



# Aerotropolis

## Landing in the Heart of 21st Century Urban Planning

The future of economic development is taking shape at major international air hubs that have become the anchor of an organically expanding growth strategy: the Aerotropolis.

“In the age of the Aerotropolis, the most competitive firms and cities will be those that connect their products and people faster and more efficiently to the global marketplace,” says Prof. John Kasarda, director of the Kenan Institute of Private Enterprise at the University of North Carolina and co-author of the 2011 book, *Aerotropolis: The Way We'll Live Next*. “Aviation is the 21st century’s physical Internet, offering speedy, long-distance physical connectivity using airports as its routers.”

A combination of giant airport, planned city, shipping facility and business hub, the aerotropolis is at the heart of our next phase of globalization. Drawing on a decade’s worth of cutting-edge research, Kasarda co-wrote *Aerotropolis* with Greg Lindsay to offer a visionary look at how the metropolis of the future will bring us together—and how, in our globalized, ‘flat’ world, connecting people and goods is still as important as digital communication. Kasarda believes

airport cities will change the face of our physical world and the nature of global enterprise. Acting as key nodes of transportation, aerotropolis (or airport cities) are attractive to time-sensitive manufacturing facilities, distribution facilities, hotels, entertainment, retail, convention, trade and exhibition complexes and office buildings that house executives and professionals who rely on air-travel to forward their business. Kasarda describes the aerotropolis as a new urban form that stretches up to 20-miles outward from some airports. Similar in shape to the traditional metropolis, it’s made up of a central city and its rings of commuter-heavy suburbs.

The idea that where we live and work is determined in large part by where commerce takes place—and that this is determined by the transportation of goods and services—is not a new one. You only have to look at where the largest cities in the world are to realize that this is how we’ve built cities for hundreds of

years, next to seaports and river ports, and after that next to rail lines and then interstates. Airports are the next logical locations for urban planning. And planning is the key, according to Kasarda, because allowing these aerotropolis to grow organically leads to traffic congestion and environmental problems that are the antithesis of what an aerotropolis should be. Simply calling an airport region an aerotropolis and attaching tax incentives to have business move there won’t work for long-term sustainability either.

An aerotropolis is forming around many airports and it’s often occurring in a spontaneous, haphazard, economically inefficient, sometimes unsightly and ultimately unsustainable manner, according to Kasarda, so the idea is to plan it out to get it right. Getting it right means putting together urban and regional planning, airport planning, and business site planning so that you get economic efficiency, nice aesthetics and





highly sustainable development.

“Some people don’t like the term, but aerotropoli are forming regardless of whether or not airports or the communities around them are planning for them. Washington-Dulles is a good example of that: it wasn’t planned for it, but it is an aerotropolis,” says Kasarda.

The other side of the coin is that some politicians and community developers love the term aerotropolis, and want to start using it right away to market their area’s airport as a new location for expanding and relocating businesses, but they don’t have the infrastructure in place to support that kind of expansion.

“The word has become popular, especially with economic developers, and it’s used in a variety of ways that is sometimes consistent and sometimes inconsistent with its original intention,” says Kasarda. “A true aerotropolis development like those in Detroit and Memphis have incentives, but they also have plans to organize the logistics facilities, commercial facilities, offices, and the highway infrastructures. It’s a full-scale aerotropolis plan. So they might have legislation, as Detroit certainly has passed with the state, but that legislation is to facilitate the development of an aerotropolis that is planned and organized.”

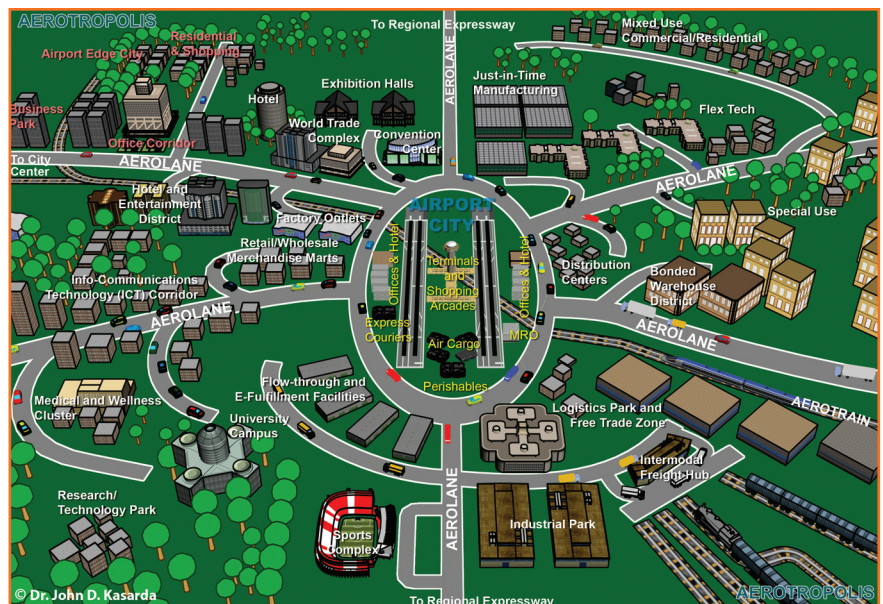
Kasarda’s ideals for the aerotropolis are backed up by much of the verbiage of the Aerotropolis Act of 2011, which is a bill that amends the Safe, Accountable, Flexible, Efficient Transportation Equity Act. It defines the “aerotropolis transportation system” as a planned and coordinated multimodal freight and passenger transportation network that provides efficient, sustainable, and intermodal

connectivity to a defined region of economic significance centered around a major airport. As more and more economic developers choose to market their airports as an aerotropolis, and more site selectors start looking at those regions as viable locations for relocation and expansion, it’s important to look at the guidelines Kasarda and the federal government have put forth to make sure developing aerotropoli are created through strategic infrastructure and urban planning. Here’s what Kasarda says needs to be created:

- Dedicated airport expressway links (aerolanes) and airport express trains (aerotrains) should efficiently connect airports to major regional business and residential concentrations
- Special truck-only lanes should be added to airport expressways, as should improved interchanges to reduce congestion
- Time-cost accessibility between key transportation nodes should be the primary aerotropolis planning metric rather than distance
- Businesses should be steered to

locate in proximity to the airport based on their frequency of use, further reducing traffic while improving time-cost access

- Airport area goods-processing activities (manufacturing, warehousing, trucking) should be spatially segregated from white-collar service facilities and airport passenger flows
- Noise and emission-sensitive commercial and residential developments should be sited outside high-intensity flight paths
- Cluster rather than strip development should be encouraged along airport transportation corridors with sufficient green space between clusters
- Form-based codes should establish general design standards for airport area buildings, walkways, travel lanes, landscaping, and public space
- Placemaking and wayfinding enhanced by thematic architectural features, public art, and iconic structures should make aerotropolis developments interpretable, navigable, and welcoming
- Mixed-use residential/commercial communities housing airport area



© Dr. John D. Kasarda

workers and frequent air travelers should be developed with easy commutes and designed to human scale, providing local services and sense of neighborhood.

“There’s formal efforts being made by some regions, and I believe that the intent is to do it right,” says Kasarda, “so if you look closely, these are some of the places that are organizing to pursue a planned aerotropolis; Detroit, MI, Memphis, TN, and Indianapolis, IN, they’ve come a long way. Milwaukee has put a formal aerotropolis group together. In Greensboro, NC, the Piedmont Triad International Airport has an aerotropolis organization formed to promote development around the airport. All of those are highly active.”

Airports are critical to U.S. competitiveness, but it’s what’s taking place on the ground around an airport that is as important as what’s going on in the air. To facilitate the movements in the aerotropolis region, the surface transportation connectivity has to be built to keep areas from getting too congested. The whole idea is to improve the accessibility of the businesses around

the airport to the airport, and that will be a major boost to aerotropolis development. The aerotropolis has both the spatial form, which is what you see built up around the airport, but it also has a functional form—all the businesses and facilities throughout the region that depend on the airport but may not be all clustered together.

“The Aerotropolis Act of 2011 speaks about improving aeroplanes and aerotrains to be able to move people and products quickly and efficiently between the airport and key residential and commercial nodes in the region,” says Kasarda. “Because with the aerotropolis the fundamental metric isn’t spatial distance, it’s time and cost between nodes; not the distance between the nodes, but the time and cost is the key metric of the aerotropolis.”

One of Kasarda’s main concerns is that countries in the Far East and the Middle East are embracing the idea of the planned aerotropolis and plowing billions of dollars into creating the infrastructure necessary to create it, but the U.S. is not. For example, the World Economic Forum ranks the quality of U.S. avi-

ation infrastructure 31st in the world, tied with Thailand and behind such nations as Malaysia, Panama, and South Africa.

“I have a bit of a frustration in that America does not take the idea of the aerotropolis as seriously as the Far Eastern and Middle Eastern countries, such as Taiwan, Korea, and Dubai,” says Kasarda. “That’s because we have a philosophical difference. In the Middle East and in Asia they view their airport as primary infrastructure to compete in a globally networked, speed-driven economy, and in the U.S. we don’t see it that way. We see airports and the areas around them as nuisances and environmental threats to be controlled. And when you have that different philosophy (that it’s an asset to be leveraged, as opposed to a nuisance to be controlled), you’re going to see differences in investment in those airports and regional areas.”

The U.S. has targeted a mere \$2 billion to its airports as part of the President Obama’s \$50-billion infrastructure stimulus package. China, on the other hand, plans to invest nearly \$240 billion in its airport sector during the next five years, including 56 new commercial airports. India is building 20 new airports and modernizing 58 others. The Middle East is experiencing a similar airport infrastructure boom, investing some \$104 billion over the next few years.

“If you look at our own data (U.S. data from 2010), we exported by air \$837 billion worth of products, and that’s the largest we’ve ever traded,” says Kasarda. “When you look at 1990, it was \$201 billion, and in the year 2000, which was a great year, it was \$592 billion. Even with the recession we’ve exported more goods



New Songdo International Business District  
(Near Incheon International Airport), South Korea



than ever by air in the past few years. So that's the physical Internet, and facilities need that physical Internet. This is why when you're dealing with manufacturing, any foreman will tell you that that factory's cost and their product's profitability is as much a function of the cost, quality and delivery of its suppliers and downstream distributors, as this is a function of what goes on within the factory walls itself. This is why I say in my book that firms don't compete—networks compete, supply chains compete, transportation systems compete. The aerotropolis is the physical manifestation of the globalization process, it's what you see."

The good news is that some U.S. regions are taking the idea of the aerotropolis very seriously and already have begun to do the strategic urban planning necessary to leverage their local airport's infrastructure to build new facilities and intermodal transportation hubs. The most recent International Airport Cities Conference, held in Memphis, TN in April 2011, was attended by more than 600 people from 40 nations, so the word is getting out there. Here are some of the regions that either already have an aerotropolis or are putting the planning in place.

### Memphis is North America's Leading Aerotropolis

"In many communities the idea of the aerotropolis is aspirational, but in Memphis it's reality," says Arnold Perl, chairman of the Aerotropolis Steering Committee and Chairman of the Memphis-Shelby County Airport Authority Board. "Since Memphis was first identified as the closest thing to an aerotropolis in North America by Dr. Kasarda in an article

in *Fast Company* magazine in 2006, the aerotropolis infrastructure has deepened and it has become much more integrated into our community's strategic planning. The federal government has now recognized that the aerotropolis is a job incubator and has put aerotropolis language into both the federal aviation reauthorization act as well as the highway reauthorization bill. And during this past year a HUD grant was provided to Memphis which will provide an opportunity for the community to create the first formal master plan for the aerotropolis. The aerotropolis was created heretofore without a master plan. And that plan will provide greater alignment and a sense of purpose for where we are headed."

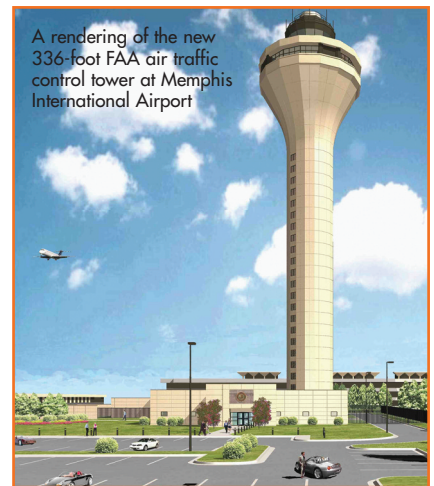
And indeed the Memphis aerotropolis is probably the most well established. But Memphis is not resting on its laurels. Instead, regional economic developers have come together to make significant improvements to the airport's entire transportation infrastructure.

"If we listed some of the improvements we made in the past few years,

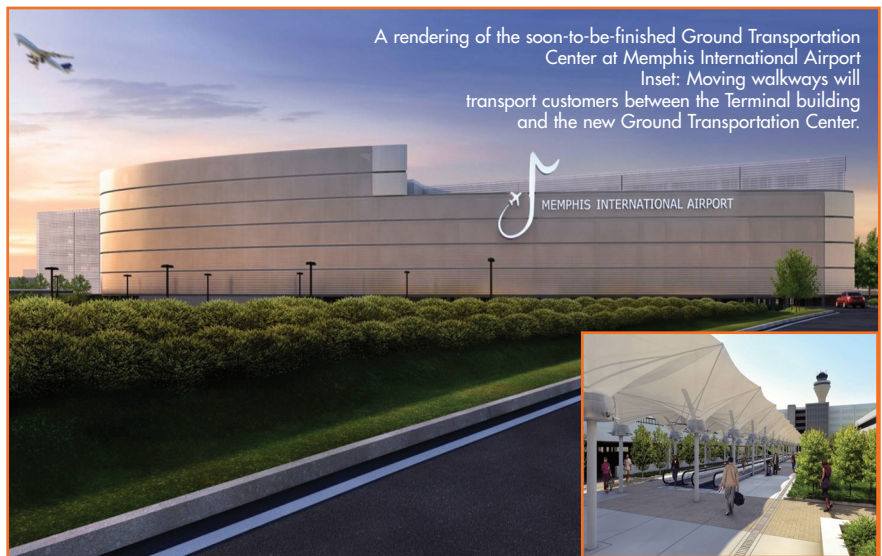
we've spent about \$65 billion on transportation projects," says Dexter Muller, senior VP of Community Development for the Greater Memphis Chamber (GMC). "We have four workgroups that work on the aerotropolis initiative here: transportation and access; master planning and redevelopment; gateways and beautification; and marketing and branding. Every year we try to move projects in those areas forward."

Some of the forward progress that was made over the last year includes:

- Access to \$56 million in funding to complete an outer loop in the next



A rendering of the new 336-foot FAA air traffic control tower at Memphis International Airport



A rendering of the soon-to-be-finished Ground Transportation Center at Memphis International Airport  
Inset: Moving walkways will transport customers between the Terminal building and the new Ground Transportation Center.



two years to facilitate freight movement by truck

- Completing an environmental impact study to build “The Southern Gateway,” an intermodal bridge across the Mississippi river with lanes for trucks and passengers and also rail
- Approval to complete building the highway 78 corridor that will connect Memphis to Interstate 22, which will connect it with Birmingham, AL. “The highway 78 corridor is one of our highest priorities,” says Muller, “because we’ve got approx. 60 to 75 billion square feet of industrial space around that corridor and it’s right near where the Burlington Northern Railroad has just built their new intermodal yard that will triple

the capacity that they have here. So that’s kind of ground zero for our industrial development. So everything’s been approved around it and we are ready to go for right-of-way acquisition on it”

- Completion of a new interchange modification study from the state transportation department. Memphis now has a final design that’s been accepted by the Federal Highway Administration
- Completion of a landscape master plan; for the first phase, the Memphis City Council appropriated \$1.2 million to plant about 2,000 trees as part of their gateway beautification plan. “We also had a consulting firm work on a gateway design plan for the eight entrances into the airport city area. We’ve looked at each one of those to see what treatment we should have for them, so when you come into the area you know you’ve entered it. The marketing end of this is important to us [in order to communicate] our branding to everyone, because we want people to know this is our air city, this is our aerotropolis,” says Muller

- Hosting the Airport Cities World Conference and Exhibition in April 2011. “We had people like Richard Anderson, the CEO of Delta, and Fred Smith of FedEx on a panel together. And we had around 700 people from about 40 countries, and we were told afterwards that that was one of the best conferences that they had ever held in the years that they’ve had it,” says Muller. “But we were in great company, because the year before it was in Beijing, China and before that it was in Athens, Greece. Memphis is a small community, we’re only a metro area of 1.3 million, so it’s rewarding to see us playing in the big leagues with [huge] cities like Beijing”

Memphis signed a memorandum of understanding with Charles De Gaulle Airport [and the Invest in Paris agency] in France to do joint marketing to ensure that when they have companies in Europe who want to do business in the U.S., Memphis is their point of contact (and vice versa), as part of what FedEx and the GMC refer to as the “Three Hub Strategy.” Memphis is considered to be one of the three FedEx “super hubs,” along with Charles De Gaulle in France and Guangzhou in Southern China.

“With the acquisition of the Boeing 777, which is the workhorse of our global fleet, we’ve now made Memphis an even more important node in our network because we now have these flights coming out of Shanghai that are coming straight to Memphis,” says Richard Smith, Managing Director, Life Sciences and Specialty Services at FedEx and Marketing Chair for the Aerotropolis Steering Committee.

“So Memphis has become increas-



PHOTO CREDITS: MEMPHIS INTERNATIONAL AIRPORT; FEDEX

ingly important, as are our other two regional super hubs of Guangzhou and Charles De Gaulle in Paris, France. What the three hub world strategy really means is the whole aerotropolis initiative aligning itself along the three FedEx super hubs. We've already got the memorandum of understanding that we signed with Paris and we've started to get some traction with the Chinese on signing an understanding with Guangzhou basically stating that we want to position ourselves as global aerotropoli. We want to share leads, in terms of businesses who want to do business in each other's countries and are looking to set up shop in terms of distribution."

"Last year, we had two very large and high profile projects," says Muller. "One of them is Electrolux, which makes kitchen appliances and vacuum cleaners. They looked all over for where they wanted to build a new manufacturing plant, including Mexico and a lot of other [U.S.] cities, but they chose Memphis and this is going to be 1,240-person operation. In addition to that they are going to be adding about 2,000 supplier jobs to our region that will go along with it."

"The other big project is Mitsubishi electronics product. They make huge transformers that weigh about 800,000 pounds," adds Muller. "A primary reason those companies located here was because of our transportation assets."

When you see everything Memphis has been doing to add to its image as America's Aerotropolis, it's clear they've been following Dr. Kasarda's guidelines to a T and it has paid off for them.

"Memphis International Airport has an annual economic impact of



\$28.6 billion a year," says Perl. "That's the second greatest economic impact of any single airport in the U.S. About ten years ago, Memphis started transforming itself from Memphis: America's Distribution Center to America's Aerotropolis. An aerotropolis is airport-centric, and Memphis International Airport has been the number one cargo airport in the world for the last 16 out of 17 years. It helps provide the fuel for the aerotropolis initiative. [This effort] has not been haphazard, it's been very thoughtful, and it has design and purpose."

### Indianapolis Aerotropolis is Taking Off

In January 2010, officials at the Indianapolis International Airport (IIA) met with Dr. Kasarda to get advice about what needed to be done to create Aerotropolis Indianapolis (IND). Dr. Kasarda made it clear that the most important thing is to make sure IND will grow in an intelligent manner with the proper planning in place. One of the first things leaders at the airport did in February of 2011 was to approve of a 30-year plan to develop the land around the airport. The plan calls for tearing down the old terminal and bringing in new development to create a central airport city, including passenger,

cargo and aviation service facilities, along with hotels, conference centers and offices.

"It will give us the opportunity to go forward and get the highest and best use of our land," John D. Clark III, executive director and CEO of the Indianapolis Airport Authority (IAA) says.

One of the first proposals to be developed is a 60-acre solar farm, one of the largest airport-based solar facilities in North America, that will power the new development and feed energy to Indianapolis Power and Light. Scheduled to be operational by the end of 2012, the array of more than 41,000 photovoltaic (PV) panels will be installed on ground-mounted racking systems over nearly 60 acres of land near the Indianapolis International Airport exit off I-70. The solar farm is expected to produce more than 15 million kilowatt-hours (kWh) of electricity annually, enough to power more than 1,200 average American homes for a year.

"The solar farm supports our commitment to sustainability while helping to grow and diversify our revenue stream," says Clark. "Finding productive and harmonious uses for airport land ultimately aids our efforts to attract and maintain the air service that anchors the IND Aerotropolis and generates economic benefits throughout our region."

When the IND aerotropolis is built out consultants say it will generate up to \$60 million a year in rent from tenants, key to eliminating the airport's \$1.1 billion debt.

"We are taking every effort to drive that debt down," Clark says. "Creating opportunities to generate alternative revenue sources, I believe, puts us in a position to accelerate





that over time.”

Now the IAA is moving forward with creating the aerotropolis, reporting in December that they held an initial meeting with representatives from surrounding cities and towns to discuss joint marketing efforts and tax incentives, and to sign a memorandum of understanding that is intended to kick off their efforts. “We believe here at the airport that the first step is getting all the right people to the table,” says Corey Wilson, project

manager for the IND Aerotropolis. “It can’t be done in a vacuum; it has to be done collaboratively.”

The MOU also acknowledges the importance of developing political and civic consensus on this concept, with the eventual goal of formalizing a mutually agreeable, binding inter-local cooperation agreement or similar arrangement that could best leverage the region-wide benefits offered by an aerotropolis.

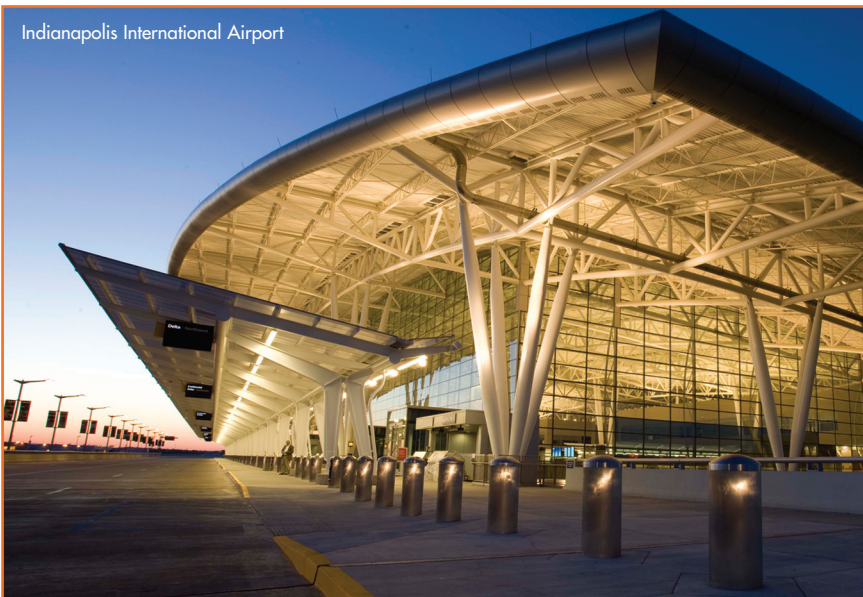
“With a collaborative approach to

the IND Aerotropolis, participants will be able to anticipate potential challenges and identify mutually beneficial development practices vital to the initiative’s long-term success,” says Indianapolis City-County Councilor Maggie Lewis, who attended the IND Aerotropolis meeting.

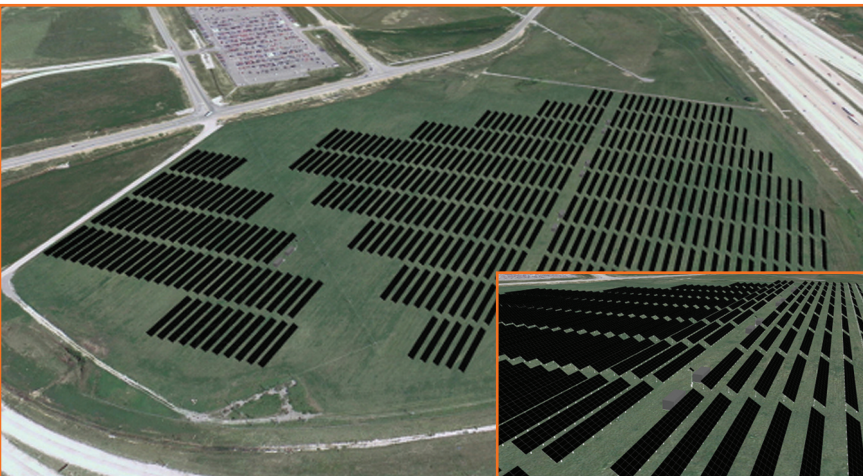
The IAA hired a Chicago firm to do a land-use study, which divided the land surrounding the airport into seven zones for development. Some will be used only for aviation purposes, such as a possible new runway, while others are designated for the economic growth of logistics and transportation companies and other support businesses. Since both the borders and benefits of an aerotropolis extend well beyond an airport’s property, a proactive and cooperative model is essential; the IAA has been seeking and forging non-binding MOUs with key stakeholders in the airport’s neighboring communities with the goal of achieving additional strategic partnerships in the future.

“These meetings ensure multiple stakeholders have a voice in maximizing the benefits our entire region receives from the IND Aerotropolis, including job creation and many other significant advantages generated by the airport’s function as an economic hub for Central Indiana,” says Al Bennett, who represents Hendricks County on the IAA board.

“A lot of airports now are completely landlocked,” says Lynn Gordon, who represents Morgan County in the aerotropolis development. “They can’t do anything. Development has happened all around them, and that development might not be the best use for the property. IND is in a different position with the freeing up of surrounding land in Mar-



Indianapolis International Airport



A solar farm in the Indianapolis aerotropolis will include more than 41,000 solar panels, each capable of producing 280 watts at peak power production. The panels will be installed on ground-mounted racking systems that will fill nearly 60 acres of land near the airport exit from I-70.

ion and Hendricks counties. Although the airport does not own land in Morgan County, northern parts of the county are so close to it that they will be affected by growth all the same. It really is a 30-year concept, an effort to have all municipal entities involved, to have them working cooperatively to make sure one entity doesn't approve something or do something that's going to impede the growth of the whole region."

### Texas-sized Aerotropolis in Big D

The Dallas/Fort Worth region (DFW) ranks 10th in global competitiveness among 21 key international metropolitan regions, according to the Dallas Regional Chamber. This ranking reflects a composite measure of 27 indicators in five essential ingredients for economic attractiveness: talent, access, resources, business climate and quality of life.

The Dallas Fort Worth International Airport is one of the keys to that global competitiveness. An aerotropolis before there was even a name for it, DFW covers 18,000 acres and operates its own police, fire, and engineering departments. It has spurred its own economic-development efforts and has even become a player in the natural gas business. While no longer the largest airport in the U.S. in terms of size—Denver has bought up a bit more land—no other airport in the country rivals its combination of size and traffic. It's the third-busiest airport internationally, in terms of the number of planes moving through it each year. With its seven runways and five terminals, it has capacity to spare at a time when many airports have trouble finding open gate space.



The economic impact of DFW on the North Texas region was \$8.4 billion a year in 1995; in 2010, it was \$39 billion. Airlines generate a third of that total. Surrounding commercial development, land leases, and hotels generate the rest. More than 2,000 companies moved to Las Colinas, an "instant" city four miles from DFW, full of companies, restaurants, hotels, and neighborhoods with tree-lined roads. Nearby suburbs, such as Southlake and Grapevine, have flourished as large employers located their headquarters near the airport. Developers are now focusing on the 6,000 acres of open land inside the airport's fences. There are 400,000 jobs within a five-mile radius of Dallas-Fort Worth's terminals.

But even more important to DFW Airport's bottom line is commercial development. Empty land has been leased to enterprises that value putting operations right on top of this major transportation hub. Recent projects include a 400,000-square-foot merchandising headquarters and warehouse for the Dallas Cowboys football team, and a 100,000-square-foot rotor-blade repair and parts distribution center for Sikorsky Aircraft. The airport has zoned about 6,000 acres for industrial parks, retail and

restaurants, hotels and an entertainment venue that will be developed gradually in the next 20 years, says John Terrell, the airport's vice president of commercial development. About 1,000 acres already have been developed, consisting of a hotel, golf course, cargo and commerce park. Aviall, an aircraft parts distributor, has moved in, as well as aircraft engine maker Pratt & Whitney.

Airport officials see three new rail stations that will connect the airport to Dallas and Fort Worth when they open in the next three years as a key part of continuing to expand upon their aerotropolis.

And to cap it all off, DFW Airport officials recently signed an alliance with leaders of Taoyuan International Airport (TPE), the largest airport in Taiwan, designed to allow the two airports to work in close cooperation. The DFW-TIA Airport Alliance outlines the principles on which the two airports will work collaboratively on business and operational projects: DFW and Taoyuan airports will jointly promote direct passenger service between Dallas/Fort Worth and Taiwan, and they will share information and best practices in areas ranging from sustainability to customer service, engineering, airport amenities and airfield operations.

"This agreement marks a significant milestone for DFW as we strive to maintain and improve our position as one of the world's most highly regarded airports," said Jeff Fegan, CEO for DFW International Airport. "We have a lot to gain and a lot to share with our new partners from Taoyuan International Airport, and we look forward to a future of mutual cooperation." **BT**