Photo by Christof Spieler

Terminal Approach

BY CHRISTOF SPIELER

IT WAS JUST A LITTLE over a year ago that one of the biggest construction projects in Houston's history drew to a close. At a cost of some $3 billion, the project had a budget sufficient to build two Minute Maid Parks, two Reliant Stadiums, two Toyota Centers, and two Main Street light rail lines—with enough left over for 3,600 Perry Homes townhouses. This was by far the most expensive set of buildings built in Houston in the past decade, and perhaps ever. And it all took place at Bush Intercontinental Airport Houston (IAH). Between 1998 and early 2005, almost every part of the airport was transformed. It was in many ways a remarkable undertaking.

But perhaps even more remarkable is that only a few months after the massive expansion of IAH was completed, the Houston Airport System came out with a new master plan for the facility. And that master plan recommended that almost everything that had been built be torn down, and rebuilt again.

Here's what IAH says about Houston: We're quite good at raising a lot of money. We have the engineering skill to take on large and complicated projects. We have the architectural skill to design quite striking buildings when we feel like it. But when it comes to planning, or anticipating the future, we're not that smart.

An airport is not like a building; it is more like a city. The scales involved are immense. At IAH, the terminal area occupies as much land as do downtown's skyscrapers. Airports also resemble cities in their resistance to planning. Every airport starts as a simple diagram of access roads, terminals, gates, taxiways, and runways. But as the airport grows, that simplicity crumbles before the demands of expansion and the ever-changing airline industry.

Intercontinental was born in the 1960s, at the dawn of the modern era of airport design. By that time air travel had been transformed from a small-scale industry catering to the elite into transport for the masses. As a result, the single-terminal airports of the 1940s had become obsolete, and planners were searching for new airport types. The major goal of 1960s airports was to minimize the distance that passengers had to walk from their cars to their plane. Perhaps the most radical solution was implemented at Washington Dulles in 1962, where wheeled lounges boarded passengers at a terminal only 200 feet from the curb, then rolled across the tarmac to dock to the planes. Most airports, though, built terminals that planes could pull directly up to, boarding passengers through jetways—invented in 1959—that jutted out from the buildings and attached to the aircraft. The wingspan of the planes, then, dictated the size of the terminals. Gates tended to be spread across multiple terminals, each with its own automobile access. Some airports circled their terminals into a ring; others arranged them along a long axis.

At IAH, which opened in 1969, the original plan was for a conventional ring of terminals. But the final plan was something more unique: a pair of terminals located between two access roads, with four "pods" of gates protruding from each terminal onto the tarmac. Each pod was connected to its terminal with an enclosed pedestrian bridge. The two terminals were essentially self-contained airports, with their own parking garages, drop-off areas, pick-up areas, check-in halls, and baggage claims. The result was wonderfully convenient: departing travelers could be dropped off right in front of the ticketing hall. If they parked themselves, they were only an elevator ride away from the counters. With a ticketing hall in the center of each terminal,

Photo courtesy Houston Airport System

Opposite page: A floor-to-roof glass wall at one end of the Terminal E concourse lets visitors know what city they are in. In the distance, Houston's skyline can be seen peeking above the trees.
Left: *Countree Music,* Terry Allen's metal sculpture of a leafless tree, provides travelers a point of reference, and a bit of visual relief, in Terminal A's south concourse atrium.

After billions in reconstruction, Bush IAH is ready to start all over again

each of the gates was only a short walk away. And the whole complex had a clarity that was readily apparent to anyone, whether they were stepping off a plane or approaching the airport by car.

But it turned out that this futuristic airport was built for a future that didn't come. Intercontinental was built when most flights were still point-to-point. There were stopovers, but few transfers. Then in 1978 the government stopped assigning air routes, and the major airlines all moved to hub-and-spoke systems. In hub-and-spoke, transfers are common. Carriers pick up passengers in different cities, bring them to a central location, and shuffle them from plane to plane to help increase passenger load. In 1982, Continental Airlines made Houston a hub operation by merging with Texas International. This meant that the airport now handled many passengers who were simply changing planes, so they didn't care how close they were to parking or to ticket counters. What they did care about was how easily they could get from one gate to another, or one terminal to another. And the original plan for IAH didn't make that easy at all.

The original plan for IAH turned out to be flawed in another way as well. When Intercontinental was originally built, airline security was not a major concern. But by 1973, a wave of hijackings led the federal government to require security checkpoints be placed between all gates and the ticketing halls. When this happened, the simplicity of the original design, in which a passenger could easily go from one pod of gates through the main terminal and out to another pod of gates, became a liability. Each pod now required its own security checkpoint, which had to be crammed into the tight confines of a sky bridge. And each pod became, in effect, a separate security zone, isolated from each of the others.

Hub and spoke air travel, as well as the need to arrive early to deal with airport security, meant that travelers now spent more time in airports. That meant that amenities such as food, shopping, and airline lounges became more important. Here, too, IAH's original terminals were flawed. They had been built for quick pass through, not lingering. And while the ticketing halls had some space to add amenities, the gate pods could accommodate only one small food counter each.

Before it was ten years old, IAH had become functionally outdated. The first new terminal added to the airport—Terminal C, which opened in 1981—retained the original concept of a central ticketing hall, but replaced the four pods of gates with a pair of linear gate piers, one on each side of the main terminal, that were both accessed through a single security checkpoint. In 1990, Terminal D, then known as the Mickey Leland International Airlines Building, opened. It reverted to a much more conventional layout, with the ticketing hall and gates in a single building that sat on one side of an access road.

Through the 1990s, as traffic doubled and Continental rebounded from bankruptcy, IAH continued to rely on 20-year-old facilities. It was clear that something major needed to be done at the airport if it were to compete with more modern airports such as Atlanta, Dallas/Fort Worth, Denver, and Chicago O'Hare. A massive expansion program was clearly in order. It began in 1998, and by January 2005, when the current International Arrivals Building opened, new construction had transformed practically every part of IAH.

The scope of the airport expansion is without question extraordinary. What's less clear is how the airport expansion stacks up as architecture.

Photo by Christof Spieler

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Photo courtesy Houston Airport System

Photo courtesy Houston Airport System

Above: Three ticketing halls illustrate the evolution of IAH. Terminal A's ticketing hall, top, is from 1969, and was one of the best public spaces in the original airport. Terminal D's, middle, is from 1991, and is starting to look dated rather than elegant. Terminal C's, above, is the result of renovations in the 2000s, and is spacious and daylit.
Right: Intercontinental Airport as it appeared when it opened in 1969. At the time it seemed futuristic, but the future it anticipated never came.

Airports are one of a handful of building types in which modernist architecture is generally accepted. The renovations at IAH fit that mold, with exposed structure and mechanical systems, crisp white walls, perforated metal panel ceilings, terrazzo floors, and prominent signage.

The interiors of the new gate areas are a vast improvement over the old ones. The original gate pods were crowded and dark, with low ceilings, earth tones, and only a strip of windows around the edge to let light in. The new gates in Terminal A—designed, along with the renovations in Terminal B, by Gensler—aren't a radical departure, but they are more spacious and have wider circulation areas, brighter finishes, and improved lighting, which results in a less claustrophobic experience. The Terminal A food court is also an improvement. Its wide open space is filled with illumination from a skylight above, and artist Terry Allen's *Countree Music*, a bronze sculpture of a leafless tree set in a terrazzo map of the world, is a welcome moment of visual relief after the security checkpoint.

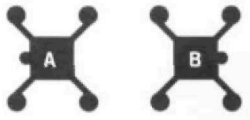
But the true revelation is found in Terminal E. There the gates are arranged along an extraordinary, triple-height atrium topped with skylights. A floor-to-roof glass wall at the end of the concourse reveals both the tarmac and the woods beyond, with glimpses of highrise buildings in the distance. Inside Terminal E the light shifts with the weather and the time of day. It's a grounding moment amidst the geographic and temporal isolation of air travel. A passenger from Montgomery waiting for a flight to Belize can tell at a glance that he or she is in Houston, it's late afternoon, and it's raining in the distance.

Terminal E has other magical moments. Where the concourse meets the passageway to security, the ceiling opens up into a skewed oval atrium, lined with shimmering metal panels lit from above by daylight. Windows reveal business travelers taking advantage of the wireless internet connections in Continental's President's Club lounge above. A strip of television monitors below their feet play a hypnotic installation by the Art Guys. Arriving international passengers are led along walkways that line the second floor of the concourse and provide views of the gates below and the skylight above. The walkways cross a sky bridge into a bright and airy immigration facility designed by PGAL, and then into a baggage claim punctuated with flashing translucent suitcases. The suitcases make up *Travel Light*, another installation by the Art Guys, and one of the many pieces of art punctuating Terminal E. (For more on the art, see sidebar, page 32.)

It's not an accident that Terminal E is so much better than the rest of the airport. It was built not by the city, but by Continental Airlines, which hired their own architect, Corgan Associates. With Terminal E, Continental asserts that architecture does matter. Airlines are in heated competition for the lucrative frequent business travel market, and Terminal E suggests that Continental considers good design a weapon in that battle.

Of course, the typical Continental passenger changing planes at IAH may not be thinking about design, though they will probably be in a better mood if their gate is spacious and well lit. Where design is concerned, the average passenger really cares about the simple things: Is there enough seating? Can they find the restrooms? Is there a pleasant food court with food worth eating? By those measures, the new IAH looks good. The food offerings include known quantities such as McDonald's and Starbucks, but also local options such as Papadeaux's and Drexler's BBQ. The restroom signs

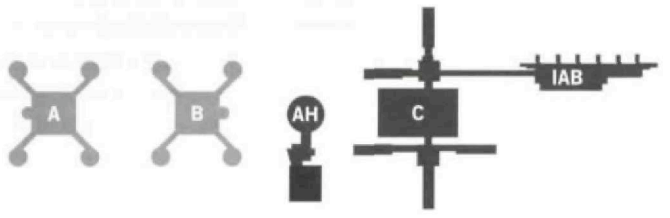
1969



Terminal A, 1969
Goleman & Rolfe and George Pierce-Abel B. Pierce

Terminal B, 1969
Goleman & Rolfe and George Pierce-Abel B. Pierce

1998

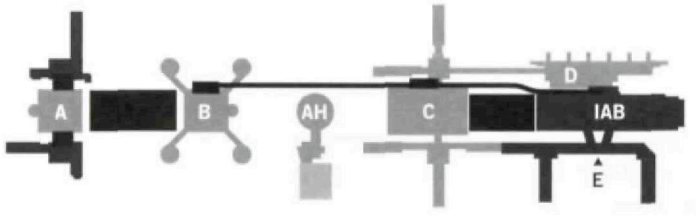


Airport Hotel, 1971
William B. Tabler & Associates;
addition 1981 Goleman & Rolfe Associates

Terminal C, 1982
Goleman & Rolfe Associates and Pierce Goodwin Alexander

International Airlines Building (now Terminal D) 1990
Harry Goleman Architects and Pierce Goodwin Alexander Linville

2006



New gate wings and renovations at Terminal A, 1997-2001
Gensler Associates

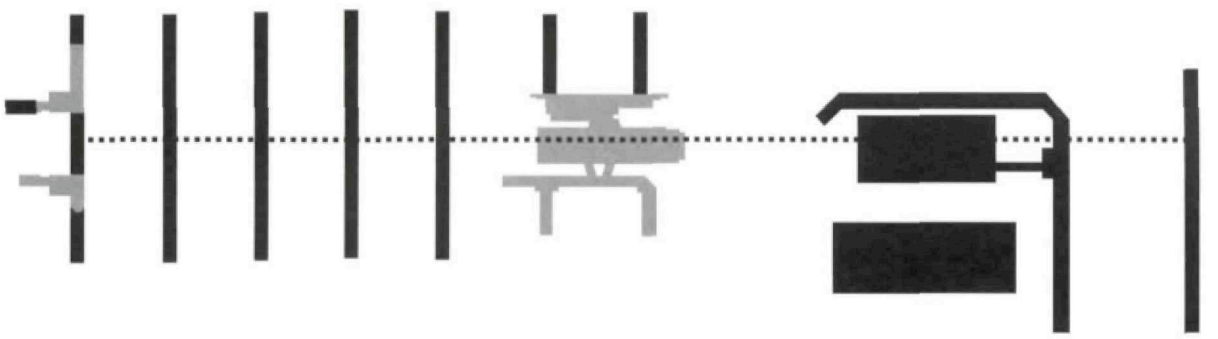
Renovations to Terminal B, 1997-2001
Gensler Associates

Renovations to Terminal C, 2000-2005
3D/International

Terminal E, 2004
Corgan Associates

International Arrivals Building, 2005
Pierce Goodwin Alexander & Linville

Long-Term Plan



Maps by Christof Spieler

As shown in the maps above, Bush IAH has grown over the last 37 years by adding to what was there before. The airport's next stage, however, may require tearing down much of its past. The new master plan, released last October, calls for remaking IAH along the lines of the airports in Atlanta and Denver. The plan, seen at left, calls for two central terminals, one for domestic flights and the other for international, connected to a series of parallel concourses. It would leave standing very little of the current IAH.

are big. IAH is a perfectly respectable modern airport, and that matters.

Airport design is all about circulation—the movement of planes, the movement of cars, and the movement of people. Among the most important goals of IAH's makeover was changing the way passengers move through the airport.

Today, 88 percent of the passengers passing through IAH fly Continental, and most of those passengers are simply changing planes. Continental and Continental Express operate out of Terminals B, C, and E, and Continental has code share agreements (where one airline sells tickets on another airline's planes) with Delta in Terminal A, Northwest in Terminal B, and Air France and KLM in Terminal D. Thus many of IAH's passengers are required to switch terminals. But in this regard, IAH, despite its improvements, can't compete with airports designed from the ground up to be hubs.

Denver and Atlanta represent the modern model of airport design. (Of course, if the industry changes again, this model may become outdated too.) They have a single main terminal that's used by those leaving from or arriving at that particular city, and that main terminal is connected by an underground train to a series of smaller, midfield terminals that contain the gates. It's efficient: many transferring passengers can stay in one terminal, while the rest simply walk to the center of the terminal they arrived at, catch a train to the center of the terminal they'll depart from, and walk to their gate.

IAH was among the first airports to use a train to connect terminals, but that original train, which runs on a curvy track along an underground walkway, was designed to service only the small numbers of passengers switching planes in the pre-hub world. When the security checkpoints went up the underground train was left outside the secured area, reducing its usefulness even more.

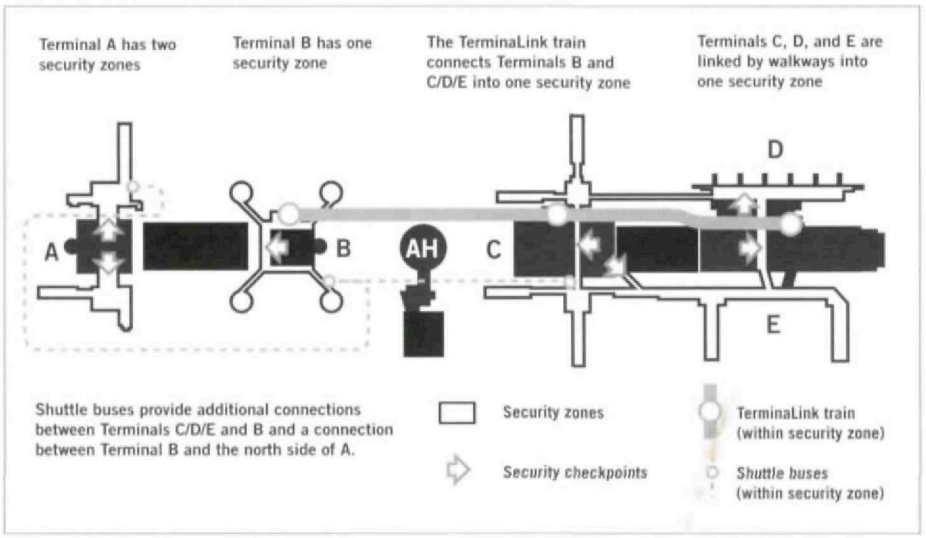
In his excellent book *Infrastructure: A Guide to the Urban Landscape*, Brian Hayes points out that for the purposes of airport security, the world consists of three zones: the secured zone, the "foreign" zone outside of customs and immigration, and the rest of the world. Every airplane is in the secured zone, as is every airport gate. People can travel from Houston to Honolulu without ever leaving the secured zone. But they can leave it just by walking out an exit alongside a security checkpoint.

Before the recent renovations, IAH had ten secured zones. Four were in Terminal A, four were in Terminal B, one was in Terminal C, and one was in Terminal D. For a hub airport, so many different security zones is a problem, because traversing them is both time consuming and cumbersome. Atlanta and Denver, in contrast, each have one security zone. The new IAH has three: two in Terminal A and one that includes all of Terminals B, C, D, and E. That change was made possible by a new airport train that's located completely within the security zone, and has stops at Terminals B, C, and D/E. (See diagram, page 34.)

That is unquestionably a big improvement. Still, it's hard to rebuild an airport into something it wasn't designed to be. The new airport train is elevated above the north access road, which puts it next to all the north gates. But the south gates are a long way away. For example, Gate E19, the one closest to the panoramic view of downtown Houston, is a full third-of-a-mile walk from the train.

In fact, the entire layout of the reworked airport is awkward. When you land in Atlanta, you immediately know where you are. If you're in Terminal

Continued on page 34



Map and photos by Christof Spieler

Top: This diagram of IAH's different security zones shows what's involved in getting from one gate to another without having to pass through a security checkpoint. Any passenger who strays into the black areas would have to go through security again before boarding his or her plane.
Middle: The TerminaLink train, running on tracks raised above street level, makes it easier to transfer between planes by never straying outside the airport's security zones.
Above: For drivers, Bush IAH can be a confusing and claustrophobic experience.

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B, and your connecting flight is also in Terminal B, you simply walk left or right along the hallway in front of you. If your connecting flight happens to be in Terminals A, C, or D, you just walk to the train station in the center of the terminal to catch a train to the other terminal. At IAH it isn't nearly so simple. Terminals A, B, and C straddle the airport access roads, so each of them is interrupted in the center by a ticketing hall. Terminals D and E are on only one side of the access roads and are both connected to Terminal C. Thus, Terminal E to the north side of Terminal C is an almost seamless transition, while Terminal C to the other side of Terminal C requires walking across two sky bridges and the length of a ticketing hall. If you don't know the airport by heart, you're beholden to the signs. And while the signage is fine, good signage is no match for a layout that makes sense in the first place.

The original IAH was designed around the movement of cars. That design gave it a unique architectural presence. In general, airports are primarily about interior design. The exteriors of their buildings are seen only by a fraction of the people using the facility, and then only through tiny airplane windows. The façade facing the roadway is seen only close up, and only from a moving car.

But the siting of the original Intercontinental allowed drivers to see the buildings clearly, and the architecture responded to that. A person in a car coming up John F. Kennedy Boulevard could view the trees open up to reveal a line of buildings in a vast clearing. The road dipped under the taxiway for the airplanes, then spun around the circular Marriott Hotel. It arrived at a space between the tarmac on the right and the terminals on the left, each building standing on its own with airplanes arrayed around it as if on display. The exterior of the terminals—the square center stretching arms to four round pods, the garage ramps wrapped in bronze channels, the mass of the garages floating above the ticketing hall below—was designed to be apparent and dramatic at 35 miles per hour. The drop-off and pick-up areas were vast porticos in the sides of the terminals, framed with tall cruciform concrete columns. The sequence from the highway to the curb was clear, varied, and rewarding.

A few modern airports offer similar experiences. In Denver, the undulating fabric roof of the main terminal appears above the horizon of the high plains from miles up the highway. In San Francisco, the international terminal, with its etched glass billboard lettering, hovers above the approach ramps like a vision.

But the new Intercontinental appears from the car as most airports do—a hodgepodge of unrelated buildings from a distance, a claustrophobic and confusing experience up close. The new gate concourses form a solid wall along the right hand side of the road, and new parking garages have filled some of the gaps between the terminals on the left. The road is now in a concrete canyon lined with buildings that match in neither massing nor finish, and which flash by as a visual cacophony. The terminals have varying entrances—D to the right; E to the left after the terminal; A, B, and C to the left before the terminal. The signs needed to explicate this fill the roadside with clutter, while the new terminal train and its stations hang above on massive concrete girders.

It is from the car that what has been left behind in the airport's growth and acquisition of better facilities becomes most apparent. Ten years ago, Intercontinental stood in its clearing in the piney woods as a coherent assemblage of 1960s architecture. Now, though none of the original buildings has been demolished, that is no more. And that's a great loss.

Today's Intercontinental Airport is much more passenger-friendly than the 1990s version. It has better food, more comfortable gates, more convenient connections, less claustrophobic terminals, and much better art. Houston need no longer be embarrassed by its major airport.

But today's IAH is still built around a 50-year-old concept, one that dates from a very different era. And while many of the original airport's merits—its clarity and its architectural integrity—are gone, the inherent limitations of its layout are not.

The new master plan, unveiled in October 2005, represents a recognition of those limitations. The master plan would level most of the current IAH and remake it in the image of Atlanta and Denver. The terminals that featured decentralized car access and check-in—the heart of IAH's original vision—would be replaced by two centralized terminals, one domestic and one international. Internal shuttles would connect those terminals, which would exist primarily for travelers originating or terminating in Houston, to a series of concourses strung out along where the current terminals now are.

The long-range plan shows these concourses as brand new, freestanding terminals tied together by a new underground train. Of the current airport, only Terminals D and E would remain. In a concession to the fact that taxpayers might not take kindly to demolishing hundreds of millions of dollars of new buildings, the plan also has an intermediate version of IAH, one that would have the new terminals, but have them connected to existing terminals by shuttle buses. Regardless, the conclusion is simple: The original vision of IAH simply doesn't work anymore, and no amount of remodeling can fix it.

And thus Houston's biggest building project leaves us with a certain lack of closure. When the original IAH opened, it was hailed as a vision of the jet age. The opening of the recent expansions really wasn't marked at all. The original IAH was a visionary attempt to build for the future of air travel; it failed not because its planners didn't try to foresee the future, but because they foresaw it incorrectly. The new IAH is reactionary. With it, we're playing catch-up with other airports, not moving ahead of them. And spending $3 billion just to stay even is not very satisfying. ■