KEEPING COMMERCE IN FLIGHT:
100 Years of Commercial Airports

A 2011 Report for the Aviation Industry Prepared by Burns & McDonnell
The Fascination of Flight: Airport Innovation for the Next Century

Flying captures — and holds — the imagination of people young and old like few other concepts. It has for centuries, long before anyone successfully lifted off the ground. From Greek mythology to Leonardo da Vinci to Howard Hughes, the idea of flight fascinates and propels us.

The innovations of a century of commercial airports are a testament to the hold it has over business executives, engineers and the traveling public alike. We want to fly better, faster, farther and higher.

The 2011 Aviation Special Report pays tribute to the spirit of invention that has made the commercial aviation industry grow and change over the past 100 years — and will drive it onward into the next.

Burns & McDonnell will be right there with you.
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Laying Claim to ‘First’: Celebrating a Century of Aviation History

By Randy Pope, PE

Nearly 100 years ago, commercial aviation began springing up around the world. Upper-class Americans, Europeans and businessmen began to sign on for the 12- and 17-passenger short and uncomfortable flights. This newfound mode of transportation brought them to their destination more quickly than rail service could promise.

With those flights came the need for commercial airports. Much discussion and debate will no doubt reign over the next few years as we enter the second century of commercial aviation, with airports throughout the world staking claim to the title of “first.”

The Military Factor

Like many aviation developments throughout the century, the first commercial airport likely sprung from the military. One airport that can certainly lay claim to being first was Le Bourget near Paris. Here, as at so many other airports, facilities began to be built to accommodate the new passenger traffic.

During World War II, many commercial airports were taken over for military operations. However, another of the earliest commercial airports worldwide was never used solely for military purposes. The Tempelhof Airport in Berlin was open during World War II but was never used by the Nazis for war operations. The airport was decommissioned in 2008 and has been transformed into Berlin’s largest park. It still boasts the third largest building in the world, the former airport terminal.

An International Affair

Many of the facilities claiming to be the first commercial airport are overseas. In the United States, the Newark International Airport has grounds to make its declaration. The airfield was built in 1928, and Amelia Earhart dedicated the terminal building in 1935. In its early days, Newark International was the busiest airport in the world. Officials boast of being home to many of the nation’s aviation firsts, including:

• First passenger terminal
• First paved runway
• First air traffic control tower
• First runway with lighting
• First airport weather stations

By 1939, Newark was the nation’s busiest airport, handling 481,000 passengers — a huge number at that time.

Other commercial airports firsts:

• Miami International Airport, built in 1928 and home to startup airlines Pan Am and Eastern
• Taliedo Airport in Milan, Italy, which traces back to the 1910s
• Flughafen Devau, near what was then Konigsberg, East Prussia, built from 1919-1921
• S. Darius and S. Girenas Airport in Kaunas, Lithuania, which opened in 1915
• Croydon Airport in South London, which started air traffic control in 1921
• Sydney Airport in Australia claims to be the world’s oldest continuously operating airport, with its opening flights tracing to 1920

No matter who was first, commercial aviation has evolved significantly in the past century. As the next generation of jumbo jets takes off and airlines test new ways to lure and satisfy passengers, the industry will see a new wave of evolution in technology and travel.
In 1910, flying boats landed and departed from the port of Southampton, England. The mayor then named this facility an “air-port.”
When commercial flights began to take off, convenience of passengers wasn’t much of a concern. Simply getting them from point A to point B was a feat in and of itself. As the years have passed, however, the needs and comfort level of passengers have come to the forefront as airlines and the industries that support them recognized the role of passengers in profitability.

In the early days of commercial flight, the passenger experience was simple. Because so few people could afford to fly and commercial airline accommodations were limited, commercial airports served a limited purpose: to allow the planes a place to take off and land. Passengers carried their own luggage and boarded planes on the apron. Eventually, stewards boarded flights to make the flying experience more comfortable and handled luggage before the flight — the early baggage handlers.

As commercial travel became less expensive and available to more people, the airport experience grew in importance. After World War II, airport design became more sophisticated, and terminal design began to evolve. Passengers were routed through terminals to board their flights, rather than simply walking or driving onto the apron. As air travel began to surpass rail travel, amenities for the traveling public and creating a transition from the terminal entrance to boarding areas became the standard for design.

During the boom of air travel, amenities during flight were an important aspect of making passengers comfortable. Progressing from airport arrival to boarding was less stressful in earlier times. With no baggage screening or security checkpoints, travelers walked throughout the terminal at their leisure. Commercial air travel was an experience in and of itself.

Today, travelers’ comfort is at the forefront of the design process. Even before arriving at the terminal, people need to feel at ease with the process. Burns & McDonnell works with airline and airport clients to lessen friction from the first step onto the property through boarding at the gate. By working with all stakeholders, we make design and construction of terminal improvements as seamless as possible for travelers and airport staff alike. Whether the project is parking improvements, wayfinding, security or concessions, communication is key in creating a positive airport experience for passengers.

In the early days of flight, the stress of flying was primarily about whether you would arrive at your destination or not. Today, many travelers experience stress throughout their journey. Burns & McDonnell works with airline and airport clients to reduce passenger anxiety at every stage of their trip. After all, a relaxed passenger will spend more time and more money on travel. And that’s good for everyone.

Passenger expectations for the airport experience have evolved to emphasize comfort and convenience.
The commercial airport was still a novelty in the 1940s. Washington National Airport leveraged the innovation of flight to draw consumers to an upscale restaurant where patrons could view aircraft taking off and landing. It wasn’t until later in the century, when commercial flights became more economically feasible for more passengers, that the airport concessions industry became a viable business. In fact, food and concessions have become an important part of the passenger experience in the past three decades.

Beginning in the 1980s, airport concession areas mimicked shopping mall food courts. Most commercial airports offered options for quick dining, sit-down meals, bookstores and souvenir shops. Because terminals were open to everyone, passengers, guests and community members alike had a range of options for spending time and money within the terminal.

After Sept. 11, 2001, the commercial airline industry changed dramatically. The impacts on the concessions world were equally significant. Security checkpoints now create a barrier among the traveling public, airport employees and the visiting public. Concessions are a key to traveler convenience as well as a revenue generator that keeps airport costs down for all users and offsets facility expenses. So how can the spaces before and after the security divide be maximized?

Burns & McDonnell’s long-standing partnership with US Airways has helped enhance the airport experience for the airline’s customers in a variety of ways. The team is currently working on a $117 million redesign and expansion of the US Airways’ 38-gate Express Terminal at Philadelphia International Airport. Once completed, the new Express Terminal will deliver passenger comfort and convenience at a whole new level, with a concession program that doubles current offerings.

Future airport concession areas must go beyond variety and convenience to passengers, bringing the concession experience closer to the passenger boarding area. US Airways is exploring options that bring food and beverage concessions into the boarding area with café, bar and lounge seating. Other enhancements could include taking food orders via portable tablet devices such as iPads. Travelers in the boarding area could have food delivered from anywhere within the terminal while they wait for their flight within the post-screening area.

In developing the latest concepts in airport concessions, Burns & McDonnell and US Airways are partnering with innovative companies like Marketplace Development and OTG. The key is to collaboratively create flexible concession environments that can adapt to future airline and airport business practices and passenger preferences.

In the past 70 years, airport concessions have evolved from novelty to necessity. Burns & McDonnell will continue to team with airports, airlines and concessionaires to plan, design and maximize the concessions industry to the benefit of all airport users and the traveling public.
Successful commercial airport operations depend on many parts of the system coming together to best serve the flying public. Hangars are seldom mentioned as a part of those airport operations, but safe and reliable aircraft, kept on-line and flying every day, form the nucleus of the entire air transportation network. Without hangars, aircraft availability is diminished, and air service becomes less reliable.

Some of the first known aircraft hangars are linked to the birth of aviation. A hangar at Kitty Hawk, little more than an outdoor timber shed constructed in 1902, served as the shelter for the original Wright Flyer before the Wright brothers made aviation history in 1903.

Hangars came about at commercial airports when aircraft stayed airworthy long enough to need repair instead of replacement. General aviation pioneer Clyde Cessna crash landed his first aircraft 12 times before making his first successful landing in 1911. When aircraft actually landed, remained intact and airworthy or in need of only minor repair, hangars became essential.

Hangars soon became standard as new commercial airports were being built around the United States. Burbank United Airport (now Bob Hope Airport) opened in 1930 with a terminal and two hangars to support aircraft production and maintenance.

Changing Aircraft, Changing Facilities
Burns & McDonnell embarked on its first hangar project in 1942 at Smoky Hill Army Airfield in Salina, Kan. This hangar is still in use today at what is now the Salina Municipal Airport. While the longevity of the structure is a testament to the design, it hardly meets today’s sophisticated demands for hangar technology. As aircraft grew in length and wingspan, hangars answered the challenge with longer clear spans and larger operable doors.

Hangar technology also advanced with aircraft technology. From the DC-3 and DC-6 piston engine airliners to the jet age of the DC-8 and B707, and on to the B747-8 and A380, aircraft size and complexity keep hangar designers and builders challenged to provide larger and more advanced buildings.

Gains in aircraft complexity now require repairs to be divided among components and subsystems. Hangar facilities added shops for component repairs. Today’s advanced aircraft Maintenance Repair & Overhaul (MRO) facilities have a variety of repair shops. Burns & McDonnell is engaged in a project that includes more than 40 shops for functions such as seat repair, landing gear overhaul and advanced avionics repair. These shops also support 20 hangar bays.

Safety and Efficiency for Crews
Aircraft became so complex and so large that working from a ladder or a simple stand was impractical. Larger components must be handled by overhead cranes in a hangar bay. Simple work stands have evolved into sophisticated work docks. Burns & McDonnell’s latest hangar designs include adjustable work docks for the nose, fuselage, wings and tail, with some docks suspended from the long-span roof above. This allows the docks to be adjusted to accommodate varied aircraft. It also enables connections for power and compressed air for tools, work lights and air conditioning for workers.

Over time, as aircraft fleets grew, airlines saw maintenance tasks grow beyond their staffing and facilities capacity. Commercial airports found less area available for large hangar and shop complexes. Third-party MRO companies were born. In today’s competitive environment for MRO work, tasks are
expedited to speed the aircraft back into revenue-producing flight, minimizing hangar turn times. Today’s newest hangar facilities are equipped with work docks, automated parts storage and delivery, and shop innovations that make quicker work possible. Commitment to technology also reduces the work hours required to complete repairs through increased efficiency and productivity, keeping MRO providers competitive.

From the Wright brothers’ simple shed on Kill Devil Hills to today’s complex hangar and maintenance facilities, the first century of commercial airports witnessed steady growth and advances in aircraft maintenance and safety reliability. Thanks to advances in maintenance technology and the hangar facilities that support and enhance that technology, commercial airports operate today with safe and reliable aircraft to serve the traveling public.

Why is the aviation term hangar spelled differently than the hanger in your closet? One of the most misspelled words, h-a-n-g-a-r comes from Middle French hanghart, meaning enclosure near a house. The word was no doubt adapted and adopted to describe this unique building type.
In the beginning of flight, airfields were quite simple — nothing but large fields that allowed pilots to take off and land into the wind, no matter its direction. Like everything else in the aviation industry, though, airfields have evolved. Those large vacant fields have given way to well-considered and complex concrete paths.

**Airstrips and Runways**

As aircraft evolved in the 1950s and air travel became a desired form of transportation for the general public, the simple grass landing strips would no longer suffice. Heavier aircraft with tail wheels that enabled ground steering forced the conversion of airstrips from grass and gravel to pavement capable of supporting the weight and technological advances.

Today, grass landing strips still dot the American landscape and serve rural air traffic well. Private, small community and small regional airports may be home to a single airstrip suitable for general aviation and corporate needs. Meanwhile, major cities and international airports boast long parallel and intersecting runways to serve larger commercial and cargo jets.

**Navigational Aids**

In the early days of flying, navigational aids were essentially non-existent. Pilots flew by looking out their cockpit window and navigating along the landscape. Once nighttime flying became necessary, particularly for the U.S. Postal Service, bonfires were lit from town to town to guide the pilots. In the early 1920s, beacons began to be placed on towers across the country at distances of every 15 to 25 miles, creating flight lines for pilots to follow.

Technology has come a long way from those early days. Complex ground lighting and highly reflective pavement markings, along with sophisticated GPS-based navigational aids and radar, enable easy identification of airports for approaching aircraft.

**Safety**

These advances added a measure of safety that did not exist in earlier days. With aircraft and airfields only beginning to grow, congested air traffic was not a concern. Before navigational aids, pilots simply circled an airport, checked for obstructions and traffic, then landed if the field was clear.

Over the years, safety became a driving force in airfield development. It is of utmost importance at commercial airports worldwide. Instrument landing systems guide pilots through inclement weather, while runways are pushed farther apart to accommodate larger aircraft. Standardized navigational aids combine with air traffic control systems to keep the traveling public safe as they arrive and depart.

The complexity of modern airfields means that any expansion, change or new development — regardless of size — requires a team with experience and understanding of how the facilities interact with pilots in flight, providing the necessary facilities, runways, taxiways, lighting, pavement markings and safety features to protect the traveling public and the investment of airlines and communities. Burns & McDonnell has been guiding airfield stakeholders through these processes for decades, and our expertise will see every project through to successful completion.
Nighttime navigational aids have graduated from bonfires to complex ground lighting systems.

Did You Know ...

A Gibraltar Airport runway crosses a road used to travel from Gibraltar to Spain. When a plane lands or takes off, a stoplight and gates halt the road traffic to give arriving or departing aircraft the right-of-way.

Pan American begins transatlantic passenger service

1936

Pan American inaugurates passenger flights across the Pacific Ocean

1939

New York Municipal Airport opens, later renamed LaGuardia Airport after New York Mayor Fiorello LaGuardia, who refused to deplane at Newark, N.J., because his ticket read “New York”
The Funding Factor: Planning Is Key in Keeping Airports in Business

By Dave Hadel, PE

When federal airport funding was established after World War II, the funding was supported by the general fund of the U.S. Treasury. At the time, funds were sufficient for the airports being established to meet the demand for increased public air traffic.

Funding requirements have changed significantly over the years. Today, the airports within the National Plan of Integrated Airport Systems (NPIAS) are funded in part through the Federal Aviation Administration (FAA) Airport Improvement Program. As the airport sponsor’s engineer, Burns & McDonnell is helping these airports identify potential projects and develop program cost estimates. This information is submitted to the FAA for inclusion into the sponsor’s Airport Capital Improvement Program.

These federal funds are collected through user fees, fuel taxes and other sources. These funds are converted to grants dedicated to aviation improvements. Distribution of these funds is allocated in multiple categories, including safety, runways, taxiways, aprons, vertical infrastructure and fueling. In general, large and medium hub airport projects are funded at a 75-25 ratio. Seventy-five percent of the project will be funded from federal grants. The sponsor is responsible for the remaining 25 percent. For small primary, reliever and general aviation airports, the federal ratio is increased to 95-5.

Regardless of airport size, the business of aviation requires continual upkeep. Cost is an important consideration of maintenance and modernization. Maximizing value added and justifying costs are the challenges every airport program faces. The FAA requires sponsors to provide a benefit-cost or life-cycle cost analysis for each project. It is the sponsor’s responsibility to include these studies as part of every grant received.

Airports large and small may choose to have outside assistance in matching the needed improvements with the available funding in order to optimize available money. The airport’s staff expertise can be augmented to ensure all necessary projects are brought to light. Burns & McDonnell, for example, helps prepare grant requests and match needed improvements with solutions that work with grant timelines and restraints.

Stretching Dollars with Technology

Burns & McDonnell is combining traditional methods with increasing uses of today’s technology to help airports save time and money on pavement management programs. By involving our geographic information systems (GIS) professionals in on-site data collection, we are modernizing a traditional system and producing better results.

This field effort includes making visual observations of the existing concrete and asphalt pavements. Characteristics recorded may include cracks, ruts, raveling, joint spalling, shattered panels and a host of other discernable pavement conditions. The field data collected and photographed at the airport is sent back to our offices electronically for real-time reviews. Issues can then be addressed while employees are still in the field, for a more efficient use of time and resources — resulting in a better product for less cost.

This eliminates the need for more site visits and streamlines data collection from the field to the office. The timely and cost-effective approach makes pavement management reports more efficient, and the data can be repurposed for historical review and other GIS uses.
In fiscal year 2008, the FAA Airport Improvement Program funded more than 2,400 new grants and 777 grant amendments totaling $3.5 billion.

Burns & McDonnell has assisted with planning and execution of projects from paving replacement to terminal renovations at Kansas City International Airport.

Smaller airfields, such as the Hays Regional Airport in Kansas, rely on the FAA Airport Improvement Program for project funding.

Pan American initiates its New York to London route with the Boeing 707

Today’s second busiest airport internationally, Beijing Capital International Airport, opens

American Airlines offers first domestic jetliner flights with routes from New York to Los Angeles
Natural Disaster Vulnerability: A Real Risk for Airports

By Grant Smith

Natural disasters have always affected air travel and airport infrastructure. Designing and constructing facilities to minimize damage risk is the key. In 2011 alone, tornados, fire, tsunamis and volcanic eruptions have disrupted travel and devastated airport operations around the world. While no one can eliminate the dangers of such disasters, updating infrastructure and developing a response plan will help weather the storm.

Earthquakes are perhaps the most destructive disasters for airports and aviation facilities. The absence of a warning period means earthquakes can cause more injuries to people in the facilities and major damage to structures that aren’t up to par. Earthquakes quickly emphasize where sufficient emergency plans, procedures and policies are not in place. Burns & McDonnell works with airports across the country, especially those in earthquake-prone areas, to help plan for earthquakes and mitigate the damage they can cause, especially to the fuel systems and fuel farms that pose great potential risk.

Facilities built before the early 1970s lack the structural steel and other design features required by modern building codes. Older structures are more vulnerable to major earthquake damage, but newer structures may avoid collapse but still suffer permanent damage. This depends, of course, on the magnitude of the quake, the soil conditions and the structure’s proximity to the epicenter.

The U.S. West Coast has the biggest threat of earthquakes and the tsunamis that may come after them. The recent 9.0 magnitude earthquake in Japan demonstrates how modern design and construction can withstand the effects of a major earthquake. All major airports in Japan were operating within a few days of the earthquake — without substantial infrastructure damage.

The only airport taken out of service for an extended time was Sendai Airport, which was devastated by the tsunami that followed. Many airports on the U.S. West Coast have upgraded their facilities during the past 30 to 40 years, building to meet stricter seismic codes. Some facilities, however, predate the 1970s, when many structural design improvements were mandated in building codes.

Other natural disasters can significantly disrupt airport facilities. The tornado that hit Lambert-St. Louis International Airport in April 2011 caused considerable damage to a terminal building. The airport had enough capacity to switch flights to gates that were not damaged, creating flexibility while damage was repaired.

A March 2011 fire at Miami International Airport was not a result of a natural disaster, but it did show the importance of the fuel supply in airport operations. The loss of the hydrant pumping system significantly reduced fuel flow to aircraft and resulted in hundreds of cancelled flights. Getting these systems back into operation soon after a problem like this requires planning. The operator, airlines, airport and fuel suppliers need to coordinate resources. While the exact system or site of a failure can’t be predicted, a plan can be in place to establish qualified contractors, define the chain of command and identify organizational structure ahead of time.

Emergency response plans are developed for fuel spills and required by the U.S. Environmental Protection Agency for large bulk fuel facilities. This can be expanded for infrastructure damage.
Burns & McDonnell is helping airport and aviation clients identify vulnerable assets and develop emergency response plans for all types of airport and aviation facilities. The Burns & McDonnell Fueling Group provides emergency response planning for fuel facilities and fuel farms at airports. Natural disasters — even those that come with some degree of warning — require careful response planning. Steps can be taken in design and construction to mitigate damage and minimize losses. Devising an appropriate plan is a big step toward keeping your airport or aviation facility intact in the wake of a natural disaster.

Emergency response plans are especially critical for fuel systems and facilities because of the risk they pose during crisis situations.

1976
Concorde jet flies first supersonic passenger flight

1978
Airline Deregulation Act is signed into law, removing government control over fares, routes and market entry

1979
First frequent flier program introduced
Looking to the Future: New Tool Brings Airspace Down to Earth

By Robert Crain, AICP, Burns & McDonnell, and Ed Young, Kansas Department of Transportation

U.S. airspace is a complex network of imaginary 3D surfaces. The surfaces can be triangles, trapezoids, conical areas, or any shape imaginable. The areas protected are equally complex, including airports, navigational aids, instrument approaches, military training routes, special use areas and more.

Explaining the configuration of airspace in public meetings requires the combined skill set of a high school geometry teacher and a rocket scientist. The mere mention of 3D imaginary surfaces results in an immediate glazing over of eyes.

But Airspace Is Important
Protection of the airport’s infrastructure requires local government action. Local airport boards, city councils and county commissions must adopt local regulations regarding the protection of their airport. While the Federal Aviation Administration (FAA) evaluates all structures, its ability to restrict the placement of a structure is limited. A local understanding of airspace is critical.

In 2009, 2,000 airspace cases were determined in Kansas alone. In 2010, there were 2,000 cases before October. The increase in case numbers left Kansas airports vulnerable to determinations that might adversely impact instrument approaches, airport expansions and general airport utility. The lack of information and complexity of airspace resulted in 20 percent of the airspace cases receiving a determination of a “presumed significant hazard.” Even wind farm developers lacked sufficient information to avoid proposing structures in locations that potentially conflicted with airports.

In the course of its evaluations, the FAA would circulate presumed hazard cases and request comments. Frequently, the comments sent by the state and the airport would be discarded as irrelevant. In many cases, the FAA would simply determine that there was no effect without asking for comment. Even in communities with local regulations, the community could not independently evaluate the FAA’s determination of no significant hazard since many of the resources available to them were useless in evaluating a potential structure. This is the value of the KAAT.

From Imaginary to Real
Kansas was the first state to create an airspace tool for public use, the Kansas Airspace Awareness Tool (KAAT). The tool visually depicts airspace, converting the imaginary surfaces into a visual layer in Google Earth. Developers can insert structures using precise coordinates and elevations, or they can identify a site on the map to conduct a preliminary analysis.

More importantly, local communities can use the tool to protect their airports. Much of the state of Kansas is dependent on air ambulance for medical evacuation. Airspace obstructions can reduce the available runway length which reduces the airport capacity. This can impact important users, such as air ambulances, from accessing a community in a time of need. The FAA’s Notice of Proposed Construction is still required,

1980s

Almost half of total flights worldwide took place in the U.S.

1980

11,400 air traffic controllers are fired by President Reagan after walking off the job on strike when labor negotiations fail.

1981

First ticketless travel becomes available.

1993
but the local community can use the tool to explain the adoption of airspace regulation and justify a determination under local regulations.

Burns & McDonnell helped KDOT turn a vision into reality. The KAAT went from concept to reality in less than eight months by utilizing unorthodox testing procedures and innovative outreach and training. The tool is already proving its value for KDOT. The agency has already challenged airspace conflicts using the tool’s output. The KAAT allows Kansas to be a credible participant in the airspace discussion. Ultimately, it helps KDOT protect the millions of dollars in infrastructure and planning in place at Kansas airports.

Burns & McDonnell used Google Earth because it enabled the team to “stand up” the state of Kansas airspace and airway system for the KAAT. With Google Earth as the platform, the viewer can see the airport and its associated airspace in 3D, creating a real-time visual representation of the existing landscape.

The web-based KAAT helps everyone visualize the imaginary 3D surfaces that make up the complex network of U.S. airspace.

1995
Boeing produces twin-engine 777, the first aircraft produced via computer-aided design and engineering

1995
First airline tickets are sold via the Internet

1998
Smoking is banned on all domestic flights
We know what the first 100 years of commercial aviation have wrought, and it falls to me to speculate on the next 100. There are numerous conceivable possibilities — some realistic and some not. It is up to us as aviation professionals to identify the good ideas that can lead to more efficient, safe and pleasant experiences for air travel.

Some big ideas won’t be realized any time soon. As long as I can remember — from the 1950s, at least — we have been waiting for flying cars. The convenience of flying from your driveway to your parking space at work would be great. But aside from the problem of extreme airspace congestion, the cost of defying gravity is outrageously high. It is doubtful this will happen anytime in this millennium.

On the other hand, Virgin Galactic will begin commercial space flights from Spaceport America in the New Mexico desert. Unfortunately, since they won’t accept my frequent flyer miles, I won’t be one of the passengers.

Let’s look at some changes in the commercial travel world that could occur.

**Passenger Processing**

I fly a lot, but flying is still an anomaly in my life — a process wedged between doing something somewhere and doing something somewhere else. The real job of an airport is to get people from the highway to the airway or vice versa as quickly and efficiently as possible. We refer to this as the passenger experience. There are two extremes on the continuum of passenger experience: make it pass as quickly as possible or make it as enjoyable as possible. I think most passengers prefer the former, and eliminating the waiting and inefficiencies should be our primary goal.

Self-service ticketing and check-in have been successful programs for most airlines. Some airports and airlines have deployed self-boarding — think barcode scanner on a subway turnstile — and are seeing positive results. Technical challenges with passengers self-tagging bags and common bag drop have been resolved, and the trials are largely successful. Only acceptance from the Transportation Security Administration and remodeling of airport bag intake infrastructure remains. I expect both of these improvements to be widely deployed in the next 10 years.

Radio frequency identification (RFID) bag tags are in limited use and will grow slowly. When the number of RFID-capable airports reaches a critical mass, we can expect permanent, durable RFID bag tags or RFID-readable luggage, likely linked to trusted traveler registration.

**Security**

I’ve heard recently that terrorists may attempt to transport explosives onto aircraft by surgically implanting the material in their bodies. The contraband cannot be detected by the
current strip-search viewers. If this type of threat proves to be real, expect another layer of screening technology, further complicating and lengthening the screening process.

Technology alone, however, cannot provide security. Only good intelligence has a chance of protecting us. The buzzphrase for this is risk-based assessment, but it’s really a reconstituted version of passenger profiling. Rather than selecting passengers to undergo additional screening, risk-based assessment eliminates passengers that do not present a threat, allowing resources to be focused on the remainder. With thoughtful implementation, we might have a chance of success using this strategy. In terms of airport design, risk-based assessment could require increased square footage for the screening process and implementation of additional wayfinding and methods to pre-sort passengers for multi-level screening.

How many of our airports perform in-line bag screening in the bowels of the terminal? This represents one of the most significant threat vectors to our facilities, and terminal planners need to eliminate it. Fortunately, the move to remote baggage check will facilitate consolidation of screening in more isolated and dedicated baggage locations.

Marketing
The amount of money airports can charge airline tenants is near maximum. Increases in the federal Passenger Facility Charge are strongly opposed by airlines because it makes the ticket price appear higher. Consequently, the only revenue growth open to airports comes from such non-aviation sources as amenities, parking, concessions and advertising.

The possibilities are limited only by airport staff creativity. Among the new ideas circulating: medical clinics, pet boarding facilities and laundry drop-off. The goal is to convince passengers it is more convenient to obtain these services at the airport rather than elsewhere. In addition to the standard fare, airport eateries will have new specialty restaurants representing the local flavor — at a higher cost.

Implementation of one-to-one marketing schemes and convenient concourse storefronts will target product offerings to specific passenger preferences as we attempt to extract more dollars between the time the passenger clears screening and boards the plane.

The Unpredictable
Flight, like steam power before it and the Internet after, was a disruptive technology — a discovery that caused the flow of progress to jump from one path to another. It precipitated a cascade of previously unconceived ideas. I hope for a new disruptive technology in the air-transport business, particularly in our approach to security.

More airport innovation has occurred in past 10 to 15 years than in the previous 80 to 90 years. The possibilities are only limited by our ability to innovate the ultimate passenger experience.
Keeping Commerce in Flight

Over the past century, commercial airports have adapted to the changing needs of complex new aircraft, ever-changing technology and the traveling public.

Burns & McDonnell is ready to help you fly into the next.

Our Services
For nearly 70 years, Burns & McDonnell has designed functional, efficient, flexible and cost-effective aviation facilities for clients around the world. Services include program management, master planning, facilities design-build, and environmental planning and design.

Our Experts Specialize In:
Aerospace manufacturing
Aircraft overhaul and maintenance hangars
Airfield design
Airport security
Airport technology
Cargo facilities
Central utility plants/combined heat and power plants
Control towers
Fueling and ramp services
Hangars
Jet engine maintenance and test facilities
Passenger terminals
Rental car facilities

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