

Joint Planning and Development Office
May 21, 2009

On, Above and Beyond the Tarmac

The Endless Dialogue between Airplanes and Airport Design

©John Zukowsky



Presentation Sequence

- My Background: Aerospace Architecture and Design Exhibits
- Aerospace Dialogue: Selected Historic Examples
- Sample Case Studies of Aerospace Dialogue:
Past, Present and Future
- Long Range Speculations: Selected Problems for Further
Interdependent Analyses

Intrepid Museum Reconstruction 2005-09



Intrepid Museum Reconstruction 2005-09

aircraft restoration and acquisition



Intrepid Museum Reconstruction 2005-09

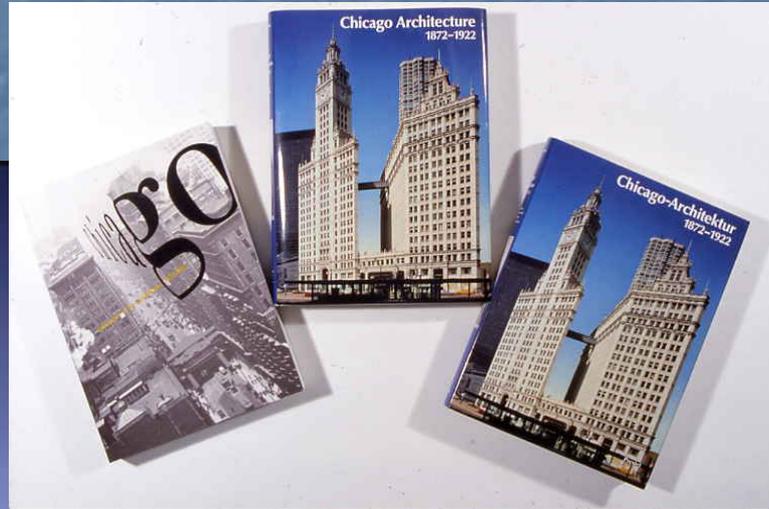
Eva Maddox Branded Environments/Perkins + Will Architects



Photographs Jon Miller, Hedrich Blessing,
Copyright Intrepid Sea, Air & Space Museum

Architecture and Design Exhibits 1978-2004

The Art Institute of Chicago



Aerospace Design

designed by Studio Gang

2003



2001. Building for Space Travel

designed by Garofalo Architects

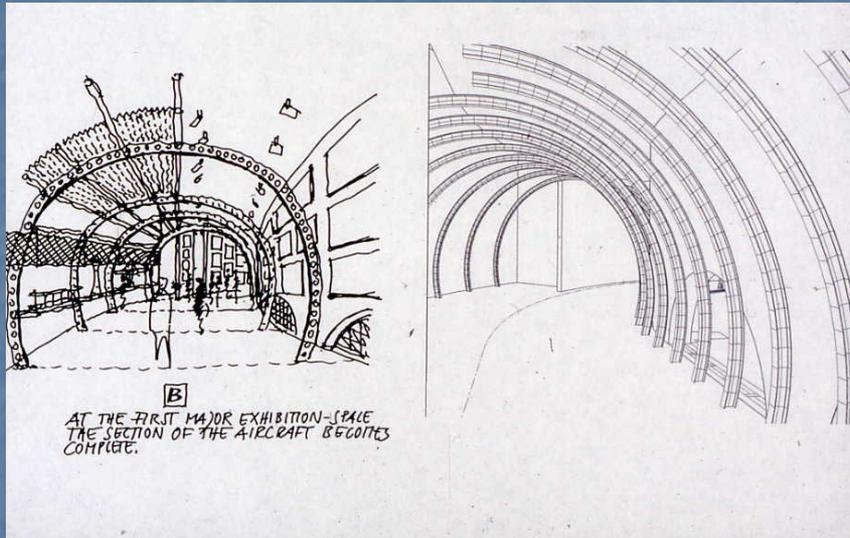
2001



Building for Air Travel

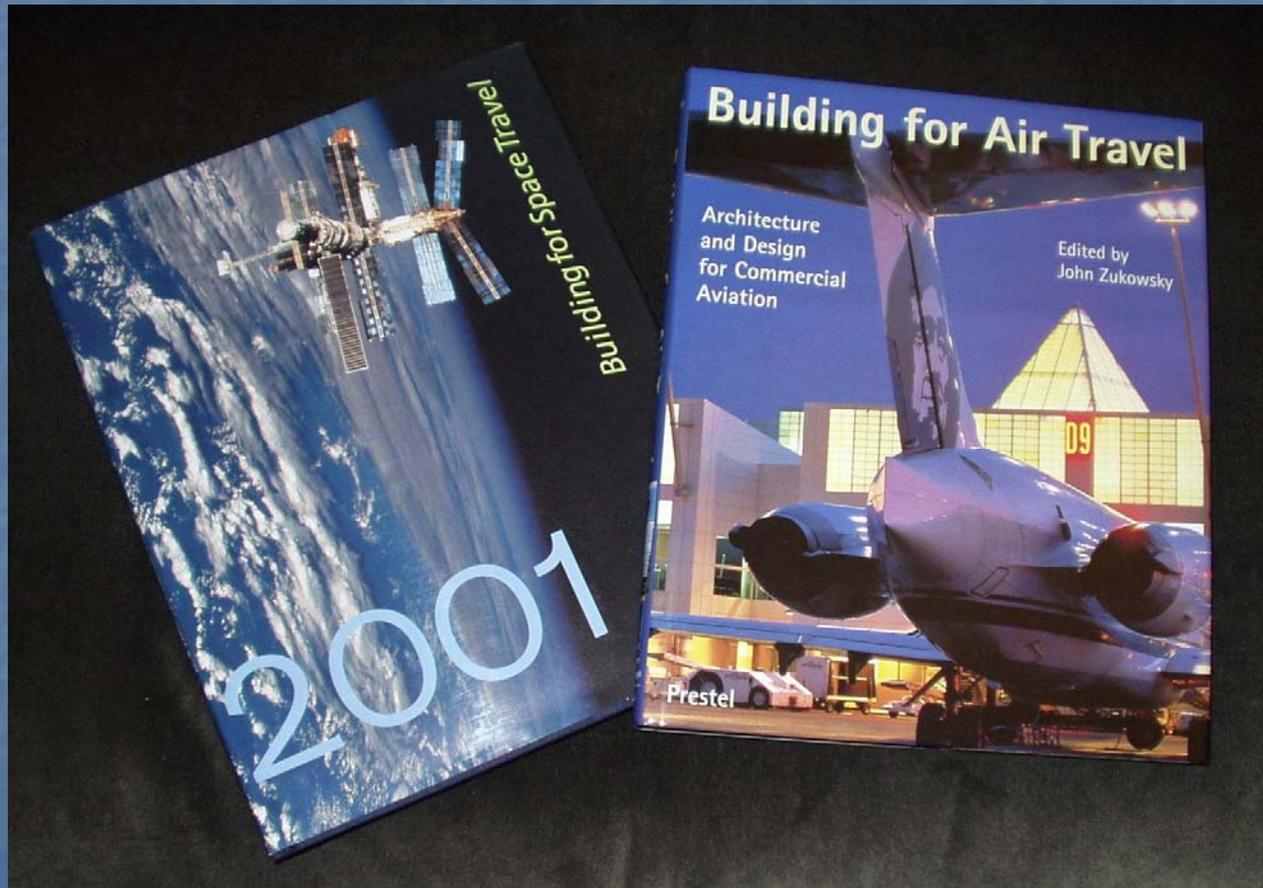
designed by Helmut Jahn

1996



The Art Institute of Chicago

aerospace architecture and design publications 1996 and 2001



Design Vocabularies: Regional and Universal



Albuquerque 1939



Nantucket 1992



Zurich 1946-53



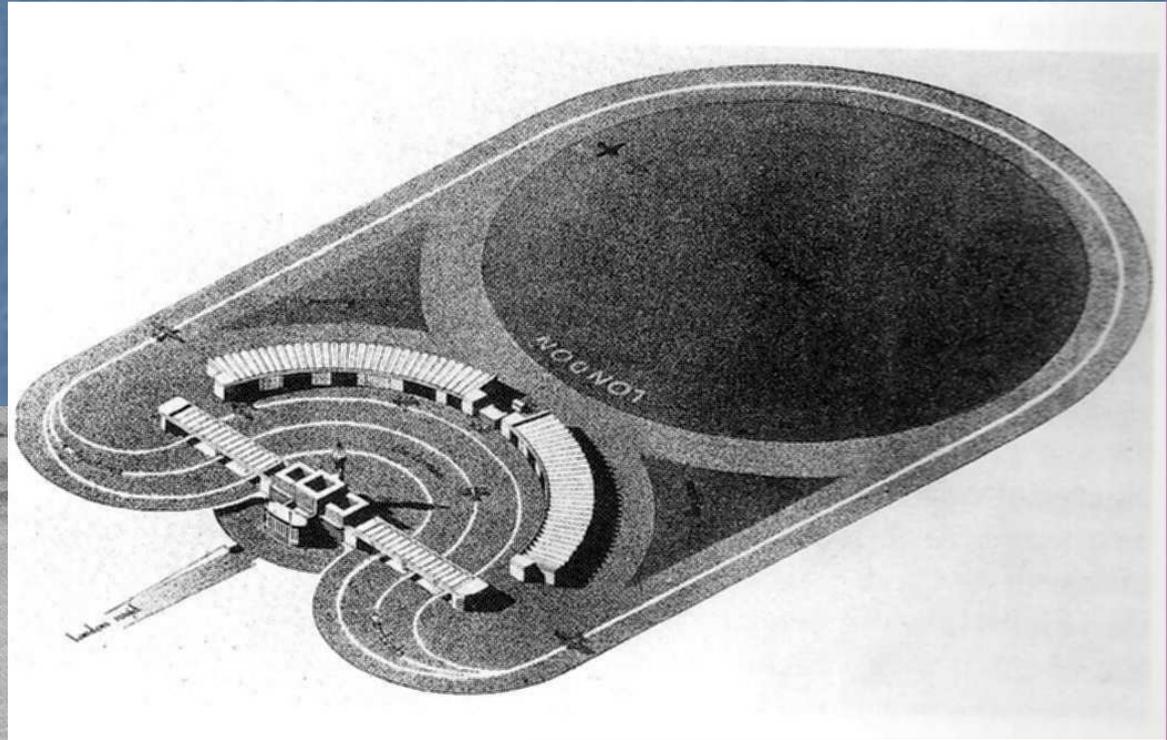
Kuala Lumpur 1998



Bangkok 2004

Aerospace Dialogue: Historic Examples

Omni-Directional Grass Fields for small post WWI airliners to....



London 1928

Konigsberg 1922

Aerospace Dialogue: Historic Examples

Multi-Directional Paved Runways and Taxiways
for larger, heavier airliners of the 1930s



Boeing 307

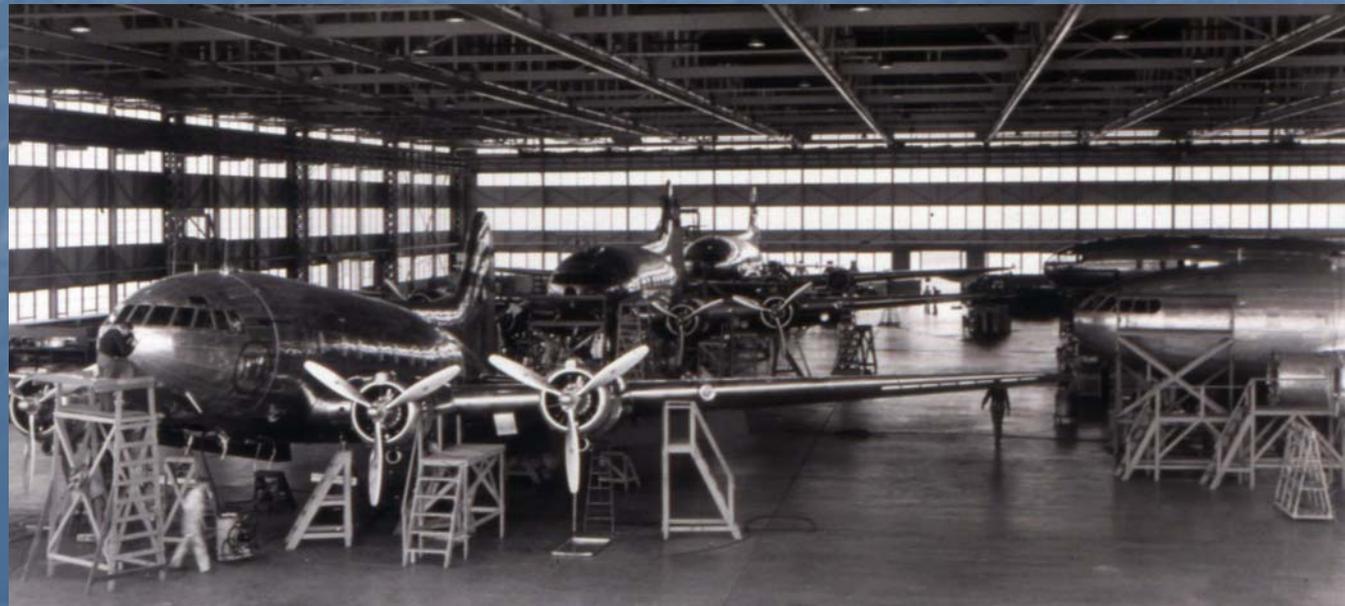


Focke Wulf 200

Stockholm 1936

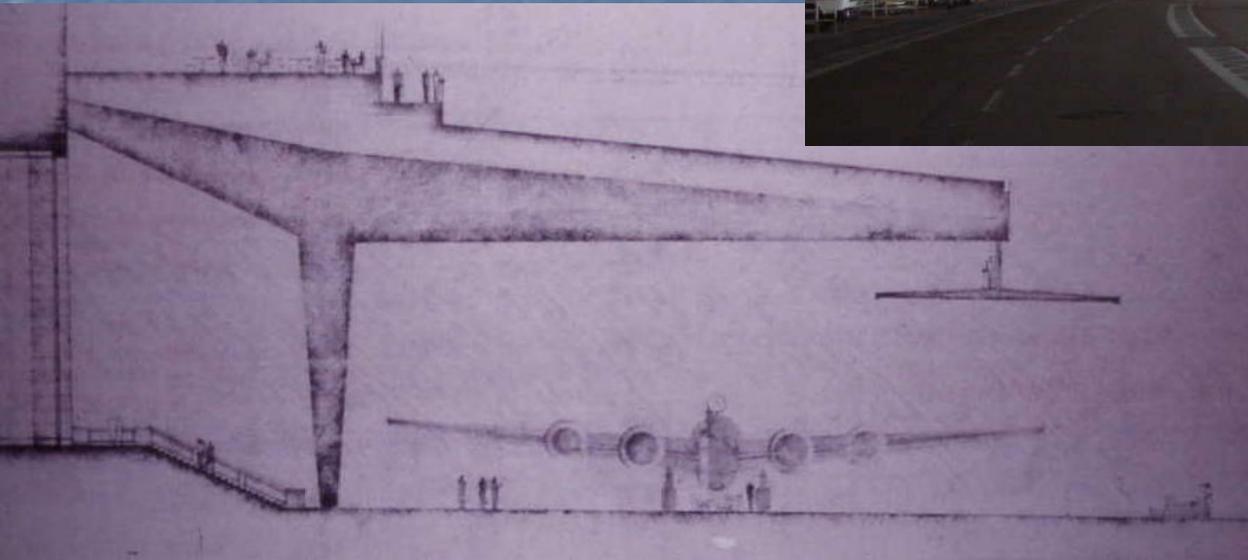
Aerospace Dialogue: Historic Examples

Adaptive Reuse to Purpose Built Factories
Boeing Facilities Contrasted 1920s and 30s



Aerospace Dialogue: Historic Examples

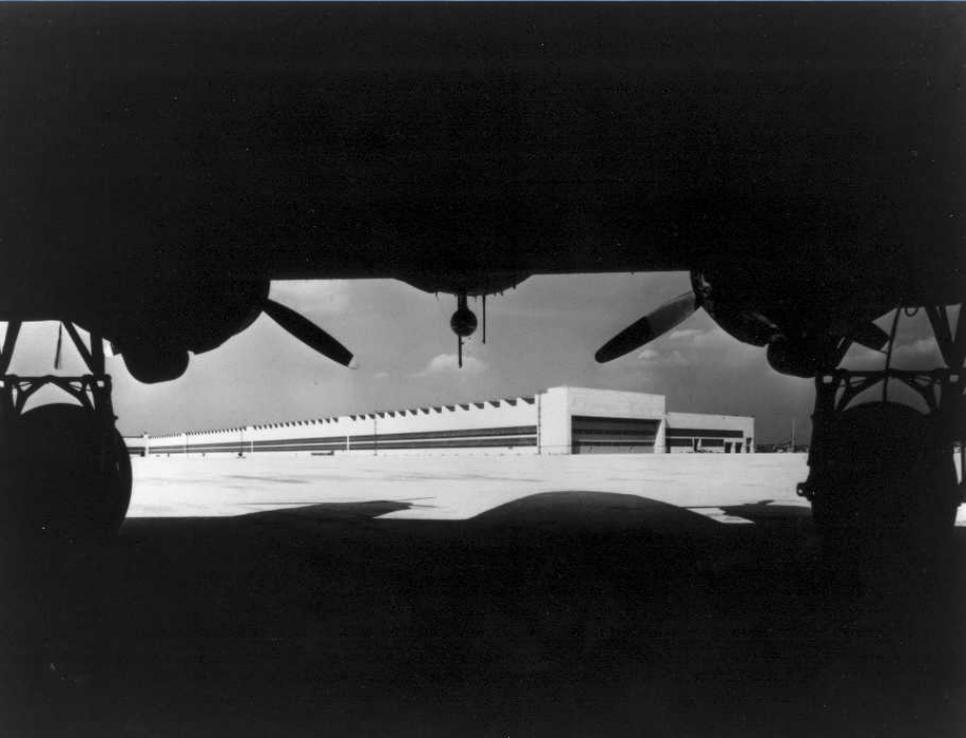
Airports Change with the Scale of Aircraft
Observation Decks: Airport as Theater



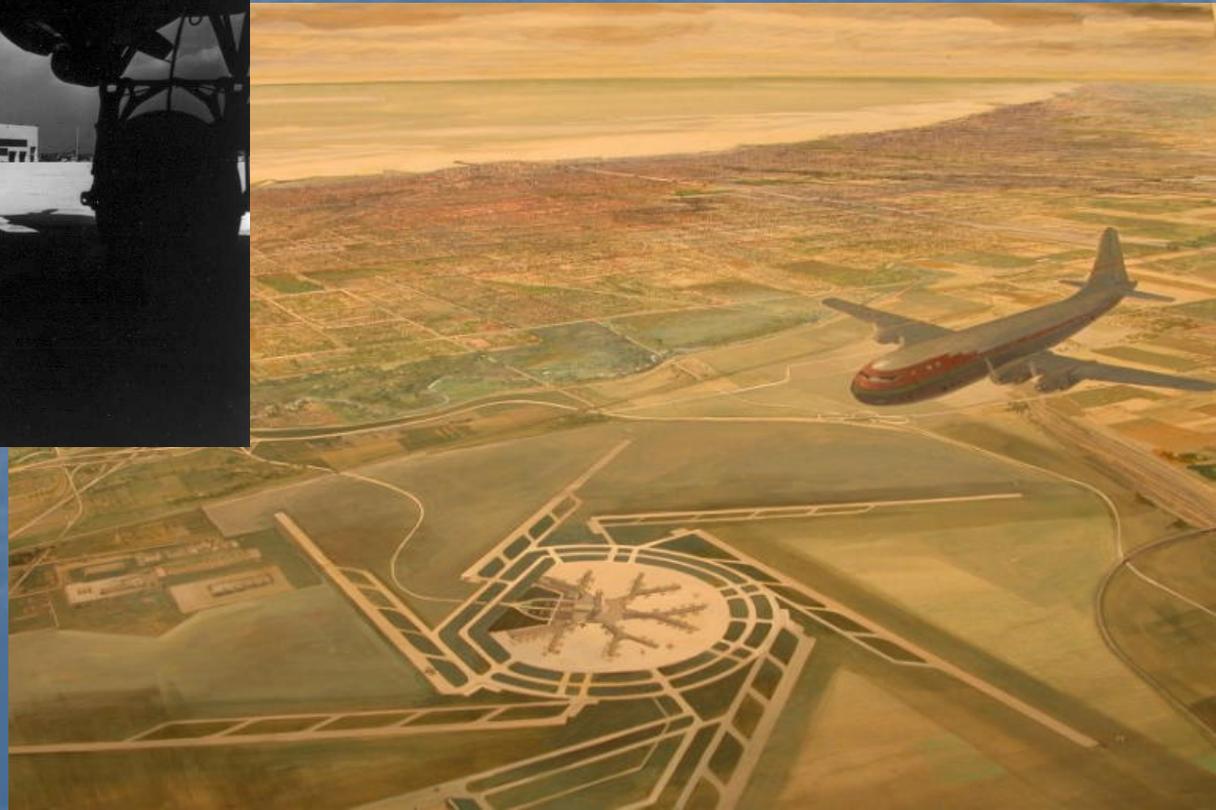
Berlin Tempelhof 1936

Aerospace Dialogue: Historic Examples

Wartime and postwar expansion to aviation's infrastructure



Orchard Field Douglas Factory in WWII
The beginning of O'Hare



Aerospace Dialogue: Historic Examples

Postwar Expansions and Inventions: Britain and the Beginning of the Jet Age



Aerospace Dialogue: Historic Examples

The Golden Age of Coordinated, Comprehensive Design
The Postwar Jet Era



Aerospace Dialogue: Historic Examples

The Mass Transit Jet Age, 1968 to the Present
Airports Adapt to Larger Aircraft
Boeing and Airbus Behemoths



Hamburg Airbus A380 Final- Interior
Assembly, GMP



Jumbo Hangar Frankfurt 1970

Aerospace Dialogue: Historic Examples

The Mass Transit Jet Age, 1968 to the Present

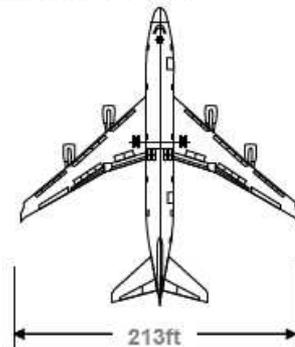
Airports Adapt to Larger Aircraft

Boeing and Airbus Behemoths

Airport Standards

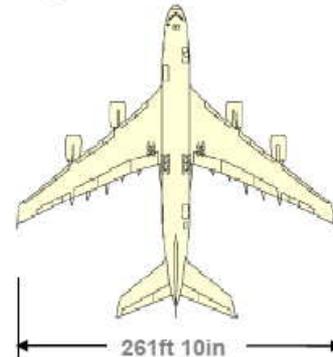
Group 5

- Parallel taxiways, centerline-to-centerline: 245ft
- Taxiway centerline to runway centerline distance: 400ft
- Taxiway width: 75ft
- Runway width: 100ft
- 171ft to 213ft Wingspan
- Design for B747:



Group 6

- Parallel taxiways, centerline-to-centerline: 298ft
- Taxiway centerline to runway centerline distance: 600ft
- Taxiway width: 100ft
- Runway width: 150ft
- 214ft to 261ft 10in Wingspan
- Design for A380:

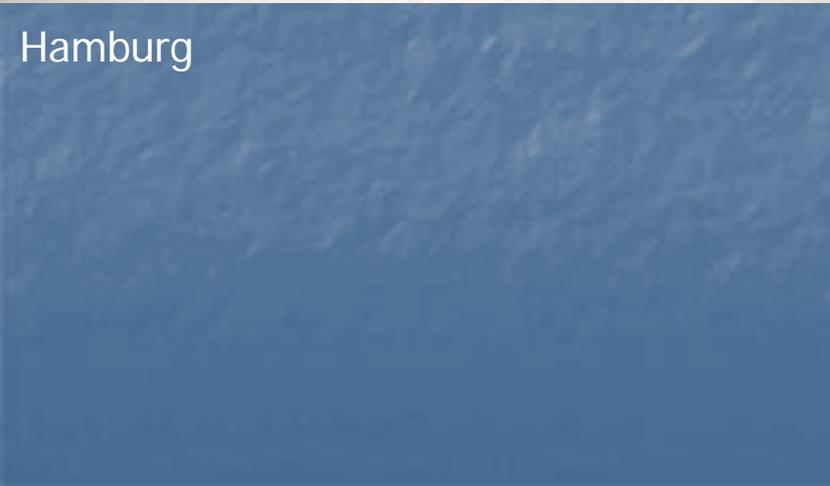


Aerospace Dialogue: Historic Examples

The Mass Transit Jet Age, 1968 to the Present.
Airports Adapt to Larger Aircraft, Boeing and Airbus Behemoths
New maintenance facilities designed by GMP



Frankfurt



Hamburg



Aerospace Dialogue: Historic Examples

Selected Historic Behemoths



Sikorsky Bolshoi 1913



Tu ANT20 Maxim Gorky 1935

Aerospace Dialogue: Historic Examples

A3XX to A380, 1994-2007



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Page updated Wednesday, June 1, 2005 at 3:00 p.m.

Airbus A380
The A380 will be a true colossus, with models seating 555 people.
The A380 will be the world's first airliner with passenger cabins on two full decks. Airbus argues that explosive growth in air traffic will fuel a healthy demand for super-jumbo jets. Boeing disagrees, and predicts the A380 will turn into a white elephant.

Suites with beds, as shown above, or private lounge suites, below, could be options for passengers once the aircraft reaches cruising altitude.



Seats vs. salons
Gift shops, lounges, casinos, restaurants — Airbus is touting endless uses for the A380's capacity. But will airlines opt for seats or salons?

Three options for airlines buying the A380 are retail space, a hair salon, above, and a bar, below.



Airbus Industrie Photographs



Sources: Airbus and Boeing

MARK NOWLIN/THE SEATTLE TIMES



Aerospace Dialogue: Historic Examples

New Construction and Airport Alterations for the A380



Frankfurt - Gate Modifications

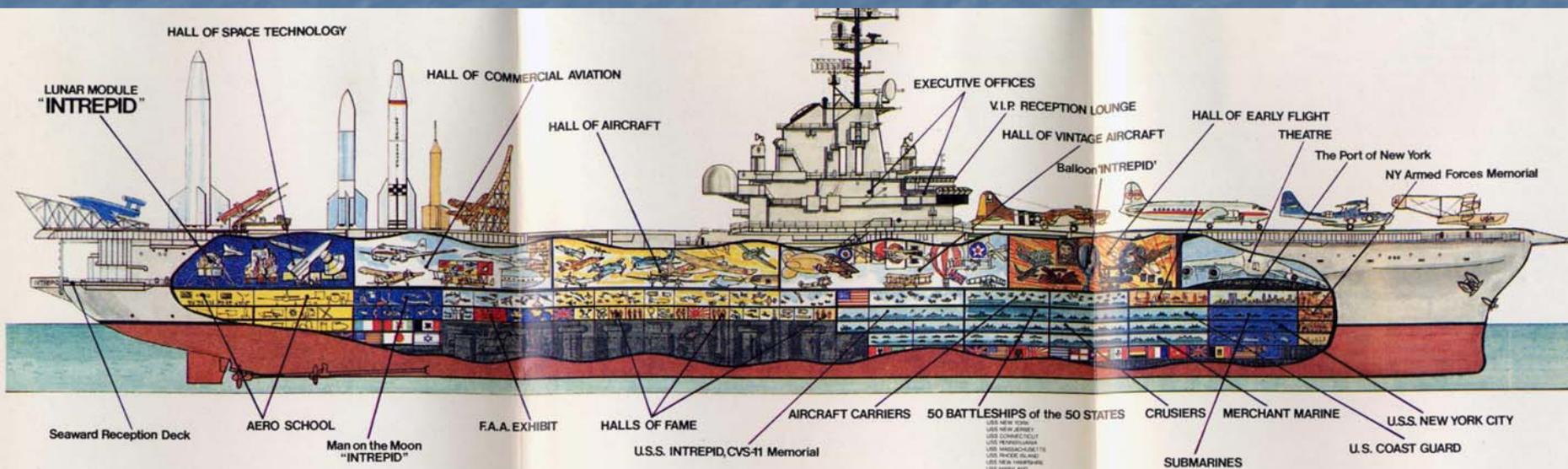


Dubai, designed by ADP - 3.5 million square feet

Case Study Past– Urban Aerial Commuters

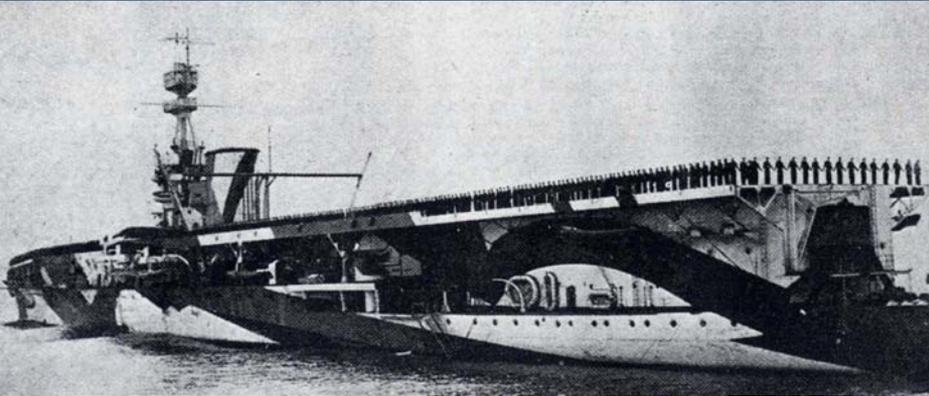
The Bicentennial

New Life for Aircraft Carriers after Vietnam – The Naval and Aviation Museum



Case Study Past – Urban Aerial Commuters

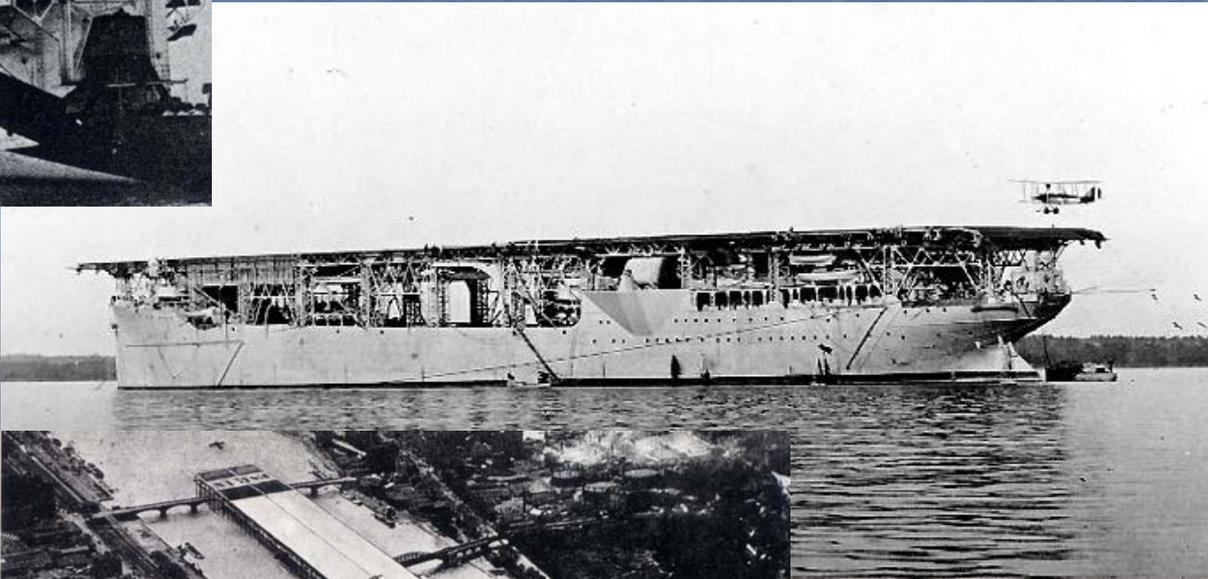
Early Aircraft Carrier History and Design Impact



USS Langley 1922



HMS Furious 1917



1929 Atlantic Seaport (left) and 1932 Seine Airport (right)

Case Study Past – Urban Aerial Commuters

The Essex Class and USS Intrepid Mass Produced Skyscrapers at Sea

ESSEX CLASS CARRIERS

HULL NO.	NAME	COMMISSIONED
CV-9	ESSEX	31 December 1942
CV-10	YORKTOWN	15 April 1943
CV-11	INTREPID	16 August 1943
CV-12	HORNET	29 November 1943
CV-13	FRANKLIN	31 January 1944
CV-14	TICONDEROGA	8 May 1944
CV-15	RANDOLPH	9 October 1944
CV-16	LEXINGTON	17 February 1943
CV-17	BUNKER HILL	24 May 1943
CV-18	WASP	24 November 1943
CV-19	HANCOCK	15 April 1944
CV-20	BENNINGTON	6 August 1944
CV-21	BOXER	16 April 1945
CV-31	BONHOMME RICHARD	26 November 1944
CV-32	LEYTE	11 April 1946
CV-33	KEARSARGE	2 March 1946
CV-34	ORISKANY	25 September 1950
CV-35	REPRISAL	Cancelled 15 August 1945
CV-36	ANTIETAM	28 January 1945
CV-37	PRINCETON	18 November 1945
CV-38	SHANGRI LA	15 September 1944
CV-39	LAKE CHAMPLAIN	3 June 1945
CV-40	TARAWA	8 December 1945
CV-45	VALLEY FORGE	3 November 1946
CV-46	IWO JIMA cancelled	15 August 1945
CV-47	PHILIPPINE SEA	11 May 1946
CVs-50-55		Cancelled 27 March 1945



Case Study Past – Urban Aerial Commuters

High Rise Heliports, Essex Class STOL Ports and DHC-6 Twin Otters in the 1970s



NEWS DAY 1-24-75

A Tentative Preview for Flying Dans

By Charles Rabb
 East Farmingdale—Pilot Tom Appleton pulled the stick back, drone of the two Pratt & Whitney PT6A-27 engines filled the cabin and the De Havilland-8 lifted off the runway. Bargain-basement short air travel—at least a demonstration of it—had come to Long Island.

The occasion was a flight arranged by Carrier Air Park Inc., to show newsmen its plans to start passenger and cargo service next year from Long Island to two mobilized aircraft carriers anchored at a pier in the Hudson River. But federal and New York City officials on hand yesterday made it clear that many details are still to be ironed out.

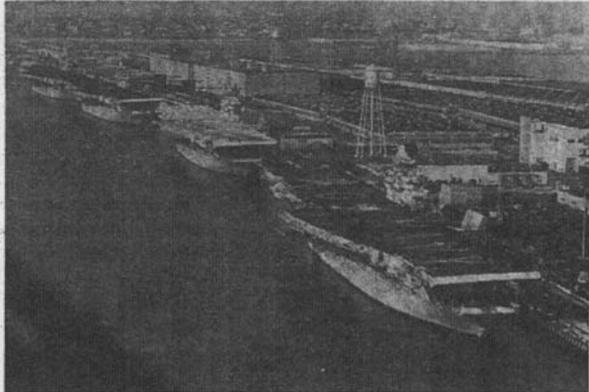
John J. Kelly, head of Zimmer Welding Co. in Brooklyn and president of Carrier Park, said he has \$10,000,000 in backing from nine out-of-town banks to get the project off the ground. He would not identify the banks.

A Carrier Park spokesman projected a cost of \$7,800,000 for mooring for the aircraft carriers, the bridge structures, the deck for taxiing and parking plus engineering and contingencies. Not included would be cost of the DHC-6s, put at price of \$660,000 for each aircraft.

Under present plans, the flight decks of two decommissioned aircraft carriers, Essex and Randolph—linked by a 300-foot steel span over the roof of a warehouse at Pier 76—would form a 2,000-foot runway. Yesterday's flight took newsmen over Pier 37 and to Bayonne, N.J., where the two carriers are now docked.

Dee Kirbow, executive vice president of Carrier Air Park said service would be provided from Telen MacArthur and other Long Island streets including Reboile as demand warranted. Kirbow saw the appeal of cheap, \$5-to-\$7-per-person and 12-to-15 minutes instead of hour-long drives, taking 300,000 cars a day off Long Island roads.

They may abandon their cars, but they won't be overwhelmed with luxury and comfort when they travel in the DHC-6 that Carrier Park plans to use initially to provide service. The DHC-6 short take off, and landing aircraft is air travel reduced to basics. The DHC-6 holds 19 passengers. (The Federal Aviation Administration requires that a stewardess be pro-



Newsday Photo by Cliff De Boer

Decommissioned aircraft carriers are potential STOL craft runways

vided on aircraft holding 20 or more passengers.) The aisles are less than a foot wide.

It is designed for use on short landing strips. It returned to an airport base in about 400 feet from touchdown to stop.

Kelly said that Carrier is a nonprofit corporation which would run the operation for a fixed fee with the remaining revenues to go to the Clinton Planning Council, a West Side Manhattan community group. The floating STOL port would be at the foot of West 37th Street.

The firm must still get approval from New York City and Federal Aviation Agency officials before its flights become a reality. FAA officials in Atlanta saw problems—such as adjusting flight patterns—but said they could be overcome.

A spokesman for New York City Transportation Administrator Michael Lazar said the city's request to the Navy for the carriers is mainly to lay claim to them while it determines the feasibility of the carrier service.

MEMORANDUM
 RM-5816-PA
 AUGUST 1988

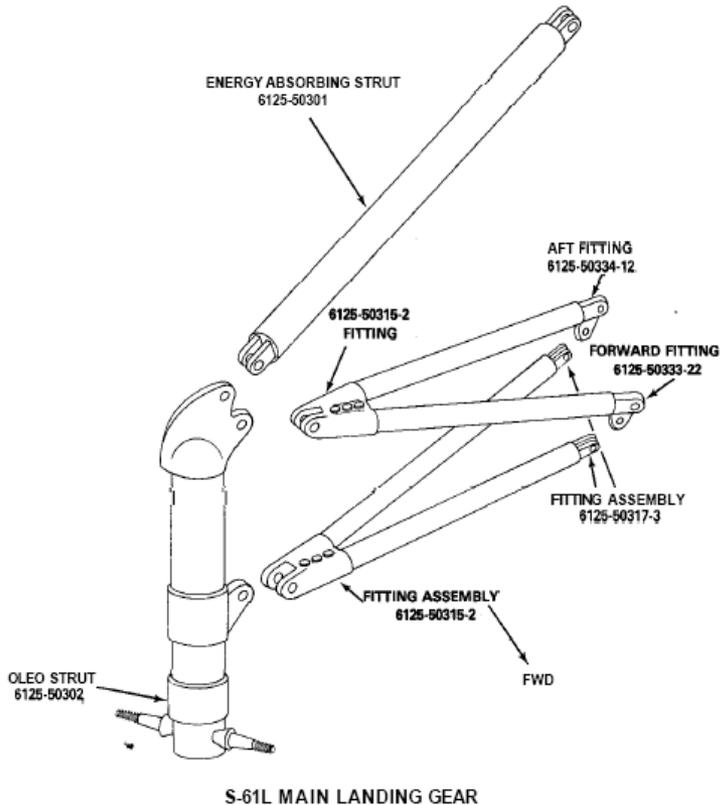
THE POTENTIAL OF V/STOL AIRCRAFT FOR PASSENGER TRAVEL IN THE NEW YORK REGION

T. F. Kirkwood and S. L. Katten

This research was supported by the Port of New York Authority. Views or conclusions contained in this study should not be interpreted as representing the official opinion or policy of the sponsoring agency.

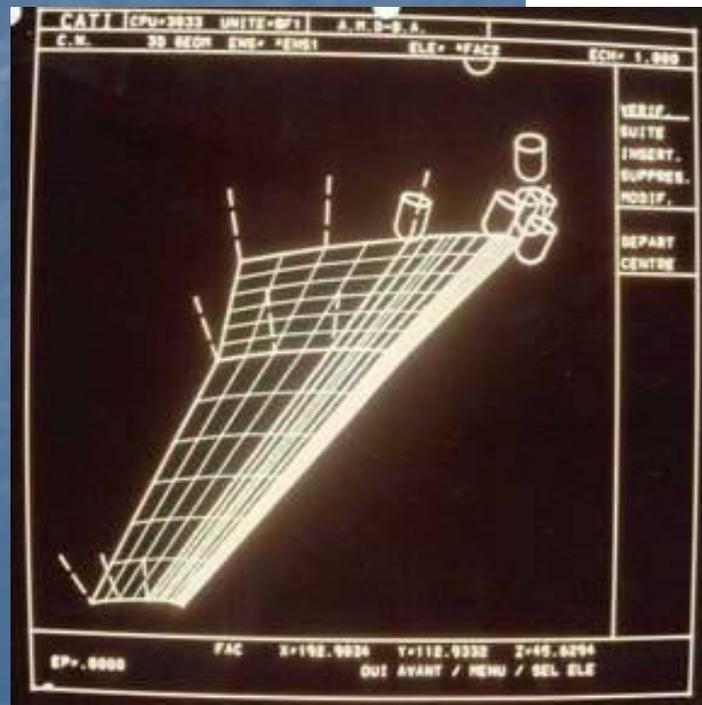
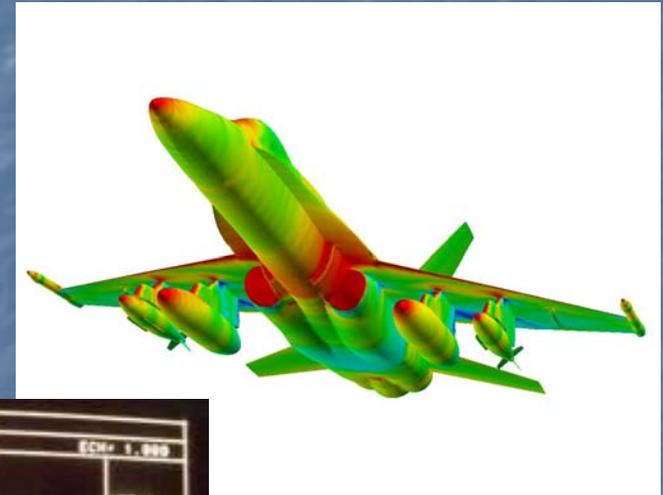
Case Study Past – Urban Aerial Commuters

1976 Bicentennial and May 16, 1977 Pan Am Building Crash catalysts to create museums not urban STOL ports from aircraft carriers such as Intrepid



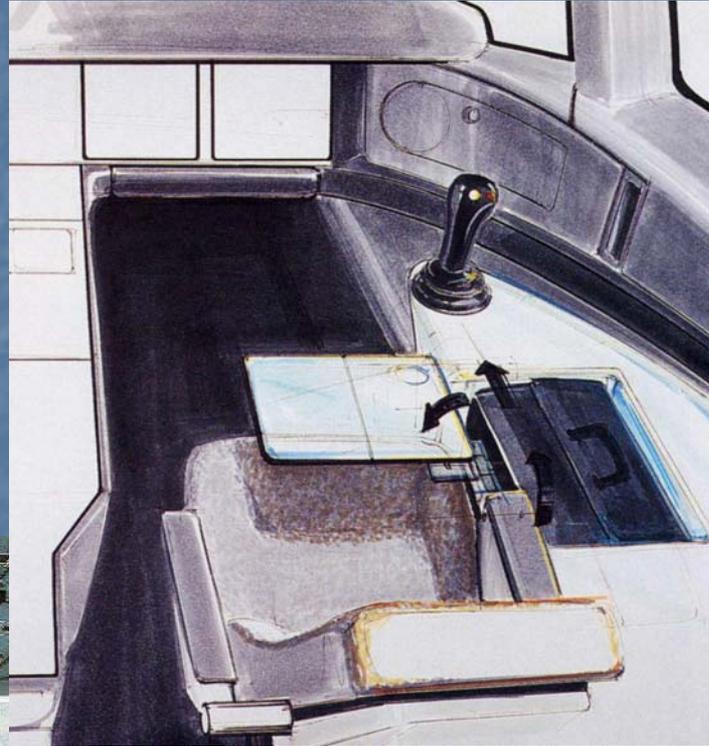
Case Study Present – Computers and Aviation

Computer Aided Design dates back to mid 1960s



Case Study Present – Computers and Aviation

Side Stick “Fly By Wire” Controllers



F-16 1973-75



Airbus A320 1987-88

Case Study Present – Computers and Aviation

Uncrewed Aerial Vehicles – Predator 1995



Case Study Present – Computers and Aviation

UAVs now and near future
extremes of scale, budget, and architectural environment

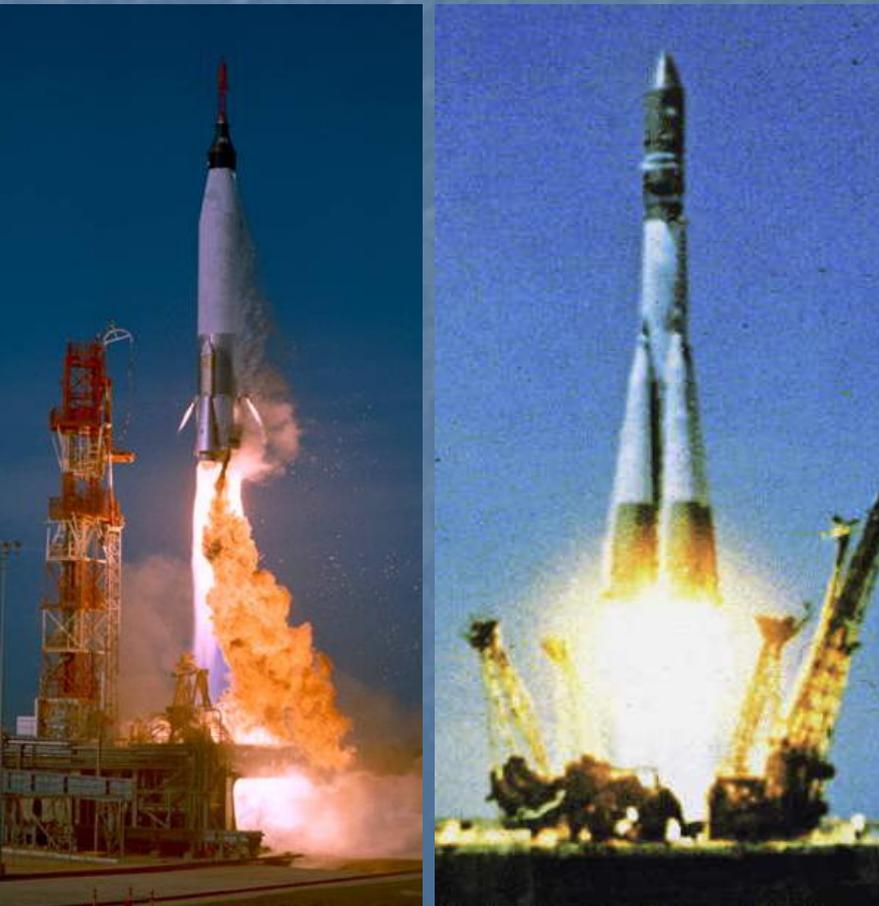


Pegasus

Raven

Case Study Future – Space Travel and Spaceports

Missile Launchers and Spaceplanes



Mercury Atlas (right) and Vostok (left) launches 1961

X-15 with astronaut Neil Armstrong

Case Study Future – Space Travel and Spaceports

2004 X-Prize and Virgin Galactic



Space Ship One



Richard Branson and Burt Rutan.

Case Study Future – Space Travel and Spaceports

Virgin Galactic Spaceport by Norman Foster



Case Study Future – Space Travel and Spaceports

Compared with Foster's American Air Museum Duxford, 1995



Long Range Speculations: Problems and Interdependent Analyses

Democratization and Big and Little Airplanes: Historic examples and the ongoing search for a new DC-3



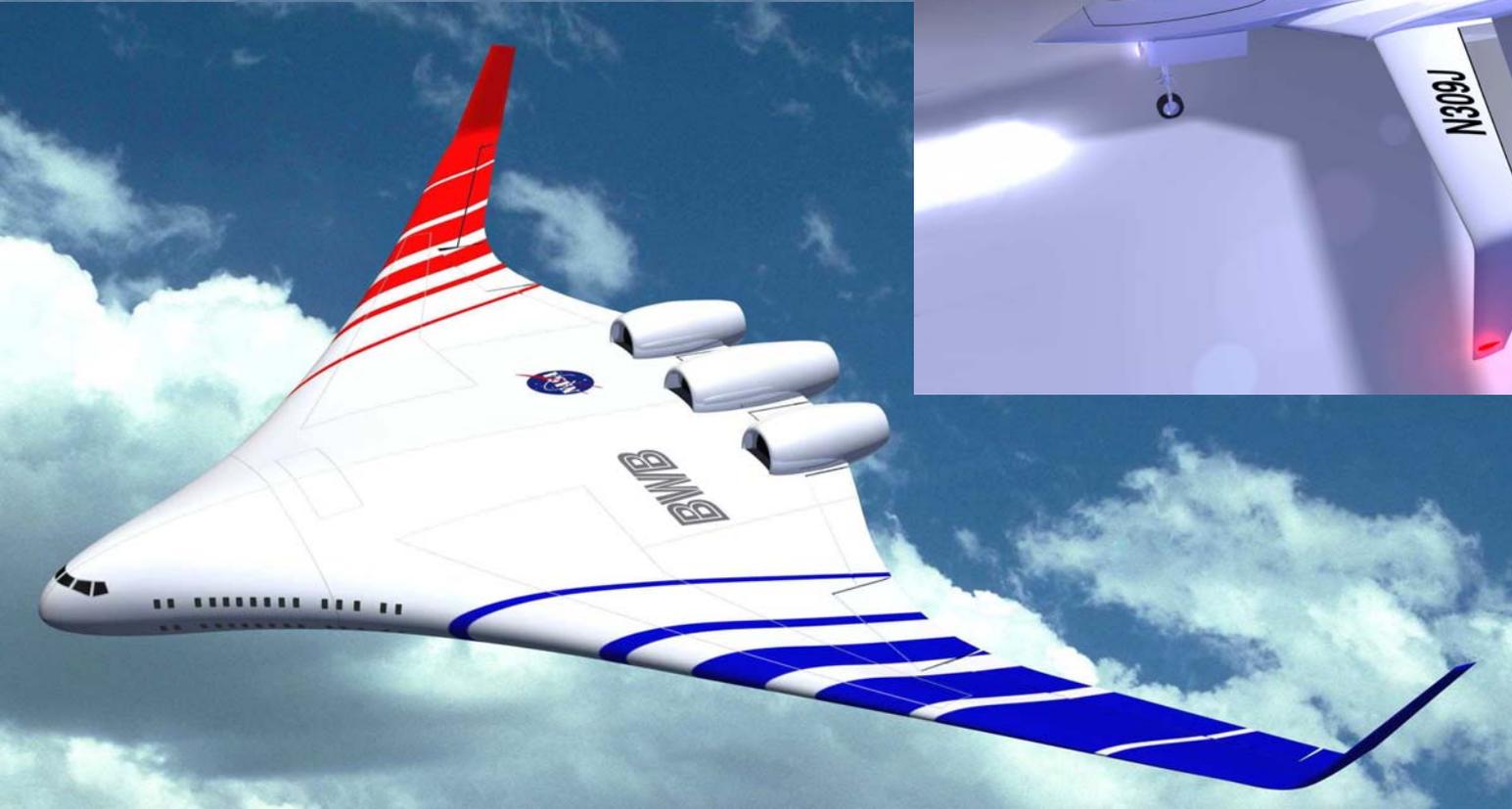
Long Range Speculations: Problems and Interdependent Analyses

Democratization and Big and Little Airplanes: Historic Examples: Boeing 747, deregulation and the wide body airliner of the 60s and 70s



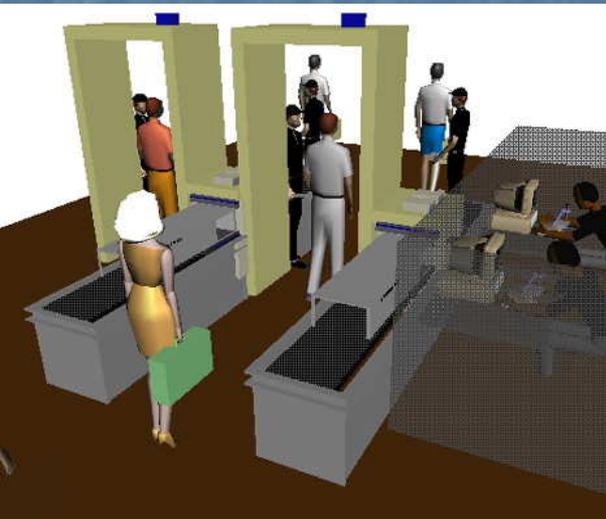
Long Range Speculations: Problems and Interdependent Analyses

Democratization, Big and Little Airplanes in the future? What will they be and how will they impact on facility planning?



Long Range Speculations: Problems and Interdependent Analyses, Reactive to Proactive

increasing adaptable space for safety and security and the desperate need for holistic, integrated design at all scales, from terminal to tray



Long Range Speculations: Problems and Interdependent Analyses

linear passenger flow from curb to gate and the moving sidewalk.
Is a century-old technology adequate for tomorrow's airports?



Long Range Speculations: Problems and Interdependent Analyses

passenger flow: covered boarding jet bridges date back to the Golden Age



Gatwick 1936



Chicago O'Hare 1963

Long Range Speculations: Problems and Interdependent Analyses

passenger flow: what should be the jet bridge of the future? Or is the future of the jet bridge in question?



Long Range Speculations: Problems and Interdependent Analyses

carryon bags and overhead bins – a very brief visual history from hat rack and sleeping berth.....



Long Range Speculations: Problems and Interdependent Analyses

.....to enclosed luggage bin.

Star Trek, the Boeing 747, Teague Associates and the wide-body look transplanted to single-aise airliners



Long Range Speculations: Problems and Interdependent Analyses

luggage transport, carryons and the need for new design solutions



Long Range Speculations: Problems and Interdependent Analyses

Neighborhood Growth, a Blessing and Curse
Chicago Midway



New Terminal HNTB



Long Range Speculations: Problems and Interdependent Analyses

the rarity of preservation success



Washington National
DCA preserved



Hamburg, demolished

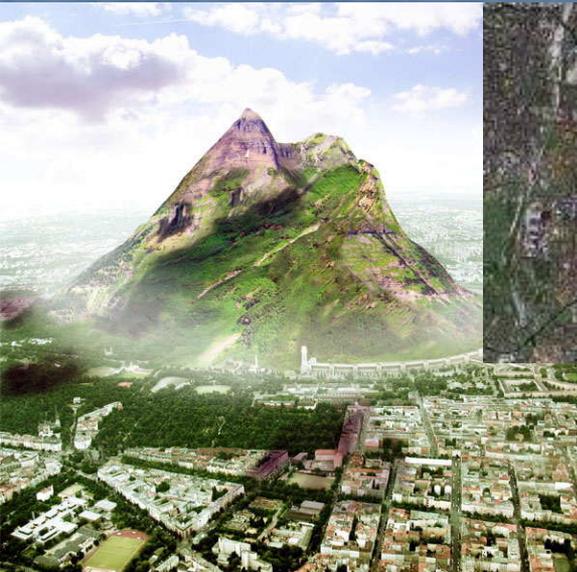
Aviator Sports and Recreation,
Floyd Bennett, Gateway
National Park



Long Range Speculations: Problems and Interdependent Analyses

any kind of successful adaptive reuse a rarity

Tempelhof Mountain?
Tempelhof Lake?



Jet Blue addition by Gensler
to TWA building at JFK



Future Use of Berlin Tempelhof TBD

Long Range Speculations: Problems and Interdependent Analyses

The Green Airport

Environmental concerns, LEED (Leadership in Environmental and Energy Design) certification, and Green sustainable airports a rarity...



SFO



Boston Logan (above), LEED certified And Indianapolis (left), both designed By HOK

Long Range Speculations: Problems and Interdependent Analyses

The Green Airport

.....when compared with other building types.

