took a long time,” Farnie adds. “As we tested the system, little things would pop up and we’d have to work through them.”

The airport and project team also had to find the right balance between integrating enough and too many systems. The radio system, for instance, is not integrated into the access control and surveillance system. “When you have multiple events happening at once, you need the ability to use the radio system as a standalone system,” Scott explains.

Ultimately, Pond integrated several different systems into a single user platform. “We even created a mobile platform so people in the field can access the computer-aided dispatch system through a tablet or phone,” Woods notes.

The resulting system is designed to last many years. “The airport now has an automated multilevel system that lets them work with the TSA to elevate its security level at any time,” Woods says. “And the system is plug-and-play, making it very easy to upgrade.” 

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Next month marks the 15 year anniversary of Southwest Flight 1248's crash at Chicago Midway Airport. On December 8, 2005, the airplane slid off a runway at Chicago-Midway while landing in a snowstorm and crashed into automobile traffic, killing a six-year-old boy.

The aircraft was a new Boeing 737-700 equipped with the latest anti-skid and braking technology at that time. The captain was a former U.S. Air Force pilot with 15,000 flight hours, including 4,500 hours on the Boeing 737. He, nor his experienced co-pilot had ever been involved in any accident or incident.

On the day of the accident, there was eight inches of snow on the ground and airport officials claimed the runway was cleared of snow prior to the time of landing. Prior to landing, the air traffic controller told the pilots that the braking action for the first half of the runway was "good" and "poor" for the second half. During set down, the 737 skidded and crashed into a barrier wall stopping at an intersection on the airport that was full of traffic. The airplane hit at least three cars, killing a six-year-old boy, and critically injuring nine others in adjacent cars.

During the NTSB investigation, the NTSB found that the controller did not give the pilots all of the required braking action reports available because he did not take into account the aircraft type from which the reports came. The NTSB determined that braking action reports varied widely based on aircraft type, changing weather conditions, personnel experience, the type of equipment used, and the time of report, and therefore shouldn't have been used as conclusive information on runway conditions.



Courtesy of NTSB

This terrible accident raised awareness of how the hidden dangers of winter operations can lead to severe consequences.

As a direct result of the Southwest Flight 1248 accident, the FAA created a Takeoff and Landing Performance Assessment Aviation Rule-making Committee (TALPA ARC). In 2016, TALPA ARC made recommendations to the FAA, who later implemented a new "Runway Condition Code" method for the communication of runway conditions from airport management to flight crew members.

I was proud to be involved with the TALPA ARC group who suggested new reporting to pilots using reporting equipment rather than subjective observation. The new matrix reporting format provides the runway condition rating in thirds (Touchdown-Midfield-Rollout) of the runway on a scale between one and five — one being poor

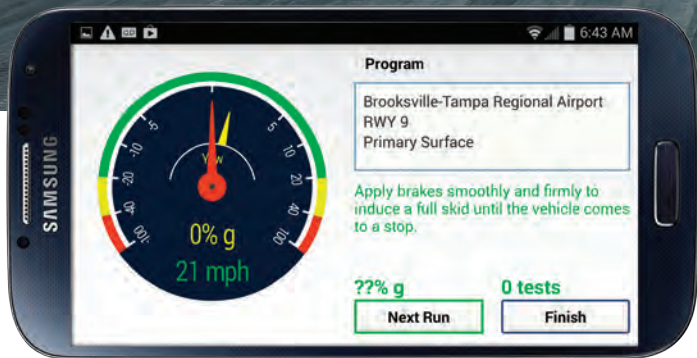


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and five being good. The matrix aligns the friction equipment readings to the runway scale. So an airport, using the matrix, would now report the runway as being, for example, 3-3-3 at 75 percent compact snow with a friction reading. While the 3-3-3 does not account for the variations in aircraft, given the relative



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uniformity of aircraft braking systems, it is a vast improvement from the “guess” system used in years passed. We know that there is a direct relation between friction values and fluid drag or pavement contaminant, such as snow and slush. It is critical to airport safety that both must be calculated in providing an accurate braking action report. The development of improved runway surface testing equipment, along with better communications between airports, air traffic controllers, and pilots has vastly improved the safety of jet aircraft operations.

Airport operators have the ultimate responsibility to provide the safest pavement surfaces using accurate and repeatable friction measurement devices, like the NAC-Dynamic Friction Tester (DFT) or a NAC-Dynamic Friction Decelerometer device or its Android phone app, for reporting friction and contaminate type allowing safe and efficient aircraft take-offs and landings. Runway friction testing is required when contaminate exists and needs to be reported to pilots. Using proper and calibrated devices and trained technicians who are following standardized test procedures will greatly improve airport safety during aircraft operations.

So, what should we do to remember the faults of the Midway disaster? One is to understand the difference between decelerometers and continuous testing devices in measuring in compliance with the 3-3-3 system. Unfortunately today,

many airfields are being inspected with a misunderstanding about the difference between what a continuous friction measurement equipment (CFME) reports and what a decelerometer reports. The two do not report the same values and there is a reason for that. A decelerometer is used to test a contaminated winter runway surface at a speed of 20 mph while locking the vehicle tires nine times on nine different locations of the runway. This results in just nine friction values. The airport vehicle might be lucky and stop on an area that has a high value. I call this, a spot value. What is the entire length of the runway’s actual condition? The decelerometer does not tell you that. Another important point is the force the decelerometer is measuring. When the airport vehicle stops, the driver feels the “forward motion” shifting which is changing force of gravity (g). All decelerometers measure “g” force and create a “g” value and not a true Mu value as many people seem to believe. The decelerometer is only measuring one force whereas a CFME is measuring both the downward force and the horizontal force on the test tire. This is why if you were to take one decelerometer and one CFME over the same exact contaminated surface you will NEVER get the same value. And, you won’t get the 3-3-3 values because the decelerometer does not measure the friction values in directional forces while in motion for the aircraft. Another advantage in using a CFME over a decelerometer is the CFME

is measuring the entire runway tire rolling resistance and not just nine spot values. The decelerometer measures and should be used for spot checks only.

It is important to note, according to both Federal Aviation Administration and ASTM performance specification, NO decelerometer can be used with the vehicle ABS system activated. Anytime the ABS system is activated and a decelerometer brake test is performed the results will fool the driver thinking the runway has a higher braking value than the actual condition of the runway- Totally Unsafe!

In conclusion, let’s take this month to remember the anniversary of a tragic accident and vow to learn more. A CFME is more accurate and reliable than a decelerometer for 3-3-3 reporting due to the number of uncontrolled variables influencing the measurements and operation of decelerometers. (braking technique, vehicle condition, etc.). Airport operators need to follow established standardized testing procedures, oversight inspection of airport devices for condition and calibration, airport operator certification programs, together with education. All are needed to alleviate the still existing problems of shortened older runways and ongoing safety concerns surrounding runway friction.

Let’s be careful out there!



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Regina Int'l Boosts Concessions Sales With Interim Renovations

BY THOMAS J. SMITH

FACTS&FIGURES

Project: Holdroom Renovations

Location: Regina (SK) Int'l Airport

Owner: Regina Airport Authority

Cost: \$1 million (\$750,000 USD)

Funding: Revenue from \$20/ticket capital improvement fee

Construction: July through Oct. 2019

Strategy: Add new wall so all 2nd floor concessions are in post-security areas; remove corridor to facilitate views of airfield in waiting areas

Other Features: Children's play area; improved Wi-Fi service

Design: In-house

Construction Manager: PCL Construction Management

Interior Design: P3A Architectural Partnership

Play Area: iPlayCO

Furniture: Arconas; Trade West

Impact: Liquor sales doubled & food sales increased more than 50% in the first 2 months after renovations



Late last year, Regina International Airport (YQR) in Saskatchewan added a glass wall, and concessions sales promptly jumped. Liquor sales doubled, and post-security food receipts increased by more than 50%.

By installing the new wall, the Canadian airport shifted the crucial dividing line between its pre- and post-security areas, and increased the volume and variety of food service options for passengers after they clear the screening checkpoint. The \$1 million project (about \$750,000 USD) was executed as a "half-step" measure until a more comprehensive project moves the security checkpoint from its current location on the second floor to the ground level.

Airport officials have put the next phase of plans on hold as they struggle to pay basic operating costs amid the COVID-19 downturn, but the new configuration created by the glass wall is helping in the meantime. (See Page 70 for more details about how the coronavirus pandemic is affecting YQR.)

James Bogusz, chief executive officer of the Regina Airport Authority, describes the recent holdroom renovations as a re-allocation of existing space that delivered

a very big bang for the buck.

In addition to installing the new glass wall, YQR removed walls that formed an obsolete corridor serving international gates, added its first play area for children and upgraded internet service throughout the terminal.

The fall/winter 2019 project was funded with revenue from a \$20 capital improvement fee added to each airline ticket.

Last year, YQR served 1.17 million passengers and ranked as Canada's 15th busiest airport. Before COVID-19, it had anticipated serving 1.22 million in 2020.



JAMES BOGUSZ

Improving the Customer Experience

When Bogusz joined YQR's executive team in 2017, he quickly set his sights on improving non-aeronautical revenue from 55% of the operating budget to 60% within five years. One of the first areas he focused on was increasing food sales because they lagged industry averages.



The problem was that the airport had only two concessionaires with full menus, Tim Hortons and Skyway Restaurant, and both were located before the security checkpoint. The post-security options, Tim Hortons Express, Skyway Lounge and Brioche Dorée, only offered beverages, snacks and light sandwiches.

After passengers cleared security, the options were too limited. “You could gaze at the food, but not buy it,” Bogusz recalls.

The concessions arrangement was a vestige of YQR’s last hold area renovation in 2008-09. “The thinking then was to have more restaurants pre-security to cater to the public-at-large,” Bogusz explains. “However, the trends have changed. You can’t take a Tim Hortons large Double-Double [coffee] through security. There is a low propensity to spend any time or money until after security.”

A 2018 survey of 1,500 passengers confirmed what Bogusz and other airport officials expected. The message from customers was loud and clear: Shift pre-security food options behind the checkpoint.

Before recent changes, landside concessions occupied 65% of the available concessions space. By post-9/11 standards, they should be just 25%, notes Bogusz. “The goal was to provide more options post-security without spending millions on renovations,” he explains.

Richard Toth, YQR’s manager of Project Planning and Development, notes that the airport had adequate square footage in the holdroom, but the space was so fragmented that it wasn’t conducive to creating a comfortable environment for passengers.

Facilitating access to concessions and removing the walls of a sterile corridor that was no longer needed due to current international boarding practices dramatically increased the utility of the second-level space.

“Removing the sterile corridor was a huge improvement in the flow and feel,” says Toth, noting that the new waiting area has open views to the airfield and much more natural light.

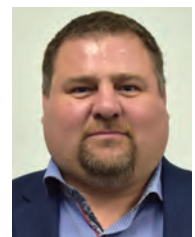
Removing the walls was the “easiest way to give the people what they wanted,” says Bogusz.

All in Good Time

Toth joined the YQR staff in 2017 just days before Bogusz, but he had worked on seven of the airport’s earlier renovations while with a local design firm. The holdroom project was one of his first assignments at YQR. Toth’s education in architecture allowed him to handle all the design work without assistance from an outside firm.

“My perspective was the long-term game plan,” he relates, noting that the 2019 project was the first step of a total renovation of the second floor. “But we were not building throw-away elements,” Toth specifies. “Instead, we were preparing for the next phase.”

The longer-term plan includes moving the screening checkpoint to the ground floor and possibly shifting restrooms, stairwells and elevator shafts.



RICHARD TOTH

As a small intermediate step between recent holdroom renovations and the checkpoint relocation, the airport plans to renovate restrooms and improve spaces currently occupied by Tim Hortons Express, Skyway Lounge, Brioche Dorée and Relay. One design goal is to open an exterior wall and provide passengers with better views of the Canadian Football League Roughriders stadium, which is just four miles away. One of the concepts under discussion is a sit-down restaurant with wait staff service.

The estimated price tag for the long-term renovation plan is \$8 million.

Much More Than a Wall

The airport retained PCL Construction Management to execute the designs Toth developed for the holdroom renovations and to remodel Airport Authority offices and relocate an information technology facility. The office and IT projects began in 2018 and were completed by spring 2019. The design for the holdroom project was completed in 2019, and PCL began construction that July. Much of the initial work occurred behind temporary walls decorated with graphics of historic aircraft.

“We fast-tracked a lot of the product ordering so we could streamline the construction and minimize the downtime,” Toth notes.

Because of the tight timeline, construction crews often worked while the airport was open instead of only during off-hours. Grant Selinger, PCL’s senior project manager, notes that this required extra vigilance from onsite managers and crews. “We always knew the biggest risk was working alongside passengers in an operating airport,” says Selinger. “We had daily meetings with the airport authority and key foremen.”

Transitioning the worksite from pre- to post-security areas occurred at night, without customers present. The bulk of the work was completed by Oct. 31, 2019.

Previously, one waiting area served several flights at the same time. So the airport re-allocated a few gates during the renovation project to help spread out the passenger volume. “You can’t have all the people boarding comfortably when crammed into a tiny area,” Bogusz comments. “Now, with the gates spread out, it doesn’t feel crammed.”

The airport replaced nearly all of its traditional row seating with new and more varied options from Arconas and Trade West, a



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supplier based in Regina. Now, almost every seat has a USB port and electrical outlet. Most tables in the shared dining area are outfitted to power and charge electronics as well.

On a related note, the airport improved its Wi-Fi by increasing download speeds from 10 megabytes per second to 30 and tripling the number of access points in the terminal. "We tripled our Wi-Fi speed at no cost to the customers," notes Justin Reves, YQR's communications and commercial development manager.

Separate from the holdroom renovations and Wi-Fi improvements, YQR retained an interior design team from P3A Architectural Partnership in Regina to eventually rebrand the airport's interior with new finishes. The colors and concepts P3A developed were used for the first time in the seating area and navigation paths throughout the renovated holdroom.



The airport added a play area like the giant structures found in fast food restaurants.

New Attraction for Kids

The play area installed during recent renovations caters to a wide range of ages.

Toth originally envisioned following an aviation or fossil theme, because

the Regina region is popular for hunting dinosaur fossils. But little could be found from manufacturers beyond a few planes designed for toddlers, so the airport opted for a larger climbing structure with slides and tunnels.

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“Most airports play areas are designed for 2- to 5-year-olds without much to entertain older kids,” he observes, noting that YQR’s new multi-level structure is sized and designed to appeal to older children as well.

Bogusz explains that the airport wanted an area where kids could burn off energy while their parents enjoyed a cup of coffee. “We did not scrimp on it,” he remarks. “We looked for the coolest one we could get in our budget.”

In the end, the airport went beyond its original budget of \$20,000, which was based on earlier concepts, and spent \$65,000 on an array that rivals the play areas found in fast-food chains. The 14-by-28-foot area was outfitted by iPlayCO, a firm based in British Columbia.

When YQR opened the play area just before last Christmas, its Facebook post elicited 1,400 likes, 231 comments and was shared 150 times. Reves and his staff estimate that the airport’s announcement reached at least 70,000 people.

Changes Pay Off, Then *Everything* Changed

In the first two months after renovations, liquor sales doubled and food sales grew more than 50%.

Originally, the project team expected that increased concessions revenue would “pay for” the cost of installing the new glass wall and other renovations in less than a year.

But then came COVID-19.

By April, YQR’s traffic was only 1.8% of April 2019.

“In May, there were 10 days we did not have a single commercial flight,” Bogusz laments. “In my wildest nightmares, I had never seen a terminal empty for an entire day with the exception of Sept. 11. It was unbelievable.”

By August, traffic rebounded to 19.2% of the previous August.

Typically, YQR averages about 25 flights a day. In September, it had seven daily flights.

With traffic off so dramatically, most concessions are closed or are operating with limited hours. The new play area is also closed.

The airport’s original game plan called for a variety of capital projects to unfold over the next five years—including more extensive renovation of the second floor.

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“We had done a lot of planning as to what the next phases would be,” Toth reflects. “One week we were talking strategy, and the next week we were restructuring our whole operational budget for essential services.”

Putting it bluntly, YQR is struggling to stay a float.

Bogusz says that YQR needs traffic levels to return to 70% to 80% of normal operations in order to break even. Near the end of the year, the airport will have depleted its operating cash reserves and will be forced to tap a line of credit to cover essential expenses, he elaborates.

Unlike U.S. airports and airlines, Canadian airports and airlines have not received special subsidies from their federal government. The only break airports received was an extension for rent payments to Transport Canada. “Airports here got nothing,” explains Bogusz. “No grants. No forgivable loans. Nothing.”

Despite the partial subsidies the Canadian government is providing to all businesses, YQR still had to lay off 35% of its staff. And the wage subsidies are scheduled to expire in December.

Toth was one of many who were furloughed at the end of April.

“My position is still there,” he says somewhat optimistically.

“When I go back is conditioned on cash flow and traffic activity. There are too many moving pieces right now to get a clear picture.”

Pushing Through

As of early October, YQR was maintaining a basic level of essential services—ground support, firefighting and security—to keep the airfield open for cargo operations and general aviation traffic.

Its business took a big hit when the federal government closed the border with the U.S., and all other international traffic is now flowing through airports in Vancouver, Calgary, Toronto and Montreal. Essentially, YQR’s outbound traffic is now limited to domestic flights serving airports in Vancouver, Calgary and Toronto.

Bogusz senses cultural challenges on that front as well. “Although well-intentioned, travel restrictions and health advisories have dramatically reduced travel demand, with many potential passengers cancelling or delaying their plans,” he observes.

Despite all the unprecedented hurdles 2020 has presented, Bogusz remains determined to see YQR through it all and emerge stronger for it—stronger and with a more effective concessions program. ✈️

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FACTS&FIGURES

Project: Ramp Replacement

Location: Paine Field (Everett, WA)

Terminal Owner/Operator: Propeller Airports

Project Scope: 3 aircraft parking pads, each 35,000 sq. ft.

Total Cost: \$1.5 million

Construction: 57 days

Completed: July 2020

Related Closure: 71 days
(May 22-July 31, 2020)

Engineering: Hanson Professional Services


Concrete Contractor: Salinas Construction

Of Note: Fast-tracking project during COVID-inspired terminal closure saved an estimated \$250,000 & prevented associated service disruptions for airlines & passengers

Future Work: Runway reconstruction & taxiway rehabilitation; master plan study by Landrum & Brown

Paine Field Saves Time & Money by Fast-Tracking Ramp Repairs

BY VICTORIA SOUKUP

 Paine Field (PAE), just north of Seattle, saved an estimated quarter of a million dollars and two months of time on recent ramp repairs by suspending commercial passenger flights and closing the terminal to complete the project while traffic was already slow due to COVID-19. The strategy also spared its airlines and passengers the service disruptions such work typically causes.

Propeller Airports, the private company that owns and operates the terminal through a long-term lease agreement with Snohomish County, was already planning to renovate the airside pavement. The coronavirus epidemic simply changed its strategy and accelerated the timeline for the \$1.5 million project.

Brett Smith, chief executive officer of Propeller Airports, notes that shortly after the terminal opened for commercial service in 2019, divots began appearing in aircraft parking areas. “Everyone

believed the pavement would be able to tolerate the aircraft movements that we anticipated, partly because Boeing 747s used to be parked there,” Smith explains. “But it turns out that the weight distribution of a 747 is over a much greater span than the E175s that utilize our airport.”



BRETT SMITH



Propeller and the airlines deemed the divots to be a safety issue, and Propeller installed steel plates at the parking positions as a short-term fix. The longer-term solution was to replace the asphalt parking pads near the gates with concrete. “Before COVID, we were going to do it over a four-month period of time,” says Smith. “However, because of COVID and the drastic drop of passenger traffic, we felt there was an opportunity to get it all done at once without disrupting our passengers or airlines.”

After securing FAA permission to suspend commercial passenger flights for 71 days (from May 22 to July 31), Propeller put its replacement plan into action.

Quick Turn Around

Hanson Professional Services, the firm that redesigned the ramp after the terminal opened in 2019, had originally planned to structure the more recent project through a series of carefully coordinated gate closures/openings and off-hour construction. When officials decided to temporarily close the terminal, everything changed.

“We had been working with the airport on a plan to pull the asphalt out and replace it with concrete,” explains Blake Swafford, senior project manager with Hanson. “When the airport

opted to close the terminal and move forward with the work, we took the plans we were working on and redid them very quickly to prepare for the shutdown.”

The project scope included three asphalt parking positions, each measuring about 35,000 square feet. Two are permanent positions serviced by jet bridges (Gates 1 and 2); the third is used for ground loading during busy times and overnight aircraft parking.

Crews from Salinas Construction spent six days pulling up the existing asphalt. Then they laid 6 to 7 inches of aggregate onto the cleared surface and installed standard rebar to prepare for a 14-inch layer of concrete.

“They were the perfect partner and the perfect contractor for the job,” Swafford says, noting that Salinas designed a concrete mix with high-strength and early-curing products specifically for PAE’s ramp.

The job was completed in 57 days, and all three pads can now hold Airbus A321s, Boeing 737-900s and other similarly sized aircraft.



BLAKE SWAFFORD

Strategy Validated

Before plans changed to replace the parking pads during a COVID-inspired closure, some personnel at Propeller were dreading the ramp project. "I knew it would be massively disruptive to passengers and airlines," Smith relates. "We would have gotten through it, of course, but there probably would have been some nasty tweets."

But completing the project without any traffic on the tarmac helped the reconstruction process run smoothly and saved an estimated \$250,000 on \$1.5 million of work, he explains.

Moreover, the new concrete is considered to be a 30-year fix. "We spent a lot of money to do it right," Smith says, adding that some important benefits can't be measured strictly in money. "We're talking about passenger convenience and no flight delays."

Hanson's Swafford was also pleased with how the change in execution strategy affected the project. "Gate positions are typically being used all day long, and quite often, this kind of work is done at night and one gate at a time," he comments. "We just happened to have COVID-19, which impacted traffic volumes to a point where the terminal was able to shut down for a period of time to do the work. Being shut down provided the opportunity to do the work all at once, which was a time savings,

a cost savings and ultimately resulted in a better-quality end product for the airport."

Smith reports there have been no problems with the new parking surfaces since commercial passenger flights have resumed. "We have a safer environment, and we can use our gates without any encumbrance," he elaborates. "And the pilots who use our airport really love it. Our goal is to exceed what normally can be done and never compromise on safety."

Happy Anniversary

Prior to the coronavirus pandemic, PAE had been offering commercial service for about one year. In fact, it broke the 1 million passengers mark during its 50th week of operation. With United Airlines and Alaska Airlines serving a total of 12 cities, about 3,000 passengers were going through the terminal on an average day.

Like other airports, PAE experienced a precipitous decline in passenger volume this spring when COVID-19 took center stage in the U.S., but Smith reports that traffic began to slowly tick up after it resumed full operations in August. With new COVID-19 precautions in place, only ticketed passengers are allowed into the terminal, and all passengers and employees must wear face coverings. A thermal camera mounted on the terminal ceiling scans for people who have temperatures greater than 100.4 F.



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As of late September, the cameras had not detected any high-temperature individuals.

“It’s not that I don’t want extra people in the terminal, but it’s just not necessary right now,” Smith says. “It’s all about making sure that the airport staff, passengers and airline employees are all safe.”

The terminal’s small size makes it easy to keep clean, he adds. “We don’t have as much surface space as a large airport.”

Smith predicts that smaller airports like PAE will become even more attractive to passengers in the coming months. “People are starting to recognize that they can get to the same destination by going through a smaller airport that they can get in and out of quickly,” he explains.

Despite dramatic changes in the industry, Smith reports that some things never change. “Our goal remains the same: to make sure we exceed our customers’ expectations. And we are doing that,” he reports. “We’re back open, and people are excited.”

More Improvements Coming

Airport Director Arif Ghouse notes that PAE has several other capital improvement projects in the works, including the



Crews were able to work unimpeded while the terminal was closed and commercial passenger traffic was suspended.

reconstruction of its main runway and rehabilitation of adjacent taxiways.

In addition, Landrum & Brown will begin developing a master plan later this year. The study is expected to take two to four years to complete and cost \$2.5 million.

“This master plan will be a blueprint for how we want to develop the airport for the next five, 10, 15 and 20 years,” says Ghouse. “It will tell us how we will do all those projects.” ✈️



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EAGLE COUNTY
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New Concourse Positions Eagle County Regional for Growth

BY KIMBERLY GIBBS

It's a new era for Eagle County Regional Airport (EGE), located in the heart of the Colorado Rockies. After operating out of a temporary facility for nine months, the county-owned airport celebrated the opening of its new 65,000-square-foot concourse last December.

Although EGE's previous concourse was still relatively young, the growing popularity of Vail, Beaver Creek and other nearby ski resorts drove the decision to replace it.

"From the time the terminal was built (1996), passenger traffic during our peak months, and even year round, continued to grow and outpaced the facility we had in place," explains Airport Director David Reid.

Specifically, the décor and customer amenities were out of date, and the boarding areas had become overcrowded—especially during flight delays due to inclement weather.

In 2015, airport and county leaders developed a plan to improve the experience of the nearly 400,000 passengers using EGE each year. Ultimately, they determined that replacing the 20,000-square-foot concourse was the best course of action. Their vision of a new concourse included jet bridges rather than ground loading, roomier boarding areas and upgraded concessions and other customer amenities.

Airport and county executives were aligned about the need for new facilities and agreed about the scope of the project and a \$33 million

budget. As key decision makers searched for the right talent to bring the "dream terminal" to fruition, they determined that a design/build contract was the right way to keep the project on track.

Designed & Built for the Future

Gensler and Hensel Phelps were selected as the design/build team after the airport and county personnel reviewed and ranked multiple contractor bids. The design/build partners and EGE then worked together to analyze the scope of work that was requested.

Reid notes that they focused on creating a facility that would meet the airport's needs and serve customers well into the future, but it was also important for the new concourse to represent the airport and local community.

"They wanted to elevate the passenger experience, folding in the other architecture that was already in place and connect it to the landscape around it," explains Gensler Design Director Jonas Philipsen of the guidance Eagle County provided. "Although EGE had the appropriate number of gates for the new terminal, they were all undersized and not providing the level of service they expected for customers."

Working under a truncated timeline, Gensler conceptualized EGE's needs and created a new concourse design in about six months. Contractors broke ground in April 2018, and construction



DAVID REID



JONAS PHILIPSEN



FACTS&FIGURES

Project: New Concourse

Location: Eagle County (CO)
Regional Airport

Size: 65,000 sq. ft.

Gates: 6 (4 with jet bridges; 2 outdoor)

Ground Services/Baggage Handling Area: 17,336 sq. ft.

Cost: \$37 million

Funding: Airport revenues; FAA grant

Design/Build Partners: Gensler (design); Hensel Phelps (construction)

Design Process: 6 months

Construction: Groundbreaking in April 2018; Gates 1-4 substantially complete in June 2019; Gates 5-6 substantially complete in Dec. 2019

Features: Lounge area with fireplace, couches & rocking chairs with in-seat chargers; expanded concessions area; new paging system; animal relief area; elevators & escalators; touchless restroom fixtures; larger private nursing rooms

Airside Elements: Common-use gate system; 4 heated jet bridges; 2 ground loading positions; 10 parking places for commercial aircraft

Electrical/Fire Alarm: Encore Electric

Mechanical/Plumbing: MTech Mechanical

Low Voltage/Security: DMI Technologies (construction); BG Buildingworks (design)

Fire Protection: Nothhaft Fire Protection

Roofing/Metal Panels: Umbrella Roofing

Glass & Glazing: Pinnacle Glass

Structural Steel: WSI Iron

Wood Ceilings: Razor Acoustics & Specialties

Polished Concrete: Absolute Concrete Flooring

Framing & Drywall: Peak Interiors

Jetbridges: JBT AeroTech Technologies

Baggage Handling System: Five Star Airport Alliance

Trailers for Temporary Concourse: Williams Scotsman

Holdroom Tandem Seating: Bernu Aero by Arconas

Rocking Chairs: GT Rocker by Gus* Modern

Holdroom Lounge Chairs: Element Lounge Chair by Andreu World

Custom Wood Benches: Knapp Ranch

was in full swing by the start of ski season, the airport's busiest time of the year.

"We made a commitment to the EGE team that we would only impact a single ski season," notes Gensler Design Manager Adam Ambro.

In order to keep that commitment and stick to the projected 20-month timeline, the Hensel Phelps and Gensler team designed and constructed a fully operational temporary concourse to serve passengers while the new concourse materialized behind the scenes.

Temporary Quarters

In keeping with EGE's overriding goal of improving the passenger experience, the project team felt that the temporary concourse could not look like it would be torn down in a matter of months.

"We wanted to make it comfortable for passengers, fully operational for the airlines and concessionaires, and it ended up coming together very nicely," says Hensel Phelps Project Manager Tyler Tubbs.

The team used pre-manufactured trailers to add 12,800 square feet of space for a gate area, food concession, bar, bathrooms, arcade



ADAM AMBRO



TYLER TUBBS

games and seating. The trailers provided the framework for the temporary facilities, and the project team added carpeting, drywall, paint and fixtures. It also created the wood-framed structure connecting the pre-manufactured trailers. Designers leveraged finish materials to make the temporary facilities comfortable for passengers and added a large north-facing window to provide them with mountain views.

The existing terminal ended at Gates 5 and 6, and a ramp allowed passengers to access Gates 7 through 10 in the temporary concourse.

The temporary facilities cost about \$1.5 million and were included in the original design/build plan and budget. The design process only took two weeks because the project team opted to use pre-manufactured structures. Crews then spent three months constructing and preparing the facilities for airport tenants and customers.

The switch from the existing facility to the temporary concourse was completed overnight. Airlines coordinated with the construction team to relocate some of their podiums to the temporary facility before the move to allow for testing. One day before the move, airlines operated from the existing concourse with fewer podiums than usual. The carefully orchestrated move began right after each airline's last flight of the day. As soon as that flight departed, the construction team relocated the airline's entire operation so the carrier was up and running before the first flight the next day.

Operations moved to a fully functional temporary concourse while the old facility was demolished and rebuilt.



Jodi Doney, EGE's terminal operations manager, reports that the project team did *such* an effective job creating the temporary space that passengers often assumed it was the new facility. "It looked professional and had a great feel for our customers," she remarks.

Construction of the new concourse was subdivided into two phases. This allowed



JODI DONEY

crews to demolish a select portion, rebuild that area, and then transition it back into operation.

Based on the ambitious overall timeline, demolition of the old concourse had to occur during EGE's peak travel period. That, in turn, made it imperative for the temporary structure to be ready for the flood of skiers and snowboarders that typically begin bustling in and out of the airport each November.

Pardon the Dust

Construction moved ahead, but not without challenges. From the airport's perspective, it was crucial for the project team to communicate frequently and coordinate effectively to keep daily operations running smoothly. Hensel Phelps stressed the importance of updating stakeholders about the construction schedule, especially when work transitioned between the two phases.

"When you're operating in an airport, overcommunicating is extremely important," says Tubbs. "We knew we couldn't operate in a bubble. It was critical to have those lines of communication open, have everyone in the loop and get the appropriate buy-in as we moved forward."

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David Lauer Photography

The team held meetings and conducted walkthroughs almost daily to stay abreast of the project and head off potential issues before they became problems.

Airport leaders and their project team were acutely aware that passengers could choose to use a larger nearby airport like Denver International to avoid EGE during construction. As a result, they worked to maintain a sense of normalcy for passengers and prevent traffic from dropping.

“We fully understood that this might be a passenger’s first and, if we weren’t careful, last experience at the airport,” Ambro relates. “So that put extra pressure on the design and construction team.”

Challenge or Opportunity?

Architects, contractors, airport staff, airlines and other stakeholders collaborated to benefit their collective customers. One of the design/build team’s primary goals was to create a more efficient infrastructure that would be easier for EGE to maintain and grow in the future.

To do so, a multi-discipline group examined how passengers navigated from the TSA checkpoint through the facility. The

group also assessed the information technology systems and infrastructure, which had been added in multiple layers over the years to improve service. Miles of cables and wires behind the walls of the existing terminal were not labeled, organized or efficient for their specific tasks.

Airport officials chose to view the situation as an opportunity to make improvements that likely would not have occurred without the new construction. But it took time for contractors to determine the use of every wire or cable and decide which needed to be returned to their original places and which needed to be relocated or removed. In all, the process took about 18 months.

To move the construction along, Hensel Phelps hired subcontractor specialists for the technology, cable and fire systems in the new concourse. The team established airport-wide cabling standards and worked with stakeholders to determine if existing lines could meet their needs. Moving forward, airport personnel will request plans before new cables or wires are added.

“We tackled cabling and really any challenges that came up in a thoughtful manner,” says Doney. “We took the necessary time to make the best choices for the airport now, but also with its future needs in mind.”

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New & Improved Facility

Although the new concourse was slated for completion in December 2019, the airport was able to hold a soft opening in July for county officials, the community and other stakeholders. The sneak peek of the near-complete facility proved popular. Gates 1 to 4 were finished by June 30, and the first flights began operating out of the new concourse on July 1. Gates 5 and 6 were completed ahead of schedule in December.

Toward the end of the project, the originally \$33 million budget inched up to \$37 million as EGE and county officials added elements such as private nursing areas to further improve the customer experience.

The end result was a new 65,000-square-foot concourse with four gates connected to jet bridges, two ground loading positions and tarmac space for 10 commercial aircraft. Improved baggage handling equipment and a more spacious TSA screening checkpoint were also added.

One of the facility's most popular features is a large lounge with a two-sided gas fireplace, couches and rocking chairs with inseat chargers for phones and other electronics. Other customer amenities include upgraded concessions, restrooms with touchless fixtures, private nursing rooms for mothers and an animal relief area complete with a fire hydrant.

"We simply could not have undertaken this project without support from our stakeholders and strong collaboration from the project team," Reid reflects.

In retrospect, he says that thorough communication and having members from the design/build team onsite helped the construction process go very smoothly.

"It was important to the team to make sure we established the expectations upfront, because we knew we didn't want to try to set a standard further into the project," he adds. "We wanted to create the best experience we could for our customers and stakeholders. The team really understood that."

New Customer Experience

Designers note that the new facility enables EGE to have the necessary ramp and gate space for flight operations, and enhanced aesthetics for passengers.

"Through our lens, we wanted to reflect the airport's primary consideration, which was to create a facility that was inspired and connected to the local Eagle County community," says Brent Mather, a principal designer at Gensler.



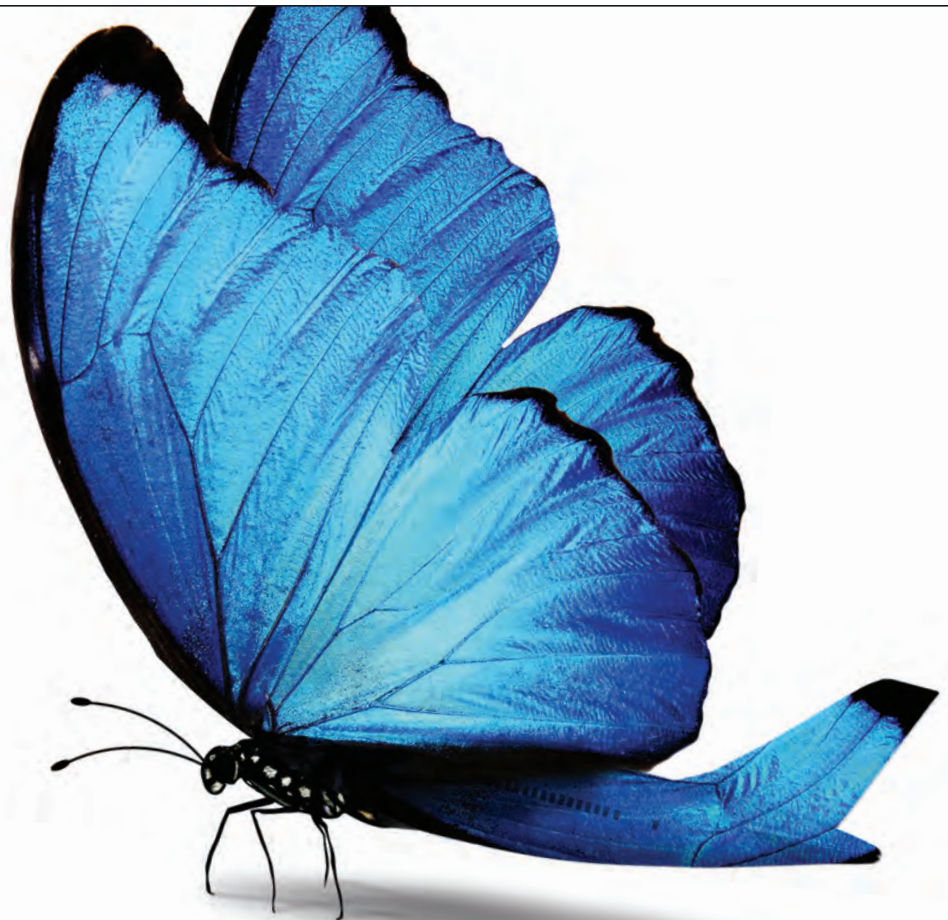
BRENT MATHER

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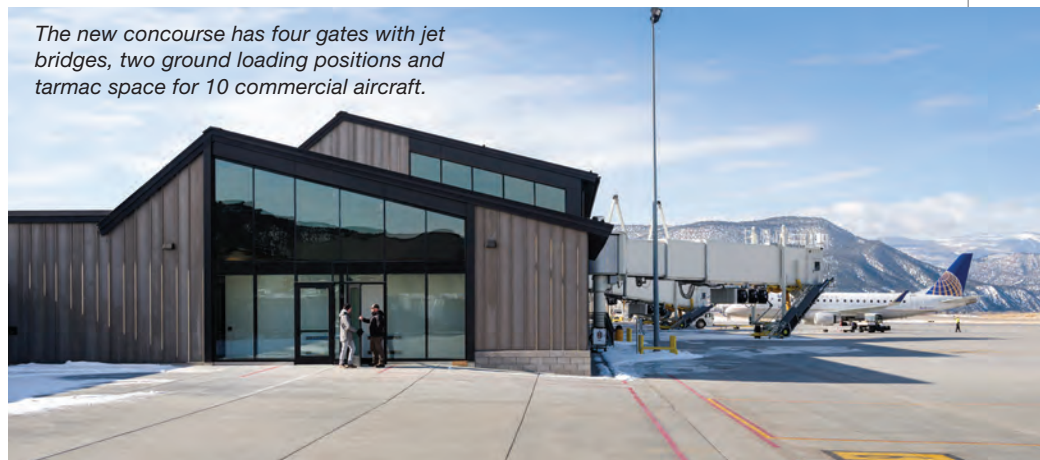
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Toward that end, the facility showcases sweeping views of the Rocky Mountains through a wall of windows on the second level that runs along the north end of the building. Other local touches include wood benches crafted by local artisans just after the TSA checkpoint. The second level of the concourse is adorned with exposed steel beams, maplewood ceilings and polished concrete floors.

“We were building this terminal for the airport, its tenants and the community,” says Tubbs. “The result is definitely something we’re proud to be part of creating.”

Ensuring a stress-free travel experience for passengers was another central objective.

“At a fundamental level, we addressed the functionality of the terminal from the checkpoint to finding a gate or a restroom,” summarizes Ambro. “Once you address those areas, then passengers can relax



The new concourse has four gates with jet bridges, two ground loading positions and tarmac space for 10 commercial aircraft.

and notice the views, the warmth and hospitable environment.”

As airport director, Reid is pleased that improving the customer experience guided the design and construction—and that county officials were willing to invest in achieving that goal. EGE is now a more attractive gateway to Eagle County, he notes.

“We’re not your typical airport anymore,” agrees Doney. “Customers feel like they’re in a lodge. They’re comfortable and they’re at home, which translates into passengers having a good feeling and great experience.” ✈️

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FACTS&FIGURES

Project: New Pickup Curb

Location: Washington Dulles Int'l Airport

Strategy: Relieve curbside congestion by adding separate pickup area for passengers using Uber, Lyft, etc.

Timeline: Aug. 2019–Aug. 2020
(bidding through public opening)

Official Debut: Aug. 18, 2020

Project Design: Johnson, Mirmiran & Thompson Inc.

General Contractor: Protec Construction (local disadvantaged business enterprise)

Tolling & Traffic Management: TransCore

Vehicle Management Software: GateKeeper

Concrete Contractor: JSC Concrete Construction

Steel Fabrication: Clark Machine Corp.

Steel Erector: LR Wilson & Sons Inc.

Solar Panels: Solar Energy Services Inc.

Electrical Contractor:
Current Alternatives LLC

Quality Control Testing & Inspections:
Geopotential Consulting

Engineering & Survey Contractor: Bowman Consulting

Traffic Maintenance: Top Dog Services

Special Inspections & Acceptance Testing: Alpha Corporation; Engineering & Materials Technologies

Pavement Maintenance: Espina Paving Inc.

Dulles Int'l Adds Separate Pickup Area for TNC Traffic

BY KRISTIN SHAW

 With curbside congestion becoming a growing frustration at Washington Dulles International Airport (IAD), it was clear that something had to change. The influx of vehicles was simply more than the veins and arteries of airport roadways could handle.

“It was practically gridlock,” relates Vice President and Airport Manager Mike Stewart.

Recognizing the need to improve ground transportation flow, the airport operations team zeroed in on traffic from app-based transportation network companies (TNCs) such as Lyft and Uber. In mid-August,



MIKE STEWART

IAD debuted what it calls the third curb, an area dedicated solely to TNC pickups. The new system is designed not only to relieve congestion at the curb, but also to make it easier for passengers using app-based ride services to connect with their drivers.

“We worked closely with the TNCs, looked at real estate we had, and learned lessons from other airports to create a plan,” says Stewart. Portland International and Los Angeles International were among the airports the ops team studied or consulted.

The new TNC pickup spot at IAD is located on the ground level outside of Baggage Claim area just beyond the curb for commercial vehicles. The airport gave up valuable real estate—about 100 spaces in its terminal



parking lot—to create the new curb. The bright spot was that COVID-related traffic declines simplified the process of resurfacing and striping the pavement. In the end, IAD was able to capture back some of the parking spots and actually improved the overall flow through the parking lot.

The new TNC curb stretches almost 500 linear feet and includes a steel canopy to protect passengers from inclement weather while they wait. The curb is divided into several zones with alphanumeric labels to help customers find their drivers quickly. (Austin-Bergstrom International Airport in Texas uses a similar zone system.)

Even though recent traffic has been much lighter due to the coronavirus pandemic, IAD personnel can tell that the new curb is helping redistribute vehicle volume. Dividing the various traffic streams helps relieve the pressure of having too many vehicles in one compact area, Stewart explains. Rideshare drivers can now enter and exit more easily because they don't have to navigate through other pickup traffic.

Additionally, the “third curb” helps facilitate social distancing by separating passengers waiting for TNC rides from other passengers waiting to be picked up by commercial vehicles or family, friends and associates.

Drop-offs from all types of vehicles remain on the main departures level.

Tracking TNC Traffic

When TNC drivers cross one of IAD's invisible electronic boundaries, their cellphones ping the associated TNC servers. The airport uses GateKeeper software to receive that data, and TransCore oversees the front-end roadway infrastructure—RFID tracking, sensors and vehicle transponders.

“GateKeeper handles all the back-end recording information, and they create the charges and the trips,” explains Forrest Swonsen, associate vice president of Airport Systems and Services for TransCore. “No physical infrastructure is necessary on the roadway; it's a Google-based geofence that works in the cloud. Essentially, the same feed going back and forth between the driver and the customer is shared with GateKeeper once a TNC vehicle hits the geofence. Then the airport get a slice of that data for tracking.”



FORREST SWONSEN

Information IAD receives includes the date, time, coordinates of where a vehicle crosses the geofence perimeter, which TNC is working through, the vehicle license plate number, the driver's identification code, and the type of trip (e.g. entry, exit, pick-up, drop-off). The airport used the data to track traffic and collect access fees from TNC. Transponder data and spot checks such as random vehicle inspections at the curb, passenger surveys and other automated vehicle monitoring technologies are drastic improvements over the previous honor system used for fee payment.

The airport project team spoke directly with app-based rideshare companies and individual drivers to ensure that the new process would work well. “The biggest concern from drivers was that they didn't want to be stuck in a remote area that would not be convenient for passengers,” says Stewart.

Don Griffin, senior manager of Airport Business Development for Lyft, notes that IAD's new pick-up area is conveniently located outside of baggage claim at ground level. “By having a dedicated rideshare curb that is still within close proximity, Lyft riders can receive prompt and improved service without having to walk a great distance,” says Griffin.

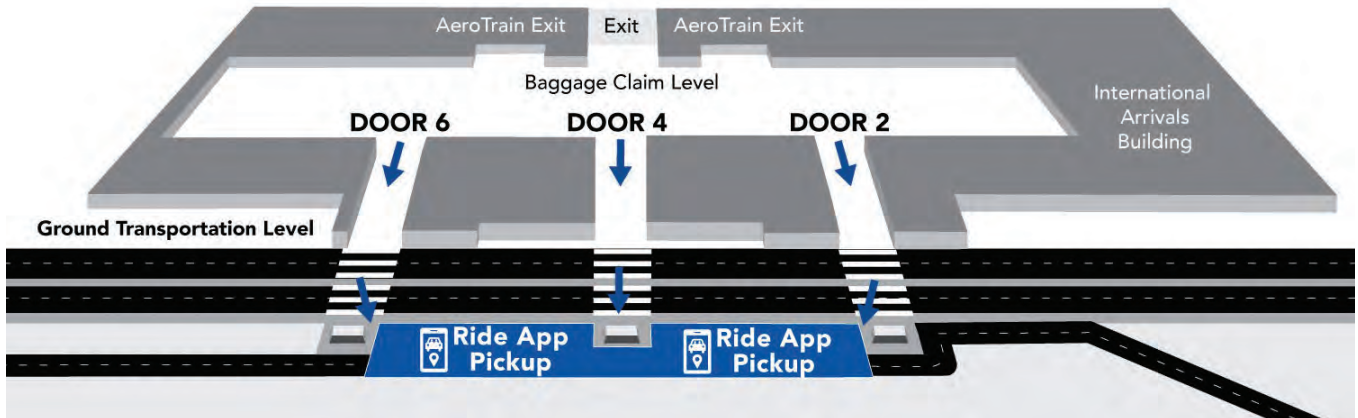


DON GRIFFIN

Several TNCs collaborated with the airport to make sure the new system would improve efficiency at the curb and accommodate rider preferences.

Griffin and his staff met regularly with the IAD team early in the design process. “Our discussions included recommendations on a multitude of operational aspects, including layout for passengers and vehicles, vehicle throughput, signage, activation date and other rideshare considerations,” says Griffin.

The airport also asked passengers what was important to them, and used their input to improve the pickup process and area. Signage was refined from April to August, during COVID downtime.



Quick Turnaround

Vik Singh, vice president of Protec Construction, recalls the airport approaching his company in August 2019, two weeks before the curb and canopy project was bid. “We won the job on technical excellence and got started three weeks from that day,” he remarks.



VIK SINGH

Before construction began, the contractor encountered pre-existing soil conditions, duct banks and abandoned concrete piers that had to be demolished. “You can’t predict these things,” says Singh. “We prepare for those kinds of unknowns.”

The project was also challenging because the worksite was located in the busy front section of the airport. Crews had to block off the main parking lot and a full commercial bus lane to receive and stage construction materials. To avoid the heaviest traffic, most work was performed at night. Outages and switchovers had to be carefully coordinated with the airport operations and parking teams.

“Each time it rained, we had to stabilize the ground and test it multiple times,” adds Singh. “When it rains, concrete loses compaction, so we had to add sub-base. It was a challenge to do that during the winter months.”

The project team paused construction for the holidays and severe weather. Fortunately, construction was largely finished by the time the coronavirus lockdown began in March. All that remained were minor touchups, electrical tie-ins and final run-throughs.

Crews Worked West to East

Protec demolished the existing curb and sidewalk, excavated for footings and began construction by pouring the new footings. It then managed the subsequent installation of the structural steel frames, steel decking, electrical rough-ins and solar panels.

Originally, the project had three phases, but Protec divided work into two geographic sections. “It made the most sense to start on the west end, with the demolition, concrete pouring, adding the canopy posts, painting and sidewalks. Then we

tackled the east canopy side,” Singh relates. “It was easier to start with west entrance because of the way we could receive the structural steel members, concrete trucks, boom trucks and cranes in and out.”

The revised two-phase approach also worked better because vehicle traffic flows from west to east.

After both sides of the canopy were complete, the Protec team used existing underground tunnels to connect the electrical cabling through the duct bank. At the same time, crews installed the solar panels on the roof, taking care to slope them so they don’t accumulate snow and rain.

“We wanted the solar panels on top of the angled metal roof to take as much sun as possible,” Singh explains. “The panels charge up all day to collect and store energy. The airport is not using any other power for lighting [in the TNC pickup area].”

There is ample room for additional solar panels to generate even more power to use in the terminal, he notes.

The trusses, frames and canopy tops are made of hot dip galvanized steel. As required by the Metropolitan Washington Airports Authority, they were fabricated and erected by contractors certified by the American Institute of Steel Construction.

Singh estimates that the steelwork process took about three months, including fabrication, galvanizing (in Pennsylvania), shop priming and inspection/testing. “It’s very well built,” he says. “If it is maintained properly, it’s going to last a lifetime.”

Singh credits an engineering and facility services department at the Airports Authority for playing a significant role in the project. He says that without its coordination, communication and dedication, Protec would not have been able to meet the stipulated deadlines.

Data Loss Was Unacceptable

Swensen emphasizes the need to prevent or minimize the loss of data when adding a new feature such as TNC-only curb. That’s why he advocates using a test bed.


Even though IAD has been using RFID to track commercial vehicles since 2007, making physical and business changes without impacting traffic flow was still challenging.

“Operations like this can’t afford to lose revenue or data,” says Swonsen. “When you add TNC operations, you have to be able to update the back-end software without interrupting data flow or revenue. The airport relies on that information from a planning standpoint. Data aggregation is the new big thing, and getting that in one dashboard is a big help because it provides a clearer picture of curbside utilization.”

TNC data is uploaded to a cloud-based platform, and data is pulled and leveraged with information about taxi dispatches and other commercial vehicle activity to drive reporting information for an integrated perspective. Creating an aggregated picture is really valuable, stresses Swonsen.

“What we’re working on now is syncing up the back end to close the trips on the third curb,” he says. “That, in turn, can generate dwell time information and other data the airport will use.”

Although the new curb was ready for traffic in April, Stewart and his team decided to delay its official debut until August because there was no immediate need for it during the COVID-19 shutdown. But as traffic inches back up, they are noticing the arrivals curb getting crowded again.

“All we have heard from the drivers has been positive,” he reports. “When we get busy again, they won’t have to weave through what could be gridlock.” 



The team refined signage while traffic was slow due to the coronavirus pandemic.

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Improvements to Bulk Fuel Farm at JFK Int'l Include First New Tanks in Almost 50 Years

BY JENNIFER DAACK WOOLSON

 Beatlemania, bell bottoms and lava lamps. These were all the rage in the '60s, when most of the bulk fuel farm at John F. Kennedy International Airport (JFK) was built. It contains 62 tanks varying from 250,000 to 500,000 gallons each because it was designed for the way airlines worked at the time, with different grades of jet fuel and fuels with different tax status stored separately.

But today, with comingled fuel and improved metering technology, the fuel farm is just as outdated as bell bottoms. Plus, with the average (pre-pandemic) demand for fuel at JFK exceeding 4.8 million to 5 million gallons per day, the tank farm was struggling to satisfy demand during peak periods.

So in 2012, the Port Authority of New York and New Jersey (PANYNJ) and the

airlines collaborated on a long-term plan to modernize the fuel system. Because the older tanks required more effort to operate, the strategy was to upgrade the size of the tanks so there would be fewer tanks to manage. This would make the tank farm more cost-efficient to operate while adding storage capacity for future growth.

To execute the plan, the airlines began by forming a consortium called JFK Fuel Infrastructure LLC. Consortium Chair Matt O'Mahoney explains that this allowed the airlines to finance the project and to retain project management and engineering services. "The way it was structured, from



MATT O'MAHOONEY

a commercial and financial standpoint, was very advantageous for the airlines."

The consortium contracted Argus Consulting, the largest U.S. based aviation fuel design and project management firm, for concept development; final design; permitting, bid and award assistance; construction administration and resident representation services. Argus developed a \$43.5 million plan to build two 3.4 million-gallon tanks, each with a secondary containment. Construction started in February 2019 and was slated to end in October 2020. But that was really just the beginning.

The longer-term plan also calls for further modernization, including demolition of the existing smaller tanks and the addition of seven to nine more 3.4 million-gallon tanks within the footprint of the bulk fuel farm.



FACTS&FIGURES

Project: 2 New Aboveground Fuel Storage Tanks

Location: John F. Kennedy Int'l Airport

Site: Bulk Fuel Storage Farm

Airport Owner: Port Authority of New York & New Jersey

Fueling Consortium: JFK Fuel Infrastructure LLC

Nominal Capacity: 81,240 barrels (about 3.4 million gallons) per tank

Configuration: American Petroleum Institute 650 tanks with suctions, fixed frangible roofs & steel secondary containment

Project Cost: \$43.5 million

Timeline: Construction began in Feb. 2019; completion anticipated in Oct. 2020

New Total Capacity at Bulk Farm: 35.8 million gallons

Project Manager: Argus Consulting Engineers, P.C.

Design Engineers (Civil/Electrical/Instrumentation & Controls/Mechanical): Argus Consulting Engineers, P.C.

Fuel Farm Manager/Operator: Allied Aviation

General Contractor: Mecon Industries Inc.

Tank Manufacturer: Chicago Bridge & Iron

Overfill Protection System: Automatic Overfill Protection System (AOPS), with independent mechanical high-level shutoff switch

Geotechnical Engineering: Langan Engineers

Structural Engineer: Thomas F. Heausler, P.E.

Corrosion Protection Engineering: EN Engineering

Tank Gauging System: ENRAF Servo Gauge System & Temperature Probe

Work Scope: Construction of 2 aboveground storage tanks at the bulk fuel farm, including pile foundations; steel containment & fuel, fire protection; civil; electrical power; communications & cathodic protection infrastructure to support tank operation & maintenance; site & roadway modifications/improvements

Next Step: Install 2 more 3.4-million-gallon tanks

Long-Term Plan: Remove existing smaller tanks & install 5-7 more 3.4-million-gallon tanks

2 New Tanks

Prior to construction, the project team spent six to nine months securing approval for the construction under the PANYNJ building permit process, completing an Environmental Assessment under the National Environmental Policy Act and receiving clearance from the New York State Department of Environmental Conservation.

To minimize risks and reduce delays, Argus began construction on an existing brownfield site that the Port Authority had been using to stage debris from runway construction projects. The site was far enough away from the existing tanks that a planned second set of tanks can be constructed adjacent to these tanks without the need to demolish any of the existing tanks. "That means we can eventually construct four 3.4-million-gallon tanks without reducing



PAUL JOHNKE

the existing capacity of the bulk fuel farm," explains Paul Johnke, director of New York operations for Argus. "This approach eliminates the risk of an issue arising during construction causing the new tanks to not come into service as planned, reducing the overall capacity of the bulk fuel farm."

The two new tanks are each 110 feet in diameter and 48 feet tall with 16-foot high containment walls nearly twice the diameter of the tanks. Because the site had poor soil quality, Argus' geotechnical design called for 293 piles per tank—each pile approximately 60 feet long—to provide a firm foundation for the tanks. A pile cap was cast on top of the piles and integrated into the concrete to support the tanks.

Crews erected the tanks ring by ring out of panels that were 30 to 40 feet long and 10 feet tall. With all five rings in place, the tanks stand 48 feet high. Because of their diameter, a center column supports rafters that in turn support the steel roof plates.



Each of the new tanks stands 48 feet tall and can hold about 3.4 million gallons of fuel.

The project also added a fire protection building with firefighting foam and a water deluge system. The existing access road to a guard post was relocated, and an access road to the tanks was provided for maintenance vehicles and fire equipment.

A Wrinkle in the Plans

Construction moved along according to plan until Halloween night 2019, when the New York area experienced a severe nor'easter

type storm with very high winds. Tank 2's shell, which was about three-quarters complete, experienced a blow-in that partially collapsed the tank into a shape that resembled the Bird's Nest, the iconic curved stadium from the Beijing Olympics. Johnke notes that although the tank erector had braced the tank to prevent a blow-in, the winds experienced that night significantly exceeded what was anticipated.

The next morning Argus and construction contractor Mecon quickly went into recovery mode with a three-step plan:

1. Stabilize the tank so it would be safe to enter.
2. Assess the level of damage and identify which plates needed to be replaced and what could be repaired.
3. Repair and replace what was damaged so that construction could continue.

"At the time of the blow-in, there were four shell rings in place, with the fourth ring not yet totally welded in," Johnke recalls. "So the amount of damage was limited, but it did cause us to have to go back and perform rework to bring the tank back to the point where we were at before the blow-in."

The repairs created a six- to eight-week lag in the schedule, but the damage was classified as an "act of God" by the contractor's insurance company and all associated costs were covered.

Bigger Tanks = Bigger Benefits

In early October (2020), crews were on track to complete construction by the end of the month and integrate the two new tanks into the existing fuel system infrastructure with the help of Allied Aviation, the firm that manages and operates the bulk fuel farm for the Port Authority.

O'Mahoney explains that having tanks with a larger storage capacity allows for lower operating and maintenance costs, which results in lower per gallon charges for the airlines. "This project gives us the ability to have more storage, better utilize the overall system and avoid any shortages as we grow—which was a major concern, given the trajectory of pre-COVID growth of gallons consumed at JFK. We simply didn't have the fuel storage."

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Both JFK and LaGuardia Airport (LGA) are fed by the Buckeye Pipeline out of Linden, NJ. So if something were to go wrong with the pipeline, both airports could have a major fuel shortage. "It's so much better to have that additional storage on site so you can more effectively and efficiently schedule the pipeline batches into the airport," O'Mahoney says. "It secures the fuel supply into JFK for several years to come. And the modernization with the bigger tanks is the right way to go because it's also more cost-effective for maintenance."

Transferring Fuel Tank Ownership

After construction is complete, ownership of the new tanks will be transferred from the airline consortium to the Port Authority, and Allied Aviation will operate them as part of the existing bulk fuel farm.

Johnke notes that this arrangement is not the norm. "The most common model in the U.S. is that the airlines form a consortium, build the fuel system, and then own and operate it on property leased from the airport. In this case, the airport owns and operates the fuel system. There aren't that many locations where that actually happens."

JFK Fuel Infrastructure obtained a loan to pay for construction of the project. When the tanks are turned over to PANYNJ, the consortium will recover its loan costs through gallonage fees that are levied based on throughput at the bulk farm.

"The Port Authority owns the rest of the tank farm, so being able to construct these tanks but then have them linked in with the rest of the fuel system that is owned by the Port Authority seemed to be the most practical approach," says O'Mahoney.

Future Plans

Looking ahead, the bulk fuel farm's 62 existing tanks and the two new tanks will provide the airport 35.8 million gallons of on-site fuel storage. Next up, the plan calls for the addition of two more 3.4-million-gallon tanks adjacent to the tanks under construction, and eventually five to seven others. Johnke explains that all the new tanks will be concentrated in one area so that as older tanks are eventually demolished, the tank farm will become smaller. This will make the farm easier to maintain and free up areas for other airport tenants, he explains.

In addition to its bulk fuel farm, JFK also has a satellite fuel farm that receives fuel from the bulk facility through a transmission system. From the satellite fuel farm, fuel is pumped through the north and south periphery distribution mains to the individual airline terminals, where Allied uses inground hydrant systems to refuel aircraft at the terminal gates. If the larger plan evolves as expected, the satellite farm will eventually be demolished and fuel will be pumped through a new set of transmission mains from the bulk fuel farm directly to the terminals.


According to O'Mahoney, no timelines have been set for later phases, and the master plan is currently undergoing a standard review process. Regardless of how the master plan evolves, the recent tank project provides a jump-start on future

improvements. "Having this project as a model of modernized tanks could allow us to 'copy and paste' that into a couple locations where it fits in with the master plan," he remarks.

Cooperation & Collaboration

Other than the blow-in, Johnke and O'Mahoney both say the project went relatively smoothly due to the team's experience, expertise and effective working relationships.

Argus and Mecon have worked together on various projects at JFK for more than 20 years, and both specialize in fueling infrastructure. Johnke notes that Argus has a good network with Mecon's project teams and executive management. "It's been a very close and collaborative situation with the contractor," he comments. In addition, Johnke's previous years working for PANYNJ helped the team navigate the Port Authority's complex permitting process.

O'Mahoney cites teamwork as a key ingredient as well, particularly the consortium's partnerships with the Port Authority and Argus. He also credits the Port Authority for providing flexibility for the consortium to manage the project and raise the funding, and for providing good oversight to the team during the project. "Those were the keys to success," O'Mahoney reflects. "There's a lot we can hopefully leverage from this good experience for future work that needs to get done at JFK." 



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Symbiotic Relationship With State University Helps Propel Salina Regional Into the Future

BY PAUL NOLAN AND TIM UNRUH

Some say that when one door closes, another one opens. Turns out that when one Air Force base closes, a lot of doors can open.

Salina Regional Airport (SLN), located about 175 miles west of Kansas City, is currently a thriving municipal airport fed by a busy industrial park and a satellite campus of Kansas State University. But that wasn't always the case.

When Schilling Air Force Base was shuttered in October 1965, the ripple effect on the local economy was devastating. The growing Salina community, which was expected to hit 50,000 residents by 1965, instead lost 13% of its citizens. By 1970, its population was down to 37,714.

"We had just moved to Salina in 1962 and wondered if we had made the right decision," local resident Karen Graves told the Salina Journal in 2014. "Every marginal business closed. 4,000 people left almost immediately. Even some churches shut their doors."

Moving On

Graves, who later served on the city commission and then a stint as mayor, explains that those who remained in Salina learned the painful lesson that the town should never again rely on only one industry—even the military—for economic survival. Local and state officials acquired the base and converted it into a regional airport and business park.

Today, SLN and the Salina Airport Industrial Center are home to 2,100 companies and organizations that account for more than 6,000 jobs and almost \$1.2 billion in total economic impact—14% of the county's total employment, according to the Docking Institute of Public Affairs.

Tim Rogers, executive director of the Salina Airport Authority, attributes the successful transition to the efforts of forward-thinking citizens and governmental bodies, including the Kansas legislature, the Kansas Board of Regents, city and county officials and the Salina Economic Development Organization.



TIM ROGERS

"From the beginning, community leaders realized the need to work as partners to achieve the successful development of the former base," he remarks.

Kansas State University has been another key partner. The airport industrial park originally included Schilling Institute, which offered two-year degrees in aeronautical technology and other technical fields. Then in 1991, Kansas State University began operating its Polytechnic Campus on airport property. The program offers four-year degrees in aviation maintenance, professional piloting, unmanned aircraft systems flight and operations, and airport management, its most recent addition.



Polytechnic Campus

FACTS&FIGURES

- Project:** Partnership With State University
- Location:** Salina (KS) Regional Airport
- Academic Partner/Tenant:** Kansas State University Polytechnic
- Aviation Degrees Offered:** 4-year programs in aviation maintenance; professional piloting; unmanned aircraft systems flight & operations; airport management
- Symbiosis:** Aviation students experience a busy municipal airport & have ready access to hands-on experiences & internship prospects; airport & nearby industrial park have local pipeline of aviation interns & graduates
- 2019 Financial Implication:** Airport collected \$73,752 in rent & fees from the university
- Emerging Technology:** K-State Polytech is growing its curriculum in unmanned aircraft systems

The SLN campus also offers instruction in non-aviation fields such as web development and automation engineering, but the majority of its 600 students are enrolled in aviation programs. Last year, the university paid \$73,752 in rent and fees to the airport authority.

Having three runways—one that is more than 12,000 feet long—allows SLN to accommodate “everything and anything,” Rogers says. Airfield traffic routinely includes massive military transporters, air refueling tankers, jet fighters, A-10s, bombers, air ambulance helicopters, corporate jets, scheduled commercial flights to Denver and Chicago, crop dusters, Civil Air Patrol planes and a wide range of general aviation aircraft. Moreover, Air Force One is occasionally spotted in the skies overhead, and Stealth Bombers from nearby Smoky Hill Air National Guard Range take training runs in the area.

Needless to say, K-State students see a lot of variety at SLN. And throughout the years, many have completed management internships just a couple thousand yards from their classrooms.

Rogers notes that many of the airport authority’s interns have gone on to successful careers in airport operations and management. Others have followed up with law school and now specialize in aviation law. Many graduates go to work at the airport and nearby industrial park. Aviation businesses in Wichita are also common employers.

The university’s professional pilot program and the unmanned aircraft program are both nationally recognized. In fact, SuccessfulStudent.org ranks Kansas State Polytechnic sixth in the nation for drone training programs. The website also says that it has more master-certified flight instructors than any other university.

On the Leading Edge

“I’ve had the pleasure, over the past 25 years, to work with K-State, to support the growth of those programs,” Rogers says. “I’m looking forward to more great news coming out of K-State’s Global Aeronautics Initiative, which will guide the manned and unmanned programs’ growth over the coming years.”

The university launched the Global Aeronautics Initiative last year. In short, the new program is designed to develop and leverage strategic partnerships with people and organizations outside the aviation world to explore opportunities for continued expansion of UAS technology. K-State, which trailed only the University of North Dakota in introducing a UAS degree, is in its 10th year of offering the program.

“Compared to other career options, it really is a new industry,” says Kurt Carraway, executive director of K-State Polytech’s Applied Aviation Research Center and department head of the school’s UAS program. “Five years ago, we did not have a commercially viable set of regulations for unmanned aircraft systems operations. Our graduates were largely going to work for defense contractors flying Department of Defense-owned aircraft.”

Now, unmanned aircraft are used for a variety of agricultural purposes, conducting power line inspections for utility companies, collecting data about municipal infrastructure, assisting law enforcement, firefighting and cinematography. A number of K-State Polytech graduates have tapped into the growing number of applications to start entrepreneurial ventures, Carraway reports.

“One of the things we’d ultimately like to be able to do is help airport managers incorporate unmanned aircraft systems into a broader airport maintenance program,” he adds. “It’s not just about integrating large unmanned aircraft into the air traffic system, which is something that will happen.”

Carraway notes that airports can also use smaller UAS to perform pavement inspections, help with wildlife mitigation efforts and airfield infrastructure such as signs and lighting. He largely attributes the increase in commercial viability of unmanned aircraft systems to the FAA releasing commercial UAS regulations in 2016.

Lindsey Dreiling, the university’s executive director of aviation strategy, foresees an important role for UAS in the future. “These initiatives are building toward the global air transportation system for the next century,” Dreiling says. “As we talk about urban air mobility, we have to have an integrated system. That takes partnerships between state and federal agencies, as well as universities and private industry. We have to have a global air transportation system that will integrate all of the partners that are active in the airspace.”



LINDSEY DREILING

Real-World Lessons

Just north of the K-State Polytech campus, another SLN tenant offers a different style of education. 1Vision Aviation, a maintenance, repair and overhaul center, regularly opens its doors to students and university instructors alike.

Students are drawn to the company’s hangar, known fondly as Big Bertha, for real-world lessons on the shop floor and the chance to snare part-time employment. Jim Sponder, the president and owner of 1Vision, takes an old-school approach to enhancing their formal education with a healthy dose of practicality.



JIM SPONDER

“All these kids come out of school with participation awards,” he remarks. “I teach them you don’t get a paycheck just for standing around.”

Sponder encourages maintenance students to train on many different airframes and stresses the importance of maintenance training for pilots. “We’ve got some work coming up on Boeing 777s, so I reached out to the school to see if they have any students interested,” he says. “I’m sure they will.”

Instructors from K-State Polytech regularly visit Sponder to see what kind of employees he and other industry employers will need. In August, Sponder told them that good avionics technicians are still worth their weight in gold, and that sheet metal mechanics will be in demand in the near future.

From casual cooperation between airport neighbors to long-term contractual relationships between the airport authority and its tenants, SLN seems to be brimming with partnerships and diversification that airport and city leaders hoped for after the Schilling Air Force Base was decommissioned. ✈️



Central Nebraska Regional Builds New ARFF Station for New Fire Truck

BY ROBERT NORDSTROM

Central Nebraska Regional Airport (GRI) was ready to retire its old 1982 Oshkosh fire truck. But when airport officials considered replacing it with a new Oshkosh Striker 4x4, they realized they had a “big” problem: The existing aircraft rescue and firefighting (ARFF) facility would be too small for the new equipment.

Their solution? Build a bigger new station.

“Frankly, our old firehouse, which was built in 1974, was not in compliance with the new generation of firehouses and fire trucks,” explains Airport Director Mike Olson. “It didn’t have a drive-through bay, lacked an adequate exhaust system and wasn’t big enough for the new generation trucks, which are long and lean as opposed to short and fat like the old ones.”



MIKE OLSON

The airport’s new ARFF station, which opened in September, is large enough to accommodate the new 1,500-gallon fire truck and an existing response vehicle. The 6,138-square-foot facility has two drive-through bays with four 18-by-18-foot overhead doors. Its 3,310-square-foot apparatus bay features a vertical stack rail

exhaust system with trench drains and Toxalert™ TSM stand-alone carbon monoxide and nitrogen dioxide gas monitors.

The FAA funded 95% of the \$3.1 million ARFF station as well as the \$832,000 fire truck and ancillary equipment. The airport paid for the remaining 5%.

The airport received one project bid, from Chief Construction, and it was higher than anticipated. “The contractor was concerned about how winter weather would inhibit progress—for example, with cold weather concrete work—and whether they would be liable for liquidated damages by not delivering the project on time,” explains Andrew Beil, a senior project manager for Benesch Engineering.



ANDREW BEIL

Benesch and the airport subsequently clarified how the contract would be administered and provided Chief Construction with 22 extra days (for a total of 202 days) to complete the project without penalty. Chief, in turn, provided GRI better unit pricing and cut \$500,000 in costs to keep the project moving forward.



Rough Start

The project kicked off in September 2019 under a contract that specified completion within 180 days. But the team encountered a major snafu almost immediately. The original plans called for a 5- to 6-foot over-excavation based on borings performed six months earlier that indicated groundwater levels at 7 to 8 feet. However, when contractors started excavating for utility work in September, they found groundwater just 2 to 3 feet below the surface.

Beil explains that the airport and surrounding area had experienced historic high-water levels and isolated flooding over the summer. “The city of Grand Island is very flat with sandy soils, and the groundwater had risen 5 to 6 feet between our initial borings and the start of work,” Beil elaborates. “As a result, work was put on hold, and we went back to the drawing board.”

FACTS&FIGURES

Project: New Aircraft Rescue & Firefighting Station

Location: Central Nebraska Regional Airport

Cost: \$3.1 million

Funding: 95% FAA Airport Improvement Program grant; 5% airport match

Timeline: Sept. 2019-Sept. 2020, with about 150 days of construction shutdown during winter

Site Engineering & Design: Benesch Engineering

General Contractor: Chief Construction

Architectural Design: Davis Design

Prefab Metal Building Supplier: Chief Buildings

Building Erector: Chief Construction

Electrical Contractor: Heartland Electric

Plumbing: O'Hara Plumbing

HVAC: Jerry's Heating & Air

Insulation, Framing & Gypsum Board: Integrity Construction

Vertical Stack Rail Exhaust System: Plymovent

Carbon Monoxide & Nitrogen Dioxide Monitors: Toxalert Int'l

Of Note: Despite high groundwater levels & change order to helical pier design for foundation support, team finished facility on time & on budget within 202-day construction timeframe

Fire Truck: 2020 Oshkosh Striker 4x4, with ECPEFP (Oshkosh's onboard integrated testing system)

Cost: \$832,000

Funding: 95% FAA Airport Improvement Program grant; 5% airport match

Timeline: Airport ordered truck Sept. 2019, issued change order Oct. 2019, took delivery in Oct. 2020



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Large windows in the control room provide a 270-degree view of the airfield and apron.

One solution would have been to install wells and pump water out to reduce the groundwater level. However, that would have meant discharging water into the airport's storm sewer system, which was already overtaxed due to flooding on the airfield. In fact, standing water in ditches had begun encroaching onto runway safety areas.

To avoid problems associated with extensive dewatering, geotechnical engineers from Benesch worked with Chief Construction to devise a helical pier solution. First, crews placed approximately 2,000 cubic yards of soil over the site to help consolidate the loosely compacted soils below. Then, they inserted 56 piers between 20 and 40 feet below the surface, depending on the depth where the necessary level of resistance was found to support the structure.

Kyle Huse, project coordinator for Chief Construction, marvels that the prefab metal building was constructed with approximately 40 tons of steel, and it's essentially held in place by 56 helical screws.



KYLE HUSE

Under the original contract schedule, the contractor would have installed footings and erected the building in fall so crews could complete the interior work during winter. The groundwater issues and subsequent delays put a kibosh on those plans, though. The project was shut down in late November, and work resumed in March.

Beil notes that the FAA remained on board with the project despite these unforeseen problems. In the end, the contractor completed the work in about 190 days, and both parties were happy. "It was a really fast turnaround on this type of build," Huse remarks.

Room with a View

The new firehouse is strategically located to meet FAA Part 139 response-time mandates that require emergency vehicles to arrive at the midpoint of the most remote runway within three minutes. "With open space on the southern end of the terminal ramp, we had a lot of site-location flexibility," Beil notes.

The facility was built directly south of the jet bridges to optimize sightlines for firefighters without impeding sightlines for air traffic control personnel. The pre-engineered metal structure is sided with a 3-foot brick base and green fiber cement lap siding, which provides insulation and complements the design of the new administrative building that is located nearby.

To meet exhaust system requirements, the building is taller than other buildings on the airfield, informs Jon Dalton, principal of Davis Design. "In Central Nebraska, high winds and heavy rain are always a concern with regard to a building's shape and form," he explains. "In response to these environmental factors, the design features a steeply sloped red metal roof."



JON DALTON

Designers infused the apparatus bay with natural light by adding clerestory windows that face north, approximately 1,000 square feet of window glass throughout the building, and roof bubbles and six sun tunnels on the north side of the building.

To create a tighter envelope and reduce energy consumption, designers specified continuous insulated metal panels on the roof and a continuous insulation system called SMARTci that uses girts and fasteners to minimize thermal conduction.

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The facility's interior features include an office that doubles as a training area, a dayroom, kitchenette and a communications room for information technology equipment. The control room, located on the northeast corner of the building, provides a full view of GRI's two runways and the apron area between the fire station and terminal building.

"The 32-foot-wide room extends 15 feet from the building," explains Dalton. "The room can seat six and has windows on three sides, providing a 270-degree view of the airfield. A nearby restroom allows staff to remain close to the control room while aircraft are landing and departing."

Up to Date & Prepared for the Future

Beil notes that the new ARFF station was designed to allow for subsequent expansion. Although it would have been easiest to bring in utilities from the south, they were routed in from the east and west sides of the building to allow for the addition of another bay in the future. Also, the backup generator was placed far enough south to avoid impeding expansion later.

Regulatory changes that emerged after the project was in motion affected the airport's truck purchase. Shortly after GRI ordered its 2020 Oshkosh Striker 4x4, the FAA issued new guidelines regarding the use of aqueous film-forming foam—a substance that is highly effective in fighting flammable liquid fires, but also contains chemicals hazardous to the environment and human health. Previously, the agency required ARFF stations to regularly test the lines on their trucks by discharging water and foam—a routine that presented disposal challenges and environmental concerns for airports. To allay this problem, FAA made *inline* testing systems (which eliminate the need for releasing foam) eligible for federal funding. Given the new scenario, GRI modified its order with Oshkosh to add an onboard integrated testing system, a change that added nearly \$30,000 to the overall cost of the truck.

Olson reflects, "After we overcame the water level issues, the project moved along like clockwork—on time and on budget. With the new truck and ARFF station, we will have completed \$29 million in capital improvements over the past five years, including a new airline terminal, a new general aviation terminal, new administration building and 500 additional parking stalls. That's a lot of capital improvements in a short period for an airport this size." ✈️

Team members commemorated their participation by signing a steel beam.



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FACTS&FIGURES

Project: Runway Reconstruction, Extension & Realignment

Location: Fitchburg (MA) Municipal Airport

Owner: City of Fitchburg

Cost: \$14.7 million

Funding: 90% FAA; 5% commonwealth of MA; 5% local

Construction: Sept. 2019-April 2020

Project Engineer: Gale Associates

General Contractor: D.W. White Construction

Geotechnical Consultant: Geolnsight Inc.

Runway Reclamation: Murray Paving & Reclamation

Runway Paving: P.J. Keating

Taxiway Paving: Don Martin Corp.

Utilities: KOBO Utility Construction Corp.

Markings: Safety Markings

Geotextile Fabric: TenCate Geosynthetics Americas

Landscaping: M.O.N. Landscaping

Key Benefits: Added length accommodates larger aircraft, helps airport attract more corporate jets

Associated Project: Self-Service Fueling System

Cost: \$860,000

Funding: 80% commonwealth of MA; 20% local

Key Benefits: 24/7 fuel availability for customers; decreased operating costs for airport

Fitchburg Municipal Courts Bizjets With Longer Runway & 24/7 Fuel

BY THOMAS J. SMITH



Recognizing its airport's potential as an economic magnet, the city of Fitchburg, MA, recently built a new runway capable of handling corporate jets. The \$14.7 million project was backed and largely financed by the FAA.

Fitchburg Municipal Airport (FIT) opened the new 5,001-foot runway in late May. It replaces a 30-year-old, 4,510-foot runway that had large cracks and was disintegrating in spots.

Interim Airport Manager Peter Kettle notes that the new runway is 1 foot longer than the length required by most insurance companies that



PETER KETTLE

cover corporate aircraft. A long-time member of the city's airport commission, Kettle was appointed as interim airport manager this past January.

Unlike many other small general aviation airports in northeast Massachusetts/southern New Hampshire, FIT will only be competing with three other airfields for corporate traffic: Nashau Airport in nearby New Hampshire MassPort's Hanscom Field in Bedford and Worcester Regional Airport.

Although the airport is awaiting final FAA publication of its new instrument landing guidance, the freshly minted runway began attracting one or two business jets per week shortly after the new pavement was in place.



City leaders consider it especially important to invest in FIT as the population of nearby Boston continues to expand. “The mayor has big plans,” Kettle explains. “We have the land and old mill buildings that can be re-used. He sees the airport as an economic engine for the city.”

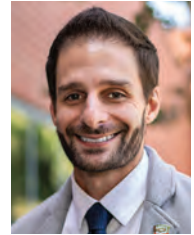
Local leaders are banking on the airport’s “easy-access location” to help attract corporate jets. Fitchburg is an outlying suburb of Boston, with multiple state and interstate roads connecting it to downtown and the inner suburbs. In addition, there is a commuter rail station close to the airport.

Airfield Improvements

Creating the required safety zones for FIT’s new, longer main runway presented a challenge because the Nashua River borders the airport on three sides.

Gale Associates, the airport’s engineer of record for the last 18 years, solved this issue by shifting the existing runway 1.5 degrees to gain the extra 500 feet that was needed.

Nikolas Ippolito, Gale’s project engineer, explains that strategy had two other key benefits: It eliminated the need for FIT to purchase additional land, and it reduced the number of obstructions that had to be removed because the elevation of one end of the new runway is about 6 feet higher.



NIKOLAS IPPOLITO

During the project approval process, airport leaders secured FAA funding to build the new runway 100 feet wide, like the previous main runway, rather than 75 feet wide, the norm for Category B-II general aviation airports like FIT.

The Massachusetts Department of Environmental Protection requires airports to remove old pavement to offset the run off from new paved surfaces and to minimize the size of the required stormwater management system. Removing the west end of the 3,500-foot crosswind runway provided the needed offset; leaving the east end intact provides for future “offset” pavement, explains Ippolito.

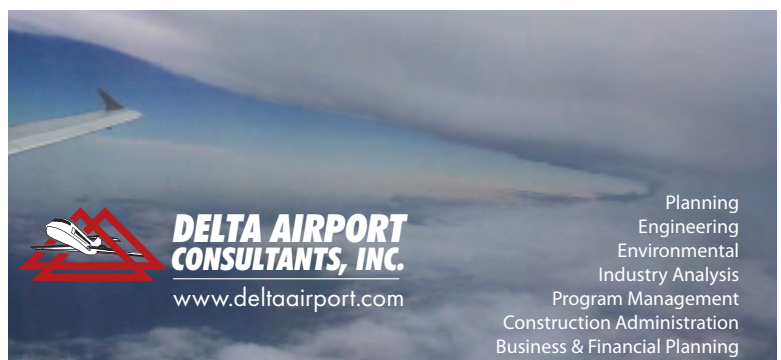
General contractor D.W. White Construction began the project in September 2019 by removing the old main runway. “They did an incredible job,” Kettle comments. “One day we had a runway, and the next it was pulverized.”

The intersection of the two original runways was preserved, because aircraft continued to use the east-west crosswind runway through the fall and into April 2020.

After grading the site, crews began building the new runway with 30 inches of fill, followed by 6 inches of dense gravel and 4 inches of asphalt pavement. They worked from each end of the runway toward the middle, and finished paving last December. All that remained of the airport’s previous runway was the intersection of the two original runways.

Work resumed in early April with demolition of the old intersection and construction of the new center section. Crews completed FIT’s new main runway on May 23.

Eventually, the airport plans to build a revenue-generating solar farm where the west end of the crosswind runway used to be located. Preliminary ideas for the 31.6 acres on the remaining east end include commercial development and the construction of more aircraft hangars. In late September, the city was preparing to retain a consultant to update the airport’s masterplan.



The runway project included new landing system lights.



The airport plans to link existing hangars to its new runway by reconstructing the ramp in 2024. FIT currently has five city-owned multi-plane hangars, three private multi-plane hangars, a single private hangar, 57 T-hangars and ramp space for 81 tie-downs.

Planning

The recent runway project was part of the airport's latest master plan, which was adopted in 2008. Although FIT's previous main runway could handle jets with wingspans up to 79 feet, many insurance companies would not cover that size aircraft operating on it.

The new runway can handle aircraft as heavy as a Gulfstream IV.

According to Ippolito, the previous runway was 10 years past due for either reconstruction or repaving. However, the FAA was prioritizing the addition of runway safety areas at general aviation airfields throughout New England and elsewhere. At the shorter length, FIT's previous runway met those standards.

Gale began planning the new runway in 2016, and work began in 2018 to remove obstructions in the new approach zones. For example, the roof of a nearby business extended into the northern landing approach, so the airport paid to modify the roof and create an easement.

The flight path for the previous main runway routed aircraft over an airport conservation area and did not encroach as deeply into the adjacent commercial area. The airport had to remove a few streetlights to accommodate the new flight path.

Underground Surprise

During a pre-construction geotechnical site evaluation, examiners discovered an abandoned dump along the north end of the new runway. "We knew there was some trash buried down at that end, but we did not know the extent," says Ippolito, noting that the area is adjacent to a metal recycling firm that has operated there for decades.

The dump was not on any of the land records for the airport, which opened in 1929, he adds.

To be safe, the airport hired Geolnsight, a geotechnical consulting firm from Manchester, NH, to explore the site further and develop a plan. Since the site and materials in it (mainly garbage and leather tannery materials) were stable, the firm advised the airport to leave the dump in place.

Crews used a technique called rapid impact ground improvement to prepare the area where the dump was discovered. Ippolito explains that workers repeatedly dropped a 20-ton weight in a grid pattern to consolidate

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Crews dropped a 20-ton weight in a grid pattern to consolidate the waste materials.



the waste materials. The site was then graded, capped with sand and topped with a geotextile fabric before runway construction began.

Kettle notes that airplane operations were only suspended for 40 days in the spring to accommodate construction, and helicopter traffic was never affected. Although the project benefited from an earlier-than-expected spring, rain delayed final paving for about two weeks.

Even though the spring work began at the height of the COVID-19 shutdown, the commonwealth of Massachusetts deemed the project essential and allowed construction to continue. Kettle reports that work was not interrupted by any coronavirus cases because crews wore masks and followed extensive sterilization procedures.

24/7 Fueling

Per its master plan, the airport also installed a new self-service fueling system. Funded primarily by the commonwealth, the \$860,000 facility includes a new 6,000-gallon aboveground storage tank.

Now pilots can fuel their own aircraft without assistance, just like at a self-serve gas station. Previously, the airport had to dispatch a fuel truck, and an attendant would do the fueling.

Kettle explains that the new system allows FIT to deploy its labor force on other important jobs around the airport and saves the airport money on fuel truck maintenance. Moreover, it is expected to increase fuel sales by providing 24-hour availability.

While the airport is currently subsidized by the city, Kettle predicts that it could be self-supporting in the near future, thanks to increased traffic and higher fuel sales. ✈️



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Collaboration, Flexibility Help Sacramento Int'l Meet Critical Deadline to Reopen Key Runway

BY KEN WYSOCKY

FACTS&FIGURES

Project: New Runway

Location: Sacramento (CA) Int'l Airport

2019 Passenger Volume: 13.4 million

Approx. Cost: \$30 million

Funding: About 80% FAA grant; 20% general airport revenue

Engineering Consultant: AECOM

Funding: FAA grant; airport revenue

Prime Contractor: Granite Construction

Paving & Earthwork: Granite Construction

Electrical Contractor: Stuebaker Brown Electric Inc.

Approach Lighting System: NBP Corp.

Base Lighting Cans: Jaquith Industries Inc.

Airfield Lights/Transformers: ADB SAFEGATE

Airfield Lighting Control System: Eaton-Crouse Hinds

Project Timeline: Planning began in 2016; construction ran early April through late Oct. 2019

Challenges: Rigid deadline due to impending seasonal fog; collapsed electrical conduit; asbestos in other pipes; unsuitable portions of base layer below runway; unsuitable sub-grade material under blast pads

Key Benefits: New concrete runway will require less time & money to maintain than previous asphalt runway; 20-year service life



Despite surprising underground discoveries and a limited construction period due to impending seasonal fog, Sacramento International Airport (SMF) opened its critically important new \$30 million concrete runway on time.

“The incredible teamwork with all our partners throughout the process made this project a success,” says Cindy Nichol, director of airports for the Sacramento County Airport System. “The team effectively and efficiently overcame several unforeseen challenges.”

At issue was SMF’s deteriorating 8,600-foot asphalt west runway, originally built in 1967 and repaved in 2001. The airport didn’t lose any revenue while it was closed for construction because the parallel runway on the east side of the airfield, also 8,600 feet, was able to handle all of the airport’s air traffic.

Officials at SMF originally hoped a mill-and-overlay project would restore the west runway, but tests revealed weakness in parts of its base layer. So airport staff opted for an all-concrete design engineered by AECOM instead of a concrete/asphalt

renovation. The new runway has a 20-year service life, notes Sean Papathakis, an associate engineer at the Sacramento County Department of Airports.



SEAN PAPATHAKIS

To cure the base-layer deficiencies, AECOM specified lean concrete instead of gravel. Lean concrete is made with a lower cement-to-liquid ratio and typically includes other materials such as reclaimed/crushed concrete and sand.

Prime contractor Granite Construction broke ground in early April 2019 and concluded on Oct. 23 of the same year. An FAA grant paid for approximately 80% of the project, while general airport revenues paid for the balance.

To prevent future operational disruptions, FAA upgraded the approach lighting, installing a system made by NBP Corp. while the runway was closed for construction.

Overall, contractors milled 50,000 cubic yards of asphalt off the runway, poured

106,000 cubic yards (11,777 truck loads) of concrete and installed 22,000 feet of stormwater sewer lines, 130,000 feet of electrical cable and 450 new runway lights from ADB Safegate.

Redefining the Boundary

The west runway is critical to operations because it is SMF's only runway equipped with a Category III instrument landing system. The extra assistance it provides pilots is especially important from about November through March, when thick ground fog regularly socks in the airport and Sacramento Valley.

As such, it was paramount for the project team to hit its October deadline. Running over could have resulted in diverted flights and many unhappy passengers, explains Papathakis, who managed the project.

To speed up the reconstruction process, SMF converted the airside area into a landside work site by fencing off the runway and associated taxiways that feed it. That decreased the level of security requirements—particularly badging requirements for all construction personnel.

“Given the number of workers involved, it would’ve been a hardship on the contractors to get all those employees badged and through the system,” explains Mark Fantozzi, Aviation Group project manager at AECOM. “The tighter security protocols would’ve been detrimental to contractors working efficiently. There still were security protocols, but they were far less restrictive.”

With the new fence boundary, vehicles and employees were able to access the construction site from the west side of the airport, without having to pass through airfield operations. The strategy saved contractors time and money they would have otherwise spent on the associated badging process. It also enabled the airport to keep the rest of the airfield open by eliminating a steady flow of vehicles that otherwise would have driven through airside operations.

“We didn’t calculate the time we saved by doing it this way, but we know it definitely allowed much more flexibility and helped expedite the construction schedule,” says T.J. Chen, deputy director of planning and development for the Sacramento County Department of Airports, which oversees operation of SMF and three other county-owned airports.



T.J. CHEN

Subsurface Discoveries

Granite Construction surmounted several unwelcome surprises that threatened to delay the project. First, crews performing earthwork discovered that much of the existing conduit contractors planned to reuse—Orangeburg pipe made of wood pulp and hot pitch—had collapsed.

Moreover, other sections of conduit were made from cement mixed with asbestos fibers, which pose environmental hazards.

In addition, contractors found that the runway’s existing blast pads, which were scheduled for repaving, needed to be fully rebuilt instead. “We ran into some soft, unsuitable sub-grade conditions on the blast pads on both ends of the runway,” says Steve Lynch, a project manager at Granite Construction.

Together, the surprises encountered during site prep added about \$4 million to the project cost, but ultimately didn’t torpedo the final deadline. Papathakis credits AECOM and Granite Construction for their flexibility and quick thinking.

“Rather than let that hold up our schedule, we just temporarily postponed that work and pivoted to another part of the project,” Lynch explains. “It helped tremendously that the airport and designers were great partners. If we ran into unforeseen problems, they were all over it to get answers to help us proceed.”

Recycle & Reuse

To support SMF’s sustainability goals, Granite Construction used 2,400 cubic yards of asphalt millings and 4,500 cubic yards of base rock made from the concrete underneath the old runway to rebuild the blast pads.

Moreover, 100 percent of the base rock removed from the old runway was put back into the structural section and shoulders of the new runway, according to an airport news release.

Proving that not *all* construction surprises are bad, tests revealed that existing sub-base material under the old runway was stable enough for contractors to reuse. Not having to replace it saved time and money, notes Fantozzi.

"In a reconstruction project, you usually have to excavate down to the subgrade (soil), which could be 30 to 36 inches deep," he explains. "It takes time to remove it all and put something back in.

"But we were able to preserve the sub-base material, which reduced the amount of runway rebuilt without jeopardizing the performance of the pavement."

Sequencing Matters

Planning for the project began in 2016 and included several components. For example, Fantozzi notes that AECOM phased the paving and electrical work for maximum productivity.

"Quite a bit of the electrical work occurs before the concrete paving," he explains. "So when developing a paving plan, we worked with the contractor to ensure there was enough time to get the electrical group far enough ahead of the paving group so they didn't interfere with each other."

Scheduling installation of the in-pavement runway lights posed a challenge because crews cannot install all of the light cans at the same time. "They run long-ways down the runway as well as transversely, but you can't block access for trucks or block the track grade that guides the paving machine," says Lynch. "So we work out a sequence before the job starts."

He compares the process to assembling a puzzle while the pieces constantly change shape. "Pavement cure-times change and unanticipated access constraints and other wild cards tend to pop up on these kinds of projects," he explains. "What looks simple on paper can become quite a fun challenge on the grade."

Jaquith Industries Inc. made the base lighting cans.

Technological Assist

Granite Construction used robotic surveying systems from Trimble to shave time off the grading and paving portions of the project. Known as "total station surveying," the advanced technology is designed to help contractors meet extremely tight tolerances for grading and paving elevations. At SMF, crews had a quarter-inch allowable tolerance.

"It's extremely important to hit the grade elevations at each level, and using this technology helps us get there," Lynch remarks. "We install these units on graders to finish the soil levels, then install them on our paving machines.

"They communicate directly with the total stations, which tell them what the finished grade elevation needs to be, and the machines then install at that grade."



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After the pavement is poured, Granite crews use a machine called a profilograph (from Surface Systems & Instruments Inc.) to measure how well the paving machines performed. As the profilograph rolls down the runway, it provides a reading of how much the pavement fluctuates up and down per mile.

“The average profile index on this runway was 1.7 inches per mile, which is super smooth,” reports Lynch. “In fact, that’s unheard-of smooth. The industry standard calls for corrective grinding if the profile index is more than 7 inches per mile.”

Collaboration Was Key

Airport and project leaders agree that planning and teamwork kept construction on schedule despite multiple unexpected surprises.

“When unforeseen conditions arose, we collaborated with the contractor to determine the most efficient way to correct the problem and still meet FAA standards,” Fantozzi says.

Lynch points out that no matter how much planning occurs, unforeseen problems can still emerge to challenge even the best “what if” contingencies. “At that point, it’s important to increase resources on a project and also be flexible,” he says.

“Everyone came in with a can-do attitude and a high level of collaboration and partnership,” adds Chen, noting the project won




Project engineers specified lean concrete to address base-layer deficiencies.

awards from public works and construction industry organizations. “Communication between AECOM, Granite and the FAA was excellent, both vertically and laterally.

“We couldn’t have completed the project successfully without our partners,” he reflects. “We knew it would be complex and challenging from a time perspective, so we all worked hard together to understand the goals and objectives. We really appreciated having these partners on board.” ✈️

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Sign of the Times



Leave it to San Diego International (SAN) to commission artwork specifically for the age of COVID-19.

From August to December, the airport is featuring interactive art designed to be viewed exclusively on cellphones, tablets and other electronic devices. The digital-only format allows passengers to enjoy the art safely while maintaining proper distance from other travelers and SAN staff.

[Sky][Muse], by performance artist Margaret Noble, is a monthly series of animated presentations that use color, light and sound to create an immersive sensory experience. The images and sounds change as each viewer scrolls around his or her own screen.

Noble designed the artwork to encourage reflection, deep thinking, imagination, dreaming and self-discovery.

Airport Improvement readers can experience the “exhibit” by visiting <http://arts.san.org/portfolio-item/margaret-noble-fall-2020/>.

In the past, SAN has delighted visitors with aerialists dangling from the ceiling, circus performers clowning around in the terminal, and friendly monsters dressed in wearable sculpture emitting operatic sounds. Clearly, SAN has a special knack for connecting with passengers through the performing arts. Its current offering shows that it also knows how adapt to changing times. ✈️



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A Candid Report About How COVID-19 is Affecting a Medium-Sized Canadian Airport

I recently reflected back on attending a major air service conference in February 2020, enjoying free conversation with colleagues, shaking hands and sharing ideas. Concerns about the potential of a pandemic were a matter of discussion but in no way diminished our efforts to secure air service for our respective communities. Prior to the economic slowdown that soon followed, Regina International (YQR) was the 15th busiest airport in the country, seeing nearly 1.2 million passengers per year. The airport serves a catchment area with more than 500,000 residents and contributes more than \$800 million per year into the local economy.

Like every airport in North America, our world changed in March. The Canadian government began implementing a reactive patchwork of rules as new health information about the novel coronavirus became available. As the month progressed, more and more arriving flights contained local passengers returning from abroad, and departures soon slowed to a crawl. Our airport staff and partners worked tirelessly around the clock to implement new processes and work with both provincial and federal health authorities to keep the public safe and updated with the latest information. I'm sure every *Airport Improvement* reader can relate to this story and understands first-hand the vital role airports played re-patriating residents to our respective countries.

In April, flight activity fell off the cliff. Passenger volumes at YQR were only 1.8% of 2019 levels, and short- to medium-term projections were grim. With no industry-specific support being

offered by our federal government, we were forced to lay off employees, slash capital and operating budgets, and look for opportunities to maximize the cash we had in the bank before incurring operating debt.

Unlike our friends in the United States, Canadian airports have not had a CARES Act or reasonable equivalent. Our government has supported airports and other businesses with a partial wage subsidy and has forgiven some of the revenue-based rent we typically pay it. However, the total impact of these programs has made very little difference to the overall operating costs we incur. Like many airports in Canada, YQR is a private, not-for-profit corporation with a long-term lease from the government to operate the airport. The lease requires us to follow many rules designed for the safe and secure operations of the airport. In order to meet these obligations, there are only so many expenses we can reasonably eliminate. The other obvious option would be to increase our fee structure to airlines. However, they are also in an impossible situation, and doing so would not help encourage a recovery.

As I write this, we are now seven months into the economic slowdown, and passenger traffic has rebounded slightly to around 20% of typical levels. This is still a long way off from being able to generate enough revenue to cover even our most critical expenses. The Canadian Airports Council and Airports Council International have been actively advocating for all of us with the federal government, and there has been a great deal of local advocacy underway here in our community. However, our



James Bogusz
has more than 18 years of experience working in airports, beginning in 2001 as a technology consultant with the Victoria Airport

Authority. During his career he has held a number of progressively more senior roles. In 2018, Bogusz joined the Regina Airport Authority as its new chief executive officer.

cash reserves will be depleted before the end of the year, leaving us with little runway left before we are forced to make incredibly tough decisions that could potentially impact our entire region.

Airports are economic engines of our respective communities and are worth saving. We admire some of the financial supports that have been put in place in other countries, but as of mid-September, Canadian airports have been left almost entirely to fend for ourselves. We won't stop sending strong messages to Ottawa, and we expect that common sense will prevail. We just hope that the support won't come too late.

After almost 20 years in the industry, I regularly remind my staff and myself that these times will pass. Airports are incredibly resilient, and the underlying demand for social interaction and life experiences are something society cannot replace with online chats. Let us all hope that 2021 is a year of true recovery for our severely battered industry. ✈️

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