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TECHNOLOGY
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INFRASTRUCTURE

THE **NEXT 5 YEARS**

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THE NEXT FIVE YEARS

BY MANIK ARORA



With the rapid renaissance of technology expansion in the aviation industry, it is impressive to see how far the industry has come. It will be even more awe-inspiring to see where it goes in the next five years as the use of technology transitions from transactional to transformational in its application to improving airport infrastructure.

Airport executives must consider how they will embrace and utilize current and upcoming technologies to enhance all elements of their business over the next five years. Trends and patterns are emerging in other industries that ultimately will be applied to aviation. The

premise around smarter airport infrastructure affects many of the key business units in an airport such as planning and design, construction, operations and maintenance, safety and security, customer service, concession management, parking, and more.

Here are some of the achievable applications of technology in infrastructure that airports soon will embrace:

AUGMENTED REALITY

Augmented Reality (AR) is a live view of the physical world with the addition of computer input such as messages, data, graphics, sound, video, and more. A simple way to imagine AR is to think about the data and functionality on a smartphone and then apply it to real-world objects and environments via glasses or headset, but on a professional level.

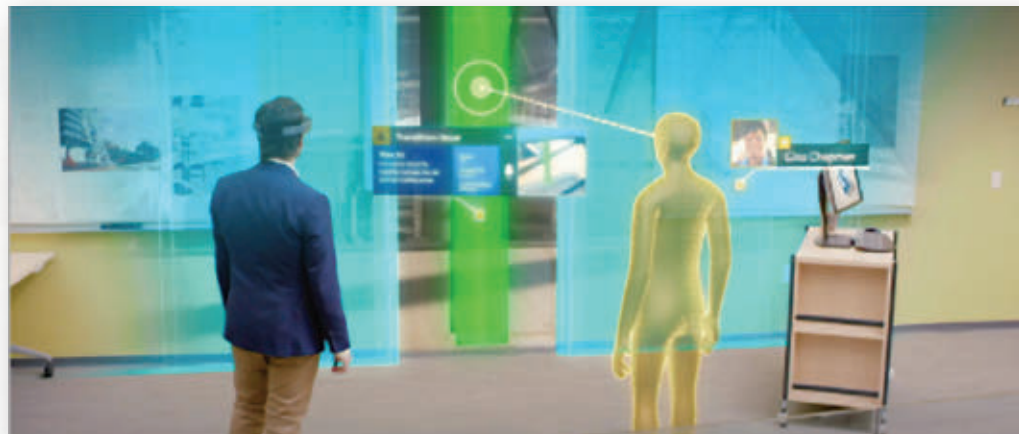
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AR will help designers quickly study alternatives by superimposing designs over actual physical spaces. Instead of using a virtual model, clients will be able to walk through their facility to see what a proposed renovation might look like. In a recent Interview with *Building Design + Construction*, Autodesk’s Dace Campbell, AIA, LEED AP, noted, “If we are surveying the real world to gather data to put into a virtual model or are doing layout with survey tools, that’s a strong case for augmented reality. If we had accurate, dependable position tracking, arguably you wouldn’t need a tape measure. It would be the next generation of the total station, where the virtual projection shows you precisely where each component of the building gets installed. Except, unlike with a total station, layout is done intuitively and in real time.” The architecture, engineering and construction community has been using this in alternative delivery models

outside of the airport industry, but it soon will be commonplace in aviation, too.

AR technology already is being used by some contractors to support prefabrication construction. Building a project in a factory eliminates some of the factors, such as weather delays, that can impact traditional construction. This approach produces a higher quality project at a faster rate and at a reduced cost to the client.

Industry products such as the Microsoft HoloLens is a wearable, self-contained holographic computer. The device features a see-through, holographic display and advanced sensors to map the physical environment. This technology makes it possible for users to interact with 3D holograms blended into the real world. In today’s aviation design practice, interpreting digital content and then translating it to real world objects depends heavily on the user’s spatial understanding.



“Airports need to embrace a digital ADA strategy for their facilities in addition to the physical infrastructure modifications.”

Trimble Navigation’s Aviad Almagor highlighted this in the firm’s *Extensions MEP* newsletter. “This is an error prone process, demanding a highly skilled workforce. Interpretation errors are common during the design and construction stages, and often result in poor quality, cost overruns and schedule delays which have a direct impact on airport CIP budgets,” he stated.

AR and holographic technology also will make it easier for project teams to work collaboratively, regardless of distance. During the design phase, 3D files quickly and easily can be shared with clients

and stakeholders to provide a better perspective on project design. During construction, hazardous work and critical emergency information could be highlighted in an AR view, making workers aware of on-site hazards and remedies.

ASSET DATA PLATFORMS WILL FORM

Asset-centric enterprise solutions will become more common. Airports tend to work in business silos, complicating access to asset data across the airport and over time. An asset-centric approach leveraging consistent naming

and unique, shared identifiers will become more relevant. Tying in Computerized Maintenance Management Systems, Asset Registry and Enterprise Content Management solutions will give the airport the ability to maintain infrastructure in a predictive versus reactive mode, help budget future CIP projects, reduce operations expenses, enhance customer service, and minimize disruptions to the operations of the airport. A user should be able to access the enterprise to create a work order, identify the asset ID, locate the manual, CAD or BIM file, and find the asset’s geolocation based on GIS. This level of data access through modern cloud-based technologies vastly can improve the business of maintaining airport infrastructure. The enterprise eventually will support movement analytics and sensory equipment to make more real-time data-driven decisions.

BASE BUILDING ELEMENTS ALL WILL BECOME SENSORY

The Internet of Things (IOT) is here. Smartphones, tablets, Bluetooth, Wi-Fi, headphones and wearables have become an integral part of daily life. Facility analytics will trigger smarter behaviors on behalf of the airport as more data is analyzed and consumed. The consumption of this data will be read from lighting fixtures, fire alarm strobes, CCTV, public address speakers, and near field communications, in addition to current methods of Wi-Fi, beacons and Bluetooth sensors. “Smart” restrooms already are appearing throughout the industry, providing travelers with a higher level of customer service through sensory



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technology. Another trend in base building products is using IOT sensors to provide data on predictive maintenance on items such as motors, elevators, escalators, and all items that can cause choke points in the customer experience. Airports must be careful to make sure they create holistic facility analytics plans for the entire airport as different capital programs have built infrastructure during different eras.

SILENT TERMINALS WILL FORM

A few airports in Asia are trying to achieve the vision of a silent terminal, not unlike a high-end hotel lobby. No announcements are made for public address, other than fire emergencies required by code. With a smartphone in everyone's hand, can technology change how airports and airlines communicate with passengers and the mass audience? Will airports focus more on a concierge-type approach instead of the traditional method? Will boarding announcements even be necessary in the future? In mass transit, it's more about reading and decision-making than it is about hearing a boarding announcement. This trend will continue to grow and be embraced by aviation to feature coordinated digital content management systems across all mediums.

TECHNOLOGY FOR PASSENGERS WITH DISABILITIES WILL TAKE CENTER STAGE

As lifespans continue to increase, it becomes even more important for airports and airlines to properly adhere to ADA standards. The population continues to travel with the ability to request assisted services at the airport. Technology to track mobile assets such as wheelchairs and pushers, as well as the ETA for mobile transport, all are being piloted at airports

around the world. Technology already is being used in the healthcare industry to track mobile assets in real time. Growth and innovation also is happening with applications and assistive technologies designed for those with sight or hearing difficulties. Airports need to embrace a digital ADA strategy for their facilities in addition to the physical infrastructure modifications.

UBER OF CONCESSIONAIRES WILL TAKE HOLD

Busy travelers spend an average of 90 minutes to arrive at their gate. Travelers who don't want to give up their seat in the hold room to purchase food or buy headphones are a challenge for concessionaires. There are currently early trends of technologies that are using the Uber formula for indoor infrastructure. In certain airports, passengers can use applications to order from any of the concessionaires for an extra fee and have items delivered to the hold room using location-based services. This trend will continue as it will eventually measure increases in revenue per enplaned passenger for the concessionaire.

SHARED DATA PLATFORMS AMONG AIRPORTS

This dream may become a reality in the coming years as airports, airport organizations and airlines all are looking for common data exchange buses to share information related to the passenger experience in terms of behaviors, wayfinding, usage of a certain platform, Google searches, and so forth. Standards will be created for the acceptance of all sorts of data sets that can be shared among airports. Technology is here today to create enterprise sharing, but it will take a little bit of geopolitical will on what those handshakes will look like.

ARTIFICIAL INTELLIGENCE

Artificial intelligence is probably the most disruptive technology to come. In computer science, an ideal "intelligent" machine is a flexible rational agent that perceives its environment and takes actions to maximize its chance of success at a specific goal. In an airport, there are many applications that eventually will be impacted that have capabilities of successfully understanding human speech, competing at a high level in strategic systems, self-driving cars, and interpreting complex data. Artificial intelligence in airports does pose a risk to replace certain human capital needed to manage and operate an airport.

There are many other technologies in development such as autonomous vehicles, customer service robots, drone baggage systems, and so on. A lot of exciting concepts are in development, but many will require overcoming legislative or labor hurdles before becoming a reality. The technology discussed above is already here and increasingly will impact how airport projects are built in the coming years. Airport managers should focus on crafting a strong Digital Technology Master Plan to ensure their airports not only meet the ROI, but also the return on objective. With the right plan and technologies to solve the right problem, one size does not fit all for airports. However, those who wait will not be able to take advantage of the data needed to better manage the airport. 

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