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Opening Perspective

Travelers to many of the nation’s airports will be seeing more airport construction projects underway. Numerous airports are in the process of executing major capital improvement plans in order for them to better meet projected demands. Projects underway include terminal renovation/expansion, airfield projects and multimodal surface transportation access.

The work being done only scratches the surface of what is needed. As airports plan future improvements to meet demand and enhance the air travel experience, they now realize with more urgency the importance of how airports connect to the communities they serve. Recently, HNTB conducted its America THINKS national public opinion survey of air travelers, which found that more than nine in 10 Americans (93 percent) believe airport terminals could be better connected to the region’s ground transportation and transit networks.

The interest for public transit access to airports is very strong. According to the survey, “Air travel’s new frontier: getting to the airport,” it was found that four in five (84 percent) of Americans would use rail transit if it could get them to the airport and back more efficiently than by car. The survey also found that more than four in five (81 percent) feel parking and drop-off or pick-up curbs have either stayed the same or gotten worse in the past 10 years.

We know that for many that air travel is often stressful. HNTB’s survey found most Americans do not look forward to their time at the airport. Factors that increasingly determine the quality of the air travel experience include ground access to the airport terminal, the movement of automobile traffic, passenger pick-up/drop-off and parking. In planning for improvements, airport operators are partnering with local and regional transit agencies to create better public transportation access that travelers seek. Also, both the airports and the airlines recognize that airport improvements expedite the movement of passengers and enable the development of amenities in terminal buildings that directly affect the quality and satisfaction of the air travelers’ experience.

These needs will continue to escalate: The Federal Aviation Administration predicts air passenger activity will increase more than 50 percent over the next 20 years. Furthermore, a recent survey by ACI-NA projects $100 billion of needed airport projects underway include terminal renovation/expansion, airfield projects and multimodal surface transportation access.

The world’s busiest airport — Hartsfield-Jackson Atlanta International Airport — understands that having multimodal options for those navigating the massive facility is vital. In 2016, the airport served a record 104 million passengers and an additional 60,000 employees.

Those numbers demonstrate that the airport may outpace forecasts outlined in its master plan, which estimates by the year 2036 the airport will handle 121 million passengers per year.

Recently, Aviation Insight spoke with airport General Manager Roosevelt Council, Jr. about how the airport monitors its systems and prioritizes transportation for the future.

AI: How important is multimodal transportation at Hartsfield-Jackson?

Mr. Council: Hartsfield-Jackson plays an integral role in the national and international air travel network. Strong multimodal transportation options, whether they are heavy rail, cargo trains, buses, taxis or transportation network communities, are vital for the network to thrive.

AI: How critical is transportation inside of Hartsfield-Jackson?

Mr. Council: Hartsfield-Jackson is located on seven million square feet of land across three counties in Georgia. For the last 19 years, our airport has been ranked as the busiest airport in the world. So, as you might imagine, Hartsfield-Jackson plays a very important role in the national and international air travel network. We have quite a few priorities in terms of transportation. With so many passengers and airport employees moving through the airport, we have built strong multimodal transportation options.

What’s important is keeping people moving. We do not have the opportunity to allow anything to just stop. Every single one of the 394 million passengers who came through the airport last year at some point touched one of our multimodal transportation options. We make sure everything works and that we can handle those 394 million people. Now we also are focused on getting ready for the 121+ million who will come through Hartsfield-Jackson in the future.

Keeping people moving at the world’s busiest airport

Hartsfield-Jackson Atlanta International Airport working towards increasing capacity on its APM

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AI: Plane Train is a critical part of transporting today’s passengers and the future passengers between the concourses. Are there any hurdles facing the growth of the Plane Train or any key lessons for other airports?

Mr. Council: The Plane Train is one of the busiest rail systems — inside or outside of airports — in the United States. The train works well for us because of how this airport was designed. All our terminals and airside concourses are oriented in a north-south direction and are sequentially laid out from west to east. All are connected by the Plane Train that runs underground from West to East through a central corridor. The sequential nature of the airport’s design makes it easy for us to transport passengers to each concourse quickly and efficiently.

With a ridership of approximately 95 million per year, it is already the busiest automated people mover in the world. Our biggest challenge is space for additional capacity. We are lucky that when the train was first developed more than 30 years ago, the airport’s planners anticipated our growth and left extra space for expansion of the Plane Train system.

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AI: You are managing the $6 billion ATLNext development program which includes increasing capacity on the Plane Train. What are the primary factors that have led to this becoming part of the plan?

Mr. Council: Plane Train forecasts and modeling prepared in our master plan showed its capacity being exceeded during peak periods sometime between 2021 and 2026. Even today, though, we occasionally see passengers arriving at the Plane Train platforms and encountering full trains. Today those passengers wait for the next train, but as ridership grows we might not have that option in the future. Therefore, we need to increase capacity sooner rather than later.

Today the Plane Train system design includes a 10-second wait at the west end of the line before returning to the start and picking up new passengers. We will reduce that wait by 18 seconds. That may not sound like much, but when you’re talking about our daily passenger numbers, that throughput will increase substantially. We also will increase the Plane Train’s fleet. Both of these efforts will reduce passenger wait times and eliminate those full Plane Trains. Again, when you are moving 285,000 people a day, every second counts.

AI: How does your 20-year master plan impact the work you are doing every day at Hartsfield-Jackson?

Mr. Council: Under our master plan, we looked at the next 20 years and conducted an exercise on how it could be implemented. We also constantly monitor our day-to-day operations. We are flexible and make any necessary improvements, changes or adjustments to our operations as soon as we see they are needed. Most of our improvement efforts are driven by current and projected passenger counts. That’s what drives us to understand what we should be prepared for.

Of course, multimodal transportation is an important part of our master plan.

AI: Does the plan include any changes to the SkyTrain or connections to MARTA?

Mr. Council: The SkyTrain to our rental car facility works well for Hartsfield-Jackson. Later this year, we will evaluate whether we need to operate four-car SkyTrain sets and when such an expansion might be needed.

The Hartsfield-Jackson MARTA connection also functions well. There is an architectural renovation project under development for the airport MARTA station. Other than this station renovation, the domestic terminal connection to MARTA will not be modified.

AI: How is the airport planning for the future of roadside transportation, such as driverless vehicles and ridesharing programs?

Mr. Council: We recently began the implementation of transportation network companies and have been pleased with the success of the program, but we’re always looking to improve, like all other airports, we’re actively monitoring trends in driverless vehicles and will incorporate whatever the state-of-the-art, driverless vehicle technology turns out to be, especially as it relates to our parking structures.

AI: Is there anything else you would like to share that may help other airport leaders?

Mr. Council: Be flexible, because change is a constant at airports. Passenger numbers rise, airline fleets change, traffic patterns are modified, and there are challenges to find the funding needed to keep facilities convenient and modern.

It’s a constant juggling act. When it comes to multimodal transportation and other projects, it is imperative that you monitor your operations and stay in constant communications with all your stakeholders. And even as you’re building current projects, you must keep an eye on the future and be ready to pivot and accommodate any changes as necessary. Never forget—we’re part of a vibrant industry that plays a role in the lives of millions of people.

For more about Hartsfield-Jackson Atlanta International Airport, visit atl.com

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Creating a surface-moving experience for airport passengers

Factoring in APMs, other transportation options into the airport environment

By 2035, global airline passenger traffic is expected to double to 7.2 billion travelers, per the International Air Transport Association. It’s also estimated by ACI-NA that their member airports in North America will need to make an additional $99.9 billion in infrastructure investment between 2017 and 2021 to accommodate growth in passenger and cargo activity and support aircraft innovation.

Terminal building projects account for 47 percent of the total development needs of all airports today, out to 2027. North American airports are looking to balance out the need for additional capacity by integrating multimodal forms of transportation, and others have included transit/transportation in master plans.

The challenge ahead is to identify balance the needs of passengers getting to and from terminals, consolidated rental car facilities, remote parking and city centers, accommodate transportation plans under existing land constraints, and find the funding to pay for these necessary improvements.

Increasing number of APMs

To facilitate the movement of passengers at large airport campuses, many airports are considering or have implemented automated people mover systems, with more than 80 of them currently operating worldwide.

APMs transport passengers by tracked guideways between and within terminals, consolidated rental car centers, and to and from regional transit centers via fully automated, driverless operations. APMs can be a rubber-tire system like the one used at Chicago O’Hare International Airport, or the steel wheel APM as used for the JFK International Airport “AirTrain.” They are popular because they can:

- Reduce roadway traffic congestion in the immediate vicinity;
- Alleviate passenger congestion within the facility;
- Reduce emissions; and
- Help passengers arrive at their gates faster and with less stress.

Connecting APMs to transit

An interesting industry trend involves airports seeking to connect APMs with multimodal stations and light rail connections. Airports including DEN, SFO, ORD, EWR, PHX and ATL currently have connections to regional transit systems. Additionally, the industry will soon see these APM connection projects become operational.

- Los Angeles International Airport: APM connecting terminals with a consolidated rental car facility and link to the city’s Airport Metro Connector 96th Street Transit Station, part of the Crenshaw subway line.
- Orlando International Airport: APM from all airside concourses to north terminal; APM from the north terminal complex to south terminal complex intermodal station and the Brightline regional rail connects to south terminal intermodal station.
- Tampa International Airport: Several APMs connect four airside concourses to the airport’s main terminal complex, and a new APM scheduled to open in 2017 connecting to a new ConRAC, long-term parking, future hotel/office and regional bus connections.

These multimodal transportation facilities can create opportunities for linking additional revenue centers and typically combine mixed-use spaces, such as retail, offices and hotels.
Airports looking to maximize these multimodal facilities should consider a few additional factors: Will there be space for retail, food and beverage venues to maximize ancillary revenues at the airport? Will the facility also provide platforms for passengers awaiting Transportation Network Companies or shared services?

**Steps to successful integration**
Integrating APMs and transit/rail connections into the current environment requires airport executives to make the right decisions in three key areas:

1. **Efficient connection to facilities**: APMs should connect airport terminals with landside facilities, such as parking, car rental services, regional transportation services, hotels and other related employment and activity centers.

2. **Connection to master plan**: APMs should be viewed as a subsystem of the entire airport system. Therefore, it is essential to conduct all planning in close coordination with the airport’s overall master planning process. Additionally, in the future there will be a need to optimize the link to surface roadway staging centers and rail connections. These connection points are being pushed further and further away from the immediate terminal areas because of the increased demand for priority airspace activity space and aviation-specific uses near the terminal.

3. **Advanced research**: APMs require ridership studies, passenger traffic and surface transportation congestion analyses, cost/benefit analysis and construction feasibility studies. The systems will impact other airport facilities and require permits, approvals and coordination with affected agencies. Anticipating these activities early will help set expectations, budgets and schedules.

**Rapidly approaching emerging technologies**
Emerging technologies likely will shift how airports plan for and manage transportation options. For example, rail track APMs soon may be replaced by autonomous vehicle roadway bus-train systems. These bus-train vehicles will closely resemble train cars with roll-in/roll-out thresholds, self- docking with side-sliding doors as we see on subway cars docking at train stations. An autonomous driverless vehicle system eliminates the capital costs for tracks, signaling systems and maintenance facilities linked directly to a track system. Autonomous vehicle APM systems allow ultimate flexibility.

Technology today allows AV vehicles to run safely on dedicated roads. Airports would still need to create the added dedicated roads and stations for the AV bus-train systems, due to the current technology and the need to separate the various modes of surface transportation choices for passengers. However, with “digitally connected vehicles,” sensor-equipped manned vehicles like hotel shuttle buses, airport parking shuttles and other vehicles also could be allowed to mix with AV vehicles in the dedicated road/guideway with today’s technology. This provides the airport with ultimate flexibility not available with a railtrack APM system.

In the future, AVs soon will penetrate the surface roadway market, which means AV bus-trains could operate on any roadway with urban traffic. Furthermore, passengers in the future could schedule a personal driverless car or for-hire driverless vehicle to get to and from the airport site. This will mean fewer passengers will park at the terminal facilities which, in turn, will drive a larger demand in vehicle staging areas and a reduced demand for parking facilities. As a result, some portions of parking garages could be repurposed for vehicle staging with multiple curbs for simultaneous loading, with directional signage to match vehicles with arriving passengers.

With technologies like these rapidly advancing, airports should factor these flexible ideas now into their plans. Travelers will come and go and the systems will change. Anticipating these changes early will help set expectations, budgets and schedules.

**Transportation**
Transportation is part of the first impression. Charlotte Douglas International Airport passengers receive when they arrive to our Airport. So, the ability to easily move through our site is very important. Like many airports across the country, we are in the middle of a redesign project that, among other things, will improve access to the main terminal building. As our city and region continues to grow, so will CLT’s passenger numbers.

We served more than 44 million passengers in 2016, and 12 million were from the local area. Based on our master plan, we anticipate overall passenger growth in the next 10 years to be about 2.8 percent annually, which adds up to 21 percent growth by 2026.

Currently, the main mode of transportation to and from the Airport is still cars, via private vehicles, taxis, limousines, shuttles and transportation network companies (on-demand ride-sharing services). Charlotte Area Transit System offers the Sprinter, an express bus that travels directly to downtown. CATS also manages two connector buses (Airport Connector) from the Airport that connect the north and south parts of the city, but these two services are used mostly by employees. We are in the process of working with CATS to offer additional transportation options to travelers.

Charlotte is one of the fastest-growing cities in the country, with hundreds moving to the area every day. Many people are coming here for job opportunities, jobs which often require travel. Thus, those demands put a lot of pressure on our current facilities. We are in the process of expanding the curbfront in front of the terminal, and soon we’ll expand the terminal lobby, helping passengers access our gates more quickly and efficiently.

Several years ago, we began laying the groundwork for additional transportation methods, accommodating additional passenger flow now and for the future.

**ABOUT THE AUTHOR**
Tom Rostbach is the national aviation architecture practice leader for HNTB. He provides strategic direction for terminal projects within the national aviation market and has more than 30 years of terminal planning and design experience. Contact him at (312) 446-1800 or trossbach@hntb.com.

**Redesigning for the future**
Charlotte Douglas International Airport manages multimodal options as the city studies a potential transit link

1. **We built a consolidated rental car facility and new hourly parking deck.** Two years ago, the Airport opened a 7,000-space parking deck (seven levels) that consolidated all its rental car centers into one building, in front of the main terminal. It also replaced hourly parking decks in front of the terminal building, giving room for our expansion projects. Passengers can now easily walk across the parking deck to the terminal to access their flights. The deck eased roadway congestion by eliminating a fleet of rental car buses that were operating in the Airport’s main roadway, which has removed some vehicle traffic pressure. Additionally, the lowest level of the parking deck is designed to accommodate an automated people mover and transfer station, should we build one in the future.

2. **This completion allowed us to launch a $2.5 billion development plan — Destination CLT.** One of the primary projects is expanding the roadway in front of the terminal to accommodate future capacity. Our elevated curbfront roadway project in front of the terminal will replace the current three lanes with a total of eight lanes to provide adequate space for passenger pick-up and drop-off areas at ticketing and baggage claim. The project is scheduled to be completed by August 2018.

3. **We also realize that on-demand ride-sharing services like Uber and Lyft are a service that passengers want.** Our job has been to figure out how to deliver that in a way that makes it work for everyone within the Airport’s existing framework. In the months since the on-demand ride-sharing services arrived, the Airport assigned special waiting areas and specific passenger pick-up points in order to accommodate the additional vehicles. The new curbfront roadway will give us the ability to provide the appropriate space for this service.
Although driverless vehicle technology is in the future, the Airport is already thinking about how to accommodate them, with several groups exploring this issue. We need to define what would happen to cars that drop off passengers and need to park, and where passengers would meet their driverless cars. The technology is coming, so we must be proactive about it.

4. We’re collaborating with the city on a potential transit link to the airport. The City of Charlotte is spending $1.5 million on a study to look at whether to build a light rail or streetcar link to the Airport, along with adding enhanced Sprinter bus service.

We understand that an optimal system would take passengers directly to and from the Airport from downtown, and because it would be convenient, more of them would be willing to use it. We also recognize buses and streetcars are less convenient because it’s harder for passengers to carry and load their cumbersome luggage. Even as the study continues, the Airport will be ready to put into place the infrastructure that’s needed for the system. Our team continues to support CATS as it works to complete the study, confirms funding and finalizes the government’s support for a final project.

Proactive communication is key
The number one thing we’ve learned with our transportation projects is to proactively and regularly communicate to the public (including passengers and our neighbors) about what’s happening at our site. During the parking deck and roadway projects, we knew there was going to be some inconvenience to those traveling in and out of the Airport. We found the more we communicated with our customers about what we were doing and how we were managing it, most of our customers were ok with the inconvenience of the construction. Additionally, we found our customers appreciated the project more when it was finished.

We continue to maintain a forward-thinking philosophy and a focus on constant growth at CLT. While our Destination CLT plans are guiding our Airport’s expansion, we remain flexible to the demands of the customer. If their demands change, so will our plans.

For more about Charlotte Douglas International Airport, visit cltairport.com.

ABOUT THE AUTHOR
Jack Christine is the deputy aviation director for Charlotte Douglas International Airport. He oversees airport development, operations and facilities. During his 20-year career at the airport, Christine has been assistant aviation director of development, planning and development manager, airport planner and associate airport planner. Mr. Christine also serves as an adjunct professor at the University of North Carolina at Charlotte teaching courses in airport development. Contact him at (704) 359-4932 or jchristine@cltairport.com.

Automated guideway transit system enhances airport connection

OAK’s connection to BART creates easier trip for travelers

As passenger traffic increases, time demands grow and environmental concerns rise, convenient access to airports is increasingly important to airport planning efforts. This is especially true for the San Francisco Bay Area, given travel time delays that can occur due to roadway congestion.

Multimodal access is particularly important for Oakland International Airport as it is closest to a majority of the Bay Area’s population. Planning for a wide range of transportation modes is necessary to accommodate as many air travelers as possible. However, for more than 40 years, plans to bring a San Francisco Bay Area Rapid Transit District (BART) rail link to OAK remained just that — a plan.

The idea to create a connection from the Oakland Coliseum BART station to OAK began in 1970, two years before the regional rail transit system officially opened. Despite several studies over a 20-year period, the connection didn’t take place. Instead, the Port of Oakland partnered with BART to operate AirBART, a shuttle bus service that shuttled air travelers between the Oakland Coliseum BART station and the airport. AC Transit bus service also was available from the station.

However, the vision to complete a light rail or other APM system to the airport remained, and BART worked with the Port and city and county leaders to move that vision forward. Alameda County voters authorized a transportation sales tax to help fund transportation-related projects, including the BART Connector, after which the BART Board certified the Final Environmental Impact Report and approved the link to OAK using an elevated Automated Guideway Transit system.

Following nearly a decade of efforts to develop a financing plan and complete preliminary designs for the project, BART awarded the contract to build the BART Connector. Construction began in late 2010 and, in November 2014, we opened the $484 million BART Connector link to the public.

Completion of the BART Connector project helped streamline the connection between OAK and the regional rail system that serves much of the Bay Area. This, in turn, further supplemented ground access as a strength of the airport, which is among the features rated highest by our air travelers.

At the Oakland Coliseum BART station, the Connector is located on a separate platform. The AGT system mainly travels along an elevated guideway that crosses the I-880 freeway on a dedicated bridge structure and offers 360-degree views during the ride to and from the airport. There are a few segments of the system that are not elevated: the guideway descends into a tunnel beneath Doolittle Drive at the Airport boundary, then continues at grade level adjacent to Airport Drive on airport property. The cable propelled system is powered from a centrally located maintenance and service facility called the “Wheelhouse.”

To facilitate the project, the Port, BART and the people mover team worked closely during the planning, design and construction phases. Port and BART staff met regularly to establish the on-Airport segments of the guideway alignment and to prepare Development and Use agreements that would govern the construction and operation of the Design-Build-Operate-Maintain (DBOM) project.

Completion of the BART Connector project helped streamline the connection between OAK and the regional rail system that serves much of the Bay Area.
Throughout each phase, the project team focused on ensuring the interests of various stakeholders and ultimately the traveling public were properly understood and that identified challenges were addressed effectively. During the project’s four years of construction, BART held regular partnering sessions to facilitate communication and cooperation among the various agency and project team stakeholders. The Port emphasized protecting airport operations and minimizing disruption of operations during construction of the 3.1 mile Connector, of which 1.1 miles would be within the airport’s property boundary. Throughout the construction phase it became clear that controlling the duration and boundaries of work, especially near the operating areas of the airport, was critical to ensuring the success of the project.

A swath of land parallel to the main access roadway was preserved for the project that allowed for efficient construction of the system guideway. The site of the airport station was more challenging to separate for construction as it was located within congested public parking areas. To protect the public and airport operations, the project team placed particular emphasis on managing contractor access and activities within the work areas near the parking facilities.

Benefits of the new system
The opening of the BART Connector in 2014 brought a seamless regional rail connection to OAK. This improved option strengthened the multimodal connection between the airport and the BART system and supported the understanding of Oakland International as a viable airport option for air travelers to and from the entire Bay Area.

Another benefit of the Connector service is that air passengers now remain within the BART system protected from the elements when transferring between trains. This new service also has enabled removal of bases from the roadways and reduced air pollution. The AGT system that replaced AirBART has attracted new riders to the system, despite an increase in the fare, because travelers find the new service convenient to connect between the airport and BART stops in the Bay Area, including downtown San Francisco. Air passenger ridership on BART increased immediately after the new Oakland service opened, with one million riders served in the first year. After a year of operating the new service, BART’s transportation mode share at Oakland Airport leveled off to about 8.7 percent.

Looking to the future
We continue to closely evaluate access to the airport and anticipate new options will be considered to best serve future ground transportation needs of air passengers. We are pleased that the rail link enhances the overall airport experience for riders of the system and will continue to do so for years to come.

ABOUT THE AUTHOR
Hugh Johnson is a senior aviation project manager for HNTB. He has managed aviation programs and projects for more than 20 years, the past 15 years with the Port of Oakland’s Aviation Planning and Development Department, with an emphasis on ground transportation, parking, air cargo and air passenger terminal facility access at Oakland International Airport. Currently, Hugh is leading the Port’s efforts to rehabilitate the main air carrier runway at OAK. Contact him at (510) 627-1449 or hjohnson@portoakland.com.

Resource Center
Other helpful websites:

Airport Consultants Council
accountline.org

This international trade association represents airport consultants and related businesses.

American Association of Airport Executives
aaae.org

AAAE is the world’s largest professional organization for airport executives, representing thousands of airport management personnel at public-use airports nationwide.

Federal Aviation Administration’s Sustainability Efforts
www.faa.gov/airports/environmental/sustainability

The FAA provides eligible airports across the United States with Airport Improvement Program grant funds to develop comprehensive sustainability planning documents.

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