RICE UNIVERSITY

IAH: Reconstituting the Coordinates

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ABSTRACT

IAH:
Reconstituting the Coordinates
by Elaine An

"A demented amoeba [that has] turned itself inside out" (Banham) is one way to describe the living organism we call the contemporary airport. It has a habit of growing haphazardly and unplanned. It combines the infrastructure of politics, technology, economy and ecology into a single urban artifact without an urban framework. Despite their scale, very few airports have been able to define edges, routes and the nature and configuration of centers, leaving passengers and other users in a bewildering megastructure. The airport has not only enabled worldwide transit, it has also served as the "centripetal city whereby a transient population forever circles its notional center" (Ballard).

"IAH: Reconstituting the Coordinates" uses program to interpose between two distinct parts of an existing airport; the terminals composed of overly systemic processes and the residual spaces leftover from the five disconnected terminals that make up Houston's George Bush Intercontinental Airport. Normally in conflict, due to scale, function and character, a resultant programmatic and spatial transformation creates an urban generator that allows new spatial links with the existing airport. This concept can encourage new and unpredictable programmatic factors that still relate to this unique site, yet fulfill programmatic demands of any variety.
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My Parents
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INTRODUCTION

Over the past two decades, it has become evident that the airport, once seen as a purely functional structure for air transport, is evolving into a new typology that has gained significant status as an urban form. As a technical, economical and urban facility, it is a dynamic center of events and interactions. Despite the tremendous economic and populated growth the airport brings to its host city, there is a lack of an infrastructural platform by which it can integrate within a system of regional centers. So how does the regional framework of the city begin to apprehend the imminent growth of this burgeoning node?

Houston's Downtown Business District has served as the longtime economic engine along with many supporting generators, such as the Galleria Mall, the Texas Medical Center and the world's 8th largest airport, George Bush Intercontinental (IAH). Although, the model of radial relations to a single city center, such as the Downtown Business District, has begun to fade as the condition of multiple city centers has begun to emerge. We often overlook the physical phenomena of the airport and the localized network it has within the urban dynamic of the city. This is partly explained by IAH's location 25 miles north of the city proper. It is a premier transportation outlet in itself, yet is disconnected in terms of regional links it could potentially have with the city. The only hint of coordinated growth with the city and its infrastructure is its proximity to newly formed community developments, such as the Woodlands, Conroe and Tomball, Texas.
IAH has one of the most diverse economies in the nation, enabling the region to survive even the toughest downturns in key sectors. IAH's significant role in Houston's transportation network has also made it a huge contributor in the city's economy; making the airport area one of the fastest growing economic regions in the country. Over 8.5 million square feet of IAH sits on 11,000 acres of land. Each day, IAH processes over 84,000 passengers, about 80,000 vehicles and employs up to 30,000 workers. This transient population made up of local and world-traveling citizens already creates a self-contained community that makes us increasingly conscious of the complexity of interactions. Keeping this in mind, how could our architectural pursuits work accordingly with accidental encounter and notions of urban access?

Currently, the speed of experience is determined by a logic of systems beyond our control. The general lack of public space or non-sterile areas inhibits the ability to conceive oneself outside of the passenger role. At IAH, less than 8% of the conditioned square footage is devoted to public space; largely due to security measures implemented post 9/11. As one of Houston's densest and most active regions, IAH's lack of public space leaves the airport community with very few moments to exit the mandated system of airport security and informed media.

While it is useful to confront issues of emergent economics and political questions, it is vital to return to the character of access and adjacency when testing the spatiality of the contemporary airport. By questioning the position and nature of program at IAH, this thesis intends to remap the way we occupy and navigate the airport. The project is to propose a new spatial model that synthesizes a new datum with existing conditions in order to create a heterogeneous cross section of function, scale and population.
Views of IAH
"The novelty of this arrangement has nothing to do with the ambiguity of place produced by such dispersion nor any mere de-centering of once integral architectural forms, but with a more fundamental overhaul that permits one to conceive of the architectural object not as a form but as an agglomeration and interaction of functions, each with its proper series of system elements whose architectonic value and role is defined only secondarily, and wholly in relation to these functions."

Sanford Kwinter, "La Città nuova - Modernity and Continuity"
Next Destination

Airports were formerly public funded institutions run and built by the city or state. Now they are becoming private business enterprises that force the redefinition of the airport's tasks, planning and profit making concerns. These days, only 20% of the airport's income comes from airline take-off and landing; in turn, most international airports have ventured into non-aviation activities as a survival tactic. This business decision has solved the decreasing role of government funding and management, and has become the likely way to finance renovation and expansion.

The imminent trends of airport development and airline traffic consolidation have also led to stronger segmentation among airports. And the overly engineered nature of airports have sometimes occurred at the expense of civilized environments. Recent developments have concentrated more on consumer patterns and less on the airport as an extension of the urban condition.
1930-1940: Simple landing strips served by most basic structures

1950-1960: Concrete runways, mostly single-storey buildings, distinctive control towers

1970-1980: Complex multi-terminal places served by three to four storey terminal buildings, road systems which are segregated vertically

1990-2000: Intermodality, Terminals huge in scale, Retail is competing element
Infrastructure Provision

- Property and Utilization rights
  - Transaction management
    - Invitations to bid
    - Contract negotiation
    - Takeovers
- Real estate and Infrastructure development
  - Real-estate planning development
  - Construction
- Facility Management
  - Facility Management
  - Security

Business-to-Business services

- Flight operations
  - Flight operations
    - Tower
    - Runway traffic
    - Gates
- Terminal operations
  - Terminal operations
- Security
  - Safety (fire protection)

Business-to-User services

- Ground services
  - Ground services
  - Luggage services
  - In-flight services
  - Cargo services
- Space allocation (non-aviation)
  - Retailing
    - Duty-free shops
    - Catering
    - Food and beverage
  - Space utilization
    - Outdoor space
    - Indoor space
    - Advertising space
- Other services
  - Parking
  - Car Rental
  - OTHER...

Interfaces

- Airport authority, Airline and Sublease companies
- Find trade-off between minimum connection time and passenger optimized terminal design

Measures of interface improvements

Source: BCG analysis
ARTS + CULTURE
- Artists-in-Residence Studios
- Museum
- Convention Center
- Artist Facilities & Exhibition Mgmt. Spaces

BUSINESS
- Conference Rooms
- Leaseable Office Space
- Large Transit Office for Mobile Workers
- Access to Convention Center

ENTERTAINMENT + RECREATION
- Movie Theater
- Gymnasium - Basketball & Tennis
- Observation Deck
- Bars/Pubs
- Restaurants - Cafeteria & Fast Food
- Large Bookstore

Space allocation (non-aviation) Other services (places)

RETAIL
- Department Store
- Pharmacy
- Duty Free Shops
- Clothing/Misc. Shops
- Bank/Currency Exchange

HOTEL + OTHER ACCOMMODATIONS
- Rentable Rooms/Sleep Capsules
- One-storey Restaurant
- Hotel
- Pool
- Two-storey Restaurant with Bar Lounge
- Observation Deck
Major airlines with more than one US hub

- Continental
- American
- Delta
- US Airways

Re-distribution of hub-system networks after traffic consolidation of major airlines

% Percentages represent the amount of share that the major carrier has in the airport

Ø Diameters represent the size of business based on passenger movement

Data Source: BCG Analysis
### AIRPORT

#### International Hubs (Mega-Hubs)
- **Key Characteristics:** High share of transfer traffic, Large catchment area, Passengers: excess of 40M/yr.
- **Airline Type:** Main hub of major int'l airline, Leadership role in alliance
- **Example:** Houston IAH, Passengers: 74M

#### International O+D Hubs
- **Key Characteristics:** Lower share of transfer traffic, Large catchment area, Passengers: excess of 20M/yr.
- **Airline Type:** Main hub of int'l long-distance or secondary hub of major airline, Subordinate or niche player in alliance
- **Example:** Sydney SYD, Passengers: 22M

#### Secondary O+D Hubs
- **Key Characteristics:** Low share of transfer traffic, Sizeable catchment area but often overlapping, Passengers: +/- 10M
- **Airline Type:** Main hub of regional airline or secondary hub of major airline, Subordinate role in alliance
- **Example:** Vienna VIE, Passengers: 12M

#### Regionals
- **Key Characteristics:** No transfer traffic, Smaller or remote catchment areas, Passengers: < 10M
- **Airline Type:** Regional airlines, LCC (Low Cost Carrier) e.g. Jet Blue
- **Example:** Albany ALB, Passengers: 1.5M

*Data Source: BCG Analysis*
EXISTING CONDITIONS/
Air Canada
American Airlines
Continental Airlines
Delta Air Lines
Frontier Airlines
Sun Country Airlines
United Airlines
US Airways

= 36 US Destinations
Terminal B

Continental Express
Northwest Airlines
= 77 US Destination
Terminal C

Continental Airlines
= 63 US & Canadian Destinations
Aeromexico
Air France
Aviacsa
British Airways
Cayman Airways
China Airlines
TAAG Air Angola
TACA
KLM Royal Dutch Airlines
Lufthansa
Pakistan International Airlines
PrivatAir
Russia Jet Direct
World Airways

= 21 International Destinations
Terminal E

Continental Airlines
Continental Express

= 64 International Destinations
Direct International, Direct to Mexico & Guatemala
PROJECTED CONDITIONS
PM
17:00-20:00

RED
20:00-07:00

Passenger Densities over 24-hr period
ACCESS-ABILITY

Access-ability changes our environments; sometimes drastically. It spreads program and in turn creates and attracts more.

Despite the airport's popular definition as an urban facility with global access to any destination, "access" is meant to describe the urban access to a new conception of site that appears due to an infrastructure that has attracted an unexpected combination of program. If we considered IAH as a prominent node, could we rethink a typology that is reflective of a cultural change in the operation and use of an airport?

Airports are the new urban generators and can have a bigger role in the nature and configuration of city centers, social exchange and movement. How can this notion of access-ability begin to subvert a single purpose typology that has barely changed in its four generations? By using the existing framework and the state-of-the-art services IAH has to offer, a high density urban form could emerge. IAH as a regional node itself can reconcile the infrastructure of the airside with the landside by creating a platform that resembles an actual urban environment and functions as a city with hotels, garages and offices among other "city" features.
PM1
12:00-17:00

RED
20:00-07:00

New Square Footage Area based on Passenger Densities
PROJECT

The project uses program to interpose between two distinct parts of the airport (the terminals composed of overly systemic processes and the residual spaces leftover from the five disconnected terminals). Normally in conflict, due to scale, function and character, a resultant programmatic and spatial transformation could create an urban generator that allows new spatial links with the existing airport. This concept can encourage new and unpredictable programmatic factors that still relate to this unique site, yet fulfill programmatic demands of any variety.

The current fragmentation of IAH allows for many juxtapositions, to achieve a spatial invention; inevitably a new conception of site. This suggests the possibility to arrange the programs differently. Currently, the repetition of program within each terminal leads to a redundancy of program, closing the possibility of reading IAH as a whole. So what are the architectural implications that arise from the overlapping of multiple functions that co-mingle within the same organism?
"The terminal concourses are the ramblas and agoras of the future-city, ..."
“Airports have become a new kind of discontinuous city, whose vast populations, measured by annual passenger through-puts, are entirely transient, purposeful and for the most part, happy.”

J.G. Ballard
LIST OF PLATES

PLATE NO. 1 -
MUSEUM
Museum, Artists-in-Residence spaces, Artists’ Facilities, Ground Parking, direct access to Terminal A

PLATE NO. 2 -
CONVENTION CENTER
Convention Center, Ground Parking, direct access to Terminal A, Shared outdoor space with Museum

PLATE NO. 3 -
TERMINAL A
New Check-in, access to air rail, direct access to Museum, Convention Center, Transit Office, Conference Rooms, Offices

PLATE NO. 4 -
GARAGE A&B
New Transit Office Center, FedEx Kinko’s, access to air rail, direct access to Terminals A&B

PLATE NO. 5 -
TERMINAL B
New Check-in, access to air rail, direct access to Transit Office and entertainment area

PLATE NO. 6 -
BOOKSTOP AT TERMINAL C
Large Bookstore with direct access to/from Terminal C, Parking Garage and Entertainment area, Offices throughout Terminal Row C

PLATE NO. 7 -
GARAGE C EAST
Various Retail shops, Duty-Free, Pharmacy, Bank, Department Store, direct access to Terminal C, access to International Arrivals and Hotel

PLATE NO. 8 -
FIS (Federal Inspections Building) / TERMINAL D&E
Hotel Rooms and Suites, Sleep Capsules, Short-term Room Rentals, Restaurant, Bar-Lounge, Observation Deck
IMAGE CREDITS

Page 1: Houston Airport System Photo Archives

Page 6: Illustration by OMA for Zurich Airport expansion competition entry

Page 7: Ibid.

Page 8: Antonio Sant'Elia, "Stazioni aeroplane", 1913

Page 9: British Airport Authority Photo Archives
BIBLIOGRAPHY


