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INVENTORY OF FREIGHT TRANSPORTATION IN THE SOUTHWEST/PART III: AIR FREIGHT SERVICE IN THE DALLAS—FORT WORTH AREA

J. Bryan Adair

RESEARCH REPORT 6

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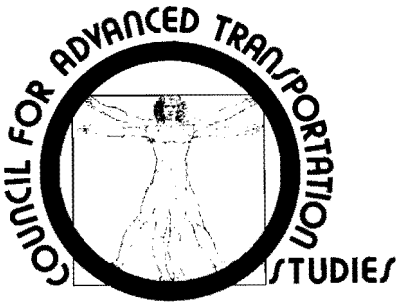

The University of Texas at Austin

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Research Report

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16. Abstract

This report provides an inventory of existing air freight transportation facilities, services, and practices in the twenty-four Texas and two Oklahoma counties surrounding and including Dallas and Fort Worth. The historical development of the air transportation business in Texas is traced from pre-World War I years, with particular emphasis on the industry expansion that has occured since the mid-50's.

Included in the inventory are details on air tonnages handled, volume trends, an analysis of domestic and foreign air commerce ties, information on airports, freight handling facilities, airlines, air freight forwarders, and commuter air carriers serving the area. In addition, there is a listing of products and commodities commonly shipped to and from the Dallas-Fort Worth region by air.

Actual and potential problem areas that are considered for their possible influence on the air freight industry's outlook include: fuel shortages, the deficiency of intermodal freight transfer opportunities, inadequate air freight services for some rural areas, and cargo security.

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EXECUTIVE SUMMARY

Introduction

This is the third in a series of four reports covering existing freight transportation facilities, services and practices in the Dallas-Fort Worth economic area. The report provides information on air freight transportation in the area.

Problem Studied

The problem studied by the research effort under which this report was produced is that of determining ways in which freight transportation in the Southwest may be improved. Improvement of freight transportation in the Southwest is the goal of the research effort. The approach to this goal has been (1) to examine the existing freight transportation system, (2) to develop forecasts of the future demands on the system, and (3) to develop recommendations for the improvement of the freight transportation system. In order to provide for detailed examination of transportation problems, an intensive study area surrounding Dallas and Fort Worth was selected within the four-state overall study area. This report presents the results of the examination of one component of the freight transportation system in the Dallas-Fort Worth area.

Results Achieved

The first report in this series presents an inventory of the major users of freight transportation service in the Dallas-Fort Worth area. The second report covers motor common carrier service in the area. This

third report covers air freight service in the area. The fourth report will cover rail freight transportation service.

The Dallas-Fort Worth region traces the beginnings of its aviation history to the period just preceding World War I. Advances in aircraft use and technology were made during the inter-war years, and then were heavily stimulated by World War II. That war promoted a large increase in the numbers of trained aviation personnel, as well as in aircraft and air service facilities. In addition, many of the military aircraft were converted for commercial carrier operations in the domestic market during the immediate postwar period.

Since the mid-50's, all nine major airlines providing passenger services to the Dallas-Fort Worth area have provided air-freight and express service, while more than 100 air carrier firms provide indirect services by one means or another. Eighty-two civilian airports are served by the Dallas and Fort Worth Flight Service Stations; eighteen aerodromes provide all weather services. Fourteen designated heliports are located in the area.

Dallas maintains about 50 percent of the air freight market in Texas, and ranks tenth in the nation for the tonnage of air cargo originated. The goods moved by air to and from the Dallas-Fort Worth area can be categorized as follows:

(1) Animals, animal products, and produce

(2) Soft manufactures

(3) Mechanical and electrical products

(4) Miscellaneous shipments

From 1962 to 1972, area air cargo and air freight tonnages have demonstrated a trend of continued growth, but at a gradually decelerated rate. Air mail tonnages have evidenced a slight decline since mid-1971, while air express volumes have been dropping steadily since a peak level that occured in 1969.

While the amount of outbound air freight originating in Dallas-Fort Worth is less than the amount of inbound air freight arriving in the area, the outbound air freight has a wider distribution of terminal points. The Pacific, West South Central, Middle Atlantic, and East North Central regions maintain a large share of the Texas manufacturers' domestic air commerce ties, because they are heavily industrialized.

Over 90 percent of the Dallas-originated air freight has its surface origin in the Dallas-Fort Worth SMSA, it is estimated that 47 percent of the amount handled in the area goes through a forwarder or other non-air carrier operation. Several trucking agents cooperate with airlines to provide an air/truck pickup and delivery service. Some airlines have worked out special arrangements with common carrier truck lines for the delivery of freight that includes both air and surface transport modes.

Ground handling of air cargo is performed by several types of operating firms, including: small parcel handlers that specialize in air express shipments having certain size and weight restrictions; local forwarders under contract with one or more airlines to pickup and deliver cargo assigned to those airlines; national forwarders with agents or terminals in many major cities; and small local forwarders which may be either low volume air freight specialists, firms operating among several modes of freight transportation, or local cartage haulers transporting items to and from local

air terminals.

The freight forwarder sector of air cargo ground handling operations has seen substantial growth in both volume handled and total market share accumulated during the past few years. The forty-nine firms now performing air freight forwarder functions in the Dallas-Fort Worth area represent a fivefold increase over the number of firms serving the area in 1960. Five of the forty-nine firms account for nearly two-thirds of the air freight and express volume originated or terminated in the area.

Of the thirteen commuter airlines which serve points in Texas, six provide the Dallas-Fort Worth area with scheduled service. The commuter lines serving the area show wide variation in the emphasis they place on air cargo as part of their business; some lines push freight service while others approach air freight in a passive manner. Air cargo haulage by commuter carriers in Texas has seen substantial growth during the past three years.

Dallas is the originating point for about 20 percent of the state's international air shipments. Over 75 percent of the total Texas air shipments to and from international locations involve Europe, Great Britian, and Canada.

Some all-freight flights have experienced cutbacks as a result of the 1973-74 fuel shortage, and this has caused a realignment of freight scheduling. Considering the probability of continued scarcity of fuels, and present technologies in freight handling and transportation, future economic expansion can be expected to be of an intensive rather than extensive nature. It is likely that the future of air cargo will reflect new

technological developments that will result in increased operating efficiencies and decreased costs.

Utilization of Results

This inventory of air freight service in the Dallas-Fort Worth area should be useful to both operators and users of air freight transportation service and to those with an interest in such service. The report should also be useful to transportation planners and to researchers conducting similar studies involving other geographic areas.

Conclusions

The metropolitan portion of the Dallas-Fort Worth area is well provided with air freight transportation service and makes extensive use of the service. The lack of adequate freight transfer opportunities between transport modes inhibits the use of air freight service in rural areas of the Dallas-Fort Worth economic area and in other rural areas of the Southwest. Problems facing the air freight industry include cargo security and the uncertain availability of fuel in the future.

PREFACE

This report presents an inventory of existing air freight transportation facilities, services, and practices in the Dallas-Fort Worth area. The material, in combination with similar reports on the other methods of freight transportation, will be used in the formulation of recommendations for the improvement of freight transportation in the Southwest.

This is the fifth in a series of reports describing the work in Topic III of Research Project DOT-OS-30093, entitled "Transportation to Fulfill Human Needs in the Rural/Urban Environment." Topics being developed are: I. Access to Essential Services; II. Influence on the Rural Environment of Interurban Transportation Systems; III. Transportation Development in the Southwest with Emphasis on Intermodal Freight and the Dallas-Fort Worth Airport; IV. Ride Quality Evaluation in Multimodal Systems; and V. Human Response in the Evaluation of Modal Choice Decisions. The reader may find it advantageous to review Reports Nos. DOT-TST-75-29 and DOT-TST-75-30 which provide background material for this report.

This is the third report in a series that deals directly with the inventory of freight transportation in the Southwest. Several other reports concerning the improvement of intermodal freight transporation in the Southwest are being submitted as they are completed.

Facilities and research materials of the Bureau of Business Research of The University of Texas at Austin were used in the preparation of this report. The research was supervised by Dr. Stanley A. Arbingast, Professor

of Resources and Director of the Bureau of Business Research, Dr. Hampton K. Snell, Professor of Transportation, and Charles P. Zlatkovich, Research Associate and Transportation Specialist. The author was assisted in data collection by Eugene Robinson, James S. Wilson, and Charles W. Adams, Research Associates; Mike Dildine and Marilyn Turnbull reviewed the work and made constructive comments. This report was edited and prepared for publication by Kathleen Luft. Typing and composition were done by Jewell Patton, Jennifer Brewster, and Clintsy Sturgill. Offset printing was the work of Robert Dorsett and Daniel Rosas, assisted by Robert Jenkins and Salvador Macias.

J. Bryan Adair

May 1974

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CHAPTER I

HISTORICAL BACKGROUND

The air transportation business in Texas has a long and colorful history. Physical characteristics of the state such as the mild climate with a predominance of clear weather, vast areas of flat or rolling prairies, and relatively great distances between the larger cities provided a natural environment for the early development of air transportation. This setting, along with the production of increasingly reliable aircraft, the effective use of aircraft in World War I, and the general acceptance of aviation technology as a part of the socio-economic development of the maturing American structure, paved the way for significant advances in air transportation during the postwar decade.

Having early recognized the business potential of a strong civilian aviation structure, Texas commercial organizations encouraged development of airport facilities in many areas; in 1919 the Texas chamber of commerce managers passed a resolution that included commercial aviation in their plans for postwar development of the state.[1] A number of cities opened municipal airports during the war years or soon thereafter, and numerous air shows and demonstrations further developed the air-mindedness of Texas citizens.

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[1]Carl Blasig, Building Texas, p. 184.

Both Dallas and Fort Worth have interesting aviation histories. Aerial demonstrations had been held in the area as early as 1911, and by 1915 the appearance of aircraft in the skies was not unusual. Both cities became aviation cadet training centers for Canadian and then American military pilots during World War I. Love Field in Dallas was established for training purposes in the fall of 1917 under the auspices of the U.S. Army Signal Corps. After the war the field was sold to private owners but remained a flying facility. In 1928 the field was acquired as the city's municipal airport. A terminal was built in 1929, and in 1931 the runways were paved. Meacham Field in Fort Worth, also one of the state's early aerodromes, for many years served as the city's primary commercial airport.[2]

The Airmail Act of February 2, 1925 provided for the carriage of mail by private carriers, and in 1926 and 1927 a number of mail routes operated by private carriers were established. Prior to the end of 1926 a coast-to-coast around-the-clock airways system had been designed by the Post Office Department. Commercial aviation began in Texas May 12, 1926, with the implementation of the first airmail service to Texas between Dallas-Fort Worth and Chicago. Scheduled passenger service began in 1928 with the design of intrastate routes between Dallas and San Antonio, between Fort Worth and Galveston, and between Dallas-Fort Worth and Wichita Falls. The air mail routes of the time also carried passengers on a standby basis and at least one firm carried express. In addition, a number of the approximately sixty landing fields in the state had air taxi service available for passengers or express shipments.

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[2]For brief aviation histories of Dallas and Fort Worth see: Dallas Morning News, October 20, 1957, Part 8; Fort Worth Star Telegram, June 4, 1967, Section H.

Not only was express carried by individual air carriers in the early days of Texas aviation, but organized express forwarding services were available to shippers. The Railway Express Agency began its Air Express service on September 1, 1927, and scheduled express service has been available since that time. Dallas was one of the cities initially a part of the joint air-rail-water nationwide system that provided local truck pick-up and delivery service. In addition to the Railway Express Agency service, local freight forwarding firms served as interfaces between shippers and air carriers.

During the following few years a number of airlines were established, and they filled out the air network connecting the Dallas-Fort Worth area with other parts of the state and nation. A large number of these firms depended heavily on airmail contracts, but others primarily served passenger markets. A mail carrier, National Air Transport, Inc. operating between Dallas and Chicago had approximately 1.2% of its haulage taken up with express in the first six months of 1930; another carrier, Western Air Express, primarily serving the passenger market between Dallas, El Paso, and Los Angeles, carried express making up approximately 13.3% of the total weight hauled during the same half-year period.

In the years following the Airmail Act, national air transportation policy encouraged the development of more spacious aircraft that could comfortably accommodate passengers as well as mail and express. Similarly, night flying was encouraged, which in turn brought about the development of basic navigation instruments and the implementation of safety measures such as lighting tall buildings, towers, and other hazards to aviation.

By the late 1930's, reliable and comfortable air transport equipment had been developed for airline use, and standardized airport and inflight operating procedures were coming into use. Air transport services had begun to mature by the end of the decade, and newer aircraft designed for commercial use were well advanced in design before World War II. This new generation of aircraft, however, was first to be used in military transport service during the war.

Even with the depression of the 1930's, the air transport business grew in Texas as terminal facilities, aircraft equipment, and navigation techniques were improved. By 1939, 133 landing fields existed in the state, fifty-two of which were operated by municipalities. The Dallas-Fort Worth region saw substantial local growth in air-related industries between the world wars, with several major aircraft manufacturers located in the contiguous communities. These industries have provided a significant part of the north central Texas industrial base since the 1920's, a base that has continued to the present.

Because of its physical environment, which allowed the development of air commerce, and the air-mindedness of the public, the Dallas-Fort Worth area early captured and held a much larger percentage of the national air cargo market than would be demanded by the portion of the national population residing in the area alone. The air-minded infrastructure of the community has encouraged the establishment of area manufacturing and commercial enterprises that make frequent use of air cargo services. This situation has been enhanced by the central location of the region and its function as a primary distribution and collection terminal area.

For many years Dallas alone commanded more than 2% of the national air commerce volume. This percentage has fallen slightly below 2% since the development of reliable all-weather service facilities in the northern regions of the country in recent years, but the present volumes are still much greater than that expected if cargo volumes were highly correlated with regional population densities.

Although air express has been transported on scheduled flights through Dallas-Fort Worth since 1927 and freight was hauled intermittently and by special flight, no scheduled air freight service appeared in Dallas until 1944. In that year, American Airlines inaugurated regularly scheduled airfreighter flights through Love Field on its transcontinental flights.[3] By the mid-1950's all the major airlines serving the area were providing freight service. American, Braniff, Delta, and Slick Airways (an all-cargo line) were the primary freight service airlines at the time and emphasized their air freight services.

World War II stimulated advances in aircraft technology and resulted in a large increase in the number of trained aviation personnel. Additionally, a large number of military aircraft thought to be suitable for commercial carrier operations were placed on the domestic market at low prices at the end of the war. Radio navigation aids, radar following services, advanced aircraft engines, and the training of a large number of technicians capable of working in all phases of the aviation industry provided a substantial foundation for postwar advancement. At the end of the war a number of enterprising exmilitary pilots started their own

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[3]"American's Story Has Lots of Color," Dallas Morning News, October 20, 1957, Sect. 8, p. 11.

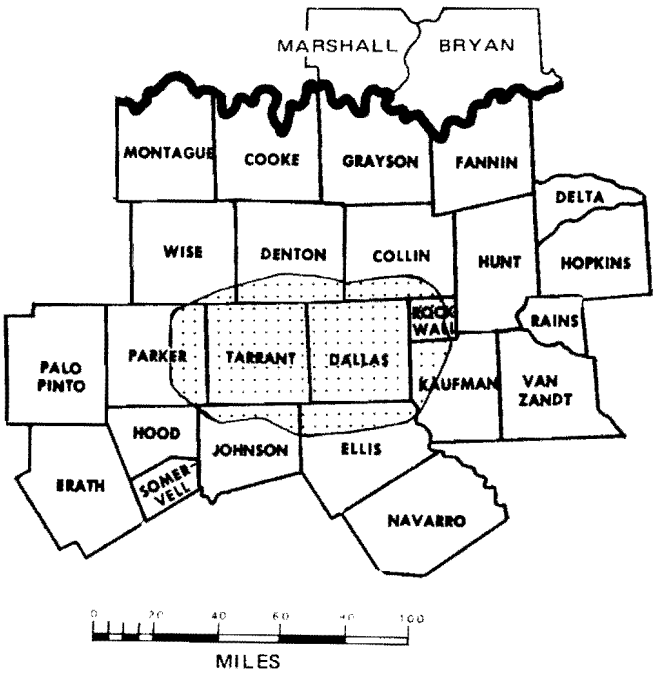
flying services in Texas and elsewhere in the country. A number of these businesses were based in the Dallas-Fort Worth area; some are still operating in some phase of air service, but many have been unsuccessful, primarily because competing firms did not base rate schedules on total operating costs; cut-throat competition between firms serving private civilian markets resulted, and consequently, failure rates of air freight carrier firms have been high since the war. Nevertheless, the immediate postwar experience undoubtedly provided a healthy and competitive background for the growth and maturity of the various air service industries in the 1950's and later.

CHAPTER II

CHARACTERISTICS OF THE DALLAS-FORT WORTH REGIONAL AIR MARKET

Definition of the Market

The study addresses the twenty-six county region surrounding and including Dallas and Fort Worth. Specific counties and their spatial relationships to the Dallas-Fort Worth metroplex are shown in the map below. The multicounty area is defined by the Office of Business



Economics of the Department of Commerce as the Dallas-Fort Worth Economic Area. Air commerce within the region is primarily focused in the Dallas-Fort Worth metroplex, encircled and highlighted by the dotted texture. Somewhat less than 10% of the air cargo originated in the twenty-six

county area originates outside of the smaller encircled area. Scheduled air service to the region is provided only to points in the smaller area; in addition, the metroplex includes most of the all-weather airports serving the region.

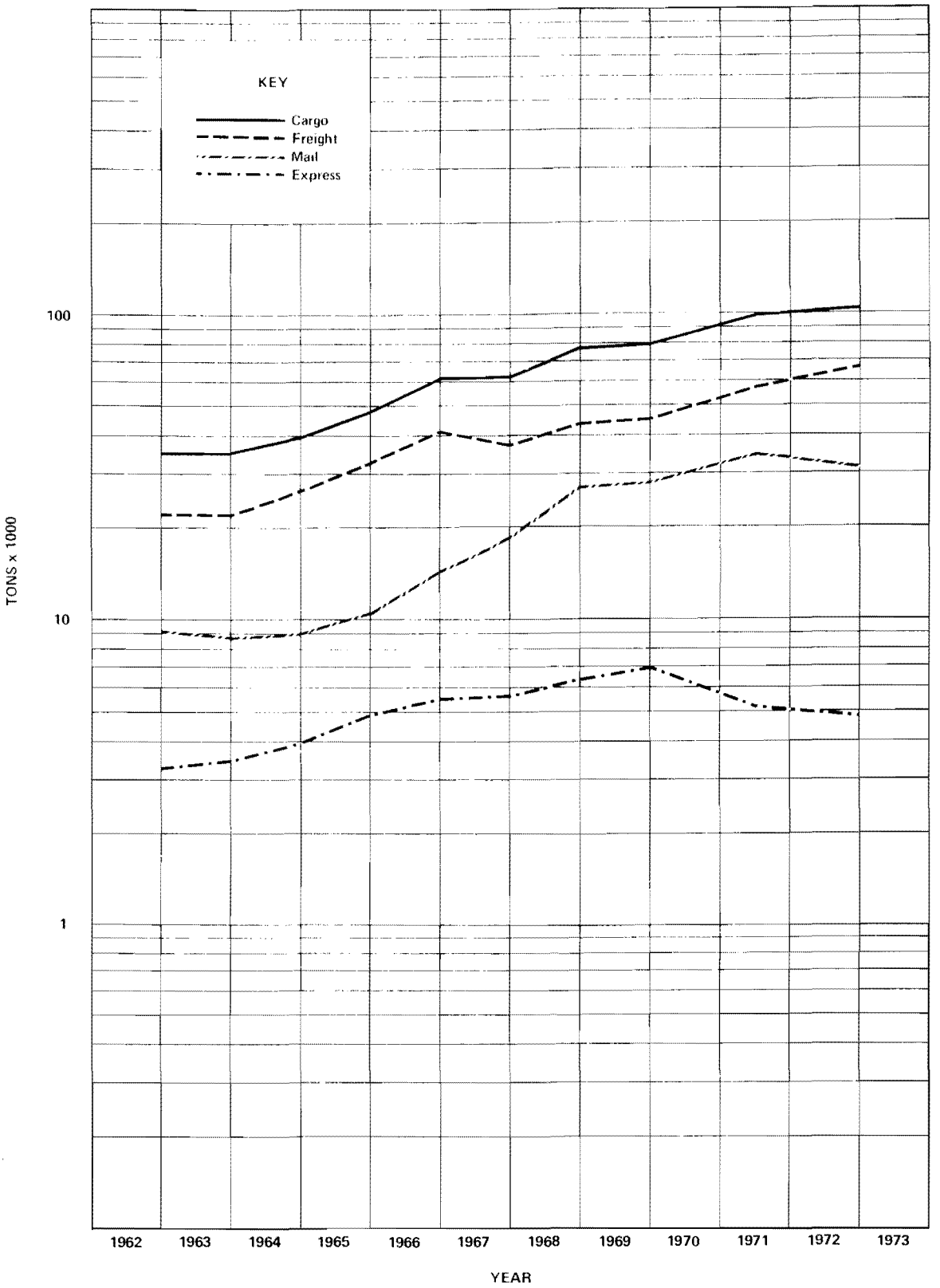
Recent Trends

The amount of air cargo originated in Dallas is exceeded by only nine other U.S. airports. Of the cargo originated at the twenty-two large air hubs in the country, Dallas originates almost 4% of the total (Chicago, the largest-volume hub, originates more than 16% of the twenty-two hub total). Dallas is the most significant air freight origination point in the state, with Houston and San Antonio following in second and third places. Roughly, Dallas maintains about 50% of the air freight market in Texas, with Houston and San Antonio splitting much of the remainder in proportions of two-thirds and one-third respectively.

Trends of air cargo haulage through Dallas-Fort Worth saw some interesting fluctuations during the 1960's, some of which are illustrated in Figures 1 and 2. In the years 1963 through 1966 tonnage growth rates ranged from 18% to 31% per year, with an average of 24%. In 1967, however, a 12% decrease in the volume of the previous year was realized. Growth in cargo weight advanced again in each year between 1968 and 1972, but the yearly growth rates fluctuated between 6% and 16% with an average for those years of 11%. It is significant that the growth rates during none of the five latter years approached even the average of the first three years. The more recent growth appears to have been more sustained and moderate than during the earlier period, but an 11% average annual growth

FIGURE 1

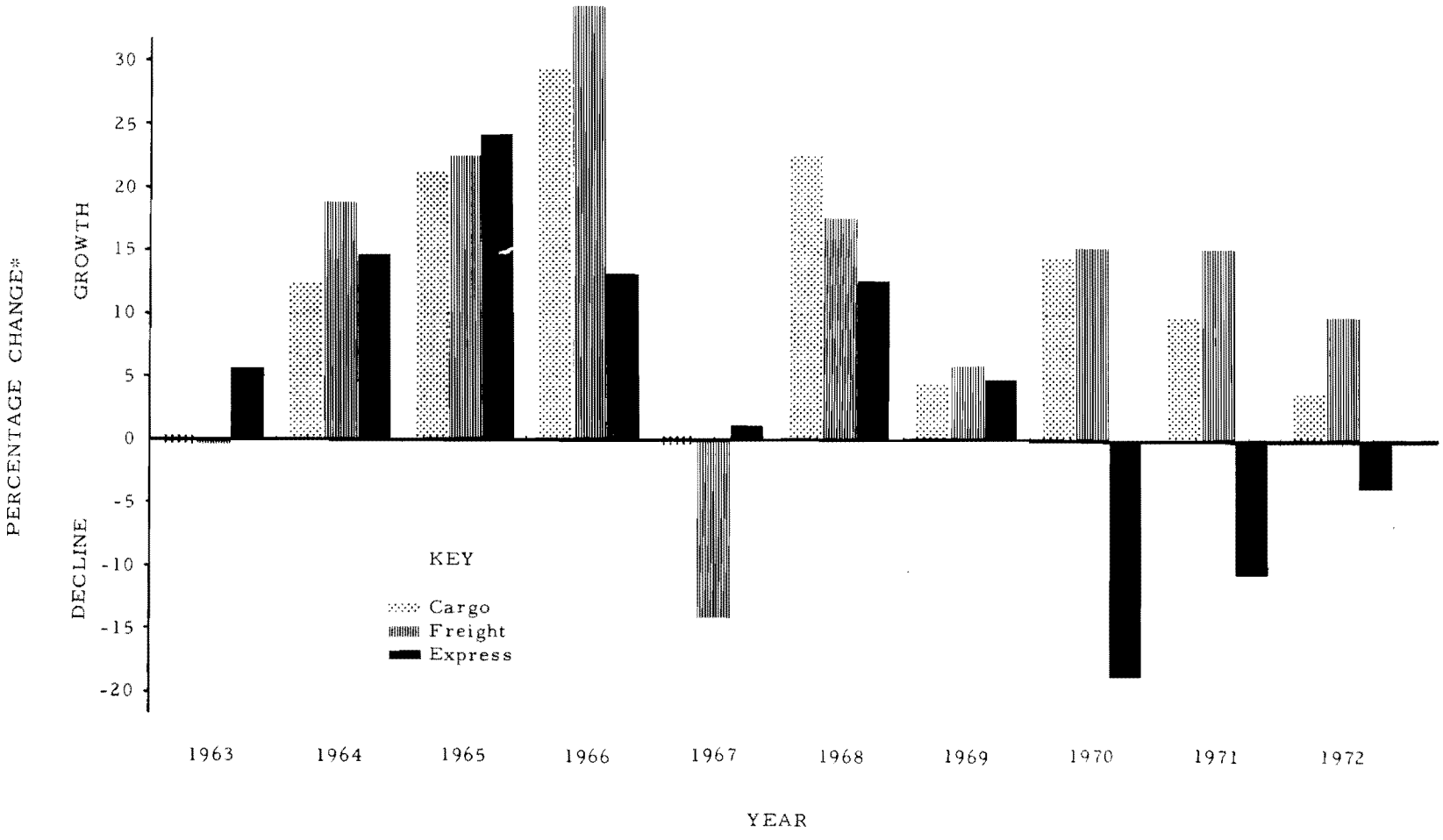
DALLAS-FORT WORTH ENPLANED EXPRESS, MAIL, FREIGHT, AND TOTAL AIR CARGO 1962-1972



Source: Airport Activity Statistics of the Certificated Route Air Carriers, 1962-1972.

FIGURE 2

GROWTH TRENDS OF AIR CARGO, AIR FREIGHT & AIR EXPRESS
IN THE DALLAS-FORT WORTH MARKET



*All growth and decline rates are percentages of previous year volumes
Source: See Figure 1.

is respectable, nevertheless. The lumpy nature of the growth and the periodic high and low growth rates in air cargo haulage are indicative of a young industry. The apparent damping of the growth surge in the late 1960's and early 1970's (when compared to the growth early in the 1960's) indicates an increasing amount of industry maturity and possibly a change in customer characteristics and use of air freight as a method of transport.

The above discussion addresses the combination of air freight and air express tonnages. The two components show somewhat different characteristics. In general, trends for air freight tend to dominate the total if the analysis is based on tonnages hauled (air freight tonnages far exceed those of air express). Consequently, characteristics of air freight growth largely mirror those of the combination, but in general, fluctuations of freight alone exceed those of the combined trend. Between 1963 and 1966, air freight volume growth fluctuated between 19% and 34% per year and averaged 25%. During the later period (1968-1972) the growth of the sector was moderated, with variations between 6% and 18% and averaging 13%. The greatest growth rates during the latter five-year period approached only the minimum rates of the previous three-year period. Nevertheless, in high-growth years, expansion of the air freight sector slightly exceeded that of air cargo in general, but the drop in air freight growth rate during low-volume years also exceeded that of air cargo in general.

Air express is a much older business than is air freight. The idea of sending small, high-value packages was established in the 1920's as a feasible use of air carriage, but the idea of hauling large, medium-

value-per-unit-weight items by air did not become established until World War II. As a result of the more mature and institutionalized nature of air express, fluctuations in tonnage carried are not so closely related to economic cycles as are air freight tonnages. An inspection of Figure 1 reveals that air express volume fluctuations are not directly in phase with similar changes in air cargo or air freight. Air express experienced a generally sustained growth between 1962 and 1969, with yearly growth rates ranging between 1% and 23%, and averaging 11% per year.

In contrast, the years 1969 to 1972 saw significant losses in air express tonnage, the yearly averages ranging from -19% to -4% and averaging -11% per year in volume during this period. The generally sustained growth prior to 1969 was almost reversed after that year and the decline continued at least through 1972. By 1972, however, the trend shows that the losses were tapering off and growth may again be apparent during the mid-1970's. In effect, air express had seen a steady and sustained growth until a change in the institutional market structure apparently transferred a segment of the express business to the air freight sector. (This readjustment will be discussed further in the following paragraph.) Until the loss settles out, air express tonnage growth trends are likely to taper off for a time.

As the air freight industry has grown toward maturity, specialized air freight forwarders have become more and more a part of the business. At the present time, approximately 47% of all air freight shipped on full service airlines from the Dallas-Fort Worth area is forwarded by these businesses. In building up their operations, air freight forwarders have

developed tariffs for parcels that undercut the charges for similar air express packages. The forwarders consolidate these packages in containers and ship them at air freight rates, thus making money on the difference between the air freight and their own package tariffs, but charging shippers less than the air express tariff rates. As a result of this development, many package shipments have been transferred from the express carriers to freight forwarders. Chapter IV deals with air freight forwarders in more detail.

Domestic Commerce

Texas manufacturers that ship products by air have fairly close commercial air ties with several regions of the nation. As shown by Table 1, Texas shippers appear to have close air cargo ties with the Pacific, West South Central, Middle Atlantic, and East North Central regions of the nation. These areas are more heavily industrialized than are the remaining sections of the country. Figure 3 relates the domestic data in Table 1 with particular areas. This map suggests that freight volume is closely related to population density and specific

TABLE 1

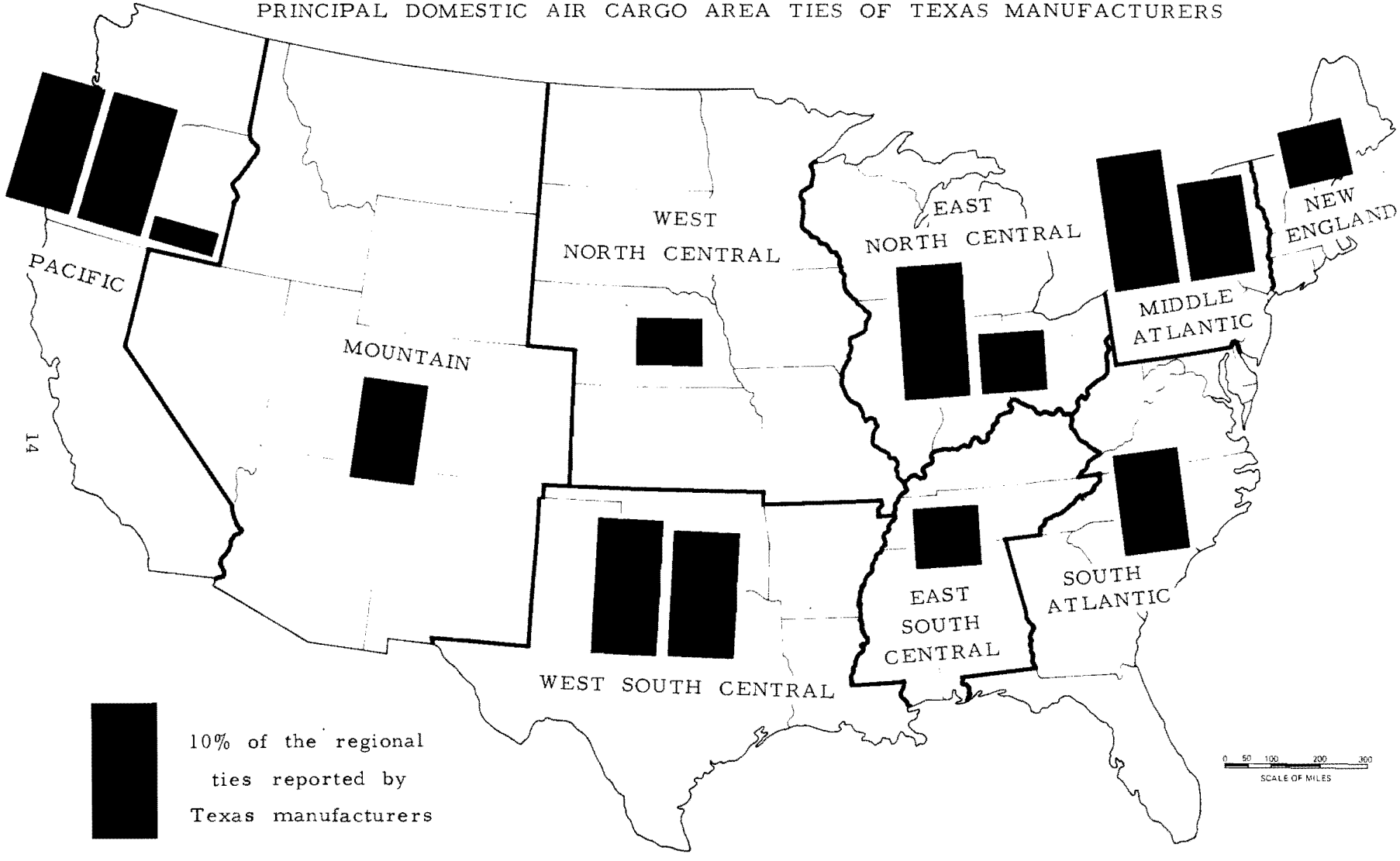
TEXAS MANUFACTURER TIES WITH DOMESTIC PLACES THROUGH AIR COMMERCE*

Domestic Regions	Percent of Domestic Air Commerce Ties
Pacific	22%
West South Central	19
Middle Atlantic	17
East North Central	14
South Atlantic	8
Mountain	7
East South Central	5
New England	4
West North Central	4

*Based on data in Texas Airport Plan, p. 3-58.

FIGURE 3

PRINCIPAL DOMESTIC AIR CARGO AREA TIES OF TEXAS MANUFACTURERS



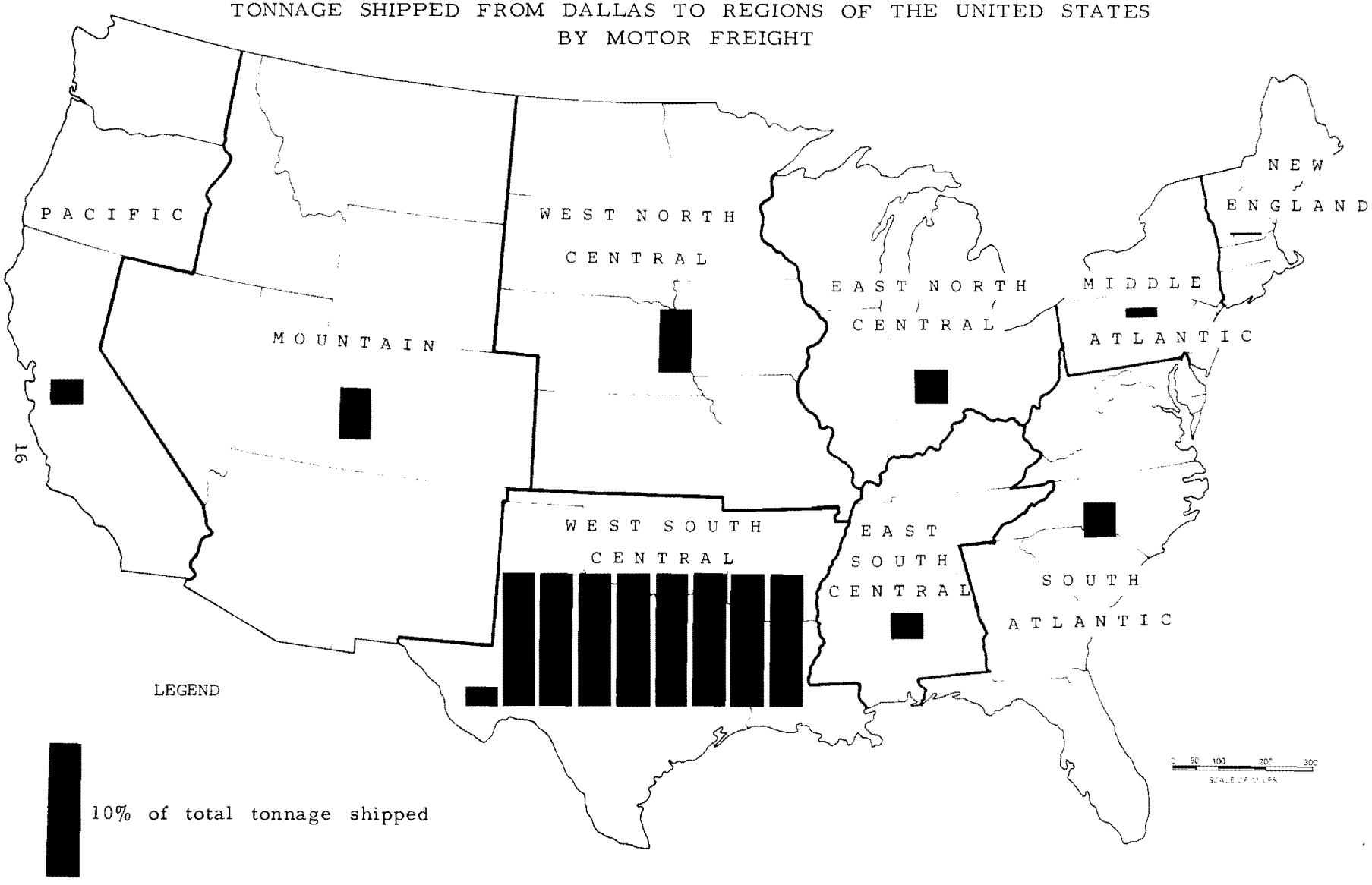
Source: Texas Airport System Plan--Air Cargo Analysis and Forecasts p. 3-58

kinds of industrialization present in areas of the country. Distance relationships are shown to be instrumental in the choice between air and surface modes of shipping freight, as shown by a comparison of Figure 3 and Figure 4. Figure 4 is a mapping of motor freight tonnage relationships between the Dallas-Fort Worth metroplex with the various sections of the country. The percentage of total surface commerce between Dallas-Fort Worth and the West South Central region is far greater than the similar percentage of air commerce. On the other hand, the high percentage of commercial ties through air commerce with the Pacific region, especially when compared with truck volume relationships with the area, indicates that some Texas businesses have unique connections with firms of that area.

A comparison of the maps showing the number of commercial air ties by Texas manufacturers with the various regions of the nation (Figure 3) and the map showing tonnage shipped by motor freight to the various parts of the country (Figure 4) gives a feel for the relative market distributions of the two carrier modes. Unfortunately, since these maps are not directly comparable, the reader may only gain an intuitive feel rather than an absolute comparison for the regional relationships involved. In any case, the great bulk of goods produced in the West South Central region that are transported by motor freight are shipped to points within the same region. Relatively small proportions of motor freight tonnage are sent to the markets of the greatest distance, even though both the Pacific and Middle Atlantic regions are heavily industrialized. In contrast, both of the latter regions hold a relatively large share of the Texas manufacturers' domestic air commerce ties. Trends indicated by both maps were substantiated by interviews with agents of both common carrier motor freight firms, and of air carriers and air freight forwarders.

FIGURE 4

TONNAGE SHIPPED FROM DALLAS TO REGIONS OF THE UNITED STATES
BY MOTOR FREIGHT



Source: 1967 Census of Transportation

In addition to the differing area/volume trends apparent in the regional map comparison, similar but more areally limited relationships are shown in Figures 5 through 8. Primary originating areas for Dallas-Fort Worth bound air freight and motor freight are shown by Figures 5 and 6 respectively. Many of the same places of origin appear on both maps, but the emphasis on air freight is physically spread much more broadly than is motor freight. Motor freight shipments to Dallas-Fort Worth tend to be dominated by the midwestern and southern-southwestern areas of the country, while inbound air freight shipments appear to be more dependent on nonbasic industrialization and population densities of particular shipment originating areas.

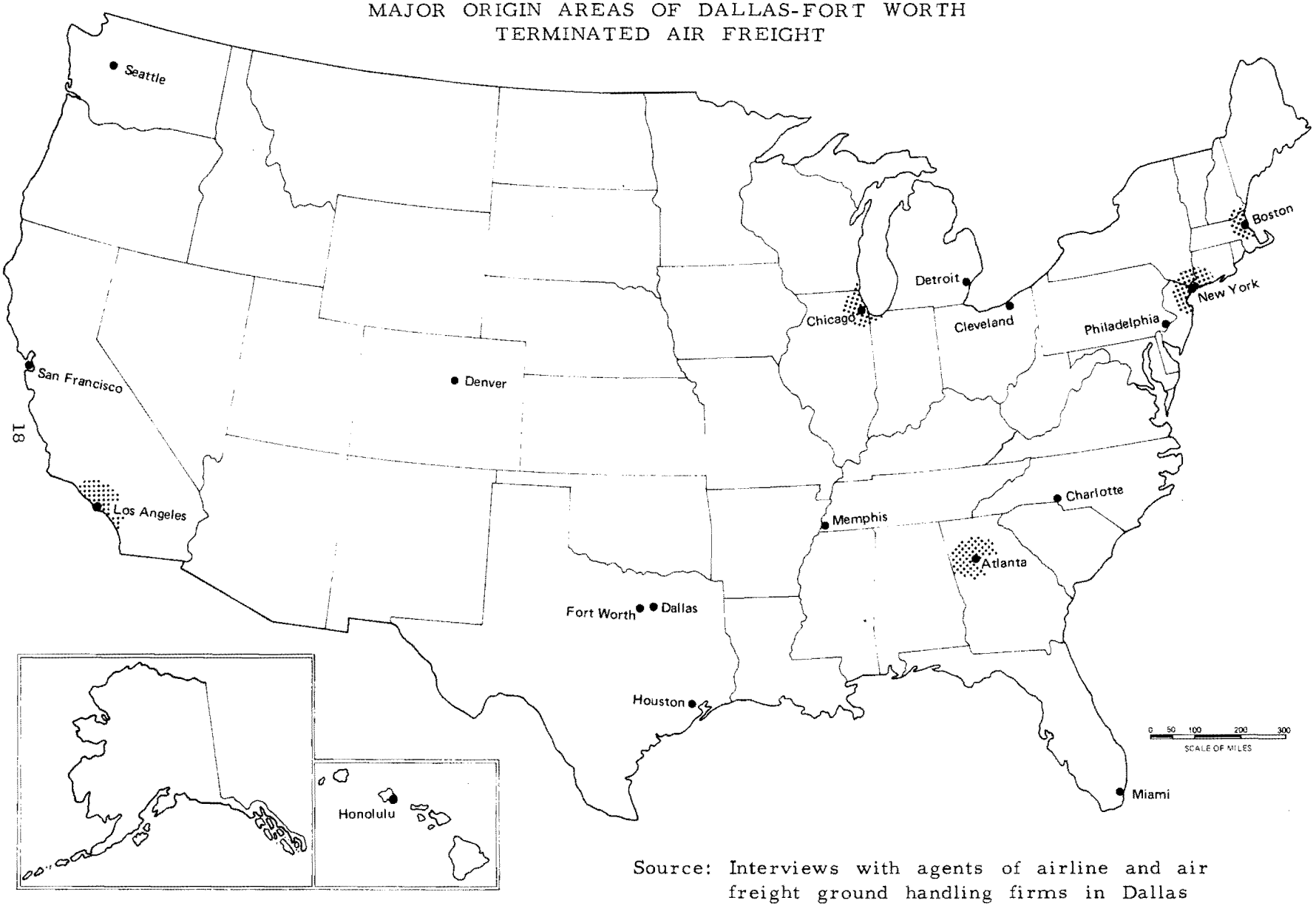
The volume of Dallas-Fort Worth originated air freight is smaller than the amount shipped into the area, but outbound freight appears to be distributed to a greater number of terminal points than originate freight bound for the area. Comparison of the origination area map (Figure 5) and the destination area map (Figure 7) suggests these differences.

Comparison of the termination area maps of Dallas-Fort Worth originated air and motor freight (Figures 7 and 8) shows distribution characteristics of the Dallas-Fort Worth freight market. In both air and motor freight, distribution from the region has a more scattered pattern than is obvious for sources of inbound commerce. Again, the air distribution system appears to be closely dependent on population and nonbasic industry, while distance tends to have a more perceptible constraining force on motor transportation.

In the comparison of air and motor freight, it appears that the bulk of the respective outbound haulage markets differ substantially.

FIGURE 5

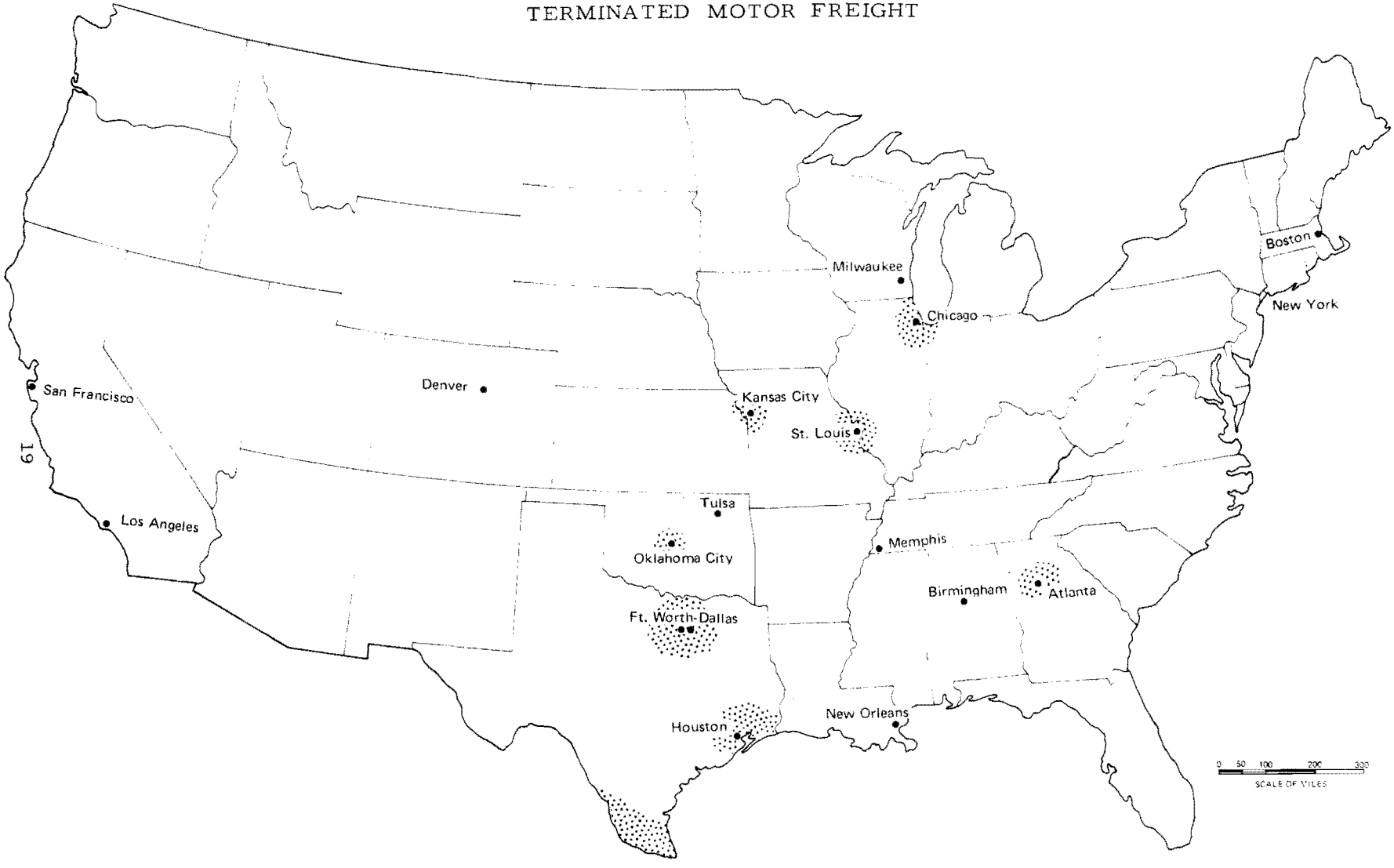
MAJOR ORIGIN AREAS OF DALLAS-FORT WORTH TERMINATED AIR FREIGHT



Source: Interviews with agents of airline and air freight ground handling firms in Dallas

FIGURE 6

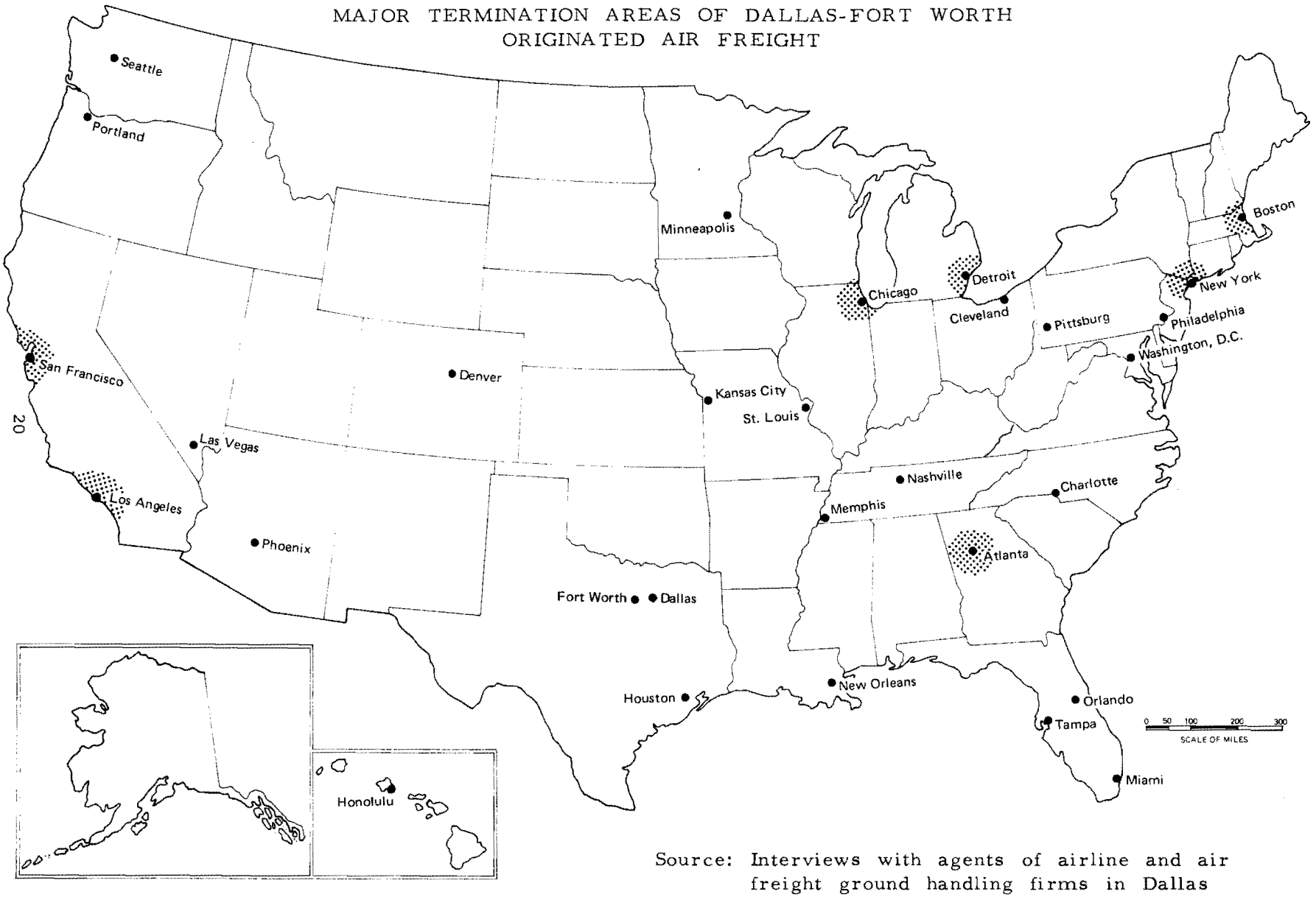
MAJOR ORIGIN AREAS OF DALLAS-FORT WORTH
TERMINATED MOTOR FREIGHT



Source: Interviews with agents of common carrier motor freight firms in the Dallas-Fort Worth SMSA

FIGURE 7

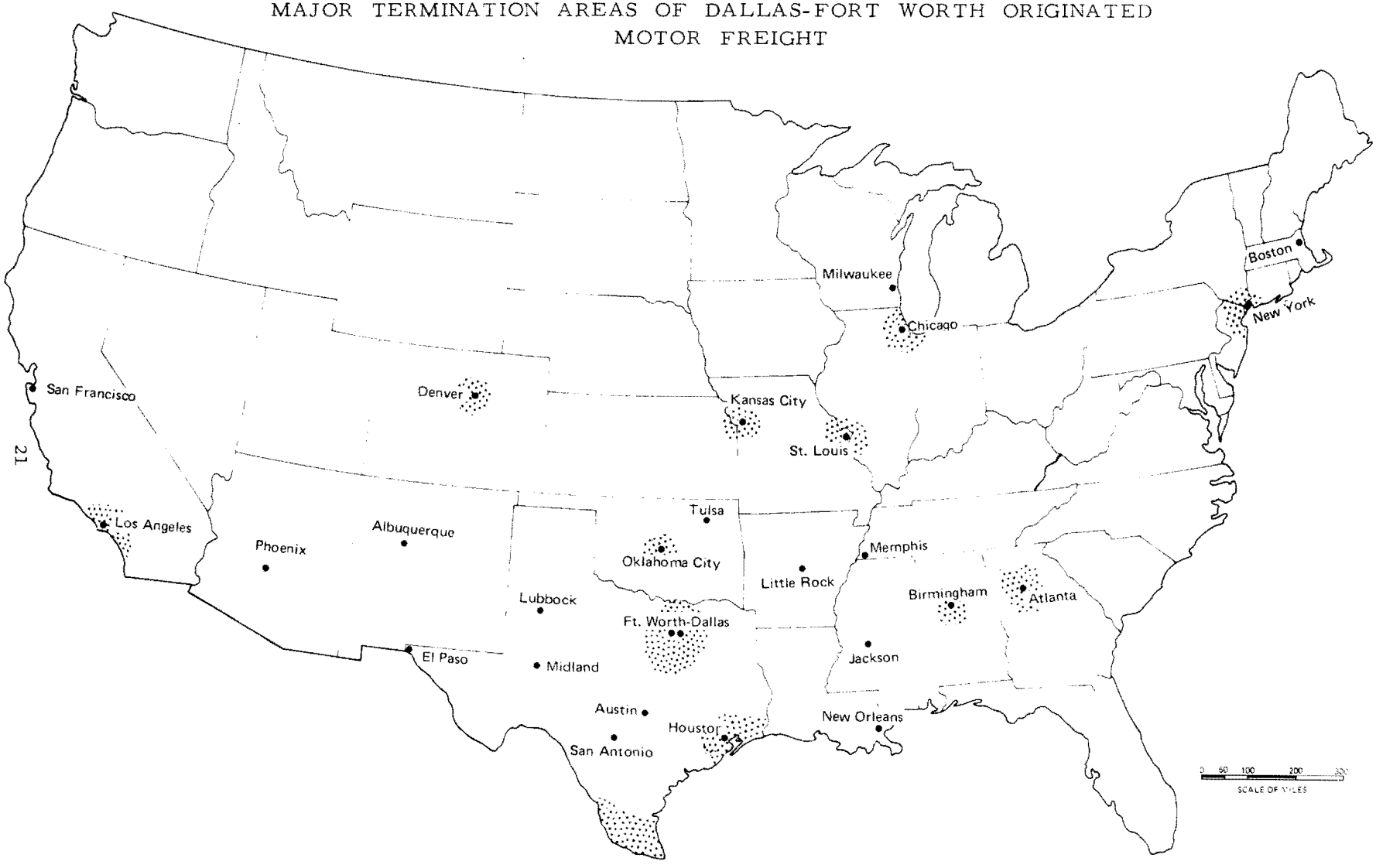
MAJOR TERMINATION AREAS OF DALLAS-FORT WORTH ORIGINATED AIR FREIGHT



Source: Interviews with agents of airline and air freight ground handling firms in Dallas

FIGURE 8

MAJOR TERMINATION AREAS OF DALLAS-FORT WORTH ORIGINATED MOTOR FREIGHT



Source: Interviews with agents of common carrier motor freight firms in the Dallas-Fort Worth SMSA

Air freight distributed from Dallas-Fort Worth appears not to consist of goods distributed from warehouses or break-bulk facilities for consumption in the Southwest; this market is served by motor freight and private motor carrier operations. The distribution of goods to merchants or to service dealers is the primary function of outbound motor freight, while air freight shipments outbound from the area consist largely of component parts or partly processed materials for industrial use in areas other than the Southwest.

Foreign Commerce

Texas-originated air freight is shipped to all parts of the globe, but a few regions predominate as destinations for this commerce. As shown by Table 2, Europe and Great Britain are the recipients of almost one-half of the international shipments of Texas manufacturers, while Canada claims more than one-half of the remainder. Houston, San Antonio, and Dallas originate most of the international air freight shipped from

TABLE 2

TEXAS MANUFACTURER TIES WITH INTERNATIONAL PLACES THROUGH AIR COMMERCE*

International Regions	Percent of International Air Commerce Ties
Europe and Great Britain	48%
Canada	28
Caribbean, Central and South America	11
Far East and Australia	10
Africa and the Middle East	3

*Based on data in Texas Airport System Plan, p. 3-58.

Texas via scheduled air carriers. Dallas originates about 20% of this commerce, but the volume makes up less than 1% of the total freight originated in Dallas. Comparative figures for the three cities are shown in Table 3.

TABLE 3

CHARACTERISTICS OF INTERNATIONAL AIR SHIPMENTS FROM TEXAS VIA THREE MAJOR SHIPPING POINTS*

Community of Origin	International freight as a Percent of Total Community Originated	Percent of Three-Community International Total
	Volume	
San Antonio	12.5%	32.4%
Houston	4.2	47.5
Dallas-Fort Worth	0.8	20.1

*Figures based on calendar 1972 data.

In 1962, 5.3% of the air cargo shipped in Texas had international destinations. This percentage saw increases through 1964 (to 5.9%), but since that time, the state has experienced a general, though not regular, decline (to 2.9% in 1970) in the number of shipments destined for foreign points as a percentage of total shipments. Even though the portion of freight shipped abroad shows the above pattern, the absolute numbers of tons carried in this commerce increased between 1962 and 1967 by about 80%, but had fallen by 1970 to 125% of the 1962 volume.[4]

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[4] Texas Airport System Plan--Air Cargo Analysis and Forecasts, p. 3-15.

Area Airports

The twenty-six county study area contains a large number of air facilities. The Dallas and Fort Worth Flight Service Stations (FSS) alone serve eighty-two airports and the FSS facilities at McAlester, Oklahoma, and Mineral Wells, Wichita Falls, and Tyler, Texas, each serve a number of landing fields in the region. In addition to airports, the area contains fourteen designated heliports, most of which are in the Fort Worth community. A display of the fifteen all-weather airports in the area is shown in Table 4. All of these airports have surfaced runways (asphalt or concrete) but the kind of aircraft that may land is limited in some cases because of runway length or aircraft weight limitations.

TABLE 4

ALL WEATHER CIVILIAN LANDING FIELDS IN THE TWENTY-SIX COUNTY DALLAS-FORT WORTH ECONOMIC AREA

Airfield	City or Area Served	Length of Longest Runway (feet)
*Addison	Dallas	7,200
*Arlington Municipal	Arlington	4,000
Bridgeport Municipal	Bridgeport	3,500
Clark Field Municipal	Stephenville	4,200
Commerce Municipal	Commerce	3,200
*Dallas-Fort Worth Regional	Region	11,400
*Dallas Garland	Garland	3,500
Denton Municipal	Denton	4,100
Eaker Field	Durant, Ok.	5,000
*Greater Southwest International**	Region	9,000
*Lancaster	Dallas	3,000
*Love Field	Region	8,800
*Meacham Field	Fort Worth	5,200
*Oak Grove	Fort Worth	2,900
*Redbird	Dallas	5,400

*Airport located in Dallas-Fort Worth SMSA.
**Flight operations at this airport were discontinued in January 1974.
Source: Airman Information Manual-Airport Directory, Part 2. Autumn-Winter 1973-74, Department of Transportation.

Seven of the all-weather airports in the region are located in the Dallas-Fort Worth metroplex. The primary commercial airport in the area is the Dallas-Fort Worth Regional Airport, located northwest of Dallas and northeast of Fort Worth. This new facility is about seventeen miles from the downtown areas of both cities. Travel time between the downtown areas and the airport may be as much as an hour, somewhat greater than the ten to fifteen minutes between downtown Dallas and Love Field but possibly less than the travel time between points in Fort Worth and Love Field. Both cities have general aviation aerodromes near downtown areas that could potentially provide convenient air freight services. Presently, (April 1974) litigation is in process that could determine the extent to which both Meacham Field in Fort Worth and Love Field in Dallas will be used for commercial services in the future. Air operations at Greater Southwest International, greatly curtailed in recent years, have been completely eliminated since the opening of the regional airport in January 1974.

Other civilian airfields in the area primarily serve general aviation needs, but certain amounts of freight and express are transported through these facilities by air taxi services and by private carriers. In addition to the fifteen civilian fields, the army, navy, and air force all have air facilities in the region, and military cargoes are moved to and from the area via these establishments.

Freight Handling Facilities

Both air freight forwarders and air carriers maintain ground terminal areas in the major cities of their respective air distribution and

collection markets. Terminal sizes, designs, and locations are varied, depending on how the particular firm visualizes markets and other, more basic, constraints such as cost and availability of facilities. In Dallas the spaces ranged from a metal building with approximately 1,500 square feet of floor space, located near Love Field and shared by four forwarders, to much larger buildings occupied by Braniff and American Airlines. The latter buildings, located at the Love Field air facility, each have about 35,000 square feet of floor space.

Since the opening of the Dallas-Fort Worth Regional Airport, many of the ground handlers and air carriers have moved their operations to the new facility. Braniff and American have doubled their freight handling space with the move; a number of the freight forwarders have experienced similar expansions.

It is difficult to describe the "typical" ground facility because of the significant variations in size, market emphasis, and scope of markets addressed by the various air freight handling firms. On the basis of national figures, ground processing of air freight requires approximately one square foot of terminal space for each fifteen pounds of cargo handled daily.[5] Variations of as much as 40% on either side of the standard appear to be common. Except for one case, the major air freight handlers interviewed (both airline and ground freight/express handlers) occupied facilities with more space than the requirement indicated by the chart. The sample of air freight and express handlers

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[5]Based on building space requirements chart, Texas Airport System Plan, Air Cargo Analysis and Forecast, Figure 2-2, p. 2-24.

averaged about one square foot of terminal space for each seven pounds of cargo handled daily, while airlines interviewed averaged one square foot for each nine and one-half pounds of cargo handled daily. Even though Dallas operations used more terminal space than is commonly used in other parts of the country, several interviewees indicated that their new quarters at the Dallas-Fort Worth Regional Airport would be larger than those then occupied.

Most of the major air freight forwarders in the area maintain facilities of 5,000 to 12,000 square feet of floor space. Typically, such a terminal has from three to six truck loading bays. In addition, special equipment for handling containers is often provided. Conveyer systems composed of inverted casters bolted to the floor provide ready means for moving containers around the facility. Forwarder's trucks, usually bobtail vans, are also often equipped with inverted casters bolted to the van floors.

Airline freight facilities commonly consist of a ramp area for loading and unloading aircraft, a terminal building for sorting, routing, and administering freight service, and a pickup and delivery dock area. Nonflight equipment consists of fixed freight sorting, handling and storage facilities, mobile equipment such as cargo trains, cargo loading trucks, and sometimes specialized air craft loading equipment such as the Astroloaders used by American Airlines. Special trucks, equipped with a pantograph mechanism that elevates the van to aircraft cargo door level, are used by several airlines.

Airline-operated flight equipment primarily consists of the aircraft themselves. (Departure, inflight, and landing services and facilities are operated and maintained by governmental agencies.) Aircraft often have been designed specifically to handle freight. Such aircraft appear as all-cargo airfreighters, as wide-body passenger cargo aircraft, and as equipment convertible to either freight or passenger service use. However, a number of commonly used aircraft types include no special design features specifically built to accommodate freight. Freight hauled on runs using such an aircraft is usually hand loaded into the baggage compartments, sometimes in an apparently helter-skelter way.

Specialized packaging equipment consists of pallets and a variety of containers. Pallets have been largely standardized but containers often are not transferable between different aircraft types or even between the same type of aircraft flown by different airlines. Much of the air cargo handled is carried inside containers with capacities ranging from 250 pounds to over 3,000 pounds. Inside the terminal the containers are broken and the contents are sorted for delivery, or are moved manually on the system of rollers, described above, to the various loading docks for local delivery, or for delivery to more distant places (usually more than twenty-five miles from the airport) by common carrier motor freight services.

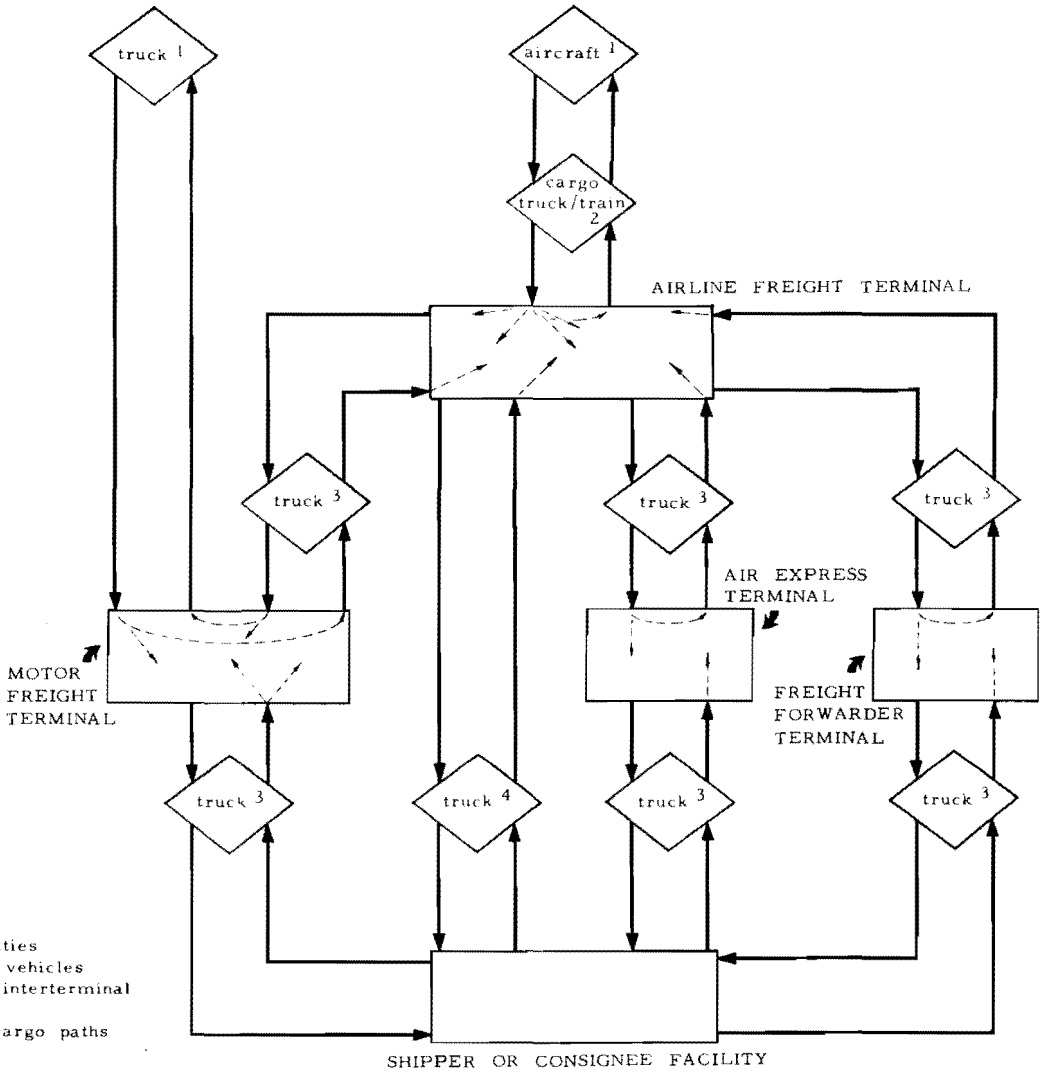
Freight Handling Modes

Local operations commonly taking place in Dallas-Fort Worth are illustrated diagramatically in Figure 9. Aircraft are unloaded (or loaded) and the freight is transported to (or from) the freight terminal

FIGURE 9

TYPICAL RELATIONSHIPS OF AIRLINE, MOTOR FREIGHT, AIR EXPRESS, FREIGHT FORWARDER, AND CUSTOMER FREIGHT OPERATIONS IN THE DALLAS-FORT WORTH AREA

This chart emphasizes intermodal air freight operations typical of the Dallas-Fort Worth area and ignores rail, water, and other operations that are not typically crossed with air in the area addressed. Air express handlers and freight forwarders together handle somewhat more than one-half of the non-mail air cargo volume shipped into or out of the area; less than one-tenth of the total is handled by motor freight firms, and the remainder is handled by private shippers or their local agents.



KEY

- Terminal facilities
- Transportation vehicles
- Intermodal or interterminal cargo paths
- Intraterminal cargo paths

NOTES

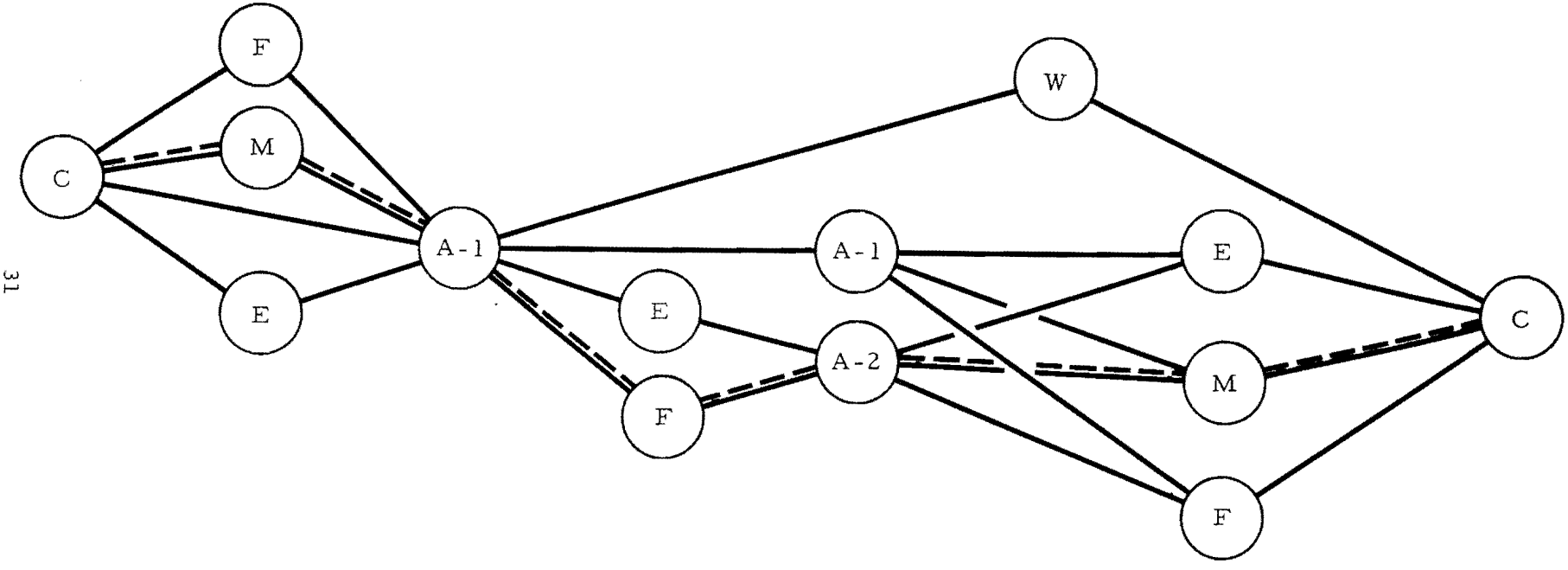
1. Intercity transportation vehicles
2. Ramp area loading equipment (cargo trains, cargo loader trucks, and Astroloaders)
3. Local pickup and delivery trucks operated by motor freight lines, air express handlers, and air freight forwarders
4. Trucks operated by shippers and consignees, or by local cartage firms acting as agents for shippers and consignees

in cargo trains or special trucks. In the terminal the freight is sorted for transshipment on the same airline, on another airline, or to an air express handler, forwarder, motor freight carrier, or other carrier. That freight not routed to other transportation service companies is picked up at the airline freight dock terminal by the consignee or his agent, possibly a local cartage company. Freight to be contined enroute by a motor freight carrier is picked up by that carrier and is mixed into its regular system at a break and collection terminal. Cargo to be handled by a freight forwarder or by an express company is picked up by that company and taken to its terminal for further air routing or for local delivery. In most cases, the shipper or consignee of freight can deliver or pick up his shipment at the air express or forwarder terminal. Figure 9 shows only one airline terminal and one of each kind of ground handler, since depiction of the nine or more airline facilities and nearly 100 ground handler terminals used in the Dallas-Fort Worth area would unnecessarily complicate the diagram. Obviously, forwarders and express handlers interline freight in the Dallas-Fort Worth area (see the A-1, E, A-2 or A-1, F, A-2 sequences in Figure 10) and airlines themselves transfer freight between their own flights in Dallas-Fort Worth.

Given a one-customer, one-forwarder, one-express-handler (REA Express), one-common-carrier motor freight company, a water transport firm, and a two-airline system, the relationships between the various parts can be diagrammed. In Figure 10 an activity node diagram of some intermodal freight transportation possibilities including air freight is shown. A shipper, C (at the left of the chart), would select the

FIGURE 10

ACTIVITY NODE CHART OF SOME INTERMODAL FREIGHT TRANSPORTATION POSSIBILITIES THAT INCLUDE AIR FREIGHT



This chart should be read from left to right. Activities (any handling of freight or express) are performed within the node circles; the lines merely indicate the path a typical air express shipment might take, while dotted lines illustrate a typical route for a shipment sent by air freight between points more than twenty-five miles from major commercial airports.

KEY

A-1 First airline
A-2 Second airline
C Customer (shipper or consignee)
E Air express handler
F Air freight forwarder
M Motor freight carrier
W Water transport carrier

best available means to transport goods to customer C (at the right end of the chart). His selection would depend on his geographical location, the size of the package or shipment, the location of the consignee, and which of the particular facilities were available in his and the consignee's areas. In most cases, many of the charted possibilities would not be feasible choices; for example, a Nevada shipper would not mix air and water routing if the shipment destination were New York.

To illustrate the system depicted, suppose a shipper in San Angelo, Texas, wanted to move a shipment of 300 pounds by air to Appleton, Wisconsin. He might choose to ship the consignment by Santa Fe Trail Transportation to Dallas; by either Braniff or American Airlines to Chicago; through an air freight forwarder between airlines at Chicago; by North Central Airlines to Green Bay or Oshkosh; and by Consolidated Freightways to the consignee in Appleton. This particular route is indicated on the activity node diagram (Figure 10) by dotted lines. Had the shipment been smaller, a package of forty pounds, for example, a possible handler would have been REA Air Express, since both San Angelo and Appleton are served by that company. In this case the origin airport would have been San Angelo and the destination airport would have been Oshkosh. The route most likely chosen by REA Express would have been: Texas International to Dallas-Fort Worth; Braniff or American to Chicago; and North Central to Oshkosh. REA would pick up the shipment from the shipper in San Angelo, interline it at Dallas and Chicago, and deliver it to the consignee in Appleton.

Similar procedures could be followed if freight forwarders had been used, but in most cases freight forwarders are limited to pick up and delivery within twenty-five miles of the originating or terminating

airports (or within the commercial zone served by the airport). It follows that a route including water transportation could be devised to illustrate that possibility. Usually such a route would be between a U.S. point and a foreign place, or between a U.S. point and Hawaii, Alaska, or some U.S. possession.

About 90% (by weight) of the Dallas-originated air freight has its surface origin in the Dallas-Fort Worth SMSA. That portion originating outside of the SMSA is brought in by truck for the most part. Several Texas motor carriers participate in an air/truck pickup and delivery program in which air cargo service is offered to small off-line cities. The operation of this system was illustrated earlier; the route shown in dotted lines on Figure 10 is an air/truck program example. All nine major airlines providing scheduled service to Dallas-Fort Worth are participants in the air/truck program. A list of motor carrier participants relevant to the market is shown in Table 5. Most of the carriers listed require motor carrier documentation in addition to

TABLE 5

MOTOR CARRIER PARTICIPANTS IN THE AIR/TRUCK PROGRAM*

Alamo Express	Red Arrow Freight Lines, Inc.
Bluebonnet Express	Santa Fe Trail Transportation Co.
Consolidated Freightways	Southwestern Motor Transport
Mistoltoe Express Service	Texas and Pacific Lines
Morgan Express, Inc.	Texas-Tex Pack Express

*Companies that operate in the Dallas-Fort Worth area.

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airbills; only one firm listed in the table accepts airbills as through documents. Even though all nine major scheduled air carriers serving Dallas are participants in the program, only five of the nine provide for through documentation.

In addition to the air/truck pickup and delivery program, some airline companies have additional arrangements with truck lines to deliver freight that is transported partway by air. For example, American Airlines serves Oklahoma City and Tulsa from Dallas in part with over-the-road transportation by Chief Freight Lines. Similarly, American serves Houston and San Antonio from Dallas via over-the-road service of Central Freight Lines. Neither of these lines is a participant in the air/truck pickup and delivery program. Other airlines may have similar arrangements with common carrier truck lines.

Commodities Transported

The various airlines and air freight forwarders serve different geographic markets, and a certain number of differences between haulage mixes by specific firms are apparent. In addition, airline and forwarder agents are generally more familiar with commodity shipments originating in Dallas than with Dallas-destined shipments. As a result, Dallas agents were more likely to specifically mention items that were frequently shipped out of the area rather than those shipped in, even though more tonnage enters the area by air than is shipped outbound. Many shippers and forwarders do not manifest containers in such a way that the contents can be identified from the outside by a prospective thief or freight hijacker, and it is not always obvious to the casual observer, or even the airline employee, what actually is being hauled; much of this unidentifiable freight is categorized as general freight. Nevertheless, an interesting array of goods is moved by air to and from the Dallas-Fort Worth area. In general, most of the

haulage can be broken down as follows:

Animals, animal products, and produce
Soft manufactures
Mechanical and electrical products
Miscellaneous shipments

Based on interviews with agents of the larger airlines serving the area and with representatives of several air freight forwarders, most of the shipments having Dallas origins or destinations apparently fall into one of these categories. Table 6 shows an expansion of the four-group list above and identifies items that Dallas airline and forwarder agents mentioned as being important.

A number of items under the general category "produce, animals, and animal products" are transported via air freight. Horsemeat is sent to France, baby chicks are sent to various parts of the nation, and young adult chickens are shipped to Hawaii to stock poultry and egg business operations. Large numbers of turkey eggs are shipped from Dallas, especially between October and June. Agricultural products such as okra are shipped in large volumes from Dallas while products such as pineapples are brought into the area. Flowers are shipped both into and out of the area by air, as are pets and other valuable animals. Numerous other products not specifically mentioned by airline agents but showing large volumes in statewide surveys are: strawberries, onions, live crabs, processed crab meat, fish, and decorative greens. Some forwarders do not handle perishables or live animals, while others report that a significant portion of their total volume, in some cases between 10% and 20%, is made up of perishable and mortal shipments.

A second category of goods commonly carried aboard aircraft is soft manufactures. Dry goods, drugs, publications, and toiletries are

TABLE 6

COMMODITIES REPORTED AS IMPORTANT CONSTITUENTS OF TEXAS ORIGINATED AND DESTINED AIR CARGO

PRODUCE, ANIMALS, and ANIMAL PRODUCTS

Outbound	Inbound
*Horsemeat	*Pineapples
Baby chicks	*Flowers
*Chickens	*Dogs and cats
*Turkey eggs	*Exotic pets
*Okra	Seafood
*Flowers	Beef steaks
*Dogs and cats	Tropical fish
Greyhounds	
*Exotic pets and other valuable animals	
Strawberries	
Onions and other vegetables	
Live crabs	
Processed crab meat	
Fish	
Decorative greens	

SOFT MANUFACTURES and GOODS

Outbound	Inbound
*Printed matter	*Wearing apparel
*Greeting cards	Magazines
*Wearing apparel	Newspapers
Textiles	Arts and crafts imports
*Drugs and cosmetics	Printed matter
Semi-finished garmets	*Drugs and cosmetics
College and high school yearbooks	*Film
Class yearbooks	
*Toilet preparations	
*Graphic arts products	
*Film	

MACHINERY, EQUIPMENT, and INDUSTRIAL GOODS

Outbound	Inbound
*Oil field equipment	*Airplane parts and engines
*Airplane parts and engines	*Automotive parts
*Automotive parts	*Computers and calculators
*Electric machinery and parts	*Oil field equipment
*Computers and calculators	*Electronic components
*Electronic parts and equipment	Machine parts
Machine parts	*Chemicals
*Chemicals	

MISCELLANEOUS COMMODITIES

Outbound	Inbound
*General merchandise	*Human remains
*Human remains	Household and personal effects
Hospital supplies	*General merchandise
Human blood	*Business and financial materials
*Business and Financial materials	

*Items specifically identified by Dallas based carriers and forwarders as important components of the air cargo shipped to and from the area.

Sources: Texas Airport System Plan--Air Cargo Analysis and Forecasts, Exhibit 3-2, p. 3-28.
Interviews with airline agents and air freight forwarder representatives based in Dallas.

some of the primary components of the group. Most of the commodities of this group are dense but relatively low-volume (printed matter), high-value low-volume (drugs, cosmetics, wearing apparel), or are items in which delivery schedules are important (newspapers, magazines). Dallas-based forwarders and carriers stressed graphic arts products, printed matter, and wearing apparel as primary area exports, while wearing apparel and drugs were often mentioned as primary import items.

A third general category under which a large portion of air freight falls is machinery, equipment, and industrial goods. As is shown by Table 5, Dallas is very much in line with the remainder of the state in this category. Some of the items listed in the group are inherently heavy items, but shipments, especially of repair parts, are often made by air so that expensive machinery breakdowns can be repaired with a minimum amount of operating time loss. Other items in the category are typically high-value low-weight/volume and are by their physical nature feasible candidates for shipment by air.

The final grouping is a catch-all for items that do not naturally fall into any of the previous groups. Probably most goods in this category would fall under the heading of general merchandise, but human remains was the most often mentioned item in the category. Business and financial materials such as contracts and cancelled checks are handled by specialty carriers and to some extent by major carriers, but this group makes up only a small part of the total haulage of firms other than commuter airlines.

Items listed in Table 6 are the kinds of goods most likely to travel by air, especially if surface travel time significantly exceeds air time,

or if distances hauled are great. The list by no means exhausts the items characteristically transported by air; it should be viewed as a list of things that typically are presently being moved economically by air over longer distances. Specific items shipped and the selection of shipping mode often depends on geographic locations of origin and destination communities. For example, vegetables and fish might commonly be shipped from Texas by air, but if these commodities are shipped from Houston they might go to New York by air, and to Dallas-Fort Worth by surface transportation. .

Several freight representatives indicated that a large number of businesses use air freight primarily for "emergency only" shipments. Equipment breakdowns, critical inventory shortages, or one-only shipment problems are often solved with the help of air freight, while normal supply and distribution systems might primarily involve surface transportation. Nevertheless, many businesses are heavy users of air freight even for routine shipping. On the basis of a survey of Texas manufacturers, the authors of the Texas Airport System Plan compiled a list of principal products commonly shipped or received via air cargo. This list, reproduced as Table 7, shows in detail a number of specific items commonly air freighted by Texas manufacturers. Most of the list would reasonably fit under the machinery, equipment, and industrial goods category of Table 6. The other three major categories of Table 6 could be similarly expanded through close examination of industries having extensive operations relevant to those categories.

TABLE 7

PRODUCTS COMMONLY SHIPPED VIA AIR BY TEXAS MANUFACTURERS

Drill Bits
Machine Parts
Surgical Instruments
Drugs
Electronic Components
Electronic Instruments
Hardware
Chemical Samples
Electronic Equipment
Payroll Checks
Maintenance Parts
Emergency Production Materials
Activated Carbons
Oil Tools-Valve-Forgings
Printing Cylinders
Intercommunication Equipment
Phone Parts
Repair Items
Aircraft Engines and Parts
Seismic Profiling Equipment
Paint
Electronic Control Systems
Piece Goods
Magnesium
Recorders
Semiconductors
Power Controls
Grinding Wheels
Computer Systems
Class Rings
Environmental Control Systems
Electric Heat Controls
Wire Mesh and Nylon Slings
Electronic Navigation Equipment
Circuit Board Assemblies
Missile Parts
Air Frame Parts
Light Fixtures
Waterblast Equipment
Chemical Equipment
Chemicals
Auto and Truck Parts
Spare Parts
Stampings
Small Meters
Plastics
Printed Business Forms
Publications
Cable
Cabinets
Emulsion Testers
Viscometers
Synthetic Resins
Electrical Parts
Transformers
Geophysical Systems
Pump Parts
Gaskets
Award Letters and Emblems
Mud Pump Parts
Earth Drills
Honeycomb Material
Film
Plotters
Test Instruments
Sample Garments
Optical Parts
Analyzer Parts
Optical Character Reading Equipment
Wellhead Parts
Plastic Synthetics
Graphic Arts Equipment
Precision Gages
Jewelry
Printed Matter
Bonds
Yearbooks
Precious Metals
Integrated Circuits
Aluminum Heat Sinks
Welding and Cutting Apparatus
Lamp Parts
Air Conditioner Valves

Source: Texas Airport System Plan--Air Cargo Analysis and Forecasts, Exhibit 3-3, pp. 3-30, 31.

CHAPTER III

AIRLINE COMPANIES

Background

More than 100 airlines provide some level of air cargo services to the Dallas-Fort Worth market either directly or by interlining with carriers directly serving the area. At least fourteen of these provide various kinds of cargo functions in scheduled service to the area. Seven others actively provide charter or contract services. Most of the remaining lines are domestic or foreign route carriers that serve the area through interlining Dallas-originated or -terminated cargo at other airports, or are supplemental carriers that perform nonscheduled freight services. More than forty of these carriers either advertise in the Dallas-Fort Worth markets or perform scheduled services in that market. Of these forty, thirty-three are listed in the Index of Airlines that appears in the Air Cargo Guide.

It is difficult to find published cargo data on any but the regularly scheduled interstate carriers; consequently, the present discussion may omit important segments of the Dallas-Fort Worth cargo market. Supplemental carriers, charter services, intrastate carriers, and commuter carriers (some of which are intrastate) all perform important freight-movement operations, but only for the last group named was enough information obtained on which to base volume estimates specifically for the Dallas-Fort Worth market. In addition to the lack of data on many carriers, a plurality of airports are used in cargo operations. Most of the scheduled cargo service (as well as much of the nonscheduled and

charter service) was previously routed through Love Field, but most has recently been transferred to the Dallas-Fort Worth Regional Airport. Cargo volumes not routed through the primary area air terminal or cargo transported by lines other than trunk carriers are often difficult to identify.

Even with the limitations outlined, some idea of the freight volumes for the region can be formed. Figures are available for the seven major airlines serving the metroplex with scheduled interstate service, and certain other national figures are available for supplemental and all-cargo lines. Nationally, approximately 7% of the cargo (expressed in revenue ton miles) shipped by U.S. airlines is transported by supplemental carriers. Another 11% is carried on all-cargo, non-supplemental carriers, and the remaining 82% is carried by airlines providing combination passenger-freight operations.[6] These figures, if applied to known Dallas-Fort Worth volumes, can give an indication of total volumes originated in the Dallas-Fort Worth area.

Full Service Airlines

The major interstate airlines that serve the Dallas-Fort Worth air cargo market hold shares of that market varying from the 35.1% held by American Airlines to the 0.4% held by Airlift International, an all-freight carrier. The general breakdown is illustrated in Table 8. Inspection of this display reveals that more than 90% of the cargo originated by the carrier group is transported by one of four airlines and more than 80% is carried aboard the top three.

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[6]Figures adapted from chart in Charles E. Schneider, "Airlines Forecast 8-10% U.S. Air Freight Growth," Aviation Week and Space Technology, March 11, 1974, p. 87.

TABLE 8

AIR CARGO MARKET CHARACTERISTICS OF SCHEDULED CARRIERS SERVING DALLAS-FORT WORTH, 1972*

Airline	Percent of total cargo originated in Dallas-Fort Worth	Cargo mix by carrier (percent of cargo transported)		
		Freight	Express	Mail
American Airlines	35.1%	77.1%	3.1%	19.8%
Braniff International Airways	30.6	56.2	4.6	39.2
Delta Air Lines	17.7	55.7	4.6	39.7
Texas International Airlines	7.4	61.0	8.3	30.7
Continental Airlines	3.6	60.1	8.3	31.6
Frontier Airlines	2.6	68.4	9.1	22.5
Eastern Air Lines	1.9	52.0	6.1	41.9
Ozark Air Lines	0.7	66.4	8.5	25.1
Airlift International	0.4	100.0	0	0

*This list does not include commuter carriers serving the Dallas-Fort Worth area.
Source: Airport Activity Statistics of the Certificated Route Air Carriers.

The freight/express/mail cargo mix characteristic of the several airlines serving Dallas-Fort Worth, although showing certain common similarities, varies appreciably between airline companies. Of the companies holding mail contracts in the Dallas market, the percentage of total cargo haulage made up of mail ranges from the 41.9% of the Eastern Air Lines market segment to the 19.8% of the American Airlines market segment taken up with mail carriage. The part of total originated haulage made up of mail for the other companies varies between the American and Eastern extremes. Similar comparisons of variations in company cargo mix characteristics could be made for express and freight.

In all cases, air freight makes up more than 50% of the Dallas originated cargo for individual airlines. Similarly, in all cases the segment made up of express is less than 10%. The three heaviest-volume cargo lines all report that less than 5% of their total cargo originated

is made up of express, while the remaining express carriers all have more than 5% of their total cargo made up of air express.

In the summer of 1973 thirty-two scheduled all-freight flights departed from Dallas at least five times per week. Thirty-one such flights made inbound stops in Dallas. With the intensification of the effects of the fuel shortage during the fall and winter of 1973-74, a number of these flights have since been discontinued or cut back in frequency of service. Much of the freight formerly carried by these now-discontinued services has been transferred to daytime passenger runs, while another part has been absorbed by third-level commuter lines. Some freight formerly shipped by air has undoubtedly returned to surface transportation modes. Nevertheless, airlines tend to think that present users of air freight will increase their use of the service even with the decreased frequency of flights on many routes. The real cutbacks have resulted in reductions in available space rather than in the total value of cargo handled and effective frequency of service. Some characteristics of air freight connections between Dallas-Fort Worth and other major domestic cities are shown in Table 9.

Densities of freight traffic through Dallas-Fort Worth appear to fluctuate somewhat through the year. January tends to be the lowest-volume month, realizing approximately 76% of the volume of November, the highest-volume month. Generally, the last quarter of the year has the greatest haulage, while the first quarter tends to be the slowest. These estimates are based on data for the three highest-volume carriers in the area, and are shown in more detail in Figure 11.

TABLE 9

DALLAS-FORT WORTH AIR CARGO SERVICE CONNECTIONS TO MAJOR DOMESTIC CITIES VIA ALL-CARGO OR WIDE-BODY CARGO/PASSENGER COMBINATION FLIGHTS*

OUTBOUND FLIGHTS		INBOUND FLIGHTS	
Destination Points	Intermediate Stops	Departure Points	Intermediate Stops
Atlanta, GA	0	Atlanta, GA	0
Boston, MA	1	Charlotte, NC	2
Chicago, IL	0	Chicago, IL	0
Detroit, MI	1	Cincinnati, OH	0
El Paso, TX	0	Denver, CO	0
Honolulu, HI	0	El Paso, TX	0
Houston, TX	0	Honolulu, HI	0
Jacksonville, FL	1	Houston, TX	0
Los Angeles, CA	0	Los Angeles, CA	0
Memphis, TN	0	Memphis, TN	0
Miami, FL	0	New Orleans, LA	0
New York City, NY	0	New York City, NY	0
San Antonio, TX	0	Philadelphia, PA	1
San Francisco, CA	0	San Antonio, TX	0
Tucson, AZ	0	San Francisco, CA	0
Washington, DC	0	Tucson, AZ	0
		Washington, DC	0

*Routes flown at least five times weekly.
Source: Air Cargo Guide, June 1973.

FIGURE 11

MONTHLY VOLUME TRENDS IN DALLAS-FORT WORTH AIR FREIGHT ORIGINATIONS

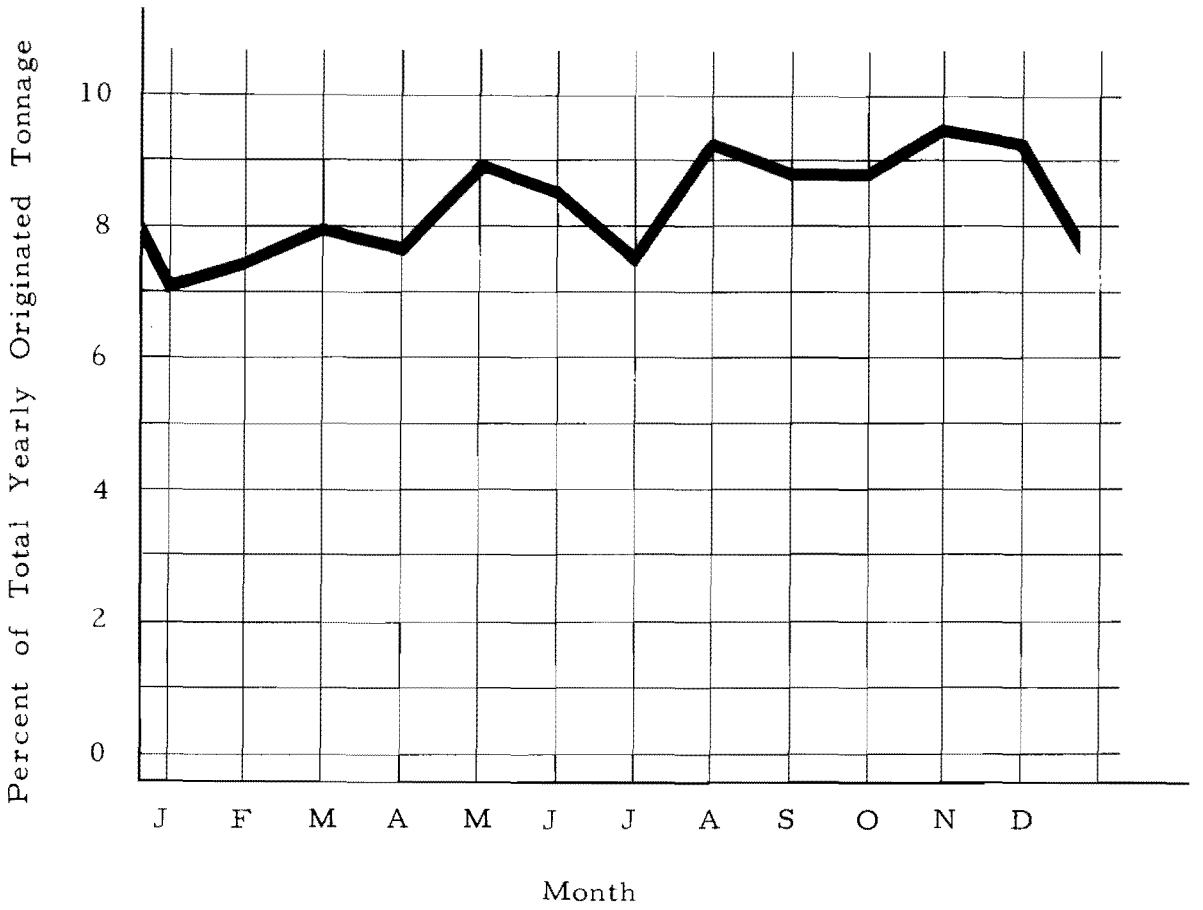

Chart based on interviews with Dallas representatives of the three major freight originating airlines serving Dallas-Fort Worth.

Commuter Air Carriers

Approximately thirteen commuter airlines serve points in Texas. Six of these serve the Dallas-Fort Worth area with scheduled service. All these carriers transport some amount of cargo to and from Dallas, but the market emphasis of the several airlines differs. Tricon International Airlines and Purolator Courier Corporation transport only cargo, as do many of the Sedalia-Marshall-Boonville Stage Line flights. S.M.B. Stage Lines also operates a number of passenger routes, while Davis Airlines, Mid Continent Airlines, and Rio Airways are primarily passenger carriers. Except for Purolator, these firms actively advertise as common carriers in the airlines guides appropriate to their service emphasis. Purolator primarily serves contract customers, which in most cases are financial institutions. Table 10 shows some of the characteristics of the commuter airlines serving Dallas-Fort Worth.

Commuter air carriers in Texas have made significant advances in the amounts of cargo carried during the past several years. The amount of cargo carried by this group of carriers in 1970 was increased by 23% (by weight) in 1971.[7] Trends of statistics for later periods indicate that the commuter carriers in Texas have continued to blossom through 1973. Cargo routed to Dallas alone is estimated to total approximately 114,000 pounds per week. Cargo distributed by these carriers from Dallas is approximately 107,000 pounds per week. Figures are based on estimates for about twenty-five southwestern cities paired with Dallas in commuter cargo commerce. About 20% of these pairs both ship and receive the same

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[7] Texas Airport System Plan-Air Cargo Analysis and Forecasts, pp. 3-103.

TABLE 10

CHARACTERISTICS OF COMMUTER AIRLINES SERVING THE DALLAS-FORT WORTH AREA

Carrier	Identifier codes*	Market emphasis	Type of aircraft	Corporate headquarters
Davis Airlines	DF/ZK	Pax	TC4	Bryan, TX
Mid-Continent Airlines	DG	Pax	PPS	Duncan, OK
Purolator Courier Corp.	PC	Frt	PPN	Dallas, TX
Rio Airways	XO	Pax	BTP	Killeen, TX
Sedalia-Marshall-Boonville Stage Lines	MJ	Frt/Pax	B8/B9/D3	Des Moines, IA
Tricon International Airlines	RI	Frt	B8	Dallas, TX

Key:

*	Unofficial codes
Frt	Freight
Pax	Passenger
B8	Beechcraft D-18
B9	Beechcraft B-99
BTP	Beechcraft turboprop
D3	Douglas DC-3
PPS	Piper Seneca
TC4	Twin Cessna 402
PPN	Piper Navaho

Sources: Air Cargo Guide, June 1973; Official Airline Guide, February 1974.

cargo volumes when averaged over three-month periods; about 45% have the city paired with Dallas sending more weight to Dallas than it receives, and the remaining 35% of the paired cities receive more from Dallas than they send. These rough proportions are substantiated by the previously mentioned total shipment weights, with Dallas receiving about 7% more than it sends out by the commuter carriers.

Since 1971, the average weight handled per flight has increased by between 15% and 20% per year for firms that emphasize nonpassenger transportation. The most common weight per Texas flight for these airlines ranges from

500 to 650 pounds, with the average about 575 pounds. Airlines emphasizing passenger service carry much less cargo, the average per-flight amount ranging from two pounds for one line to twenty-two pounds for another.

Table 11 displays the commuter airline connections to Dallas-Fort Worth via airlines listed in Table 10. Service is extended to three states and in some cases duplicates trunk line and intrastate airline operations (Dallas-Austin, Dallas-San Antonio, and Dallas-Houston). Figure 12 maps the communities shown in Table 10 and gives the reader a feel for the spatial relationships of the various southwestern cities served.

TABLE 11

DALLAS-FORT WORTH AIR CARGO SERVICE
CONNECTIONS VIA COMMUTER AIR CARRIERS*

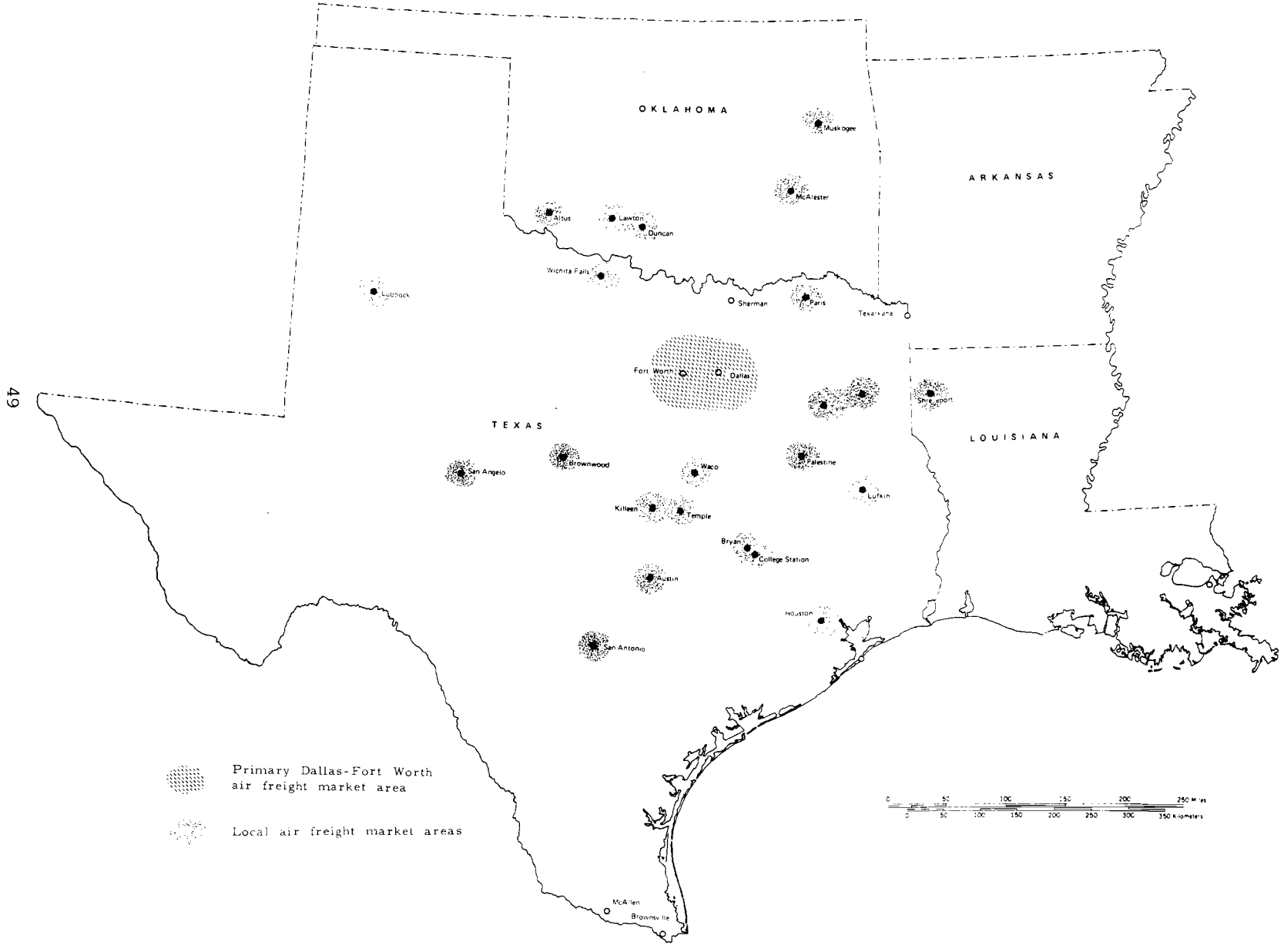
OUTBOUND FLIGHTS		INBOUND FLIGHTS	
Destination Points	Intermediate Stops	Departure Points	Intermediate Stops
Altus, OK	0	Altus, OK	2
Austin, TX	0	Austin, TX	0
Brownwood, TX	0	Brownwood, TX	0
College Station, TX	0	College Station, TX	0
Duncan, OK	0	Duncan, OK	0
Houston, TX	0	Houston, TX	0
Killeen, TX	0	Killeen, TX	0
Lawton, OK	1	Lawton, OK	1
Longview, TX	1	Longview, TX	1
Lubbock, TX	0	Lubbock, TX	0
Lufkin, TX	1	Lufkin, TX	1
McAlester, OK	1	McAlester, OK	1
Muskogee, OK	2	Muskogee, OK	2
Palestine, TX	0	Palestine, TX	0
Paris, TX	0	Paris, TX	0
San Antonio, TX	1	San Antonio, TX	1
San Angelo, TX	1	San Angelo, TX	1
Shreveport, LA	2	Shreveport, LA	2
Temple, TX	0	Temple, TX	0
Tyler, TX	0	Tulsa, OK	3
Waco, TX	0	Tyler, TX	0
Wichita Falls, TX	0	Waco, TX	0
		Wichita Falls, TX	0

*Routes flown at least five times weekly.

Sources: Air Cargo Guide, June 1973; Official Airline Guide, February 1974; Texas Aeronautics Commission.

FIGURE 12

SOUTHWESTERN CITIES CONNECTED TO DALLAS-FORT WORTH
BY COMMUTER AIRLINES PROVIDING CARGO SERVICE



Seasonal trends of the commuter carriers in Texas are somewhat difficult to establish because rapid growth during the past three years has substantially overshadowed seasonal fluctuations. The most significant growth has appeared between March and September, with a general plateau of activity between September and March. This trend would indicate that, after the business cycles of the industry begin to relax with maturity, the warmer months of the year will result in somewhat greater average haulage than will occur during the cooler months. The greatest fall in weight carried per flight appears to occur during the first quarter of the calendar year, with the greatest recovery occurring during the second quarter.

Commuter carriers, using equipment and managerial structures readily adaptable to customer needs, have a bright growth outlook if it is assumed that the present fuel crisis is moderated. Safe, reliable equipment that can be economically operated in and out of small municipal airports has become available in recent years. The present growth trends indicate that the available technology has not been completely implemented in service of the hinterlands of the Southwest. Furthermore, national experience since World War II has created a present institutional infra-structure ripe for profitable entrepreneurship in commuter air carrier operations.

CHAPTER IV

NON-AIRLINE AIR FREIGHT HANDLERS

Introduction

Categories of Handlers

Ground handling of air cargo is performed by several types of operating firms. Probably the most obvious handler is the airline carrier involved. Airlines accept a large part of their haulage directly from shippers at the shipping point, then transfer the freight to consignees at destination airline terminals. But a significant amount, perhaps more than 60% of all freight shipped on scheduled carriers, is originated, terminated, and often handled enroute by business firms other than airline companies. These firms take a number of forms and appear in a large range of sizes. In general, four categories can be readily identified. The first of these groups, the small parcel handlers, usually specialize in transporting shipments by air express and for the most part have size and weight limits either in specific terms (length plus girth must be less than some specified amount, or the maximum allowable weight is a stated amount), or in generally limiting terms (the shipment must fit on a conveyer). The average size of shipment sent by air express is somewhat smaller than that sent by other types of forwarders or by air freight.

The second category of nonairline ground cargo handlers is the local forwarder under contract with one or more airlines to pick up and deliver cargo assigned to those airlines. Industries that make large or frequent air cargo shipments tend to assign their cargo to the airline providing the most direct route to a specific destination, and much of the cargo

thus shipped is forwarded via local contract forwarders.

The third type of cargo handler is the national forwarder that has agents or terminals in many major cities. These firms often forward small to medium-sized shipments for a large number of shippers. Some of the larger members of this category of cargo handlers operate elaborate computerized control and communications networks. A number of the national air freight forwarders have international subsidiaries that operate in the major air terminal cities of the world.

The fourth category of air freight handler is the small local forwarder. This group, usually numerically the largest of the four categories in a given geographic area, includes firms that are small, low-volume air freight specialists, firms that operate among several modes of freight transportation, local cartage haulers that transport items to and from local air terminals, or firms that perform a combination of the operations mentioned.

Any of the four types of cargo handlers may specialize within its general area of operations. Sometimes specific shippers (such as a particular branch of the military) are addressed. Other firms may specialize in serving a specific industry such as garment manufacturers, or may perform specific functions such as courier services. Most firms, however, perform forwarding functions in several areas, even though certain specialties may be more heavily stressed in advertising and promotional activities. Some of the firms carrying yellow page listings under "air cargo" may have relatively small shares of the air cargo market but may handle large volumes of freight via land modes of transport. In fact, the percentage of total tonnage that moves by air handled by some of these firms may be quite small.

In sum, ground handling of air cargo is performed by several kinds of organizations, often performing functions with various kinds and sizes of freight, serving varying market scopes, emphasizing a variety of specialties within the overall freight-handling structure, and having a variety of organizational and service incentive structures. In view of this, it is difficult to strictly define the air freight handling or forwarding operation other than to say that freight or express to be transported by air is processed.

Rate Structures and Profit-Making Methods

Typically, rate structures followed by air freight forwarders are bracketed by air express and air freight rates. Most of the major national forwarders ship their consignments via air freight and take their expenses and profits from the premium charged in excess of air freight rates. Nevertheless, various kinds of organizations perform air freight forwarding operations. Those having contractual agreements with airlines may have business structures and profit incentives that differ from those of independent forwarders. Local air cargo handlers may make charges independent of air fares for specific hauling services to and from airports, while national forwarders may make single door-to-door charges.

Many of the firms performing air freight forwarding services in the area are not licensed as such by the Civil Aeronautics Board. Local forwarders, moving and cartage companies, and similar operations fall into this category. In addition, some larger companies acting essentially as forwarders are not so designated. REA Express, the largest air express

handler in the country and the single firm having the largest number of offices and agencies in the region is not a licensed forwarder, even though the company's name appears under "freight forwarder" telephone directory listings in most cities where agencies exist.

Industrial Growth Trends

As a business, air freight forwarding has grown significantly during the past decade. Nationally, air freight forwarders increased their share of total air freight originated through the 1960's at an average yearly rate of about 7.8%, and by 1969 they were originating about 25% of all air freight. Some current estimates claim that fully 50% of all air freight is forwarder-originated and -handled. The numbers of authorized air freight forwarder companies in the country increased by about 11.5% per year during the 1960's, while the rate of increase of cargo tons originated increased an average of 24.2% per year during the same decade. Revenues for the group analyzed above saw an average annual increase of 30.9% during the same period. Rigorously comparable figures for Dallas-Fort Worth air freight operations are difficult to obtain, but during the same ten-year period, the number of noncarrier air freight advertisers in the telephone yellow pages increased significantly. Since 1960, the area has seen a sixfold increase in the numbers of firms, and the average number of new firms entering the air cargo business between 1967 and 1970 was seven per year. For the overall period between 1964 and 1970, an average of five additional firms per year entered the Dallas-Fort Worth market.

Since 1970 a trend toward stabilization of the number of firms in the business has become apparent. The air freight handling business became

a viable and instituted mechanism in freight movement during the 1960's, but with the slowing of the national economic pace within the last three years, the rate of increase of air freight volume has diminished somewhat. This factor, along with the obvious maturity and institutionalization the industry gained during the economic upswing of the 1960's, have combined to provide apparent barriers to entry. The stronger, well-managed firms have developed close forwarder-customer and forwarder-airline relationships, efficient business methodologies, and communication systems that small uninitiated firms see as overwhelming competition. In sum, growth in the industry promoted innovation and experimentation which, in turn, has resulted in defining most of the potentially profitable areas within the air freight forwarding function. Once these areas (voids in the transportation structure) were identified, businesses were established or modified to fill the need.

In early years, airlines tended to consider noncarrier air freight handlers direct competitors and tended not to cooperate to any great extent with noncarrier forwarders. That policy has been changed recently as airlines have discovered that forwarders are able to originate more freight than they themselves can, and that the forwarder performs a specialized function while freight processing by the airline is only a part of the whole business. During the past few years, the airlines themselves have increasingly encouraged the development of a viable air freight forwarder function.

Even with the evidence provided by World War II military operations that air transport of freight was a viable operation, recently much of the air cargo transported consisted of parcels sent by express, of

high-value, perishable, or critical items that had obvious economic reasons for being shipped by air. Advertisements by air cargo ground handlers usually stressed air express or parcel services and tended to discount or ignore heavier freight capabilities. These tendencies appear to have prevailed during the first two decades following World War II. Consequently air express made up a much larger part of the total air cargo market than is true at the present.

Historically, a large part of the cargo shipped by regularly scheduled airlines has been handled by REA Air Express (Expressco Inc.), which has a contractual arrangement with and is partially owned by a group of the major airlines. During the past several years, however, the market share of this firm has dropped. Freight forwarders have increasingly sought out the small shippers and sold their services to him at a cost lower than the minimum allowed in air express tariffs. By accepting parcels, and consolidating them into shipments that can be readily containerized or otherwise transported in bulk, forwarders ship parcels at air freight rather than air express rates. The success of this strategy may be measured not only by the decrease in market share held by REA Air Express, but more dramatically, by the substantial growth in both volume handled and total market share accumulated by the freight forwarder sector during and following the economic boom of the 1960's.

Businesses, Volumes and Patterns of Movement

Dallas-Fort Worth Area Firms

About forty-nine firms perform air freight forwarder functions in the Dallas-Fort Worth area at the present time. This number is a significant increase over the approximately nine firms that served the area in 1960.

Currently emphasized air freight forwarder functions advertised in the area are shown in Table 12. It is doubtful that any single air freight handler in the area performs all the services listed, but the list suggests which services are available along with air freight handling. Many of the firms perform services and may forward goods via various surface transportation modes as well as by air.

TABLE 12

SERVICES ADVERTISED BY DALLAS-FORT WORTH AREA AIR CARGO FORWARDERS

Local and regional deliveries
Contract delivery
Export packing and delivery
Domestic and international service
Door to door service
Local pickup and delivery
Hot shot services
Export documentation
Translation services
Expediting
Courier service
Warehousing
Pallet service
Charter loading and unloading
Crating and packing
Clother and packing
Clothes on hangers specialists
Specialized animal handling (special attention to pets)
Distribution
Piggy back
Pool car

Company Names

Company names often reveal the primary business emphasis or phase of operations in which a firm is involved. Other services with which the firm may have close ties, or the area or geographic scope the firm addresses or plans to serve at some point in the future might also be determined to some extent. A survey of company names listed under "air cargo" in the

yellow pages in Dallas and Fort Worth telephone directories can give some insight into the nature of the air freight market structure in that area. Most of the nonairline company names contain some indication that the air cargo market is served. Several names imply close associations with railroads, common carrier trucklines, or other organized and certificated transportation mechanisms. Some names imply extensive national or international operations, while others connote local delivery operations as a primary business interest. A few companies use only the owner or company founder's name without further modification. Still others have "delivery" or "transport" in the name allowing the service customer to know that the firm is in the freight or transportation business while not specifying air operations. Finally, a small minority of the listed names are quite broad in nature and only indicate that the firm is involved in the service business or that it covers some general geographic region.

Of all the firms listed under "air cargo service" in the Dallas and Fort Worth telephone directories, the majority specifically address the air cargo industry, with 65% of them having "air" in their names. Fifty-one percent of the listed firms names mention freight, cargo, or some other term indicating the handling of freight (as opposed to "express"). Area or market scope is indicated in 18% of the names and some form of the word "service" appears in 14% of the names. Local "delivery" or "moving" companies make up 12% of the list, while 10% have railroad or truckline associations. Firms advertising under air cargo and having names that do not refer to air, transportation, or any other term that indicates business activity or market scope make up less than 10% of all listings. Likewise, "air express" and "expediter" entries each make up less than 10% of all listings.

TABLE 13

USE OF NONAIRLINE GROUND CARGO HANDLERS
IN THE DALLAS-FORT WORTH AREA

Airline	(1) Percent of total haulage handled by forwarders[1]	(2) Percent of total Dallas freight originated by airline[2]	(3) Percent of total air freight handled by forwarders[3]
American	30%	42%	12.6%
Braniff	65	27	17.6
Continental	70	3	2.1
Delta	65	15	9.8
Eastern	20	2	.4
Frontier		3	1.5 (est.)
Ozark	51	1	.5
Texas International	35	7	2.5
Total			47.0%

[1]Based on interviews and data reported in Texas Airport System Plan, Air Cargo Analysis and Forecasts, p. 3-107.

[2]Based on 1972 data in Airport Activity Statistics of the Certificated Route Air Carriers.

[3]Product of columns (1) and (2).

cases forwarders may be one-man or part-time local freight collection and distribution operations.

On the basis of interviews with several of the larger air freight forwarders and ground cargo handlers, various information supplied through airline sources, and information found in Airport Activity Statistics of the Certificated Route Air Carriers, it is estimated that noncarrier ground handlers in the Dallas-Fort Worth area forward in excess of 105,000 tons of cargo yearly. This figure includes cargo originated, terminated, and transshipped (or interlined). It is difficult to categorize air cargo

shipments handled in the Dallas-Fort Worth area by size, but tariff rates tend to group shipments sent via freight forwarders into the less-than-150-pound category. Average shipment sizes for forwarders interviewed falls in the 90-to-95-pound bracket. Shipments handled by specific forwarders may average as much as 110 pounds or more; others may average less than 80 pounds. Ground cargo handlers that specifically address the express business average 40 to 45 pounds per shipment. Consolidated and containerized forwarder shipments average about 5,000 pounds or more each, with the weight of any specific consolidated shipment varying with the amount of cargo destined for a particular place at a given time. In some cases, especially when commuter airlines are used, consolidated shipments may fall far short of the 5,000-pound average indicated above.

Concentration of Service

Five of the forty-nine firms operating in the Dallas-Fort Worth area appear to account for about two thirds of the air freight and express originated or terminated in the area. All of these organizations primarily serve the air cargo business in forwarder functions. The largest of these firms currently handles about 16,000 tons of cargo per year in Dallas-Fort Worth but a significant part, more than 30%, of this volume is transshipment handling. Several other firms handle between 5,000 and 10,000 tons per year. Among that number is REA Air Express.

Problems and Future Outlook

Fuel Shortage

Air freight forwarding has been affected by the fuel shortage. Airlines have dropped many of their least profitable schedules and have cut some freight runs as well. Night flights suit the needs of forwarders well, but unfortunately, those are the runs most likely to be abandoned by a carrier during resource crises. Consequently, a certain amount of realignment of freight scheduling has been done by freight forwarders in order to meet their previously advertised and attained timetables. Some forwarders have shifted a significant amount of business to third-level commuter carriers. Somewhat permanent arrangements may result from this change in environment because commuter carriers may be more willing to specifically address the needs of forwarders than might the larger, full-service airlines.

Industrial Expansion Expectations

As a result of technological and economic factors, extensive expansion of the air freight function has been curtailed since 1969 or 1970, even though the market share and absolute volumes handled have increased markedly during the past three or four years. With the obvious limitations on fuel and other resources, and given present technologies in freight handling and transporting, future economic expansion should be expected to be intensive rather than extensive in nature. Presently established companies will quite likely absorb new technological developments in communications and materials-handling fields as they become available. Operating efficiencies may be expected to increase while

absolute costs decrease in future years. New companies will more likely be spin-offs of presently established firms than independently established firms of people entering the air freight business for the first time. The newer spin-offs will probably be much more specialized than their parents, addressing only a portion of the business that innovative insiders would recognize as having potential market development in a sector presently being unserved or poorly served.

CHAPTER V

SERVICE TRENDS, PROBLEMS, AND FUTURE OUTLOOK

For the most part, the Dallas-Fort Worth metroplex is well provided with air freight service, as are the other larger SMSA's of the state. The immediate community has ready air access to most of the major national and international air centers of the free world. Efficient ground handling businesses,combined with frequent flight schedules on airlines,designed to accommodate freight,allow reliable service to be available within the local Dallas-Fort Worth commercial area. Air freight services are available to the shipper through freight forwarders and directly with airlines. Package express may be handled by forwarders, express handlers, or the airlines themselves through special express handling provisions. Containers are available to the shipper through either airlines or freight forwarders.

The several businesses serving the Dallas-Fort Worth air freight market are varied in a number of ways. The major airline companies all have direct predecessors dating from the late 1920's or early 1930's. REA Air Express dates from 1927. On the other hand, most of the remaining ground handlers and smaller airlines have post-World War II origins. In large part, the major air freight forwarders began business during the decade following the end of the war. Local forwarding businesses freely enter and leave the industry and are represented by many firms dating from World War II. Some entered the business during the economic buildup of the late 1960's. By and large, the air freight forwarding function has seen its greatest growth and has experienced its largest portion of new business entries since 1960.

The various business parts making up the air freight service industrial structure, are of different ages, are at different levels of maturity,and have recently seen different rates of growth as the newer entrants have settled into the overall marketing structure. Variations of a similar nature should be expected in the future as new business spin-offs enter the industry and new technologies are introduced. Given the increasing constraints on resources, industrial expansion of the air freight services mechanism may be expected to be intensive rather than extensive in nature. Efficiencies in handling technologies and labor and administrative structures should be expected to be emphasized more heavily than the opening of entirely new markets, given the present level of aircraft technology.

A certain amount of readjustment will take place as the full long-run impact of limited fuel availability is realized. Shifts in transport modes used and amounts of freight shipped on a mode by given categories of freight may occur. Certain changes in regional economic structures may come about, yielding a secondary, but significant, effect on freight service businesses in general. New and revived technologies are surely to appear and reappear as world resource constraints become more acute. Efficiencies will be emphasized in use of fuels and structural materials, and in actual manufacturing and construction fabrication processes.

Commuter air services are offered between Dallas and several south-western cities. Some commuter air services offer collecting and distributing services with Dallas as a central hub and an interchange point between full-service trunk line and commuter lines. Some commuter carriers perform services relatively independent of other airlines and

modes of transportation. A variety of individual carriers have attempted courier and third-level services from time to time but many of these have been unsuccessful. Helicopters, airships, and autogyros have not appeared on the Dallas-Fort Worth scene in scheduled services but versions of these technologies may see use in the future.

A number of carriers and ground handlers operate computerized cargo tracking and scheduling machines of varying levels of sophistication and capability. At least one firm can track shipments enroute and can determine the place of a particular shipment at any given time. Scheduling mechanisms operate in much the same way as the passenger reservation systems commonly in use by the major airlines of the country. Much of the technology described has only recently been placed in operation; it should be expected that more advancement in the computer services art will appear with time and that freight service businesses in all modes will adopt the art as it becomes financially feasible to do so.

Although not presently recognized as a serious problem, the lack of freight transfer opportunities between transport modes may become more apparent in the future. Much of Texas is not well provided with reasonably priced air freight service. Even though the air/truck program exists, and both air and truck companies serving the state are members, most interchange possibilities do not provide for through routing on one document. Consequently, each carrier involved charges tariff rates as if the shipment were being originated at each interchange point. (In most freight transportation systems the firm originating the shipment receives a larger portion of the fare than would be the case if the fare were

distributed to all the carriers involved on the basis of distance traveled on each individual company system.)

Air freight services to some rural areas of the state appear to number among the areas provided with less than desirable freight service. The arrival date of an air freight shipment sent to certain parts of rural Texas might be three or four days after the shipment leaves its domestic originating aerodrome. Freight flown on day one from the original shipping point arrives in Texas (usually Houston or Dallas) that afternoon or early that evening. The receiving truck line picks up the freight the morning of the second day (the morning after arrival in Texas) and takes it to the company truck terminal. The parcel might sit at the terminal all day, then be shipped out that evening on a truck bound for the destination region. On the morning of the third day the shipment reaches its destination terminal; from there it might be distributed on a local delivery route or be picked up at the terminal by the consignee. In some cases, delays prevent the shipment from being delivered until the fourth day. The purchaser of the service pays premium air rates to transport the shipment to the regional air hub and again pays full surface rates for the trip from the air hub to the local distribution terminal town. It appears that the time saved by shipping via air/truck to and from small towns can be quite expensive. At some point in the future, airlines and motor carriers might do well to arrive on a point-to-point rate structure that would be more a function of time than mode.

Cargo security problems are present among all modes of freight transportation and are geographically dispersed over the nation. Some

areas realize the problem to a far greater extent than most of the southwestern states. Fortunately, cargo security is not a large-scale problem in the Dallas-Fort Worth freight market, particularly in comparison with the extent of the problem on parts of the East Coast and other areas. Nevertheless, air carriers and freight handlers in the survey area are cognizant of the potential problem and most take overt measures to discourage cargo loss by theft.

SOURCES

1. "Air Cargo at the Crossroads" (40 articles). Aviation Week and Space Technology, October 26, 1970.

2. Air Cargo Guide. Oak Brook, Ill.: Reuben H. Donnelly Corp., June 1973.

3. "Air Containers: Who Offers What?" Transportation and Distribution Management, November 1973.

4. "Air Express and U.S. Scheduled Air Transport System: Airborne 30 Years Ago." New York: Railway Express Agency News Bureau, August 26, 1967.

5. Air Freight. New York: F.S. Smithers & Co., 1967

6. "Airline to Open Freight Terminal." Dallas Times Herald, March 19, 1967.

7. Airman's Information Manual--Airport Directory, Part 2, Autumn-Winter 1973-74. Washington, D.C.: Federal Aviation Administration, Department of Transportation.

8. Airport Activity Statistics of the Certificated Route Air Carriers, Washington, D.C.: Federal Aviation Administration, Department of Transportation, 1962 through 1972.

9. "The Airport Decision." Fort Worth, Texas: Fort Worth Star Telegram, June 4, 1967.

10. Air Transport Industry: Annual Review. Loeb, Rhodes & Co., November 1969.

11. Barksdale, E.C. The Genesis of the Aviation Industry in North Texas. Austin, Texas: Bureau of Business Research, The University of Texas at Austin, 1958.

12. Blair, Eddie R. "Cattle Shipped by Air Freight in Historic Haul." Steering Wheel, December 1971, pp. 14-15.

13. Blasig, Carl. Building Texas. Brownsville, Texas: Springman-King Co., 1963.

14. Brewer, Stanley H. Air Cargo Comes of Age. Seattle, Washington: Graduate School of Business Administration, The University of Washington, 1966.

15. Brewer, Stanley H. Vision in Air Cargo. Seattle, Washington: Graduate School of Business Administration, The University of Washington, 1957.

16. Building Rural Texas. Austin, Texas: The Texas Department of Community Affairs, October 1973.

17. Emery, John C. "Blending Human Hands and Simple Hardware, Emery is Solving Terminal Cost Problems." Traffic World, June 26, 1972.

18. "How Emery Lives With Airline Cutbacks." Business Week, January 19, 1974.

19. "The Land Boom at a Texas Airport," Business Week, March 11, 1972, p. 116.

20. Maio, Domenic J. Long Range System Planning for Air Cargo. Denver, Colorado: Intersociety Conference on Transportation, September 25, 1973.

21. "The New Dallas Love Field and Terminal." The Dallas Morning News, October 20, 1957.

22. "A New Kind of Freight Plan for Small Freight." Business Week, November 3, 1973.

23. 1967 Census of Transportation: Commodity Transportation Survey (Production area 20). Washington, D.C.: Bureau of the Census, Department of Commerce, 1970.

24. Official Airline Guide, North American ed. Oak Brook, Illinois: Reuben H. Donnelly Corp., February 1974.

25. Official Motor Freight Guide for Dallas. Chicago: Official Motor Freight Guide, 1973.

26. Ryan, Robert H. "Anatomy of Texas Airline Transportation." Texas Business Review, June and July 1967.

27. Schneider, Charles E. "Airlines Forecast 8-10% U.S. Air Freight Growth." Aviation Week and Space Technology, March 11, 1974.

28. _____. "American Asks Air Cargo Rate Related to Cost." Aviation Week and Space Technology, April 29, 1974.

29. Shreve, Nelson. "The New Sea-Air Concept Looks Promising for Isles." Hawaii Fleet Management, March 1973.

30. Stuart, John. Air Travel Comes of Age. New York: Public Affairs Committee, 1956.

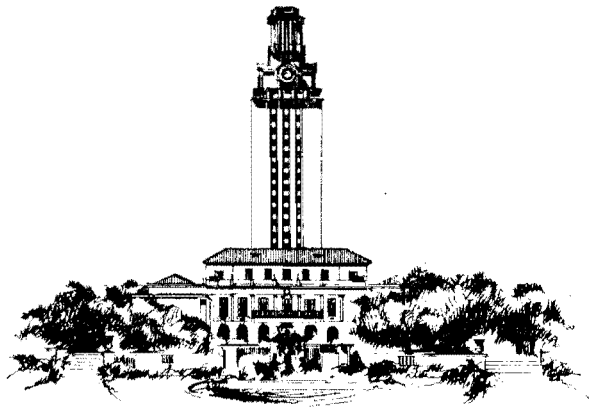
31. Swart, Bernie. "Air Freight Truckers Wait for Big Take-Off." Fleet Owner, May 1973.

32. Texas Airport Plan--Air Cargo Analysis and Forecasts. College Station, Texas: Texas Transportation Institute, 1972.

33. Texas Almanac and State Industrial Guide. Dallas, Texas: A.H. Belo Corp. (various issues since 1911).

34. Transportation Facts and Trends. Washington, D.C.: Transportation Association of America, 1972.

35. "Wide Body Shipping is Solving Marketing Dilemma." Aviation Week and Space Technology, January 28, 1974, pp. 24-25.



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