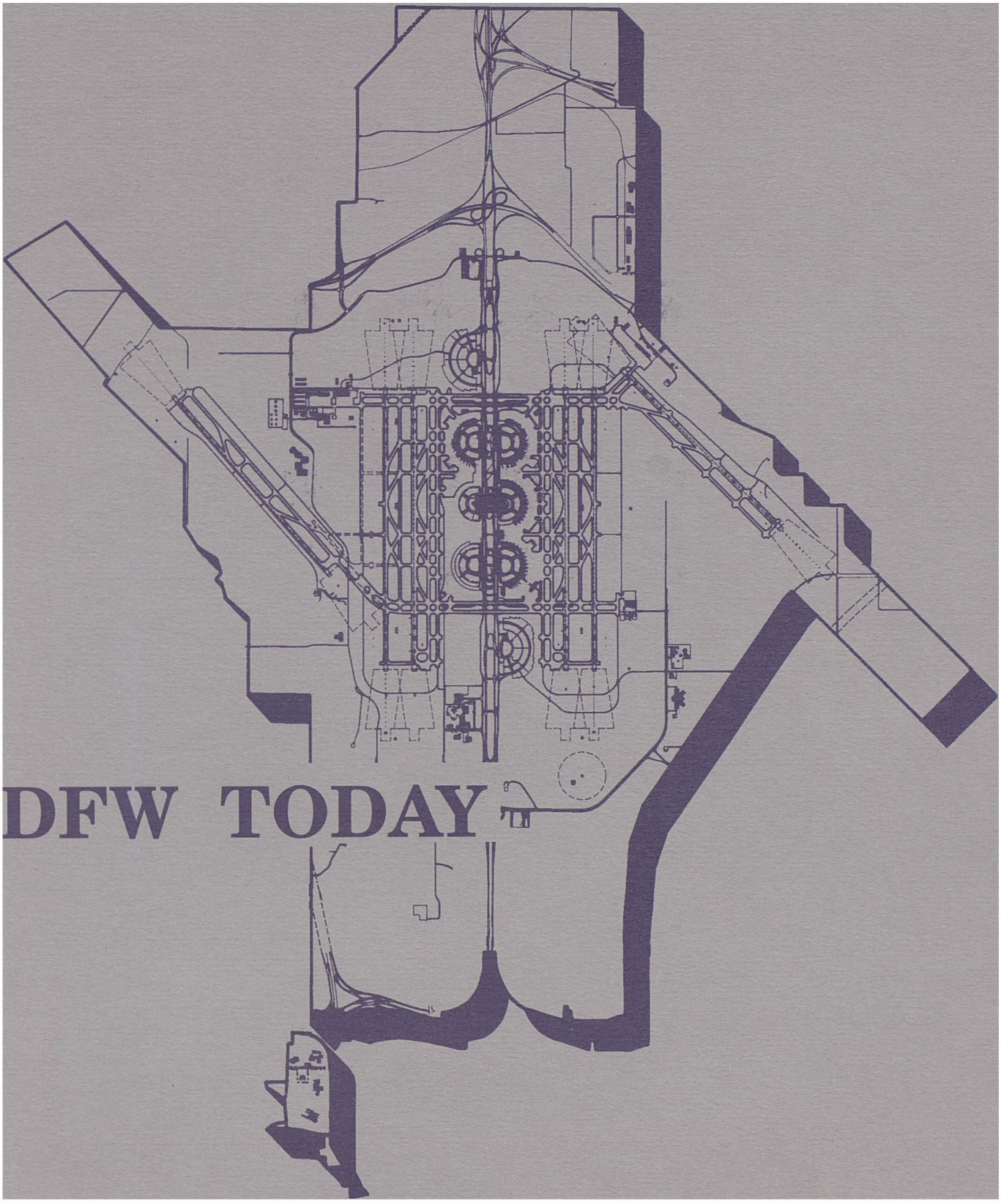
Dallas Fort Worth International Airport

DFW 2010 AIRPORT DEVELOPMENT PLAN

Final Report Summary

June 1991



DFW TODAY

DFW

Airport Development Plan

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A New Plan

The Airport Development Plan (ADP) is an instrument of Dallas/Fort Worth International Airport Board policy - an expression of the goals and objectives of the Board and a means for achieving those goals. It is the successor to the 1967 Master Plan which defined the initial development of Dallas/Fort Worth International Airport (DFW). That plan could not have foreseen the dramatic changes that would affect the airline industry in the 15-year time period after the Airport opened. Growth stimulated by these changes was accommodated by significant changes in the usage of existing facilities from that which had been envisioned.

Airline Deregulation

Deregulation of the airline industry in 1978 was at the heart of the explosive growth and changes in facility usage experienced at DFW in the 1980s. Two basic measures were responsible for changing the airlines from regulated public utilities to free-enterprise business entities:

- Airlines could fly wherever they chose without governmental restriction.
- Airlines could set fares and schedules based on competitive marketing decisions.

A Nation of Hubs

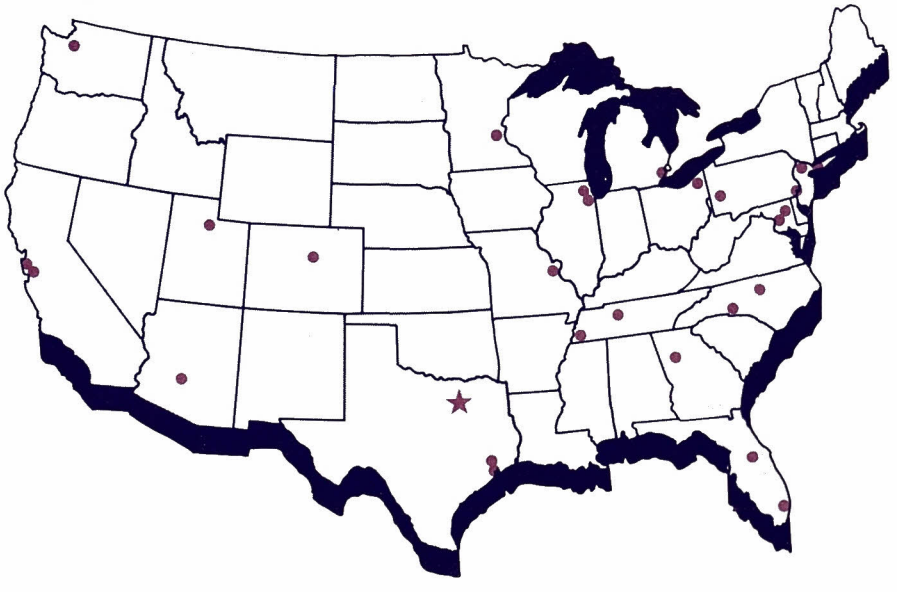
Under deregulation, the airlines turned increasingly to hub-and-spoke route systems as the most efficient and productive use of their assets, and a Nation of Hubs was born. With this new air transportation system, the airlines must operate profitably in order to generate the capital to invest in new aircraft, facilities, and equipment. It is the deployment of these new assets in scheduled service which determines the air transportation system capacity.

The major beneficiaries of new system capacity will be the communities whose airports are able to provide the physical facilities to sustain the growth and operation of airlines' hubs. These hubs provide far more scheduled air service than is economically possible on the basis of local populations. Accordingly, communities with airline hub airports gain significant direct and indirect economic benefits in the form of added employment and additional purchases of goods and services. Also, abundant air service acts as a growth catalyst for existing and new community businesses.

DFW's Growing Role

DFW has become a leader among world airports during the 1980s. However, for the Airport to remain at the forefront, it must grow and change with the industry it serves. The DFW Airport Board initiated the ADP in order to prepare for the future. With implementation of the ADP, the Airport should continue to expand its contribution to the Metroplex economy as one of the world's truly great air transportation facilities.

A Nation of Hubs



Replace Outdated Master Plan

The Dallas/Fort Worth International Airport exists for the benefit of air travelers in the DFW Metroplex and the nation as a whole. It is an asset of great economic value to the North Central Texas Region. To fulfill its mission, the Airport must perform the following:

- Enhance the efficiency of aircraft operations
- Provide terminal facilities that best meet the requirements of the airlines
- Provide for the comfort and convenience of passengers and visitors
- Minimize the airlines' cost of operations at the Airport
- Ensure payment of the Airport's bond indebtedness

The 1967 DFW Master Plan has reached the end of its useful life. The plan provided direction for the Airport over the last 20 years and served the Airport well. A new plan is necessary to establish the Airport on a firm foundation for growth. The ADP responds to this need.

Provide a Basis for Development Decisions

The Airport Development Plan is the foundation for the future of DFW. It replaces the 1967 Master Plan as a more flexible basis for future development decisions, particularly in the terminal area. The ADP will enable the Airport to provide for the growth of its airline hubs by meeting the requirements of the hub airlines and non-hub airlines.

Specifically, the ADP provides a flexible plan to maximize overall airport capacity through the year 2010. The airside portion of the Plan is clearly defined in scope and concept, and should be implemented to meet the increasing air traffic demand. The landside portion of the Plan can be adjusted to accommodate any needs and plans of the airlines at DFW, other airport users, local and state agencies, and the Airport Board.

Create the Framework for a Continuous Planning Process

The ADP provides all necessary information essential to allow the Airport Board to make future decisions about the implementation of new facilities. It details expected demand levels and identifies the facilities to accommodate that demand.

The ADP requires planning, programming, design, and construction investment decisions to be made and reviewed in conjunction with the airlines and the Federal Aviation Administration (FAA).

Facilities Development Program

The Facilities Development Program is a dynamic program detailing timing of improvements, funding sources, and payment methods. The purpose of the Facilities Development Program is to outline and prioritize all of the improvement projects of the Airport in three development phases. These phases are triggered by forecasted levels of demand. Change in growth demand may either accelerate or slow the implementation of each phase.

Foster Improved Communications and Community Relations

Under the continuous planning process and management plan of the ADP, communications with the airlines, the FAA, and the community will be enhanced. The ADP has set the tone for future coordination.

Consultation with the airlines has resulted in improved understanding of how the Airport and the airlines can work together for future expansion. In addition, the airlines are now aware that the ADP can enhance future profitability through operational efficiency.

It is clear that DFW competes directly with other airports for development funding from the FAA. Presentations to the FAA have stressed the capability of DFW to provide a higher level of potential system capacity per development dollar than other airports. The Airport Board must continue these discussions to ensure priority funding allocation, allowing the Airport to accomplish its mission.

The ADP has also clearly demonstrated the economic benefits of DFW to the Metroplex. These benefits must be continually reevaluated as the airport grows. Future coordination should emphasize the beneficial economic aspects of the Airport, as well as solicit community support to allow the Airport to increase its benefits to the Metroplex.

The Airport Development Plan was created in three parts:

- Part 1 - Needs
- Part 2 - Solutions
- Part 3 - Implementation

Part 1- Needs

The needs analysis began with a data collection effort to determine the facilities available at DFW and the demand on those facilities. Analysis of the data produced an assessment of existing system operations and the resulting system impacts on the community. A demand forecast based on historical activity and the expected national and regional economic growth was prepared.

The initial ADP focus was on the development of landside improvements to meet perceived needs in the functioning of the terminal and ground transportation systems. Previous airside analyses by the FAA had concluded only two new commuter runways would be needed. With the use of the SIMMOD simulation model, the airfield and airspace system would be examined to validate runway requirements and to establish the timing of their development.

Part 2 - Solutions

During Part 2, an intensive effort was devoted to the development of the FAA's proposed new Metroplex Air Traffic System Plan. This was necessary for airside simulation analyses in conjunction with the DFW airfield. The results of these analyses indicated the need for new air carrier runways.

The other elements of the airport were also subjected to demand/capacity analysis in Part 2, based on the projected demand for the year 2010. These analyses determined the additional capacity requirements for the following facilities:

- Apron/Gate Areas
- Terminal Spaces
- Roadways
- Transit Systems
- Parking Facilities
- Utilities

Alternatives were evaluated and a program of recommended improvements was assembled. The overall cost of the program was determined, and a phasing plan for its orderly implementation prepared. Development impacts, consisting of economic impact and noise impact, were also analyzed.

Part 3 - Implementation

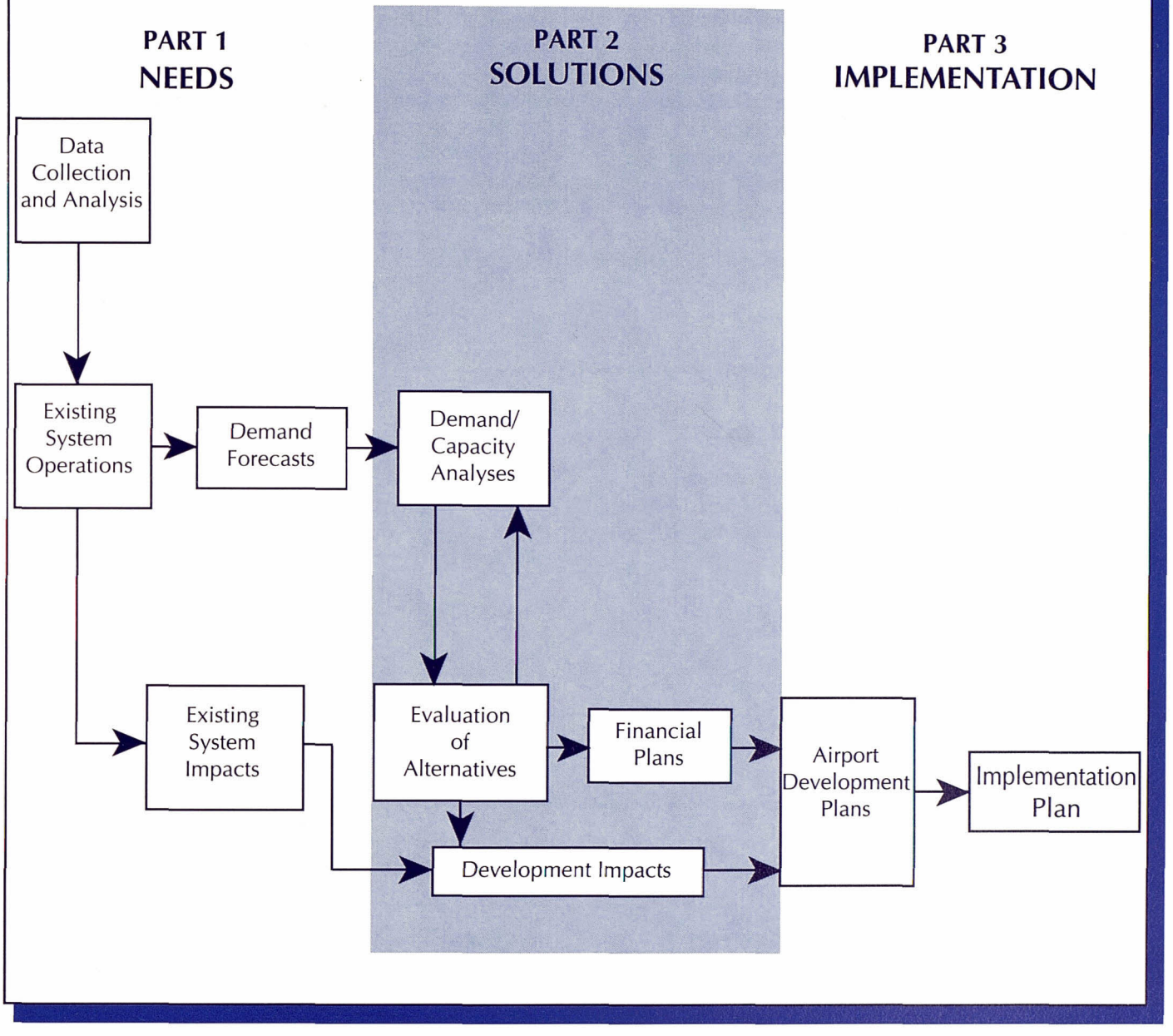
The final step was to develop a program for the implementation of the recommended improvements. The resulting management plan provides the Airport staff with tools that will permit the ADP to be periodically updated under the continuous planning process. These tools give the Airport the ability to program improvements in response to changes in facility usage. They include the following:

- A Working ADP Document
- Computerized Airport Layout Plans
- An Aviation Demand Forecasting Model
- A Financial Analysis Model
- A Land Use Plan and Policy Manual
- An Economic Impact Model

The outcome of the ADP planning effort and the future success of the ADP management plan depends on the coordination established with many interested parties, including the following:

- Federal Aviation Administration
- Major Airline Users of DFW
- North Central Texas Council of Governments
- Aviation Departments of the Cities of Dallas and Fort Worth
- City and County Governments in the Metroplex
- Community Groups and Interested Individuals
- Aircraft Manufacturers

ADP Methodology



Aviation demand forecasts were developed from statistical analyses of socioeconomic trends and historic aviation trends experienced in the Metroplex area and across the nation. These analyses projected aviation activity for a 20-year planning horizon that spans the years 1990 through 2010. The resulting projections were used to identify future airport facility requirements.

Base year for the forecast preparation was 1987. Principal assumptions used to derive the activity figures included the following:

- Strong growth potential for population and employment in the Metroplex.
- Larger aircraft and higher lead factors will characterize airline activity.
- Saturation of smaller markets may restrain the growth of commuter airlines.
- DFW Airport would continue to serve two airline hubs.
- Connecting passengers would increase as a percentage of total passenger enplanements.
- An all-cargo airline hub would be established.

The forecasts indicate that total aviation activity at DFW Airport could be expected to double by the year 2010. By that year, passenger enplanements would exceed 52 million. To serve those passengers, more than 1.2 million aircraft operations would occur.

Peak hour activity in the year 2010 is also anticipated to double. Airport runways would need to accommodate over 300 landings and takeoffs during the most active hour. The terminal population would increase by 15,100 passenger enplanements.

DFW Airport Forecasts

Forecasts	Actual 1987	1990	Forecast* 2000	2010
Annual Operations:				
Commercial Aircraft				
Air Carrier	484,961	511,400	701,000	951,600
Commuter	99,587	138,000	162,400	166,700
Large All-Cargo	8,706	13,400	24,000	34,700
Small Cargo	9,495	15,800	28,800	41,600
Subtotal Commercial	602,749	678,600	916,200	1,194,600
General Aviation	20,746	20,000	20,000	20,000
Military	1,265	1,400	1,800	2,400
Total Annual Operations	624, 760	700,000	938,000	1,217,000
Annual Passenger Enplanements				
Originations	7,687,717	9,536,000	14,202,000	19,132,000
Connections	13,236,936	14,338,000	22,312,000	32,996,000
Total	20,924,653	23,874,000	36,514,000	52,128,000
Peak Hour Activity:				
Operations	149	177	237	307
Enplanements	6,040	6,900	10,600	15,100

* Base Year 1987

Need - Capacity

By 2010, DFW will need to accommodate over 1.2 million aircraft operations. During peak hours, 307 aircraft operations are expected, of which approximately 85 percent will be narrow body and wide body air carrier jet aircraft. Air carrier operations spurred by continued growth of the two hub airlines will nearly double by 2010. Commuter aircraft operations in 2010 are projected to increase by more than 50 percent over 1987 operation levels, but will constitute a smaller percentage of the total operations.

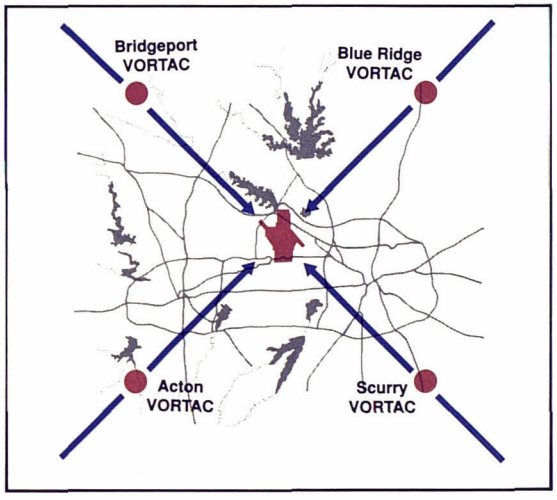
Solution - Provide New Airspace

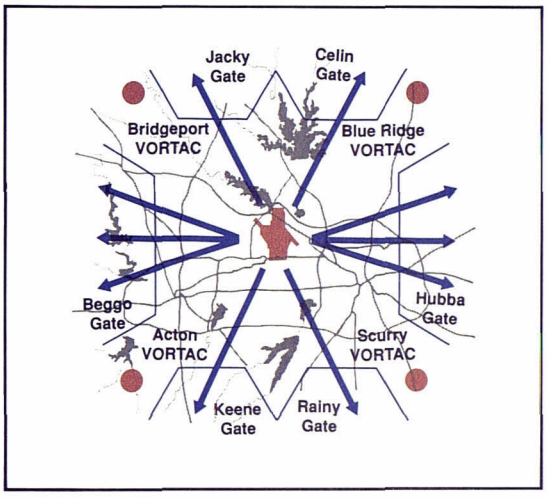
To provide additional capacity for DFW and the regional satellite airports, the FAA has developed a new "DFW Metroplex Air Traffic System Plan." The Plan consists of additional air navigation facilities and revised air traffic control procedures including the following:

- Expanded Terminal Area Airspace
  The four "cornerpost" VORTACs which form the present Metroplex airspace boundaries will each be relocated 42 to 58 nautical miles from the center of terminal airspace.

Expanded Terminal Airspace

Existing:





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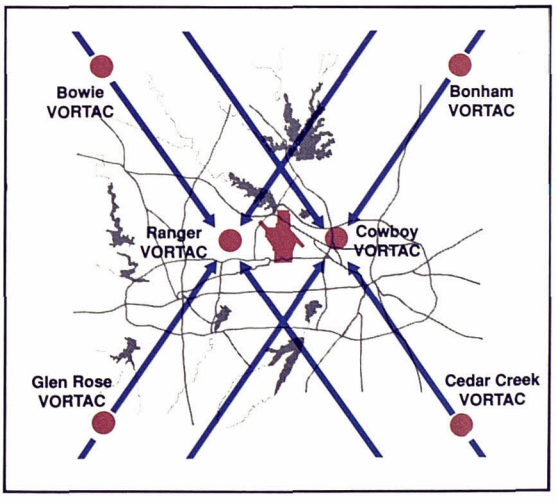
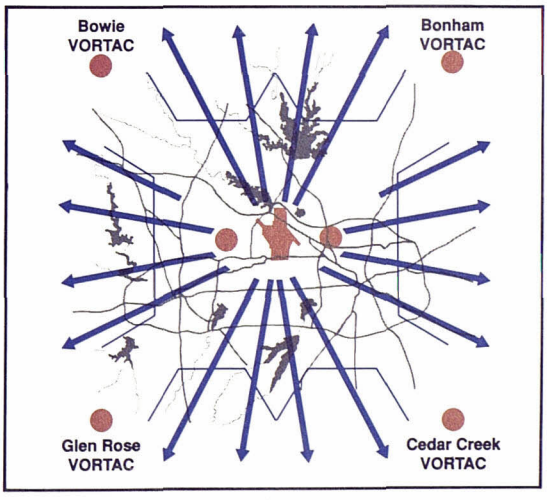




- Additional Navigation Facilities
  Two new "centerpost" VORTACs will be located to the east and west of the airport. In addition, new technology radar systems will be added, along with a new pair of air traffic control towers.
- Parallel "Demand Responsive" Arrival Routes
  Separate arrival routes will be established across the cornerposts using the new centerpost VORTACs, effectively doubling the arrival rate across each cornerpost for air carrier traffic and allowing aircraft to be routed to either side of the Airport.
- Separate Turboprop Altitudes
  A third traffic altitude level for turboprops will be established between the levels designated for higher performance turbojet traffic and lower performance piston-engine traffic.
- Additional Departure Routes
  The number of departure airspace "gates" will be expanded from 10 to 16.
- Quadruple IFR Arrival Streams
  This procedure will provide up to four simultaneous IFR arrival streams to DFW compared to the current maximum of two.

The Metroplex Air Traffic System Plan provides for expanded terminal area airspace, new arrival and departure procedures, and navigational and air traffic control facilities that can support aviation growth at DFW, and all other airports in the Metroplex through the year 2010 and beyond.

Solution - Construct Two New Air Carrier Runways

The airside needs analysis indicated that additional runway capacity is required to meet future demand. A simulation analysis using the FAA's SIMMOD quantified the aircraft delays resulting from different combinations of adding two new runways. Both air carrier and commuter runways were analyzed. The simulation results were then used to determine the potential delay reduction of each combination of runways.

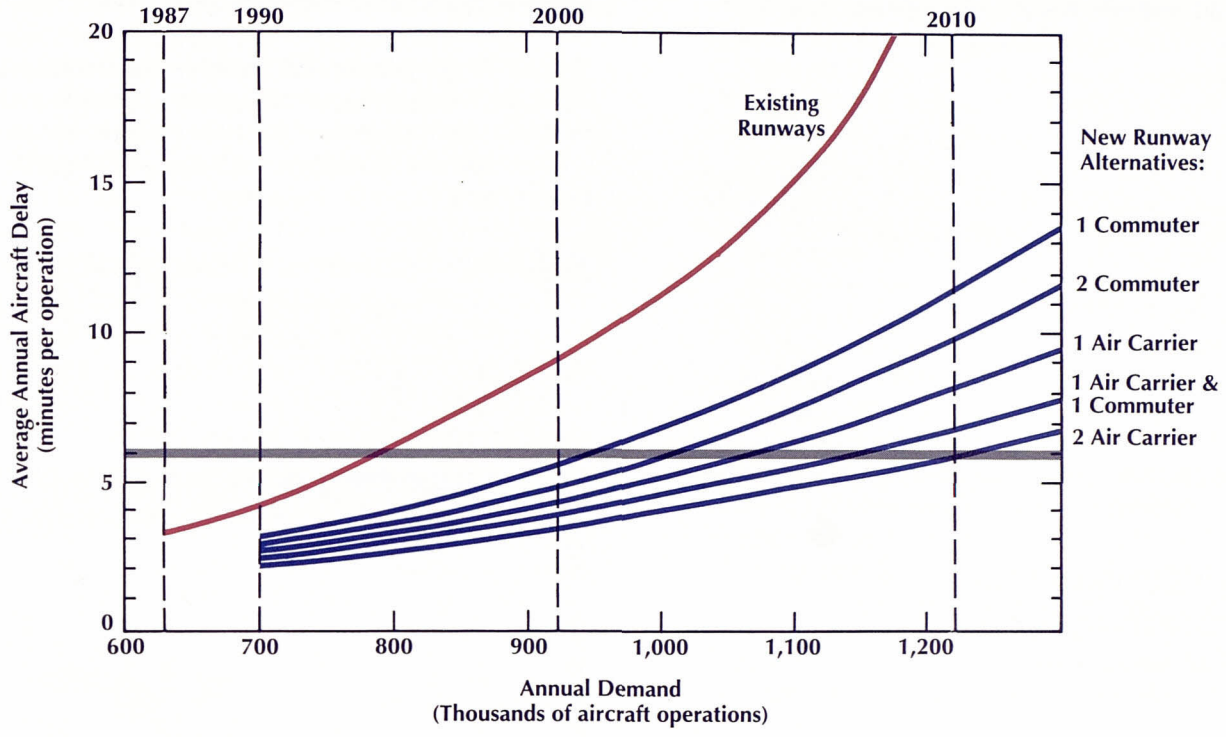
The Airport Board established a six-minute delay factor as the level of service to be afforded the airlines. A single new air carrier runway will reduce future average aircraft delays more than would two new commuter runways. Two new air carrier runways will reduce average aircraft delays to less than six minutes in the year 2010.

Both new air carrier runways will be parallel to the existing north-south runways. Most importantly, the separation distances of the runways from the existing parallel runways will permit four simultaneous approaches under instrument weather conditions.

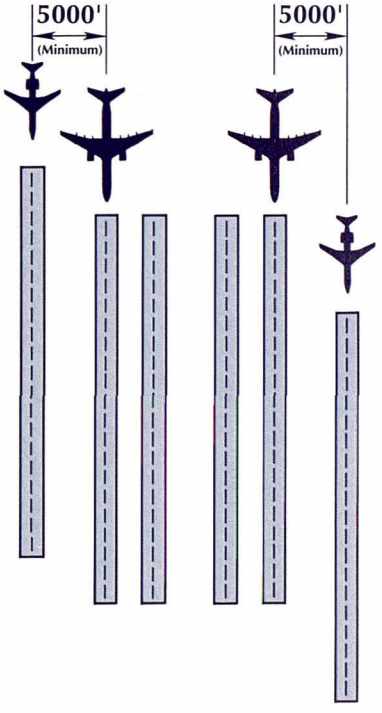
- East Air Carrier Runway
  Runway 16-34 East will be 8,500 feet long, located 5,000 feet east of the centerline of existing Runway 17L-35R. This runway will generate significant current delay savings and is, therefore, recommended for immediate implementation.
- West Air Carrier Runway
  Runway 16-34 West will be 9,760 feet long, located 5,800 feet west of the centerline of existing Runway 18R-36L. It will intersect the existing west diagonal Runway 13R-31L. The length is a function of the distance required south of the intersection to maximize north flow capacity in conjunction with takeoffs on Runway 13R-31L.

  This runway should be constructed in two phases. The first phase will result in an operational commuter runway north of Runway 13R-31L. The second phase consists of an extension through the intersection to the full planning length for air carrier operations.

Runway Facilities vs. Future Aircraft Delay



Quadruple IFR Approaches



Solution - Extend North-South Runways

The ADP includes extension of the north-south runways and their associated parallel taxiways northward by 2,000 feet. These extensions will provide two benefits:

- The queue of departing aircraft will be relocated away from the terminal area, reducing the congestion in front of the terminal areas.
- The additional runway length will permit increased payloads for departures to overseas destinations by current and future air carrier aircraft.

Need - Taxiways

DFW is deficient in taxiway capacity today. This is evident by congestion on the dual north-south taxiways between the runways and gates, and in the lack of aircraft holding areas. The projected increase in aircraft movements between the runways and gates will not be easily accommodated on the existing taxiways.

Solution - Create Triple Parallel Taxiways

The 375-foot separation between existing north-south parallel taxiways exceeds FAA requirements. Space for a third parallel taxiway between the runways and gates can be created by relocating the existing "inner" taxiways towards the "outer" taxiway.

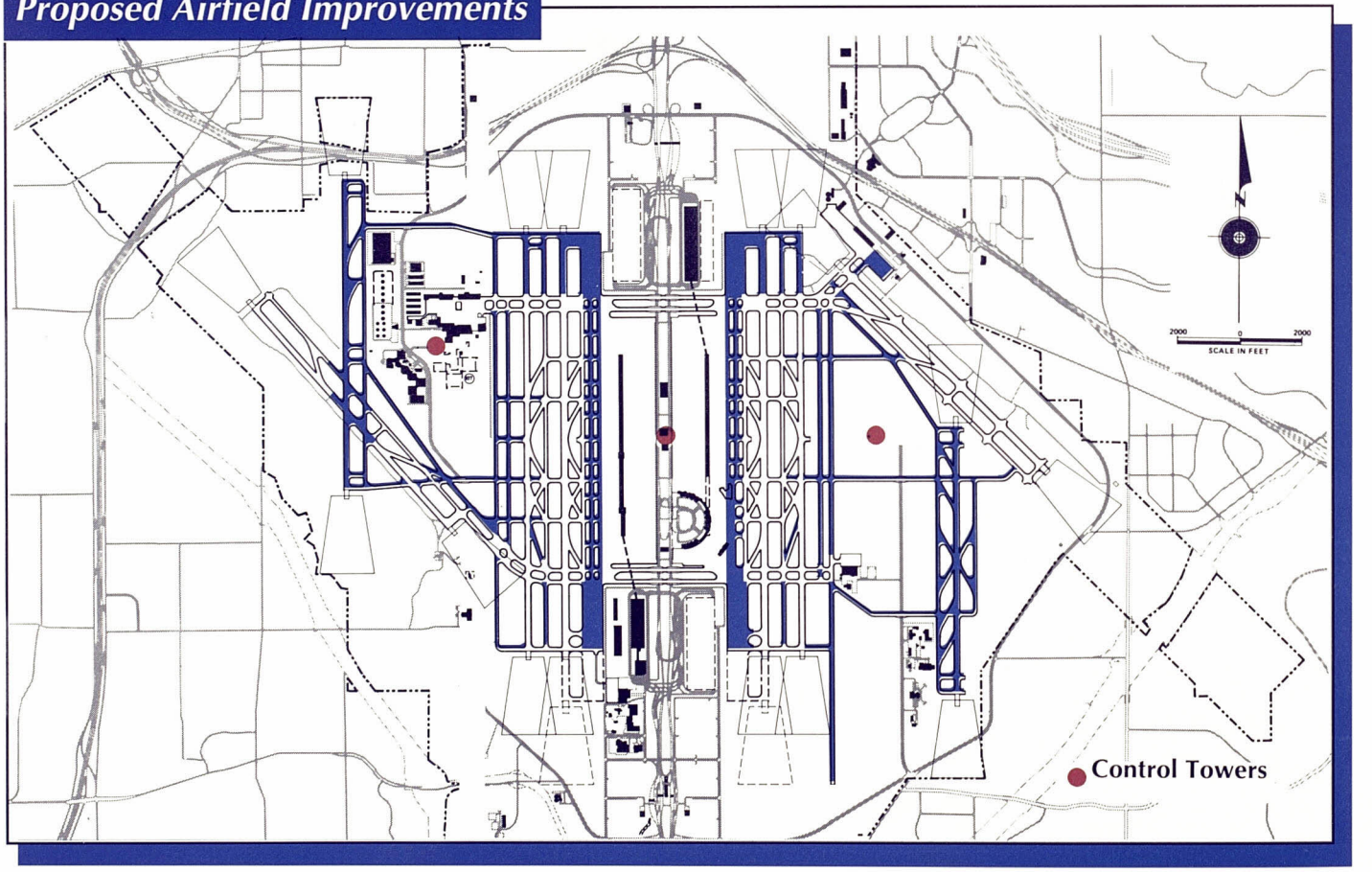
The resulting triple parallel taxiways will improve north-south aircraft flow by permitting runway traffic to use the outboard taxiway and terminal traffic to use the inboard taxiway. The center taxiway will expedite through traffic.

Solution - Construct Holding Aprons

The ADP recommends construction of new apron areas at the four ends of the north-south runways. These holding aprons are direct extensions of the triple parallel taxiways and will provide for queuing of departing aircraft and for holding of arriving aircraft.

The aprons will help minimize congestion in the terminal area. In addition, they will also help maximize runway departure capacity by permitting air traffic controllers to queue aircraft according to their airspace departure routings.

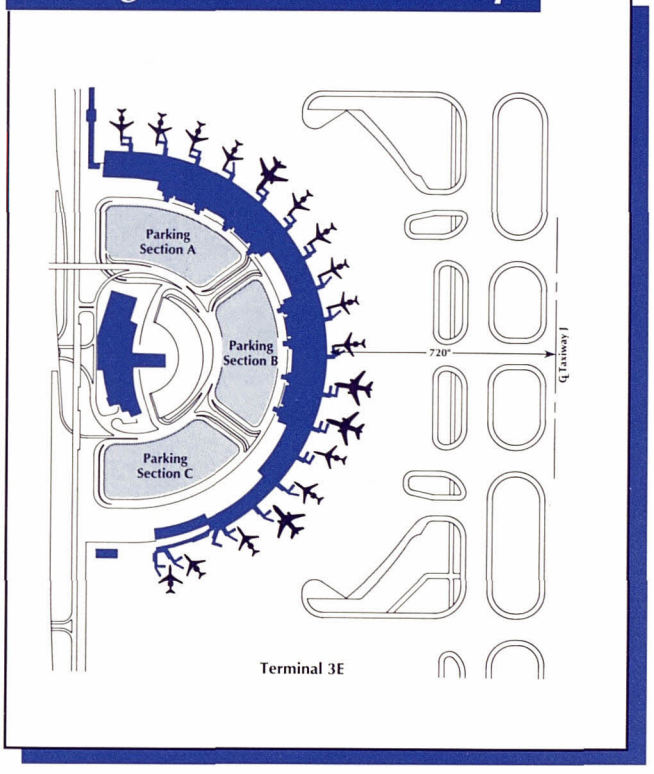
Proposed Airfield Improvements



The primary measure of airport terminal capacity is the number of aircraft gates which can be provided for scheduled flights. That capacity should be supported with space for passenger and baggage processing, roadways and curb frontage, and parking facilities for travelers, meeters/greeters, and employees.

The 1967 DFW Master Plan envisioned 13 unit terminals located north and south along International Parkway (the "spine road"). Six unit terminals were planned within the central terminal area bounded by the north and south crossover taxiways. Seven were to be developed north and south of the crossover taxiways. Each unit was to be a self-contained airport terminal facility, providing for all passenger, vehicular, and aircraft functions with a nominal capacity of 25 gates.

Existing Unit Terminal Concept



Need - Terminal Capacity

By 2010, gate capacity will be required for 52 million passenger enplanements. Between 170 and 200 concourse gates are needed to accommodate air carrier peak hour requirements. DFW currently has 115 aircraft gates.

- The existing "drive-to-the-gate" terminal concept is convenient for local passengers. However, future growth in passenger enplanements will overwhelm support facilities close to the gates, reducing overall convenience. Congested terminal roadways and full parking lots will become increasingly common as growth continues.
- The existing unit terminal concept cannot provide the capacity to respond effectively to the projected demand.
- Unit terminal gate capacities are insufficient for the development of large airline hub operations in one location.
- Unit terminals outside the crossover taxiways would present severe taxiway circulation problems and lengthy taxi distances to other parts of the airport due to their remote location.
- Six unit terminals (the maximum number which can be located within the crossover taxiways) cannot provide a sufficient number of gates to meet future demand. The maximum number of gates which can be provided is nominally 150.
- Forty percent of the central terminal area that could be devoted to aircraft gates is currently occupied by roadways, parking areas, and hotels.
- In the year 2010, it is estimated that the terminal area will need to accommodate 10,100 vehicles arriving during peak hours, over twice the total volume of current terminal access traffic. A total of 62,700 parking spaces are needed by the year 2010.

Solution - Adopt a New ADP Terminal Concept

Redesign the terminal concept to maximize the number of gates in the central terminal area.

The passenger terminal area encompasses all of the land and facilities between North and South Airfield Drive and between the parallel taxiways on the east and west airfield.

- The central terminal area should be reserved for the exclusive development of apron/gate capacity.
- The available area for apron/gate use should be maximized by removing all terminal functions not directly required for enplaning/deplaning passenger activities and aircraft gate movements.
- Relocation of the inner parallel taxiways outward to create a third parallel taxiway will expand the east-west depth of the concourse apron/gate area.
- With the reclaimed and expanded central terminal land area, double-loaded apron/gate concourses (aircraft gates on both sides) can be developed, each with 100 aircraft parking positions to meet future demand.
- Aircraft access and circulation within the apron/gate area will be significantly improved due to the use of dual taxilane access to all gates. A large area will be available for taxilanes and off-gate hardstands.

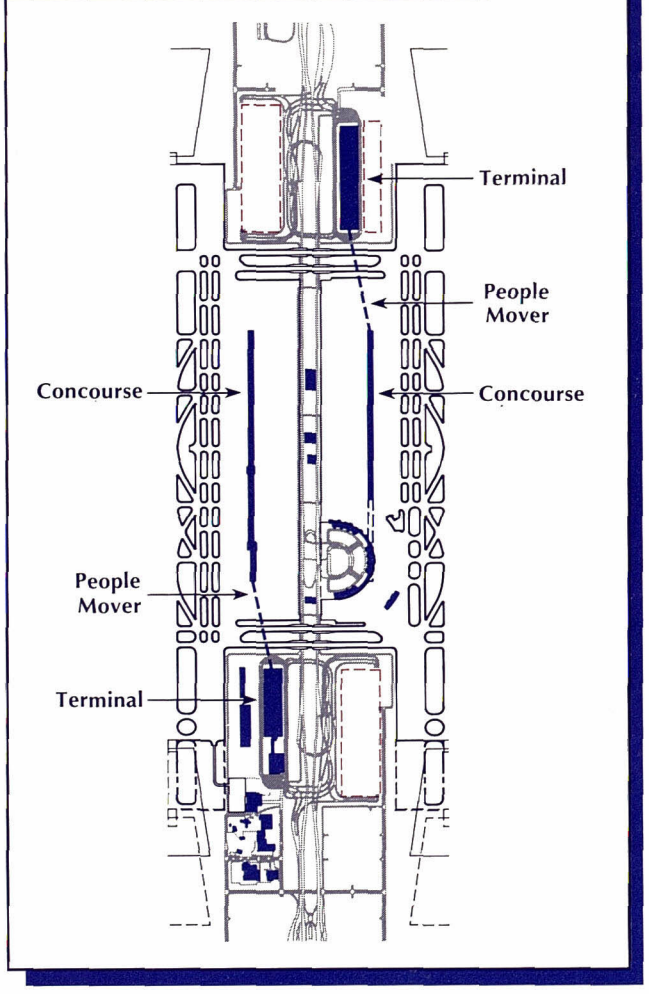
Solution - Provide New Terminals and Roadways

Of the total deplaning and enplaning passengers passing through the Airport, 65 percent are connecting passengers. These passengers do not use the ticketing/ baggage claim areas of the terminal. This strongly suggests a separation of the terminal into an airside/ landside concept.

The terminal area north and south of the crossover taxiways, outside the apron/gate area should be reserved for all of the passenger terminal and support functions which are not directly required for the passenger-aircraft interface.

Development of the landside terminal area is based on a flexible land use plan to allow for the relocation of supporting functions, such as surface parking and rental car facilities.

New ADP Terminal Concept



Selection of the areas outside of the crossover taxiways for new landside terminals is based on several factors:

- Staggered locations north and south will allow more space for the roadway interchanges which will be needed to access the new landside terminals from International Parkway.
- The terminal areas are adjacent to the new airside concourses and will have convenient roadway access from the north and south airport entries.

Solution - Provide a New Underground People Mover System

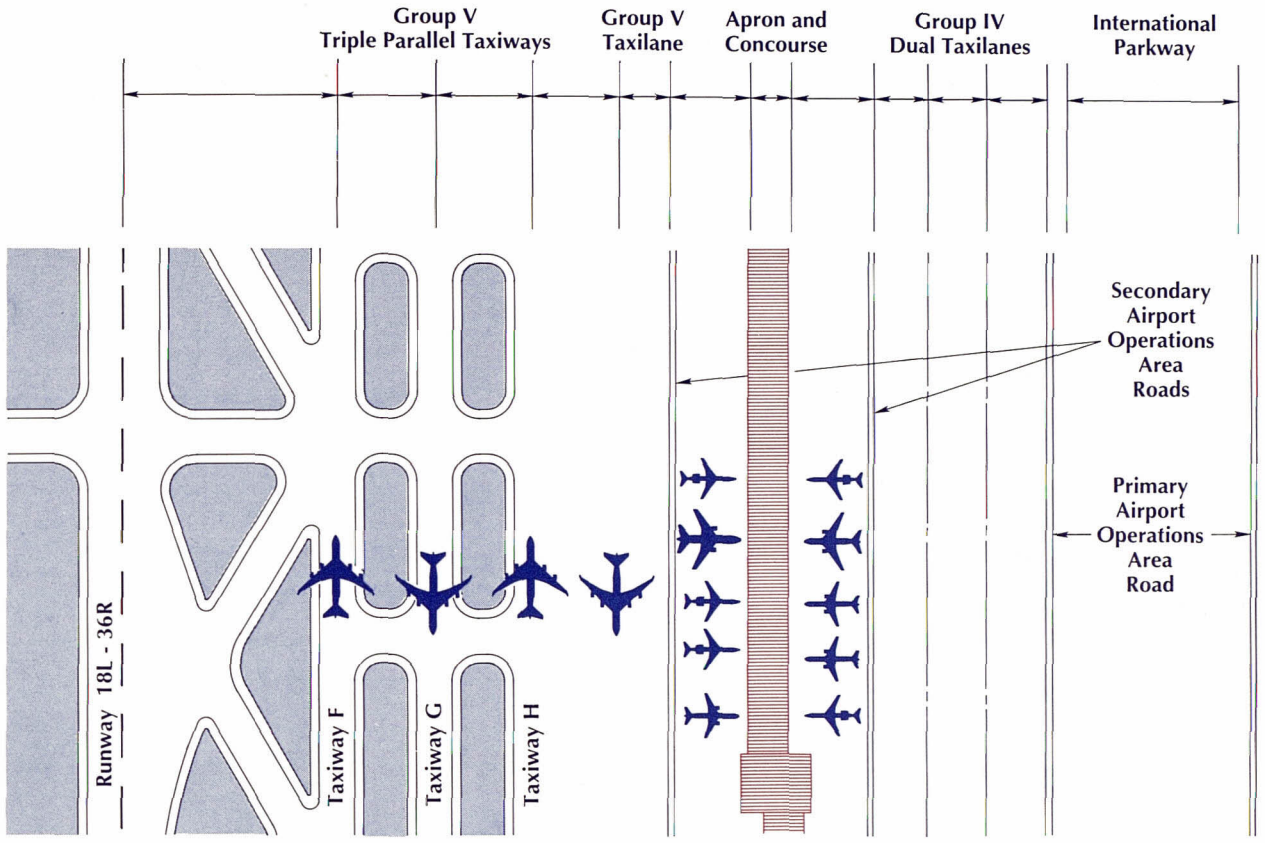
New technology people mover systems will be required to provide frequent, rapid, and dependable passenger service between the landside terminals and the airside concourses.

Replacement of the existing people mover concept with underground, terminal-to-gate systems has the potential to reduce walking distance for local passengers.

Solution - Provide New Roadways from International Parkway to Terminals

New roadways are needed to provide access to the new landside terminals. These roads should provide curbside lanes of sufficient length for arrivals and departures; circulation roads; access to short-term and long-term parking facilities; and separate routes for commercial bus, taxi, limousine, and rental car services.

New Apron/Gate Concourse Configuration



Solution - Construct New and Expanded Parking

Land will be reserved in the landside terminal areas to satisfy parking facilities requirements by 2010. The following types and quantities of parking are needed:

• Public Short-Term	14,640
• Public Long-Term	21,960
• Hotel	1,500
• Rental Car	6,300
• Employees	18,300
	62,700

A phased plan of development is critical to the success of the terminal area expansion. The land use and terminal development concept presented by the ADP should be implemented in phases. This phasing will help the Airport smoothly transition from the existing unit terminal concept to the new ADP terminal concept.

Phase I - Westside Development

Terminal expansion and redevelopment will begin with development of the 3W/4W areas for new airside concourse and apron/gate facilities.

The new landside terminal serving the westside gates will be located south of the crossover taxiways, in Terminal Area 5W.

An underground people mover system would be installed to connect the airside and landside terminals.

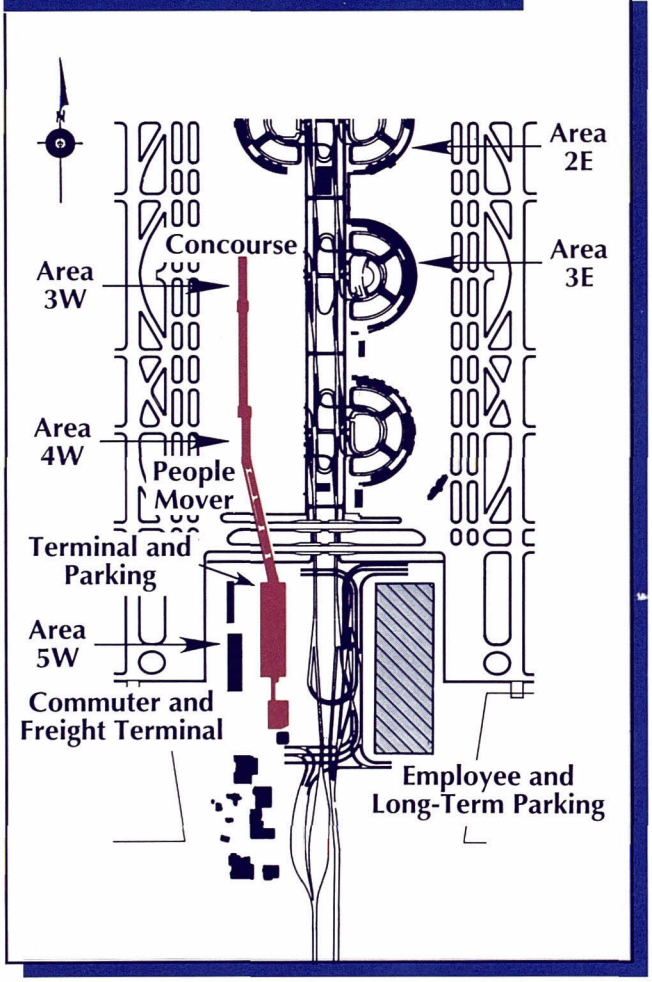
Non-hub carriers will be located in existing terminal 2W.

Phase II - Eastside Development

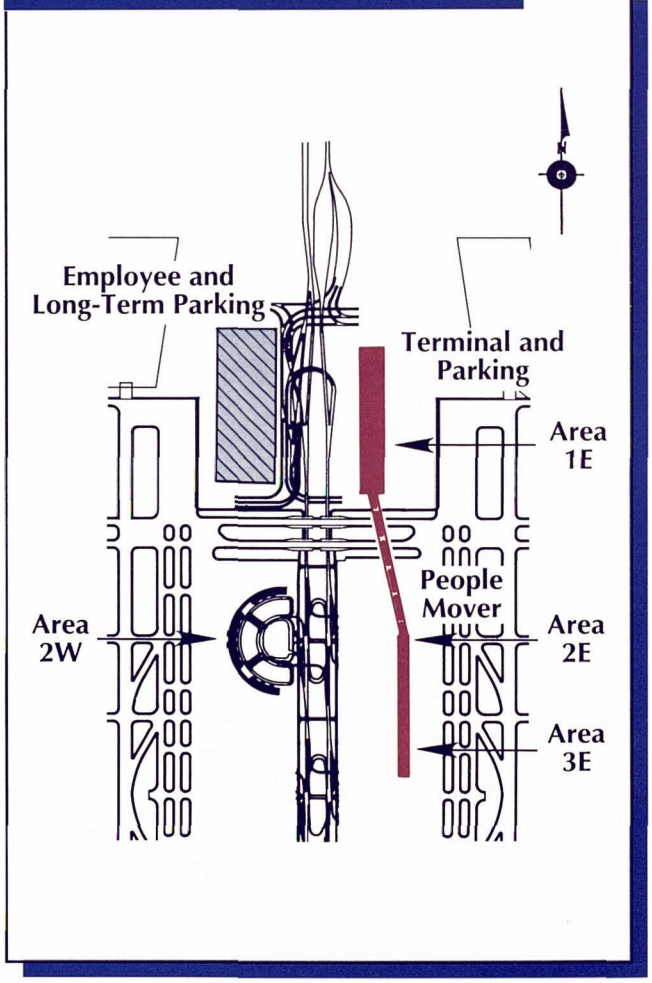
Following relocation of the existing 2E/3E airline hub (American) to the westside, existing Terminals 2E and 3E would be demolished.

The east landside terminal would be developed in the 1E area and the 2E/3E areas would be redeveloped for airside concourse and apron/gate facilities. These new airside and landside facilities would be linked by a people mover system and occupied by the second airline hub now located in 4E (Delta).

Phase I Development



Phase II Development



Interim Phase II

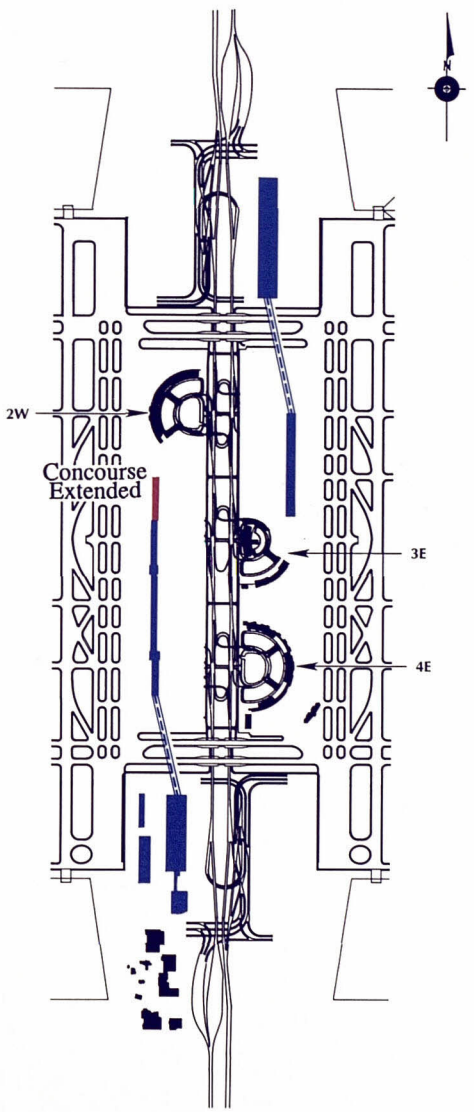
In order to permit the continuous expansion of the new westside concourse and apron/gate facilities, an interim stage of eastside development may be feasible. In this first stage of eastside concourse redevelopment, a third of Terminal 3E would remain in place to permit relocation of some carriers from the southern third of Terminal 2W.

Phase III - Complete the Eastside and Westside Developments for the Year 2010 Demand

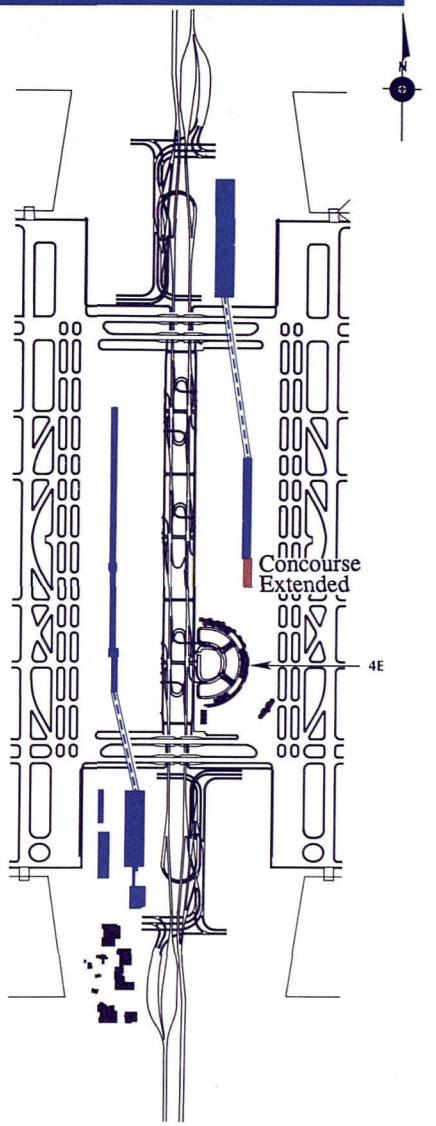
Completion of the terminal area redevelopment could involve one of two scenarios:

- Demolition of remaining Terminals 2W and 3E and extension of the eastside apron/gate concourse to its ultimate length.
- Retention and renovation of Terminal 4E to serve non-hub airlines.

Interim Phase II



Phase III Development



Need - Roadways

By 2010, DFW will need to accommodate 10,100 incoming vehicles during the peak hour. This traffic level is twice the current figure of 4,200 vehicles per hour. The distribution of traffic is expected to remain similar to the existing conditions, with 60 percent of the demand from Dallas and 40 percent from Fort Worth. The current 50/50 north-south traffic demand distribution should also hold steady.

Solution - Expand International Parkway to Four Lanes in Each Direction

The 1967 Master Plan intended International Parkway to be a high speed collector and distributor of traffic between the DFW terminals and the regional highway system. The Parkway was designed as a six-lane freeway to provide direct access to the passenger terminals.

Exits from International Parkway to the terminals are located from the left lane, while entries onto the Parkway from the terminals merge into the right lane. As a result, two of three lanes in each direction are subject to sudden reductions in vehicular travel speed, leaving only the center lane for through traffic. The 1967 Master Plan did not envision traffic weaving across the full width of International Parkway to the degree that has become necessary as inter-terminal vehicular traffic has increased.

Under the new ADP, terminal access at 5W and 1E will be from the right lanes. Traffic will exit International Parkway and will be given adequate signage and deceleration distances to sequentially access remote parking, rental car returns, short-term parking, and the arrival/departure curbs.

With the addition of a lane in each direction and the improved right-hand terminal exits, International Parkway will be better able to serve its originally intended purpose and accommodate the year 2010 peak traffic demand.

Solution - Expand Parking Control Plazas

All vehicles entering DFW on International Parkway are processed through the parking control plazas for revenue collection and control purposes.

In order to accommodate peak periods of 10,100 vehicles per hour, the parking control plazas and systems will need to be expanded. A total of 60 booths will be required to process vehicular demand in the year 2010, as compared to the existing total of 37 booths.

Expansion of the parking control plazas must be integrated with the design of the International Parkway widening and the terminal exit roads at 5W and 1E.

Solution - Provide East-West Connector Expressway

DFW is currently accessible by major highways at the north and south ends of International Parkway. In addition to expanding the capacity of these roadways as required, the State Department of Highways and Public Transportation (SDHPT) has two additional state highways (SH) under construction in the vicinity of DFW:

- SH 360 is under construction to be extended northward along the west side of DFW
- SH 161 is under construction along the east side of DFW

These highways can be connected at their closest points by constructing a new expressway across DFW just south of South Airfield Drive. This would provide improved regional access from the North Fort Worth and northern Tarrant County areas and from the North Dallas/Las Colinas areas. The use of SH 360 and SH 161 would also provide shorter, more direct routes to the new 5W and 1E landside terminals in some cases.

Although not its originally intended purpose, South Airfield Drive has become an east-west arterial providing supplementary capacity to SH 183. As much as 80 percent of peak hour traffic on South Airfield Drive traverses the airport as a commuter bypass route. The SDHPT has designated South Airfield Drive to be developed as a regional east-west arterial in recognition of its current role in relief of SH 183 congestion.

The ADP proposes that the Airport Board and the SDHPT jointly develop the east-west connector expressway south of South Airfield Drive in lieu of the expansion of South Airfield Drive. In this manner, South Airfield Drive can serve its intended function of providing access to airport support and service facilities. Further, the Airport Board should reserve adequate right-of-way for the East-West Connector Expressway to be developed jointly with the SDHPT.

The new east-west expressway would be connected to International Parkway by a partial interchange which would allow northbound access to and southbound egress from International Parkway. This will permit traffic from the expressway to reach the new 5W and 1E landside terminals.

Solution - Complete the Airfield Drive Loop

Airfield Drive provides public access to all of DFW' s activity centers except for the terminals, which are only accessible from International Parkway.

The ADP provides for reconfiguration and realignment of some sections of Airfield Drive and the addition of a new section to complete the loop in the northeast quadrant of the airport. Right-of-way for Airfield Drive should provide sufficient width for three lanes in each direction with a median.

With the completion of the Airfield Drive loop, all areas of the airport required for aviation-related development can be accessed. In addition, aviation- and non-aviation-related land uses can be developed along the east and northeast boundaries of the airport in proximity to regional road access.

Solution - Plan for Rail Service

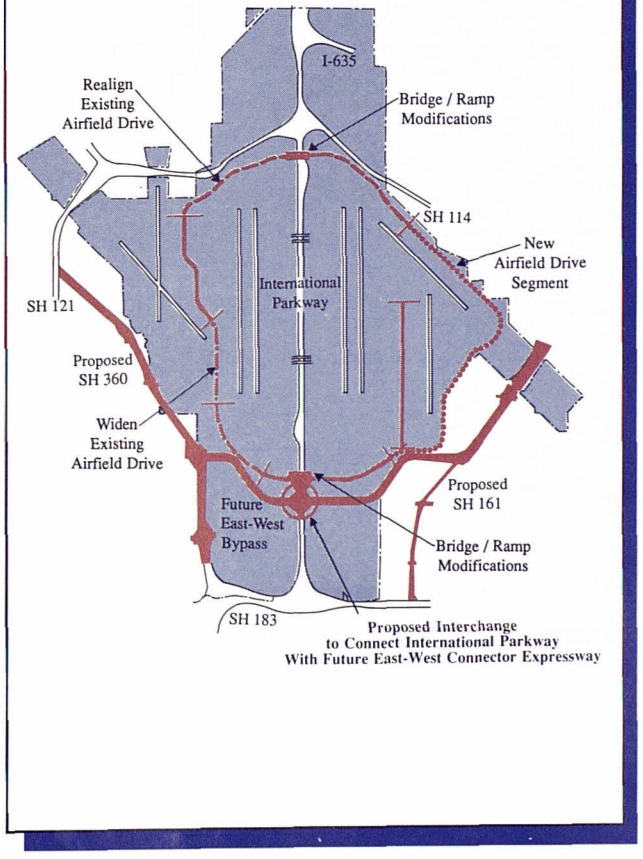
The ADP recommends immediate planing of a commuter rail service connects DFW with other regional centers of commerce and residential populated areas.

The Airport Board should join with the Dallas Area Rapid Transit (DART) to support its planning for the priority use of the Dallas/Fort Worth RAILTRAN line as a rail transit link between downtown Dallas and the Centreport Development.

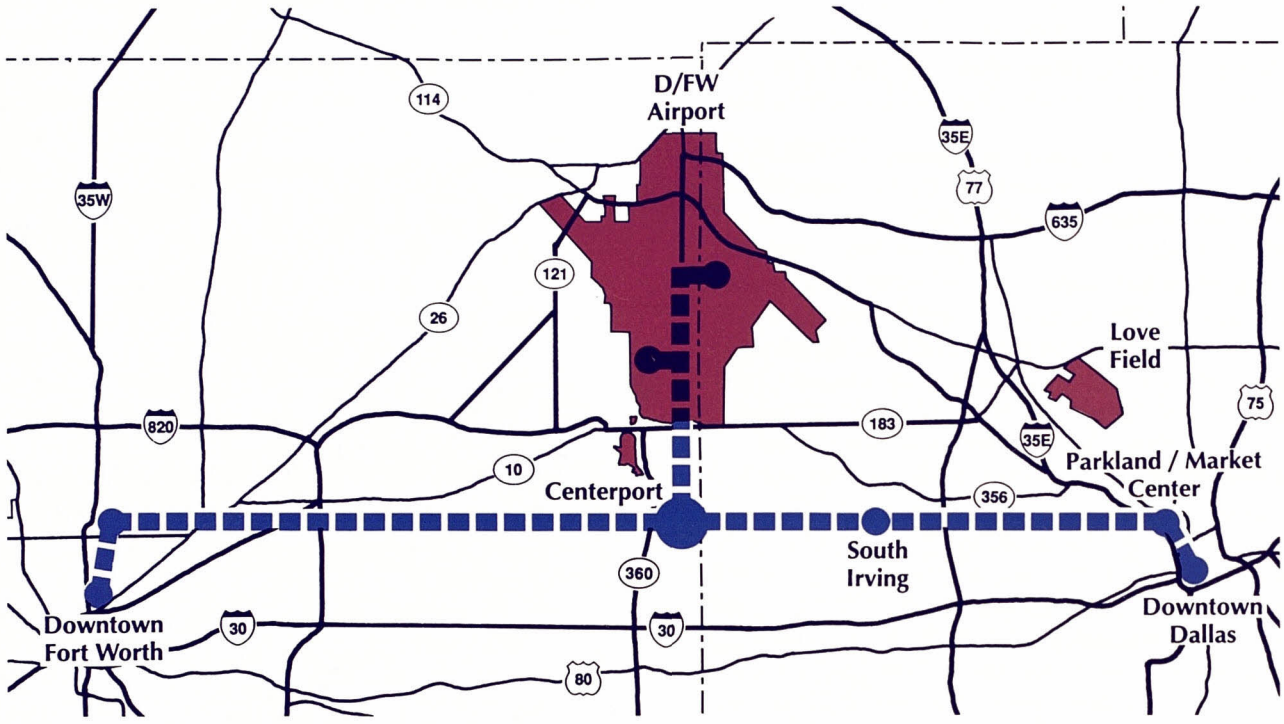
The RAILTRAN line can also link Fort Worth to DFW, and planning should include the extension of DFW rail service to Fort Worth. Northeast Tarrant County is the source of a majority of the daily population working at DFW. Service to Fort Worth would tap a potentially large commuter ridership pool.

A northern corridor should also be considered for rail service to DFW, with North Fort Worth and Alliance Airport at its terminus. This line will link DFW to the northern mid-city area along the SH 114 corridor. Planning should include investigation of the feasibility of utilizing the old Cotton Valley Railroad right-of-way.

Ground Transportation Improvements



Future RAILTRAN Access



Solution - Replace AIRTRANS and Service Roads

The ADP terminal concept departs from the original multiple unit terminal plan. Under the ADP, only airside concourses and apron/gate areas will exist within the central terminal area. The unit terminals which AIRTRANS serves will be eliminated and the service road system will not be needed to serve the concourse areas.

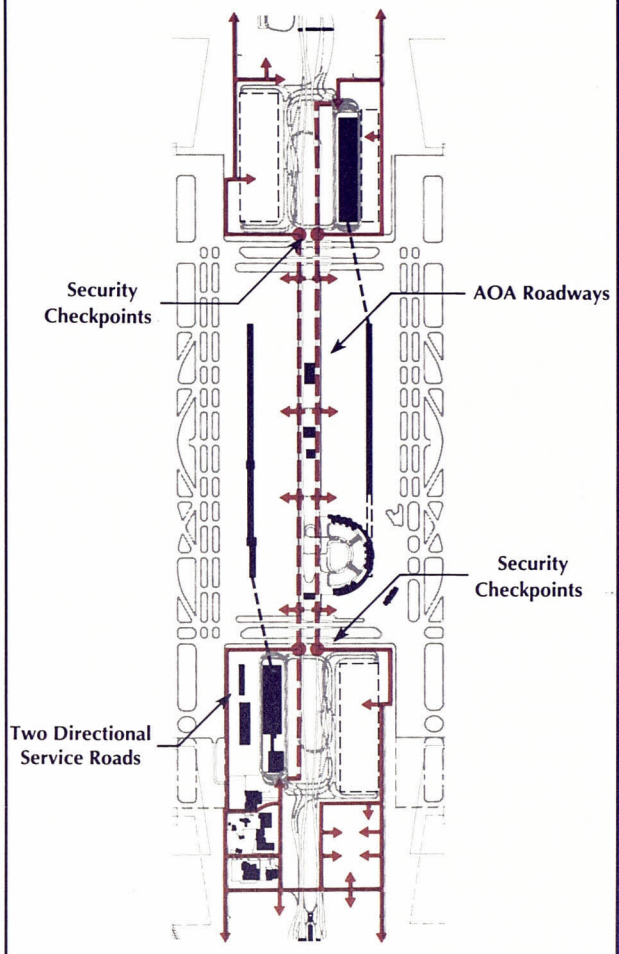
- **AIRTRANS**
  This pioneering people mover system has served Airport travelers and employees well since 1974. However, its capability to serve future needs is constrained by an aging fleet of rolling-stock, unidirectional routing, and slow vehicle speeds.

  In addition to linking the concourses and terminals, the future purpose of the airport transit system will be to shuttle passengers between the new landside terminals at 5W and 1E. Economic analysis of alternatives undertaken by the ADP indicates a bus system will have superior cost-savings, flexibility, and a level of service comparable to an automated guideway transit system.

- **Service Roads**
  The east and west service roads allow support and ground servicing vehicles to access the Airport Operations Area (AOA) entrances at each terminal. However, an estimated 60 percent of service road traffic in the peak periods consists of commuters bypassing regional roads.

  Under the ADP terminal concept, all unsecured service road traffic will remain in the terminal areas north and south of the crossover taxiways. Access from those areas to the apron/gate areas will be controlled. In place of the existing service roads, the ADP establishes new AOA roads adjacent to International Parkway which are secured from landside traffic.

Service Roads



Support facilities refer to those activities associated with the airfield and terminal areas which must exist for the Airport to be operational. In order to keep pace with the projected airfield and terminal expansion, the Airport will need a comparable increase in the capacities of all aviation and non-aviation support facilities in the following categories:

- Airline Operations
- FAA Operations
- Airport Operations
- Utilities

Need - Airline Operations Facilities

There are five sub-categories related to Airline Operations:

- All-Cargo: Facility requirements are projected to increase to more than two and one-half times the total enplaned tonnage; to approximately four times the current apron frontage and apron areas; and to twice the current acreage for freight forwarders.
- Aircraft Maintenance: Airlines are expanding their fleets and require additional maintenance hangars to perform specialized and routine maintenance. American Airlines' expansion plans call for three additional maintenance hangars and Delta Airlines plans to double existing facilities.
- Flight Catering: Facilities must expand to serve the projected doubling of passenger enplanements.
- Aircraft Fuel: The Airport's fuel farm maintains a capacity of 384,000 barrels which is the minimum aircraft fuel supply required to support airline operations for six days. The Airport must retain the six-day capability as aircraft operations increase.
- Corporate Aviation: General aviation and corporate jets currently use Terminal 2W. At this location these aircraft must be mixed with larger airline jets, which can create operational difficulties. A separate complex catering to the needs of corporate and general aviation is warranted. Segregated facilities will enhance operating conditions and offer corporate users higher levels of service.

Solution - Reserve Land for Support Facilities

In order for the Airport to expand in a logical and efficient fashion, the ADP has made provisions to expand facilities for airline operations.

- Land area required for all-cargo activities will increase three-fold over the planning period. In the year 2010, nearly 200 acres should be dedicated to cargo activities.
- Locations for future cargo terminals and freight forwarders should be reserved adjacent to the existing East and West Cargo areas.
- Approximately 50 acres of land adjacent to Taxiway C and south of the West Cargo Area should be reserved for American's maintenance complex. Areas adjacent to the Delta hangar and Taxiway N should be reserved for Delta maintenance expansion.
- Flight catering kitchens can expand in the area south of existing facilities in Terminal Area 6W.
- Four additional 70,000-barrel fuel tanks will be required by the year 2010. Sufficient space is available north of the existing fuel farm and should be reserved for future expansion.
- The area between East Airfield Drive and Runway 16/34 East may provide the optimal location for a corporate aviation complex, including apron area, terminal facility, and corporate hangars.

Need - FAA Operations Facilities

The FAA is responsible for directing all aircraft operations at the Airport and in the immediate vicinity. The construction of two new air carrier runways may create potential line-of-sight difficulties from the existing centrally located air traffic control tower.

Solution - Add Air Traffic Control Towers

The FAA plans to construct two additional control towers in conjunction with new the runway developments. The locations selected by the FAA for each new tower is designed to maximize runway visibility and minimize potential line-of-sight conflicts from existing and proposed structures.

- All operations east of the terminal complex will be controlled from a new East Tower location.
- All operations west of the terminal complex will be controlled from a West Tower location.

Need - DFW Operations Facilities

The Airport has major support functions which are vital to operating the Airport including administration, maintenance, AIRTRANS, and public safety.

- As the activity at the Airport increases, administrative functions and other support functions must expand accordingly.
- Locations for the Aircraft Rescue and Fire Fighting (ARFF) stations are selected to provide complete coverage of the entire AOA and cannot be more than three minutes from any location on the airfield.

Solution - Reserve Land for Expansion

- Administrative offices and other Airport support offices should be expanded as needed. Land is available adjacent to all existing offices.
- To enhance response to all public safety emergencies, airside and landside, and to enhance structural fire response capabilities, a fifth Police/Fire/EMS facility is proposed within the median of the International Parkway and the terminal area.

Need - Utilities

Infrastructure is an inclusive term that encompasses all public utilities and other improvements necessary to serve each of the developable properties not including the airfield or terminal facilities.

Solution - Expand and Modify Existing Infrastructure

Because of the structure of the Airport's property leases, only the "trunk" infrastructure for distribution of utilities is included in the development plan for future airfield improvements. Trunk infrastructure includes those improvements that provide common service to multiple properties.

- The Central Utilities Plant (CUP) utility tunnel, currently retained within the cross-over taxiway bridges, will be extended to serve the new terminals.
- Modifications to the existing wastewater system, industrial waste system, and natural gas will accommodate the anticipated growth of the Airport.
- Water distribution modifications will provide service to new areas. A booster pump station is recommended north of the west support area.

Need - Flexible Land Use Plan

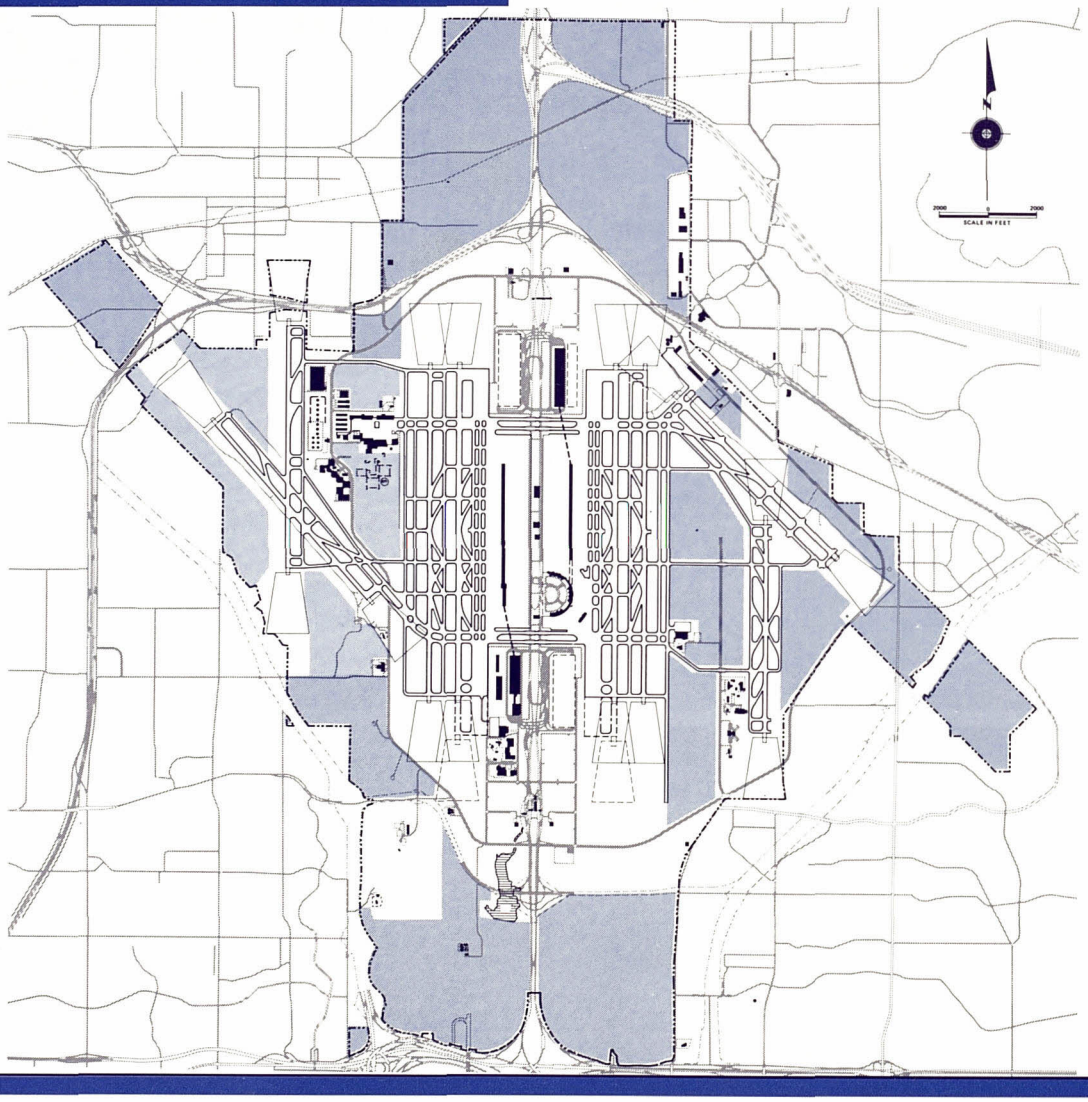
The 1967 DFW Master Plan included a rigidly defined plan of land use. The past history of development, however, demonstrates that land outside the airfield and terminal areas has not been developed along these rigid guidelines. In fact, in many cases Airport properties are being used for purposes quite different from the land uses proposed in the original land use plan. However, these existing developments are suitable for the property on which they have occurred.

The amount of property that remains to be developed warrants a new plan. The Airport Development Plan recognizes that a flexible approach must be adopted for the development of Airport properties. The approach should also allocate uses to these properties.

Solution - Develop Land Use Plan and Policy Manual

A Land Use Plan and Policy Manual has been developed as part of the Airport Development Plan. The purpose of the Land Use Plan and Policy Manual is to present a developmental framework for land on the airport that is not for airfield, terminal area, or roadway use. This developmental framework was formulated to be consistent with the Airport Development Plan planning horizon of 1990-2010. The Manual includes present and proposed land use and lease policies, practices to guide the implementation of proposed policies, and a land use plan. The Land Use Plan and Policy Manual also includes an analysis of each of the 26 tracts available for development.

DFW Land Available For Development



The ADP has identified the development needs for the Airport and the land development plan has been established. An implementation plan and program is necessary to ensure that the ADP is followed and that development at the Airport occurs in an orderly, logical, and efficient manner.

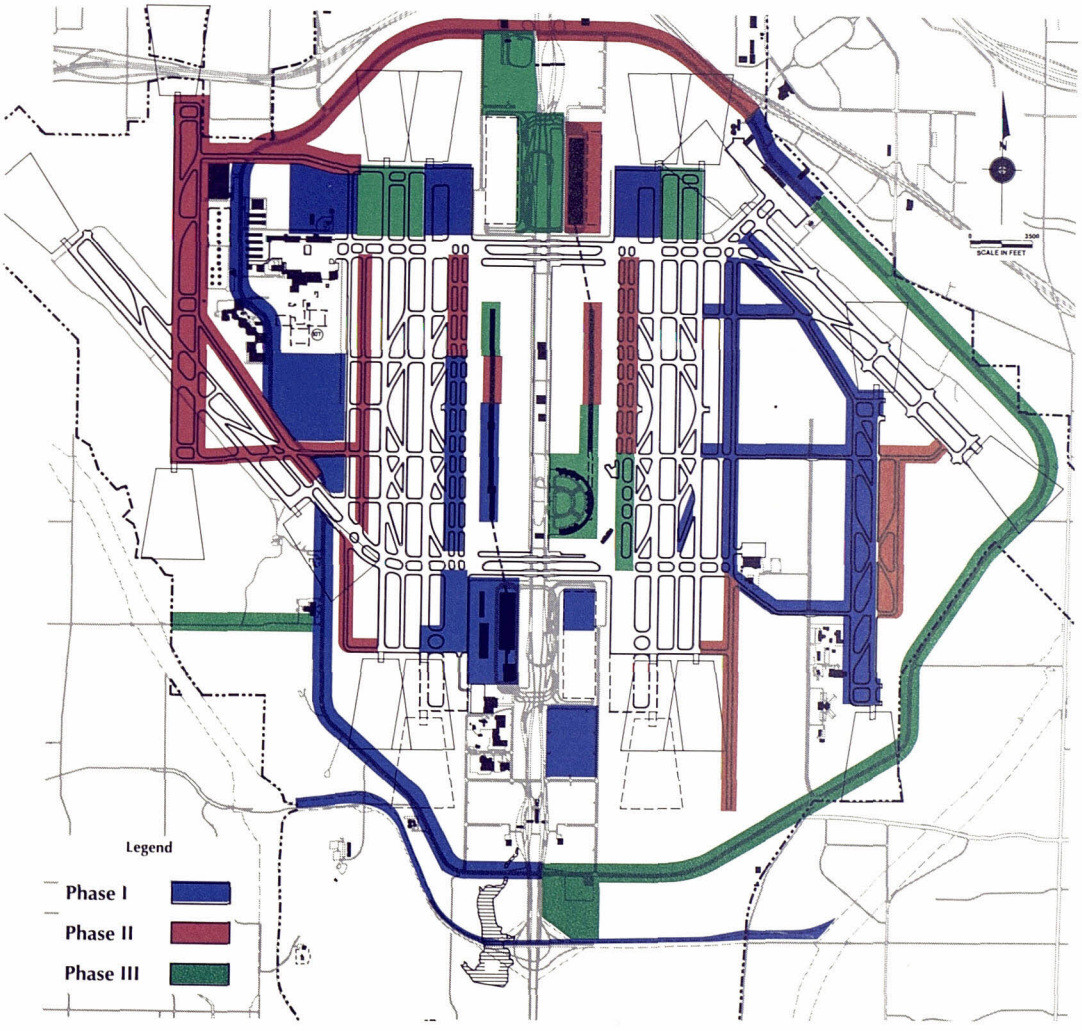
Facilities Development Program

The Facilities Development Program is a dynamic program detailing timing of improvements, funding sources, and payment methods. The purpose of the Facilities Development Program is to outline and prioritize all of the improvement projects of the Airport in three development phases. These phases are triggered by forecasted levels of demand. Change in growth demand may either accelerate or slow the implementation of each phase.

- Phase I: Near-Term Development (One to Five Years) Designated for Implementation from 1991-1995
- Phase II: Mid-Term Development (Six to Ten Years) Designated for Implementation from 1996-2000
- Phase III: Long-Term Development (11-20 Years) Designated for Implementation from 2001-2010

The major development areas detailed in the Facilities Development Program are as follows:

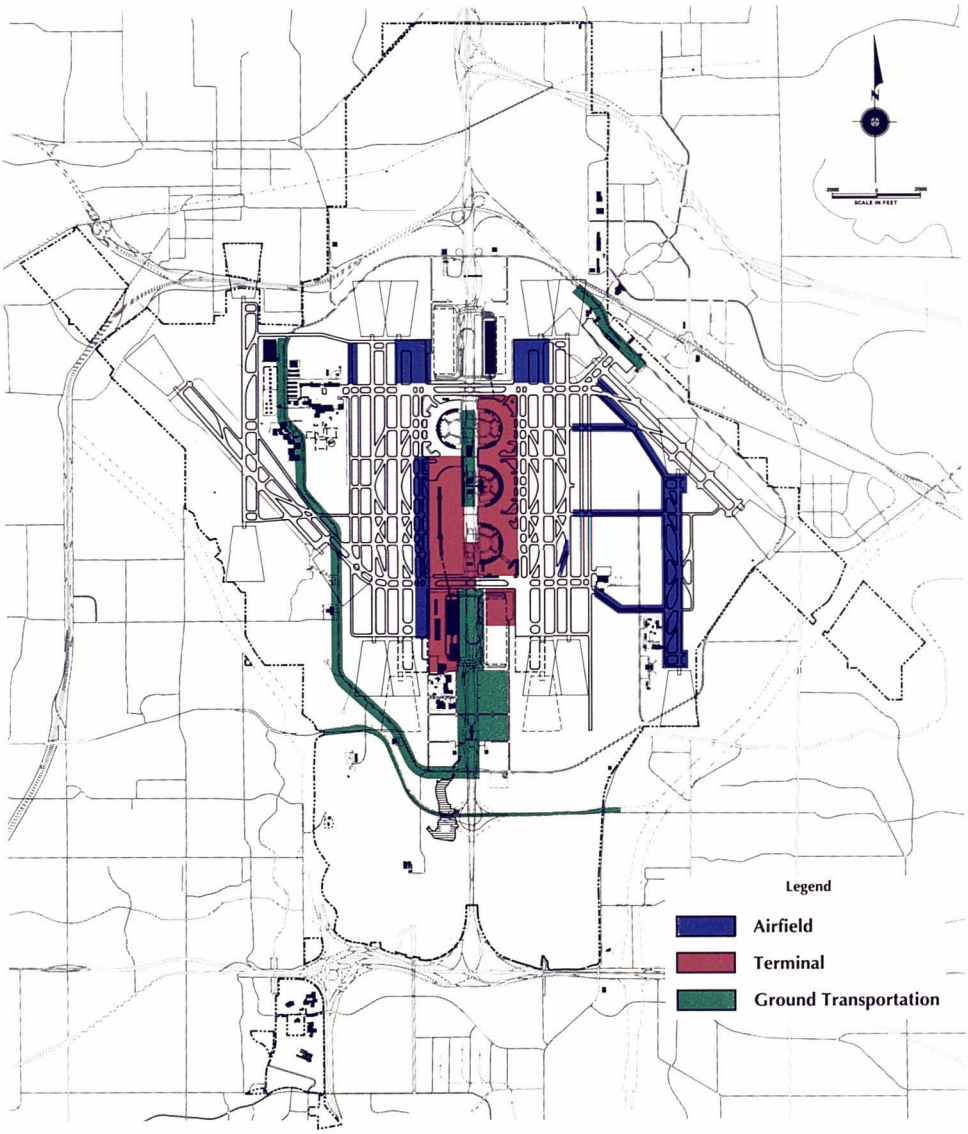
- Airfield - Runways, Taxiways, and Airport-Funded Instrumentation
- Terminal Area - Aprons, Concourses, Passenger Processing Facilities, and an Intra-Terminal Automated Guideway Transit System
- Support Facilities and Utilities - Utilities, Storm Drainage, and Facilities Paid for as Part of the Operating Costs of the Airport
- Ground Transportation - Roadways, Parking Facilities, and Non-Automated Transit Systems



Phase I (1991-1995)

The major facilities for which development is anticipated to commence in this phase include the following:

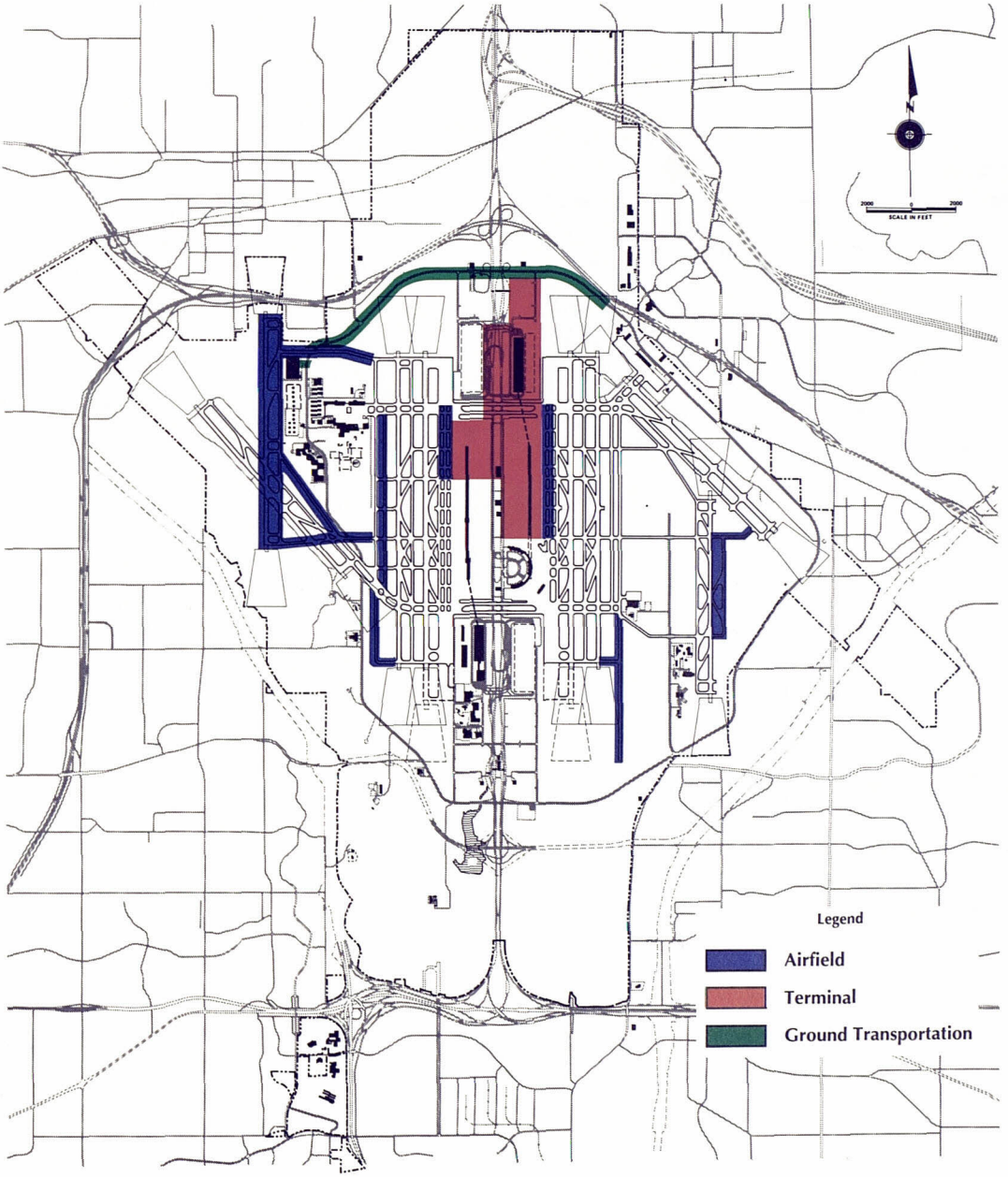
- Airfield
  - Runway 16/34 East and Associated Taxiways
  - Runway 17R/35L Extension and Associated Taxiways/Holding Pads
  - Runway 18L/36R Extension and Associated Taxiways/Holding Aprons
- Terminal
  - Terminal 2E/3E Interim Expansion/Renovation
  - Terminal 4E/5E Expansion/Renovation
  - Westside Terminal Development
- Support Facilities and Utilities
  - Aircraft Rescue and Firefighting Stations
  - West Support Area Utilities
  - Utilities for West Support Area North of Taxiway 18
- Ground Transportation
  - East-West Connector Expressway
  - Airfield Drive Roadway Improvements
  - Modifications to AIRTRANS
  - International Parkway Expansion



Phase II (1996-2000)

The major facilities for which development is anticipated to commence in this phase include the following:

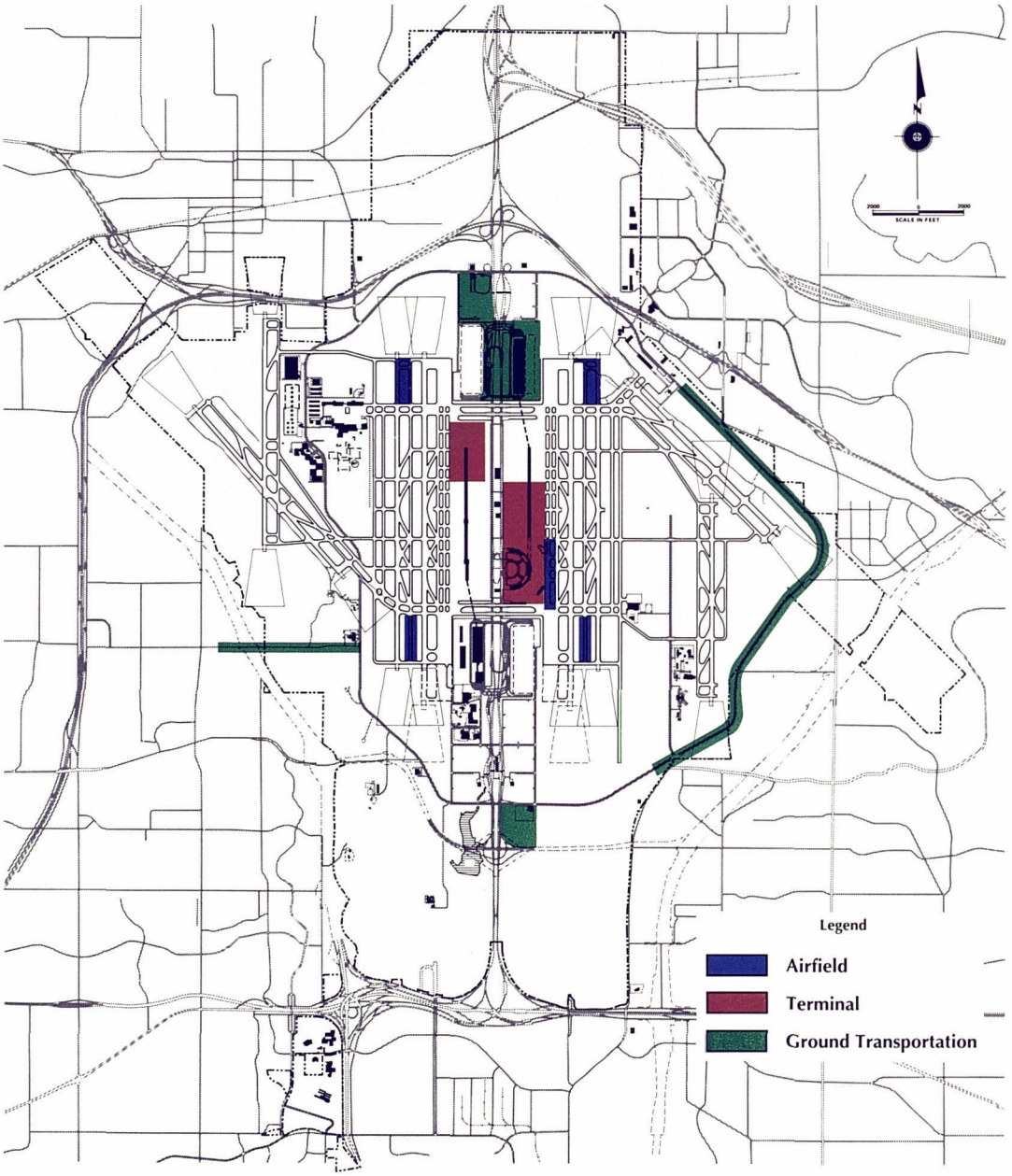
- Airfield
  - Runway 16/34 West and Associated Taxiways
  - Taxiways for Access to Development Areas Requiring Airfield Access
- Terminal
  - Initiate Phase II of Westside Terminal Development
  - Initiate Redevelopment of Eastside Terminal Area
- Support Facilities and Utilities
  - Expand Water Storage and Extend Utilities to New Development Tracts
- Ground Transportation
  - Continue Expansion of International Parkway
  - Provide Access to New East Terminal
  - North Airfield Drive Realignment



Phase III (2001-2010)

The major facilities for which development is anticipated to commence in this phase include the following:

- Airfield
  - Extend Runways 17L/35R and 18R/36L and Associated Taxiways
  - Expand Southeast Terminal Taxiways
- Terminal
  - Complete Reconfiguration of Westside Terminal Area
  - Renovate Terminal 4E
- Support Facilities and Utilities
  - Water Distribution System Improvements
  - Utilities for Development Tracts
- Ground Transportation
  - Complete International Parkway Expansion
  - Complete Airfield Drive Loop
  - Improve Access to Developable Tracts
  - Remote Parking



Need

The completed ADP must be continuously monitored to ensure it meets the needs of the changing aviation industry.

Solution - Management Plan

The new ADP will have a management plan to ensure that it remains responsive to the changing needs of a dynamic growth industry and to the public it serves. Accurate financial analysis and prudent financial planning form the basis of the ADP Management Plan. The Continuous Planning Process will maintain the ADP and the Facilities Development Program. Management tools will provide the capability for continuous planning and for ADP update documentation.

Financial Plan

The total order of magnitude cost of all Airport improvements is estimated at $3.5 billion. Projects will be funded by a combination of joint revenue and special facilities bonds, supplemented by federal grants under the Airport Improvement Program (AIP); proceeds from previously unspent bonds and monies in Airport Board trust funds; and interest income. An additional source of funding is the Passenger Facility Charge, which has recently become available as a result of congressional action.

The ADP Financial Model provides Airport management with the capability to calculate cost impacts of construction projects on the various rates and charges through which Airport revenues are derived. The financial model provides the basis for interactive communications with the DFW Airport airlines so that timely decisions can be made on implementing and financing the ADP's capital improvement projects.

Continuous Planning Process

The ADP must remain responsive to developments which will continuously reshape the need for and timing of its various capital projects. The ADP serves as the framework for a continuous planning process and will continue to evolve as the airline industry itself changes. An annual review schedule should include the following actions:

- Review and Update Forecasts
- Update Statistical Database
- Review Demand/Capacity Requirements
- Review Standards and Design Criteria
- Review Planning Documents
- Update the Economic Impact Statement
- Review the Environmental Analysis
- Identify Potential Improvements

Management Tools

The ADP provides a comprehensive series of planning tools to determine facilities and policy needs and to identify alternatives. These tools will subsequently provide the capability for continuous planning and for ADP update documentation:

- A Working ADP Document
- Computerized Airport Layout Plans
- An Aviation Demand Forecasting Model
- A Financial Analysis Model
- A Land Use Plan and Policy Manual
- An Economic Impact Model

ADP Coordination

To ensure the ADP remains abreast of government and industry trends, requirements, and regulations, the continuous planning process must include coordination with the FAA and DFW's airline users. Coordination with the FAA is crucial to the successful implementation of the ADP.

Implementation of the ADP will require communicating with the airlines that serve DFW. There are two basic areas in where airline industry communications are critical:

- Identification of New or Changing ADP Requirements
- Financial, Technical, and Operational Analysis of ADP Actions to Ensure Timely and Efficient Implementation of Specific Projects

Need

The environmental impact potential of the proposed improvements must be assessed and documented to meet the requirements of the National Environmental Policy Act of 1969 (NEPA). Proposed improvements need environmental analysis and documentation in order to comply with applicable federal requirements.

Solution

With the implementation of the ADP, environmental impacts will inevitably be introduced. The environmental impacts by category vary from zero impacts to potentially significant impacts. The impacts associated with the ADP will be determined and, where necessary, mitigation measures will be developed through the Federal Environmental Impact Statement (EIS) process.

Airport projects that require environmental evaluation are conducted under the guidance of the FAA. FAA environmental studies are prepared following guidelines that require a number of specific impact categories to be examined. A preliminary examination of the environmental impact potential of recommended ADP improvements in the context of the FAA's impact categories has been accomplished. The Environmental Impact Statement of the proposed Runways 16/34 East and West is published in a separate document.

Analysis of the noise levels for DFW in 1971 indicated the area within the 65-Ldn contour would be approximately 73.7 square miles by 1985. The 1989 noise contour area within the 65-Ldn is estimated to be considerably smaller at 44.8 square miles.

The increased aircraft operations and the addition of proposed Runway 16/34 East will result in a slightly larger area within the 65-Ldn noise contour in 1992. However, by 1997, the increased use of quieter Stage 3 aircraft at DFW will decrease the area within the 65-Ldn noise contour even with the completion of Runway 16/34 West. By 2010, it is estimated that the entire aircraft fleet at DFW will be comprised of Stage 3 aircraft. The projected area within the 65-Ldn contours will be greatly reduced to approximately 18.9 square miles and will be almost completely contained within the boundaries of the Airport.

A noise mitigation plan has been proposed to minimize the impacts associated with the two new runways. The mitigation plan will help to reduce the noise impacts projected to occur in noise sensitive areas affected by the proposed runways. Several types of mitigation measures are considered:

- Acquisition Within the 70-Plus-Ldn Contour
- Sound Insulation Within the 65-Ldn Contour
- Easement Acquisition Program Within the 65-Ldn Contour
- Sales Guarantee Program Within the 65-Ldn Contour

A permanent noise monitoring system is also proposed to measure and continuously monitor sound from aircraft activity.

Need

Implementation of the ADP will contribute significantly to the Metroplex economy. Without the ADP implementation, its role in the national and international aviation market would surely diminish and would result in a negative impact on the local economy.

Solution

Concurrent with the ADP, an economic study to assess current and future impacts, local real estate values, and population was conducted. An estimate of the economic impact of airport operations was developed, including primary impacts (related to initial expenditures) and secondary impacts (related to subsequent rounds of spending).

In 1988, the Airport was responsible for the creation of the following:

- $6.2 Billion in Total Economic Output
- $1.7 Billion in Earnings
- 69,300 Jobs
- $92.3 Million in Tax Revenue

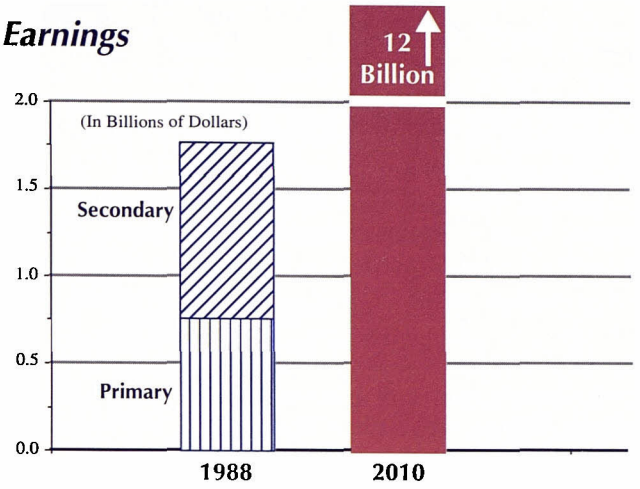
The Airport plays a major role in the area's economic development and is cited by local companies as one of the most important factors in their location. DFW has also contributed to increased property values, population, and housing growth in the communities surrounding the Airport.

Future economic impacts resulting from Airport operations were estimated using forecasts of aviation activity. With the implementation of the ADP by the year 2010, the Airport will generate the following:

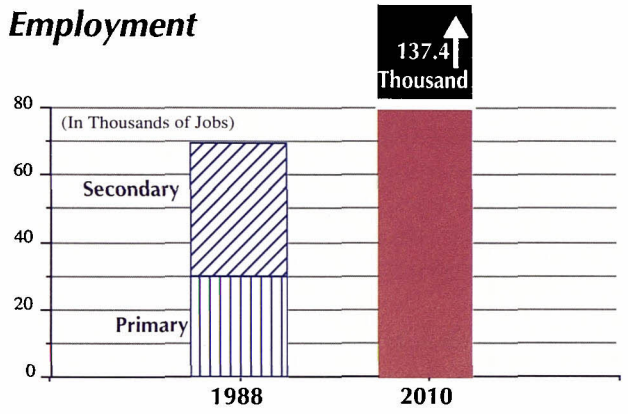
- $12 Billion in Total Economic Output
- $3.4 Billion in Earnings
- 137,400 Jobs

If the ADP is not implemented, a substantial amount of economic activity will not be realized. Nearly $3.1 billion in output, $796 million in earnings, and 31,000 jobs would be lost in 2010.

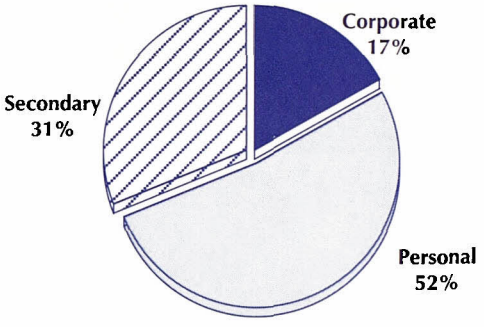
Earnings



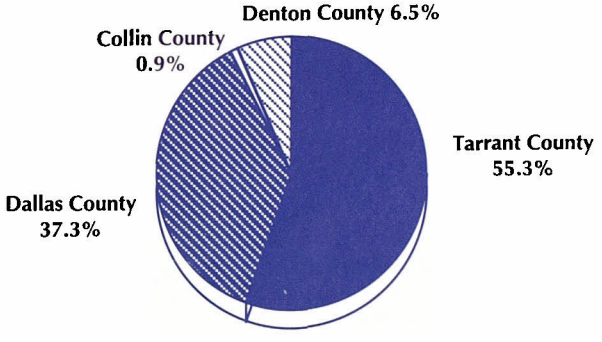
Employment



1988 Taxes ($92 Million)



1988 Distribution of Primary Employment



Long-Term Growth

Implementation of the ADP through the year 2010 will not signify the end of DFW's growth. While further expansion of the Airport's land area is impractical, growth in passenger enplanements and aircraft operations will continue beyond 2010. That growth will be fostered by air transport market conditions and by technological developments in the areas of aircraft size and air traffic control.

The ADP aviation demand forecast projects the air carrier fleet to consist of approximately 20 percent wide body and 80 percent narrow body aircraft in the year 2010, with an average aircraft capacity of 175 seats. Without deviation from the 80 to 20 fleet mix, but with an increase in average aircraft seating capacity to 200, it is possible to increase passenger enplanements to greater than 60 million beyond the year 2010.

Technological improvements in air traffic control will continue, supported by Aviation Trust Fund investment over the next 20 years. DFW can expect these improvements to yield benefits in both the capacity of its individual runways and its airside system as a whole.

Nation of Hubs

The ADP is based on the premise that deregulation has transformed the domestic airlines into a profit-oriented industry. It is highly unlikely that any form of reregulation, save for the resumption of rate-making and market-entry controls, will be instituted.

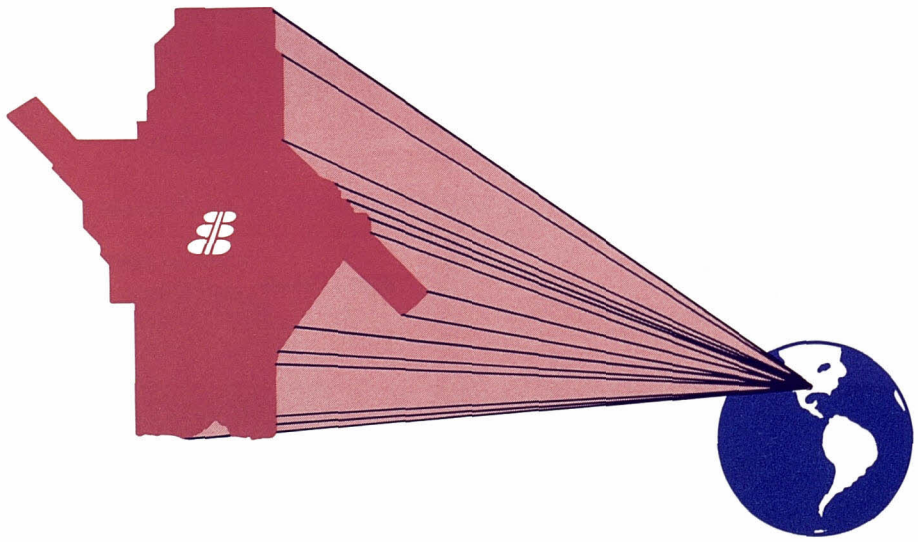
The ADP envisions the intensification of hub competition because it has proven to be an efficient system of mass air transportation. The Nation of Hubs is competitive, profitable, and capable of generating the system capacity necessary to foster economic vitality through its direct and indirect contributions to the Gross National Product.

World Commerce

The success of deregulation in the United States, coupled with the oncoming advent of the Common European Economic Community and the economic growth of Pacific Rim nations, portends a World of Hubs. Already the signs of DFW's role in the world air transportation system are evident. The DFW airline hubs now serve five continents. DFW's airlines have invested in ownership shares of foreign flag carriers and are seeking partnership roles for foreign carriers in their computer reservation systems.

The vision of Dallas and Fort Worth community leaders deserves recognition. Twenty-five years ago they formed the DFW Airport Board and selected the site for a new airport. Today, DFW is one of the world's leading airports. With the adoption and implementation of the ADP, the Airport can ascend to world aviation leadership and transform the North Central Texas region into a center of world commerce.

DFW An International Gateway



DFW Airport Development Plan Team

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Parking Systems

Gellman Research Associates
Economic Impact Analysis

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Noise Impact Analysis

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Environmental Impact Analysis

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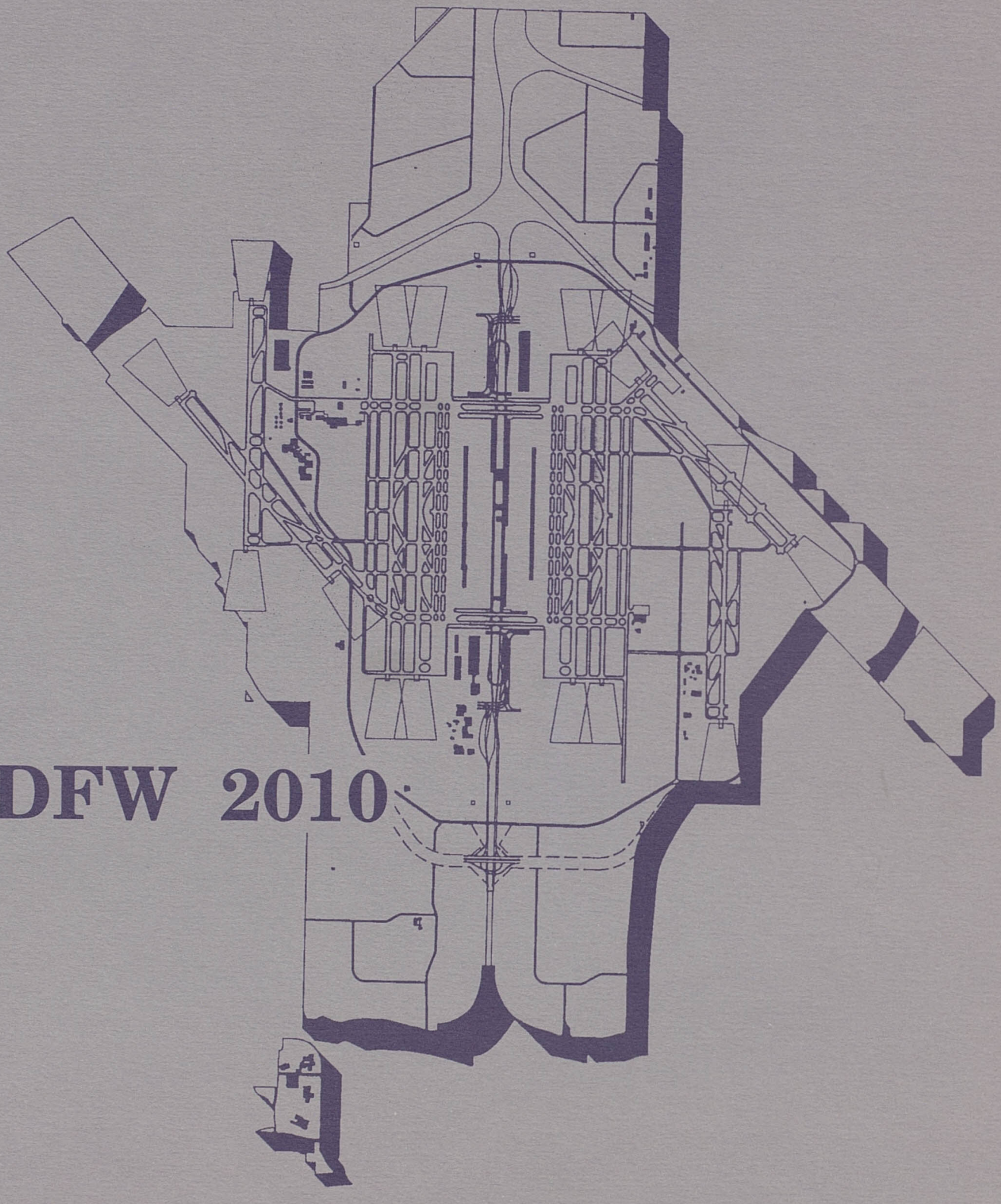


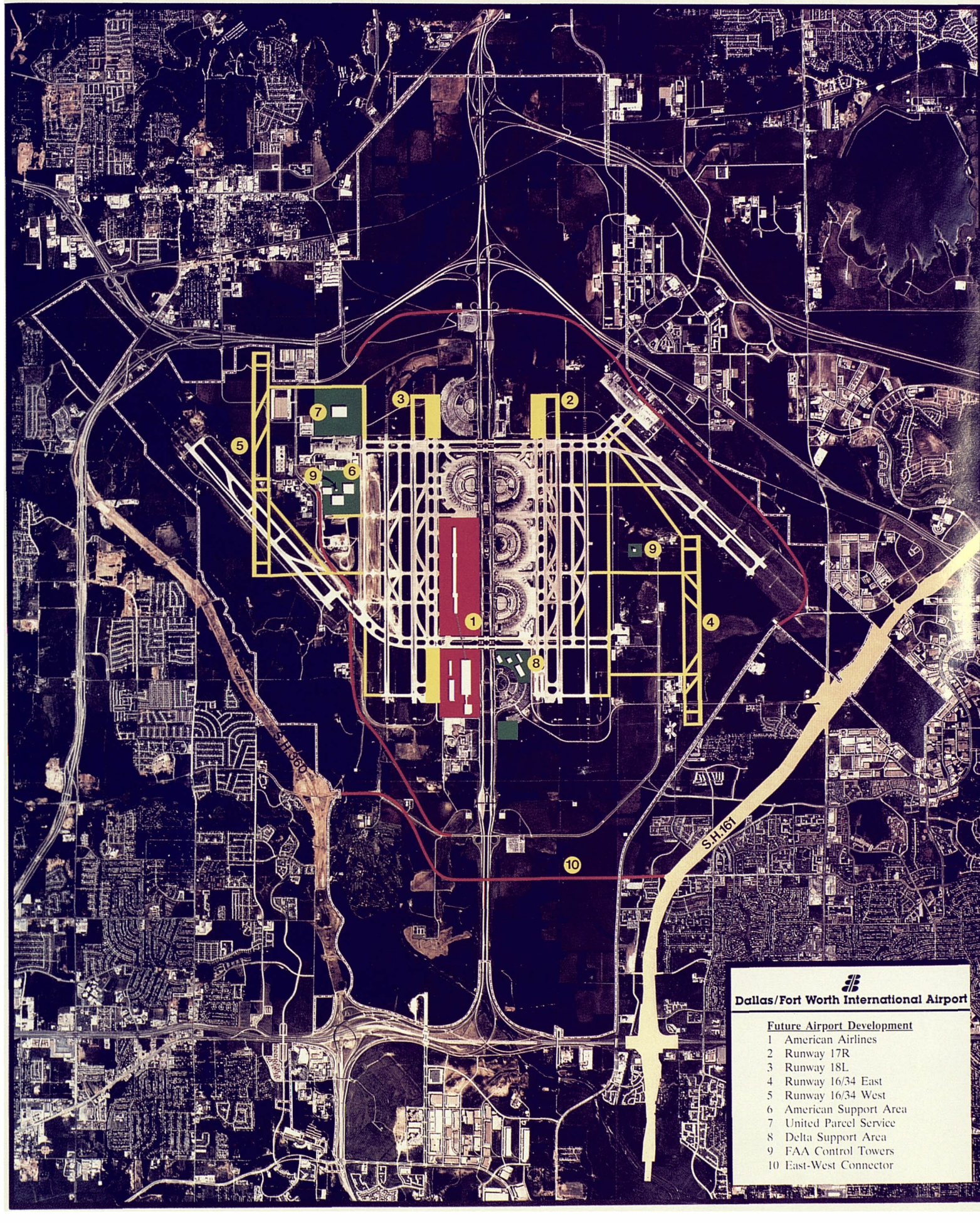
DFW 2010

DALLAS/FORT WORTH INTERNATIONAL AIRPORT
FUTURE AIRPORT DEVELOPMENT HIGHLIGHTS

DFW International Airport is the second busiest airport in the world. Over the next twenty years demand for aviation services is expected to double. By the year 2010, the Airport will be required to accommodate over 100,000,000 passengers and 1,200,000 aircraft landings and takeoffs each year.

To provide the facilities that will accommodate future growth, $3,500,000,000 will be invested for airport capital improvements. The attached aerial photograph illustrates the many projects that are anticipated. Key highlights include:

No. 1	**Proposed West Terminal** New passenger terminal and concourse connected by an underground automated transit system.	on-line 1997
No. 2	**Runway 17R** - 2000' extension with aircraft hold pad New runway length 13,400'	on-line 1992
No. 3	**Runway 18L** - 2000' extension with aircraft hold pad New runway length 13,400'	on-line 1993
No. 4	**Runway 16/34 East** Length 8,500'	on-line 1994
No. 5	**Runway 16/34 West** Length 9,760'	on-line 1997 or when required by aviation demand
No. 6	**American Airlines - Support Area** Three additional aircraft maintenance hangars	on-line 1992 and beyond
No. 7	**United Parcel Service** New parcel sort facility for overnight package delivery	on-line 1994
No. 8	**Delta Air Lines - Support Area** New cargo and ground support facilities	on-line 1992
No. 9	**FAA Airport Traffic Control Towers** Two new ATCT facilities	on-line 1994
No. 10	**East-West Connector** New expressway from SH 360 to SH 161	on-line after 1996


S.H.360
S.H.161
Dallas/Fort Worth International Airport
Future Airport Development
1 American Airlines
2 Runway 17R
3 Runway 18L
4 Runway 16/34 East
5 Runway 16/34 West
6 American Support Area
7 United Parcel Service
8 Delta Support Area
9 FAA Control Towers
10 East-West Connector