

Jumbo Architecture

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ABSTRACT

Airport design in the 1960s and 1970s reflected the exponential changes in scale and experience brought about by the 747 and other “jumbo” aircraft. New requirements for passenger loading, accommodation, and circulation meant that the “airy prettiness” that had defined terminal buildings, cabin environments, and airport landscapes in the 1950s were subsumed by less humane and more disconcerting environments and systems that produced more noxious sensory environments. The sublime scale of the new hardware and its surrounding operations marked a sudden shift in sensibilities, economies, and passenger experience that remains symptomatic today.

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Airport Design, Aircraft Interiors, Infrastructure, Marketing, Industrial Design

“l’avion accuse.”

Le Corbusier

“Just as New York City can now be seen to inhabit a fossil future that was laid down about 1910—the future that was institutionalized by the Futurists themselves—so dinosaur-designs like Dallas/Fort Worth can now be seen to inhabit a fossil future that was laid down in the days of wide-bodied Jumbo Jets, which may themselves prove to be the last of their lines, too.”

Reyner Banham,
Megastructure: Urban Futures of the Recent Past.

Corbusier’s indicting aircraft eviscerated classic architectural principles on several levels. In its tectonic conception, its remarkable performance, and its god’s-eye (or, perhaps more to the point, urban planner’s-eye) view of the twentieth century city, the new vehicles were agents of spatial and urban change. The old guard could not maintain against the aircraft’s machine-gun efficiency, a swift, violent modernizing force that was so omnipotent, in Corbusier’s view, as to verge on the poetic, even the spiritual.

For thirty-five years after Corbusier’s pronouncement, developments in aviation and architecture moved forward with new building typologies—the hangar, the air terminal and the control tower—contributing to a streamlined art deco style, and later integrating long span structural engineering with architectural design. Throughout the 1920s and 1930s, aviation’s effect on architecture was manifest at three scales: terminals themselves that adopted prototypes from railway architecture, hangars such as those by Eugene Freyssinet at Orly that brought new structural forms to the long spans required by aircraft and airships, and town-sized precincts of runways and tarmacs like those at Chicago’s Municipal (later Midway) Airport, the world’s busiest airport in 1932 and among the world’s largest when it usurped neighboring rail lines and doubled in size ten years later.

Through the jet age of the 1950s, aircraft terminals celebrated air travel’s dynamism and vaporous aesthetics. Architects offered metaphorical interpretations such as Saarinen’s terminals at Dulles and Kennedy airports [Figs. 1-2] along with material and experiential tributes such as Tippetts-Abbot-



FIG. 1 TWA Terminal, Idlewild (later Kennedy) Airport, New York. Eero Saarinen & Associates, 1962. [Author’s collection.]

McCarthy and Stratton's "saucer-like" Pan American terminal at Kennedy, a concrete parasol and airy glass curtain wall so elegant that the building was featured in *Vogue* upon its completion in 1961 [Fig. 3]:

Here's our idea of indispensable: straight-forward, independently pretty dresses—and jackets that provide them with the fashion-substance of suits. (Background here is Pan American's new jet-oriented terminal at Idlewild, where suit-substance is clearly indicated; six hours from this point, the scene might be Claridge's in London and the dresses jeweled, tullehatted, wearing furs in place of jackets).¹

The trans- and intercontinental travel that the four-engined 707 spawned led airlines to push manufacturers for further efficiency, larger and faster aircraft that sped the new traveling class to global destinations in increasing numbers. After following up the 707's success with smaller jet aircraft designed to feed larger international hub airports, Boeing transformed an unsuccessful military freighter design into one of the decade's most recognizable icons. Debuting in 1970, the 747 was something new in the skies, a massive, skyscraper-sized aircraft that laid waste to a generation of received wisdom about the economics of jet travel, its associated architecture and infrastructure [Fig. 4]. Boeing's freighter design had relied on a front-opening nose, requiring the cockpit to sit well above the fuselage and requiring a long fairing to its rear. This 'hump,' with all of its aerodynamic inefficiencies, became the plane's signature, along with its ponderous scale, its space- and time-warping abilities and the landside contortions required to service its 350-seat capacity. The 747 was a quintessential artifact of the 1970s, changing the face of airports worldwide and providing new spatial experiences and demands at three scales. The aircraft's interior represented a new space in aviation, one more akin to a movie theater or living room—"the double aisles in a 747 do lead people to walk around and chat for a while," noted humorist Calvin Trillin.² Its effect on urban infrastructure was also profound, as its capacity required airports to change from civic precincts to networks of vehicular interchange.³ Finally, the airport terminal itself faced grave challenges, requiring systemic approaches that replaced the jet age's monumental qualities with efficient but disorienting, antiseptic corridors. The Jumbo transcended human scale, and its disorienting effects on interior, urban and architectural design mark the onset of a Jamesonian hyperspace, a realm in which

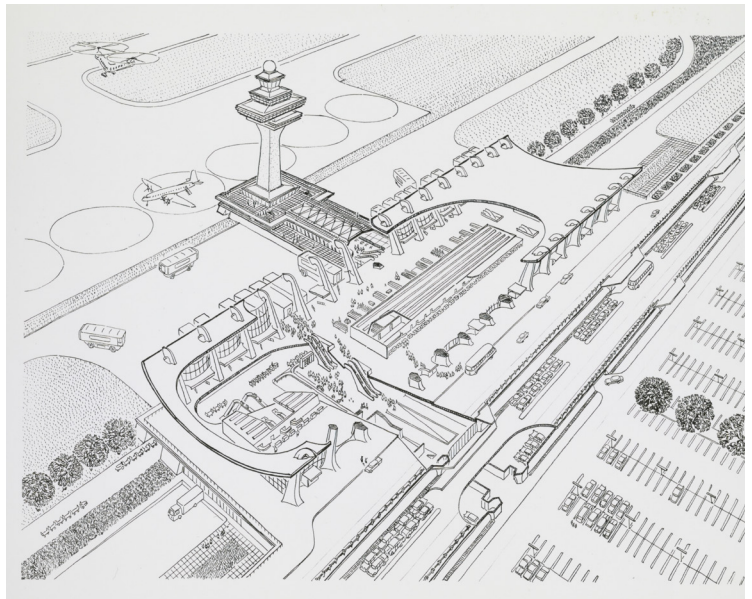


FIG. 2 Cutaway perspective, Dulles International Airport, Chantilly, Virginia. Eero Saarinen & Associates, Architect, and Eero Saarinen, 1959. Retrieved from the Library of Congress, <https://www.loc.gov/item/2008680884/>. (Accessed August 25, 2017.)



FIG. 3 Pan American Terminal Building, Idlewild (later Kennedy) Airport, New York. Tippetts-Abbett-McCarthy-Stratton, 1960. *Vogue*, October, 1960. © 1960 Vogue The Conde Nast Publications, Inc.

1. "New York's Idlewild: The New Look," *Vogue* (October 1960): 190-191. See, too, "Saucer Terminal," *Time*, April 15, 1957, 105.

2. Calvin Trillin, "U.S. Journal: N.Y./L.A./N.Y. A Travelling Person on a Beautiful Place," *The New Yorker*, April 4, 1970, 66-77.

3. See, in particular, Reyner Banham, and Raymond Spurrer, "The Landscape of Hysteria," *Architectural Review*, no. 132, (October 1962): 251-260



FIG. 4 Figure 04. "The Spacious Age is Here." Boeing's 747. Promotional Brochure, The Boeing Corporation, ca. 1969. [Author's collection].

human scale and experience were cast off. Beyond an indictment, the 747 evaporated its predecessors' spatial norms, offering a perceptual warping of time and space. The resulting agonies and pleasures became defining spatial and urban vectors during the Jumbo era.

The Cabin

The Jumbo jets' early reviews focused on their interiors. Twice as wide as the 707, the 747 presented a different air travel experience from the previous decade's crisp elegance. Its cabin's flat ceiling and near vertical walls belied the external shape of the fuselage [Fig. 05]. Double aisles and nine (or ten) abreast seating meant that the new aircraft's economy cabins were more akin to small cinemas, or large living rooms, than the previous era's tubular spaces. Intermediate bulkheads, distributed throughout the cabin further concealed the interior's vast scale while providing convenient galley space. With Cinerama movies, seat-side service on hot porcelain plates, and most seats removed from the small porthole windows, the new jets' 'flying rooms' insulated their passengers from flight's visceral sensations, focusing attention inward on meals, movies and music at the seat itself. The 747's ponderous bulk further reduced travel sensations for passengers and pilots. The planes' massive control surfaces had to be maneuvered through cockpit controls connected to hydraulic relays, and pilots spoke of 'flying valves' instead of gaining the direct feedback from rudders and ailerons.⁴ The cockpit's location, thirty feet above the ground and well forward of the nose wheel, forced Boeing to build a training rig at their Everett, WA factory so that pilots could get used to the ground handling of the unusual arrangement prior to their driving the \$20 million aircraft (\$96 million in 2003 terms) through confined airport tarmacs.

Economy class' "flying rooms" were supplemented by the 747's most unique feature, the 'hump' that filled the aerodynamic fairing behind its cockpit [Fig. 6].⁵ While the Boeing Stratocruiser had been a double-decker plane with a lounge below, the Jumbo's upstairs deck cemented its



FIG. 5 "The 747 is a lot of little nice things." Promotional Brochure, The Boeing Corporation, ca. 1969. [Author's collection].

- 4. For a history of the aircraft's most notable feature see Bill Sweetman, "How the 747 Got Its Hump," *Air and Space Magazine*, (May 2003).
- 5. For a history of the aircraft's most notable feature see Bill Sweetman, "How the 747 Got Its Hump," *Air and Space Magazine*, (May 2003).

reputation for technological wizardry, and airlines responded by tailoring seating arrangements and (more popularly) lounges to its bulbous proportions. For a time, the spiral staircase leading up to the lounge was the aviation's 'most renowned architectural feature,' a promenade like no other in travel.⁶ Upstairs, airlines recognized the opportunity to configure and design the hump's interior to reflect their own brands, targeting their first class passengers with fashionable shag carpeting, wood and laminate bars, and the opportunity to "see from twenty-thousand and fifteen feet what one couldn't see from twenty-thousand." Ubiquitous throughout these lounges were the airlines' stewardesses, whose presence in the male-dominated lair of the frequent traveler in the 1970s was an unspoken amenity. In the words of Southwest's chairman, any 'girl' who couldn't wear 'kinky leather boots and hot pants' was not stewardess material, and the job became the stuff of constant innuendo throughout the decade, quietly encouraged by airlines seeking to attract businessmen's travel.⁷

Over time, these factors - the room-like interiors and seat-side service of economy class, the upstairs lounge and the winking presence of the airline stewardesses - became elements in a formula designed to placate passengers on the long flights made possible by the 747's new range. While the 707 had permitted the first regular non-stop service across the Atlantic, new routes offered by the Jumbos began to push flight times back into the marathon journeys of pre-war propeller planes, with the longest trans-Pacific flights averaging over ten hours. Adding to these long periods of confinement and inactivity in close proximity to 350 other travelers, the 747 was plagued in its early years by mechanical and logistical delays, leading airlines to devise ways to "prevent outright passenger revolt."⁸ In addition to the soporific effects of meals and cinema, alcohol became a staple on long hauls, which became known as "gin flights." Airline strategy on these long-haul routes was, in the words of one stewardess, to "feed 'em steak and give 'em all the liquor they can drink."⁹ Where airlines had sold their 707 flights in the 1960s as experiences in themselves, advertising for 747's focused instead on the complete *lack* of stimulus offered by the specially designed seats, the quiet, stable interior, and the endless flow of spirits [Fig. 7]. American described its aircraft's interiors as "beautiful places," while Pan Am sold its economy service as providing "all the room in the world," even though travelers were given brochures full of advice on how to spend most of the flight either asleep or, at worst, mildly intoxicated. Passengers' intentional disorientation was no match for the effects of jet lag on arriving travelers, and the "dysrhythmia" of transpacific 747 travel was more profound than

6. Trillin, "U.S. Journal".

7. Keith Lovegrove, *Airline: Identity, Design, and Culture* (London: Laurence King Publishing, 2000), 32.



FIG. 6 The spiral staircase was the 747's most distinctive architectural feature, complemented by full shag carpeting and lounge seating designed to match individual airlines' branding campaigns. Promotional Brochure, The Boeing Corporation, ca. 1969. [Author's collection].

8. "Aircraft: Period of Adjustment," *Newsweek*, July 13, 1970, 81.

9. "Aircraft: Period of Adjustment," 81.

that of the transatlantic 707. Even in the airline cabin, there was a conscious attempt to transcend, or rather to suppress space and time themselves, the ideal flight being seen by airlines and passengers alike as one during which the economy traveler would be either unconscious or distracted by on-board movie screens.

Infrastructure

If the 747 cabin was an anesthetizing, disorienting environment for the human psyche, the Jumbo's effects on the urban landscape were also profound. Doubling the number of passengers per plane at airports built during the early jet age required infrastructural approaches on a scale so massive as to distort and disfigure the surrounding city. Reyner Banham noted this as early as 1961, when his critique of Idlewild (later JFK) airport in New York pointed out that the airport's 'architecture' was confined to a small nucleus in the center, surrounded by a protoplasm of runways, hangars, highway interchanges and radio signal devices that mocked the terminals' airy pretensions.¹⁰ And this was seven years *prior* to the first 747 landing. While larger aircraft promised greater efficiency in long haul flights, the resulting increase in feeder routes airside and vehicular traffic landside proved catastrophic.¹¹ Ninety-minute delays at JFK became the norm in the early 1970s as aircraft lined up for gate space, while highways leading to the airport became jammed with traffic. Kennedy quickly supplemented its looping, graceful roadway with freeway overpasses and connections requiring arriving passengers to drive beyond their terminal and loop back to dedicated parking lots, following signs rather than finding their way by the landmark terminals [Fig. 08]. Chicago's O'Hare, constructed for 707 traffic, benefited from its location by two major interstates, however its surge in popularity as the geographical center of the nation's airline network required a mammoth parking garage, still the largest of its kind in the world, its 13-acre decks still require complex signage to direct baffled arrivals [Fig. 9]. "So long as flying and getting to your destination remain two distinct activities," opined *Progressive Architecture* in 1969, "then air transportation problems will not be resolved. Flying is the business of the airline, getting [to the airport] is the sole purpose of the passenger. The two objectives are not necessarily compatible."¹²

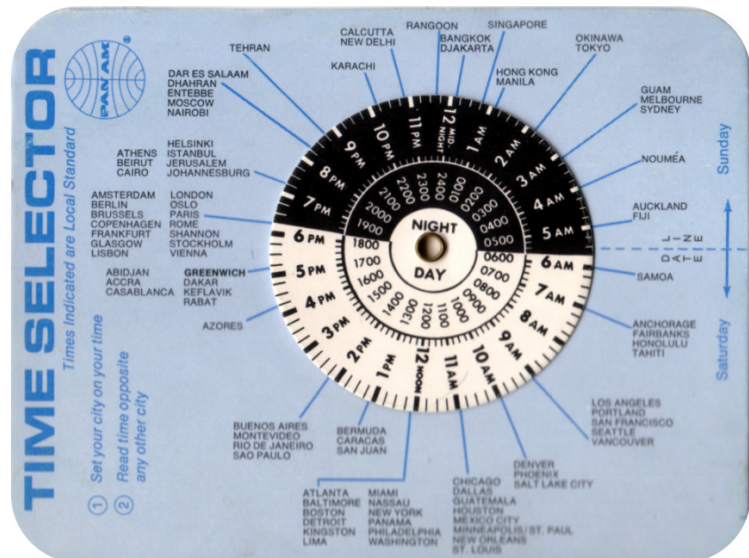


FIG. 7 Spatial dislocation was just one symptom of trans-continental travel. Pan Am issued time zone calculators to passengers in an attempt to ease the cognitive effects of jet lag. "Time Selector," Pan American Airlines, ca. 1972. [Author's collection].

10. Reyner Banham, "The Obsolescent Airport," *Architectural Review*, no. 132 (October 1962): 252-253.

11. William Burrows, "Time Runs Out at JFK," *New York Magazine*, July 29, 1968, 14-21.

12. Forrest Wilson, "Editorial," *Progressive Architecture* (November, 1969): 91.

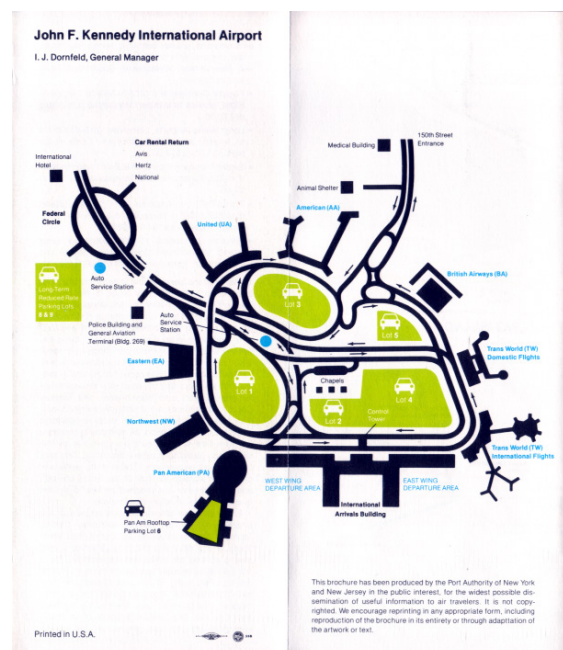


FIG. 8 John F. Kennedy International Airport was an ongoing laboratory for infrastructural and architectural attempts to cope with the scale of the 747. New freeway interchanges produced baffling wayfinding problems for arriving traffic. Informational brochure, The Port Authority of New York and New Jersey, ca. 1980. [Author's collection].



FIG. 9 Parking Garage, O'Hare Airport, Chicago. C. F. Murphy & Associates, 1969. The 'world's largest parking garage,' built to handle the increase in traffic brought about by wide-body jets with over 9000 parking spaces. Contemporary postcard [Author's collection].

Solutions to air and landside congestion repeated the spatial dysrhythmia of the Jumbo's interiors. On the tarmac, the solution for airports constrained by outdated designs was the Plane-Mate, developed by the Chrysler Corporation as a 'mobile lounge' that would keep the massive aircraft far from the terminal. The Plane-Mate was a bus mounted on hydraulic jacks that could dock with standard jetway entrances at either end, boarding passengers at the terminal, dropping down to ground level, trundling across the tarmac while providing a "wide view of airport activity" and then rising to align with the aircraft's main doors [Fig. 10]. The Plane-Mate eliminated the "maze of aisles and corridors" spawned by new jumbo jet terminal construction, even allowing passengers journeying to their aircraft the chance to "smoke, if you wish."¹³ The spatial efficiency was impressive, and it was adopted wholesale at Eero Saarinen's Dulles International Airport outside of Washington, D.C. However the Plane-Mate did nothing to decrease boarding time, and airlines balked at parking their \$20 million flying billboards at remote boarding positions, far from the captive eyes of potential travelers.

Landside, planners recognized the need for new scales to shuttle passengers between urban centers and the waiting 747s. While highway improvements such as Kennedy's offered some mitigation, airports of the 1970s included steroidal freeway approaches and new, futuristic light rail systems that connected to intermodal transit or to distant parking lots connected to interstate highways.

13. *The Mobile Lounge...A New Concept in Convenience for Air Travelers*, promotional booklet (The Chrysler Corporation, ca. 1965).



FIG. 10 The "Plane Mate" brought problems of loading and unloading directly to the aircraft themselves. Promotional brochure, The Chrysler Corporation. ca. 1966. [Author's collection].

Kansas City's new airport, designed to cope with the increased feeder traffic brought about by the Jumbos, featured four circular terminals that balanced automotive turning radii with jet wingspans. The result was an exaggerated set of traffic roundabouts with a thin, undulating architectural strip mediating the two vehicular scales [Fig. 11]. Tampa, on the other hand, limited the automobile's intrusion into its new airport in 1974, placing its check-in facilities underneath a multi-story parking garage and distributing passengers back across the looping entry highway by light rail to aircraft gates. Liberated from the curbside luggage and ticketing facilities, Tampa's aircraft gates proved efficient, but the counter-intuitive nature of the centralized pavilion and the graceless entry to the ticketing basement by elevator from the car park were disorienting in their own right [Fig. 12]. Other airports including Houston and Cleveland proposed similar rail systems, usually monorails with forms derived from supersonic aerodynamics, but traveling at more pedestrian speed.

Nowhere were the architectural effects of Jumbo-ready urban infrastructure so dramatically manifested as at "DFW" in Texas, completed in 1973. DFW, completed between Dallas and Fort Worth in 1973, was among the late 20th century's greatest urban precincts and infrastructural monuments, an incomprehensibly-scaled megastructure that represented the wholesale systematization of the airport [Fig. 13]. Its diffusion of spatial norms into the ether of freeway and aviation was Jumbo Architecture's most extreme replacement of architectural space with systematic vehicular infrastructure—a logic only visible from the air. DFW was built around a new freeway that ran through the airport's center spine, with access to parking and terminals taking the forms of left-exiting offramps. The new sixteen-lane freeway competed against the airside's vertigo-inducing open space, hinting that the terminal, trapped between these two concrete networks, no longer deserved the monumental status accorded to it in the previous jet age, now being just a thin membrane between two forms of vehicular transportation. At DFW, this passenger osmosis occurred in a landscape with no discernible scale whatsoever, the airport occupying a land area the size of Manhattan, transfer between terminals accomplished by subterranean light rail, and the freeway 'front doors' flashing by at 65 mph [Fig. 14].



AIR VIEW OF KANSAS CITY INTERNATIONAL AIRPORT

FIG. 11 Kansas City International Airport. Kivett and Myers, 1972. Contemporary postcard [Author's collection].



FIG. 12 Tampa International Airport. Reynolds, Smith, and Hills, 1971. Contemporary postcard [Author's collection].

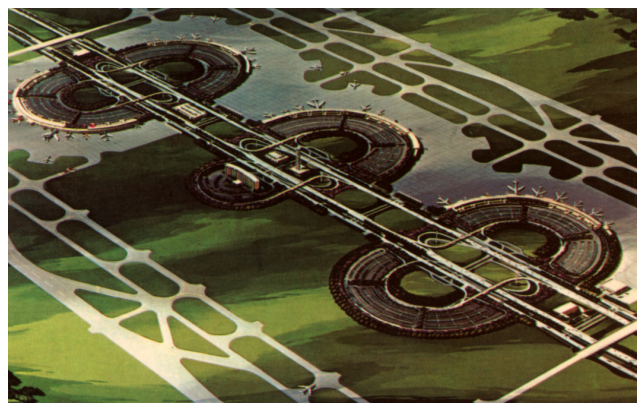


FIG. 13 Dallas-Fort Worth International Airport. HOK, 1973. Contemporary postcard [Author's collection].

DFW separated incoming and outgoing passengers through a complex floor plan rather than the more traditional sectional division, reducing the terminal's scale to a single story and moving passenger drop off to within 100 feet of aircraft boarding [Fig. 15]. The airport's experience, however, was not so simple, as departing passengers had to find their way around baggage claim areas to check in desks, and then walk along the security perimeter to security checkpoints, often doubling back once airside to find their gate along the arcing, single story terminal concourse. As with most other airports in the 1970s, DFW employed an extensive graphics program to orient passengers, creating an informationally rich though experientially impoverished visual environment in which the freeway's counterintuitive left exits were duplicated on a smaller scale by maze-like circulation patterns within the terminal.¹⁴ To this day, it is difficult to experience DFW without thinking that Archigram were too conservative in their estimates of the discentering effects of advanced technology. It is, as one contractor described it, "one sumbitchin' airport."¹⁵

While press reports detailed DFW's extraordinary scale and intricate mechanisms as a Texas-sized triumph over the problems of servicing 747s, the reality upon its opening suggested that the problem's scale could not be solved even with an ingested land area the size of a county. Writing in *Esquire* in 1976, Molly Ivins reported:

D/F.W.'s designers were understandably defensive. One airport official said, "So Ada Louise Huxtable isn't going to like it. So to hell with her." Tom Sullivan, DFW's first executive director, said, "We did not set out to build a monument. This is a tool." That was the general tenor of the defense: DFW might not be a thing of beauty, but, by God, it would work. But then it opened in January, 1974, and even that thesis got trashed.¹⁶



Dallas, Fort Worth International Airport

FIG. 14 One of six planned terminals that formed a security and circulatory membrane between automotive and aeronautical infrastructure at DFW. Contemporary postcard [Author's collection].

14. How the airport combines colossal size with total passenger convenience is an interesting story of innovative planning and modern technology; *Introducing the Airport Designed for People: Dallas/Fort Worth Airport, promotional brochure (Dallas/Fort Worth Airport Authority: 1973).*

15. Molly Ivins, "Biggest Public-Works Project Since the Pyramids," *The New York Times Magazine*, September 16, 1973, 16.

16. Molly Ivins, "The Worst Airport in America is Not O'Hare," *Esquire* 85 (February 1976): 101.



FIG. 15 Dallas-Fort Worth International Airport featured a sectional circulation strategy designed to place cars and aircraft in close proximity—a desire that was never fully realized as security and baggage requirement overwhelmed the simple diagram. Informational brochure, Dallas-Fort Worth Airport, ca. 1975. [Author's collection].

DFW's transportation network, "Airtrans," took years to become operational. It was the subject of workers' strikes and breakdowns that left passengers stranded a dozen or more meters above the ground, watching their departing flights, for hours at a time. For Ivins, however, these mechanical issues weren't even the major problem with the airport:

So there's DFW: it functions; the p.r. department will be more than happy to tell you how many passengers and planes it has processed. It was born, but it would be a lie to say that it lives. It is a spirit-killing place. Thirteen miles of beige concrete will do in anyone's joie de vivre. Douglas Davis was too kind when he called it 'a Los Angeles of transportation.' It hasn't the faintly decadent funkiness of LA. It's the apotheosis of every interstate, every Howard Johnson's, every Thruway Hot Shop, every concrete and plastic excrescence that has ever afflicted this country.¹⁷

17. Ivins, "The Worst Airport," 101.

Terminal City

If the 747's most extreme spatial effects were found at the cabin interior and urban network, the middle scale of the terminal building itself also provided troubling architectural issues. Jet age architects had reveled in the 707's sleek lines and ethereal suggestions, creating transparent monuments such as the Pan Am terminal and sculptural celebrations of flight's new accessibility such as Saarinen's TWA building. The functional pressures of scale brought about by the gargantuan Jumbo Jets, however, cast aside such formal and spatial experimentation. The Jumbo terminal was a circulatory problem, demanding architecture derived more from analysis and systemic planning than from any coherent experiential pretense. If the aircraft cabin was a dislocating environment for the human body and psyche, and the infrastructural network surrounding the airport an evisceration of urban scale, the 747 terminal represented an implosion of architectural values and norms into a data-filled, antiseptic, anti-spatial field. Here, in terminals around the world, anthropomorphic space was trumped by the economics of flow and control.

This effect was most notable at terminals that had to be retrofitted to handle the new aircraft. Most distressing was the Pan Am building at Kennedy, which was overhauled eight years after its initial opening.¹⁸ The jetways that had been designed for 707s were too small to handle 747s, and the passenger spaces in the Pan Am terminal's airy interior could not contain the crowds they disgorged. Confined by terminal buildings on both sides, Pan Am built a new wing out into the tarmac, retaining the concrete parasol as an entry pavilion for a new "Worldport," with six 747-sized gates, additional room for smaller, feeder line jets, check in facilities, and rooftop parking [Fig. 16].¹⁹ While efficient, the new structure was disorienting, forcing drivers to pass underneath the original terminal and up a steep ramp to drop passengers off in the center of the addition. The

18. See Thomas Leslie, "The Pan Am Terminal at Idlewild/Kennedy Airport and the Transition from Jet Age to Space Age," *Design Issues* 21, No. 1 (Winter 2005): 63-80.

19. Richard Witkin, "Pan Am to Expand its Terminal," *The New York Times*, November 14, 1968.

site's tight geometry forced designers to take a simple linear scheme and fold it in on itself, leaving passengers with no clear sight lines through the terminal. Its complicated section meant that disembarking passengers might end up having to walk across the terminal to descend to baggage claim, pass through a maze-like immigration and customs facility deep in the bowels of the building, and then cross back to be picked up in a subterranean cab rank—directly beneath the aircraft they had just left. Despite an extensive graphics program and a complimentary map (titled “Worldport Made Easy”), jet-lagged passengers were faced with a labyrinth of fluorescent-illuminated, low corridors jammed with graphic information but with no clear legibility.²⁰ While Pan Am suffered the worst of these renovations, Kennedy’s TWA terminal did not escape either, its facilities expanding into a neighboring, functional terminal. Other airports scrambled to assemble temporary solutions to new demands for customs facilities and baggage handling, including O’Hare, which converted its original terminal building and then, in the mid 1980s, shoved international arrivals into a retrofitted lower level of its parking garage while a new building was designed and built.

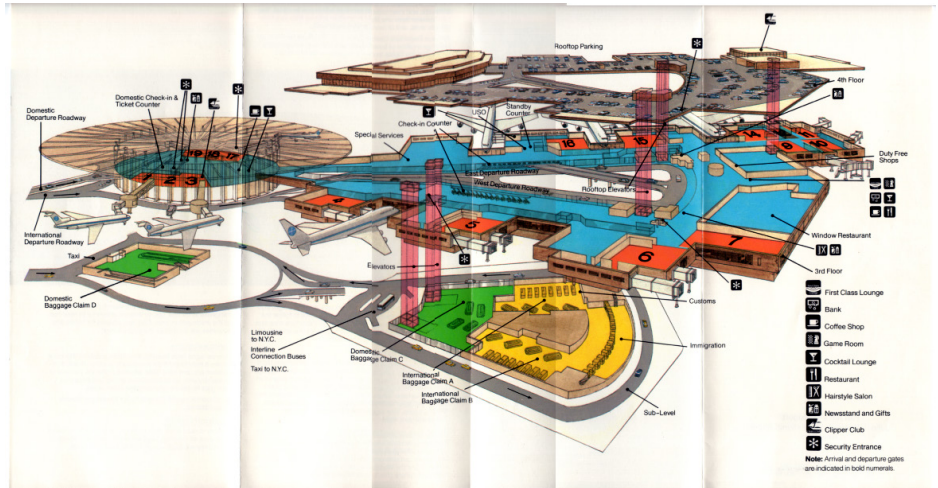


FIG. 16 Pan Am’s “Worldport Made Easy.” Informational Brochure, Pan American Airways, ca. 1973. [Author’s collection].

Immigration and security issues meant that international passengers arriving on 747s had to run a gauntlet of official bureaucracy. Even domestic flights, however, were soon subject to intensive security screening after hijackings and a bombing at La Guardia Airport in December 1975 that killed 11.²¹ The transparency and legibility that had been proffered by earlier terminals gave way to an emphasis on the mechanisms of passenger processing, with terminals at Dallas/Fort Worth and Kansas City offering functional diagrams that separated ‘sterile’ operations of baggage handling and passenger boarding from public, uncontrolled areas. It was, perhaps, no coincidence that the ‘airy prettiness’ of the 1960s gave way, in terminal design, to fortress-like megastructures that broadcast their origins not in the free flow of tourists but rather in the rigid processing and classification of passengers who now each represented a potential security threat.

The results of this new emphasis were terminal buildings that eschewed open spaces, clear sight lines and easy access, providing instead planometric and sectional barriers, divisions and efficient though mute circulation through security checkpoints, immigration controls and

20. See Leslie, “The Pan Am Terminal at Idlewild/Kennedy Airport,” 63–80.

21. “Bombing Damage is Put at \$750,000; Police Still Soliciting Clues to La Guardia Explosion,” *New York Times*, January 6, 1976, 36.

baggage handling. The crystalline visibility through airy curtain walls of the 707 era was replaced by an experiential and visual opacity in the Jumbo era, with concrete forms providing a sterile zone for loading and unloading, in many cases reminiscent of military bunkers emerging from the acreage of surrounding concrete aprons [Fig. 17].

Conclusions—Architecture in the Baroque Machine Age

While the connotations of the 747 were troubling, the evaporation of human scale and experience was seen in a favorable light in the 1970s. In particular, the overwhelming scale of the aircraft and its circulatory tendrils into the city played into the era's fascination with technology's sublimation of human scale and experience. The gantries of Cape Canaveral, and the cramped capsules that they threw into the void of space were only the most extreme examples of the era's technological fetish, which took the frightening implications of applied science and turned them into totems. In particular, popular culture adopted wholesale the perversely pleasurable dehumanization of the 747, a sensibility that also infatuated architects of the era.

The gargantuan size of the jumbo jets led to films and books keenly exploring their potential for disaster on greater scales than previously known. While the airline crash had been a staple of news reporting since the disintegration of several Comet jets in the 1950s, the scale of tragedy made possible by the 747 was irresistible to bloodthirsty journalists and savvy film producers. The first

documented accident involving a Jumbo occurred in July, 1971, when a departing flight struck a runway light in San Francisco, injuring 18, while the first fatal crash of a 747 occurred in Kenya in 1973. But the potential for a colossal disaster was omnipresent, and 747s featured in the popular "Airport" films throughout the mid-1970s, in which they were put through an increasingly improbable series of nightmarish events. Less popular but more provocative was the science fiction of J.G. Ballard, whose 1973 novel *Crash* featured an automobile accident fetishist who circled highways and access roads around Heathrow Airport seeking out violent, staged scenes of vehicular carnage. While Ballard's "technological pornography" proved unreadable for the general public, his subtler fiction of the era focused on the dislocation of the human body and psyche proffered by Jumbo technology, taking as its sites the high-rise apartment tower, the airport and the archaeological site of Cape Canaveral. Space travel



FIG. 17

Tampa International Airport

Tampa International Airport was one of many that adopted light rail to overcome the vast distances required by large-wingspanned, high-capacity aircraft such as the 747. Contemporary postcard. [Author's collection].

formed the stage set for Stanley Kubrick's epochal essay on technology as a dehumanizing force; the antiseptic interiors of his 1967 film *2001: A Space Odyssey* echoed themes of alienation and post-human artificial intelligence.

If films and fiction explored the grave effects of 747s and their associated technical artifacts run amok, lighter fare still examined the idea of a technological world in which human bodies and emotions were secondary to the drama and visual impact of gargantuan aerospace vehicles and their supporting infrastructure. As early as 1965, *Thunderbird 2* foretold the hyperfunctional shape of the 747 itself, presenting a vehicle so scaleless, so bizarre that it seemed to operate under a different set of physical laws. The dramatic appearance of vehicles and aircraft whose functional parameters transcend our ordinary understanding of structure, aerodynamics, and operations was a constant theme in the science fiction of the 1970s. The spinning space stations and antiseptic cabins of Stanley Kubrick and Arthur Clarke's *2001: A Space Odyssey* and the conceptual heir to the 747s, the Imperial Cruisers of the *Star Wars* series, represented machines and vehicles that offered such complex operations that their forms were counterintuitive or, at the least, unfamiliar—derived from principles of flight or construction far removed from our day-to-day experience or intuition [Fig. 18]. The scales involved and the lack of immediate comprehension marked these proposals as machine-age baroque: grotesque extensions of fundamental principles beyond their inherent sensibility.

The neurosis of the era is reflected best by the architectural cousins of the 747 and its accoutrements. The 1970s saw the first realizations of megastructural schemes that had been polemically proposed in the previous decade. Only, perhaps, with the cultural license of the jumbo jet were such mechanically sublime structures such as Centre Pompidou or Place Bonaventure possible. These relied for their architectural effects on aesthetics of bloated technology, the evaporation of the human in the face of our own extensions, the triumph of the tools over the makers and the odd, decadent gratification that comes from such overwhelming scale. Like the 747, their popularity derived from their trans-human scale, and their formal and spatial tastes of space age vastness over jet age beauty.

Faced with the greater likelihood of the species' evaporation in the face of unchecked environmental exploitation, the Jumbos hold a more ambivalent status with forty years' hindsight. Their emphasis on scale alone goes against the mantras of sustainability and balance that occupy

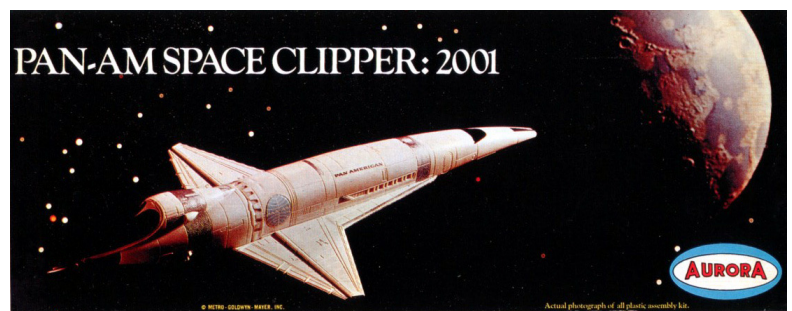


FIG. 16 The sublime scale and hyper-functional appearance of aerospace vehicles and architecture inspired numerous pop culture responses. Stanley Kubrick's *2001* in particular responded to the antiseptic interiors and evocative hardware of the Jumbo era. Retail package, Aurora Plastics Corporation, ca. 1969. [Author's collection].

our attitudes toward technology, and the dystopian possibilities inherent in the energy-intensive lifestyle represented by the 747 are all too real. Recent developments have rendered the Jumbo as obsolete as its jet-age predecessors: the debut of the 800+ passenger Airbus A380 in 2005 dwarfed even the largest, 500-passenger variants of the 747. More pervasive developments, however, have followed the smaller jets that came in the 747's wake [Fig. 19]. As jet technology has become more reliable, twin-engined aircraft have proven safe and suitable for intercontinental travel, and the dispersion of international air routes to secondary and even tertiary airports led in the 1990s and early 2000s to a change in airline's emphasis to smaller, more agile planes. Both Airbus and Boeing have responded with more efficient, longer range twin-engine jets such



FIG. 19 The Airbus A380. Photograph by the author.

as the 777 and the A350, which burn up to 20% less fuel per passenger.²² Both United and Delta Airlines have announced that they will phase out 747 flights by the end of 2017, and Boeing has hinted that it will cease production of the 747 by the end of 2019 as airlines switch to smaller, more efficient alternatives.

The impact on terminal design has been profound; where Jumbo terminals brought vast networks of landside circulation to fewer discrete - and crowded - docking ports, the dispersion of more, smaller aircraft has led to layouts like Detroit's or Kansai's; long, linear structures that eschew the Worldport's complex tangle for vast, clear spaces with simpler, more legible layouts. In Detroit's case, over one hundred gates are laid out in a one-mile long terminal, accessible by an indoor tram that shuttles back and forth every three minutes. While airside operations remain immense, the result has been a humanizing of the landside experience, albeit one more fraught than ever with concerns for security. Just as the Jumbo era's sublime scale replaced the 'airy prettiness' of the jet age, the 787's era has refined the steroidal, anesthetic experience of the 747 with more visceral and graspable physical sensations, and a pervasive electronic atmosphere of control and surveillance. But these aircraft and their antiseptic terminals provide their own glimpses of our contemporary and urban subconscious, suggesting that the aircraft's 'indictment' remains powerful and valid eighty years after Corbusier first pronounced it.

22. Julie Johnson and Michael Sasso, "Boeing Jumbo-Jet Era Ending in U.S. as United Retires 747 Fleet," *Bloomberg Technology*, January 11, 2017.