JUNE 1980

Prepared by: Michigan Air Service Task Force

MICHIGAN'S SCHEDULED AIR SERVICE: AN ANALYSIS

- ISSUE STATEMENT
- SERVICE SUPPLY AND DEMAND
- ALTERNATIVES ANALYSIS
- RECOMMENDATIONS

MICHIGAN DEPARTMENT OF TRANSPORTATION

MICHIGAN DEPARTMENT OF TRANSPORTATION

MICHIGAN'S SCHEDULED AIR SERVICE: AN ANALYSIS

JUNE 1980

BUREAU OF TRANSPORTATION PLANNING
MODAL TRANSPORTATION PLANNING DIVISION
AVIATION PLANNING SECTION

MICHIGAN AIR SERVICE TASK FORCE

Edgerton W. Bailey, Chair	Department of Transportation Bureau of Transportation Planning
Herm W. Baadke	Department of Transportation Bureau of Urban and Public Transportation
Thomas Drake	Executive Office of the Governor
John F. Hanieski	Department of Commerce Office of Economic Development
Richard J. Lilly	Department of Transportation Bureau of Transportation Planning
Francis X. McKelvey	Michigan State University Department of Civil Engineering
Edward A. Mellman	Department of Transportation Bureau of Transportation Planning
James L. Roach	Department of Transportation Bureau of Transportation Planning

This study was funded in part through a grant from the Upper Great Lakes Regional Commission.

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, GOVERNOR

DEPARTMENT OF TRANSPORTATION

TRANSPORTATION BUILDING, 425 WEST OTTAWA PHONE 517-373-2090

POST OFFICE BOX 30050, LANSING, MICHIGAN 48909

JOHN P. WOODFORD, DIRECTOR

June 16, 1980

Mr. John P. Woodford, Director
Michigan Department of Transportation
P.O. Box 30050
Lansing, Michigan 48909

Dear Mr. Woodford:

We are pleased to forward to you the report of the status of air service in Michigan. This effort was undertaken by a task force of representatives of the Michigan Departments of Transportation and Commerce, the Executive Office of the Governor and Michigan State University.

This is a unique period in commercial aviation history in the United States. The Airline Deregulation Act of 1978 and subsequent actions on the part of the air carriers have brought sweeping changes throughout the country and have affected Michigan's commercial air transportation system.

This report examines these factors and makes recommendations regarding future commercial air transportation in Michigan. It is acknowledged that an adequate job of planning and regulating commercial air transportation will require continued monitoring of this form of transportation by the State of Michigan. We intend to do this and will continue to keep you aware of events that influence this important mode of transportation.

Sincerely,

Sam F. Cryderman

Sam F. Cryderman, Deputy Director
Bureau of Transportation Planning

MICHIGAN
THE GREAT LAKE STATE

An Equal Opportunity Employer

TABLE OF CONTENTS

APPENDICES

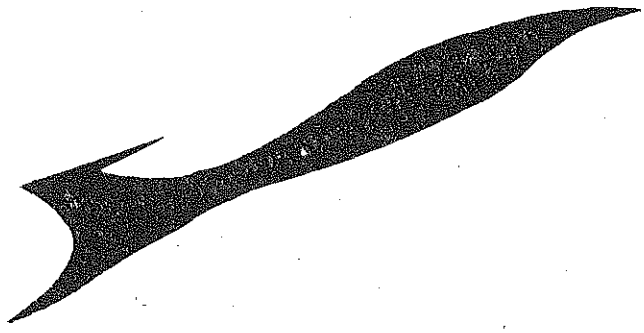
LIST OF FIGURES

Figure

LIST OF TABLES

Table

ISSUE STATEMENT



part one

PART ONE

ISSUE STATEMENT

Michigan is facing a transportation crisis. Nationwide, commercial air transportation is currently responding to regulatory reform, fuel price escalation, limited fuel availability, and the economy. Thus far, the effect has been a tendency for larger carriers to reduce service in low density smaller markets in favor of increased service in higher density larger markets. Short-haul service has given way to longer distances between stops resulting in the affected communities experiencing loss of service or replacement of service by a smaller carrier. Michigan has not escaped. Several communities are confronted with the possibility of a substantial reduction in scheduled air service. More could be in the not too distant future.

The ability to manage in this crisis rests in attaining a position capable of directing, rather than reacting to, events. This requires an understanding of the forces at work, existing service levels, community scheduled air service needs, and desirable courses of action. This document represents the first step in establishing such a position.

SOME FORCES AND THEIR IMPACT

Regulatory Reform

The Airline Deregulation Act of 1978 has been described as the most significant Federal Aviation legislation enacted in four decades (1). The purpose of this Act which amends the Federal Aviation Act of 1958 is "to encourage, develop, and attain an air transportation system which relies on competitive market prices to determine the quality, variety, and price of air services." The Act provides for (1) automatic entry to one new non-stop route per year through 1981 to fit, willing and able air carrier applicants within 60 days, (2) elimination of routes with 90 days notice (3) free market entry and exit effective 31 December 1981 excepting provision of essential air service, (4) a fare structure controlled only by the market effective 1 January 1983, (5) termination of the Civil Aeronautics Board (CAB) by 1 January 1985, and (6) guarantee of essential air service through October 1988 to those communities now served at a service level determined by the CAB.

Major changes have already occurred in the nation's air transportation system since enactment of the Airline Deregulation Act on 24 October 1978. Nationwide, in the first 11 months since passage (2) . . .

- 135 notices of service suspensions affecting 163 cities were served on the CAB.

- o CAB allowed 61 notices to take effect. 45%
- o Competitive service appeared in 466 markets and disappeared in 249 others.
- o Over 20 medium-sized cities have lost substantial amounts of air service.
- o A total of 23 former intrastate and commuter air lines have become certificated air carriers.
- o In California alone, 32 of the 42 air carrier communities have suffered service reductions of at least 20 percent.
- o There are 134 fewer small communities nationwide accessible to Michigan's citizens by regular and convenient air service.
- o The substitutions being allowed by the CAB, commuter carriers for either trunk or regional carriers, do not provide comparable numbers of seats and enroute times between points.
- o The CAB's Essential Air Service guidelines, procedures and rulings do not provide for mail and cargo.

It is difficult to predict reliably the full impact of deregulation. It is likely that a restructuring of the airline industry will occur with carriers moving out of some markets and into others. The lower-density, short-haul markets are most sensitive to such changes. In these markets, a trend away from larger to small capacity aircraft is emerging. One impediment to development of new short-haul markets by smaller airlines is a distinct void in aircraft equipment having capacities in the range of 20 to 50 passengers. However, manufacturers are beginning to recognize this market potential and are planning to develop an adequate fleet in this range.

Also, deregulation will probably influence, and be influenced by, social and economic factors. Future air service changes should be examined with due consideration being given to promoting the social and economic well-being of Michigan's communities.

Fuel Pricing and Availability

Aviation fuel costs have quadrupled in the last six years. In 1974, fuel cost $0.21 per gallon and accounted for 14 percent of the total airline operating costs. Today, fuel costs approximately 0.85 per gallon and represents nearly 30 percent of the total airline operating costs. In terms of flight or direct costs, fuel comprises over half (about 52 percent) for larger turbojet aircraft with a typical flight crew representing 20 percent. The trends in fuel costs, crew costs, and selected performance data for Boeing 737-200 are indicated in Table. 1.

Table 1. Selected Direct Operating Costs and Performance Data for the Boeing 737-200 Aircraft, 1974-80

Category	1974	1978	1/ 1980
Aircraft Operating Cost (dollars/block hour)			
Fuel	$195.00	$349.00	$ 686.00
Crew	151.00	240.00	264.00
Other	271.00	331.00	364.00
Total	$617.00	$920.00	$1,314.00
		+49%	113%
Performance Data			
Fuel Consumption (gallons/block hour)	857.00	857.00	857.00
Fuel Cost (dollars/gallon)	.21	.36	.85
Stage Length (miles)	290.00	304.00	304.00
Passenger Capacity (seats)	94.00	96.00	96.00

Notes: 1/ Estimated based on existing data.

Sources: Civil Aeronautics Board, "Aircraft Operating Cost and Performance Report," July 1976 and July 1979 editions; U.S. Department of Energy, March 1980.

During this same period, use of fuel by air carriers has increased steadily. Since the oil embargo of 1973, the following amounts of fuel were consumed annually nationwide by air carriers . . .

Year	Gallons Consumed (In billions)	Revenue Passenger Miles/Gal.	Load Factors
1974	9.5	19.5	54.9
1975	9.5	19.5	53.7
1976	9.8	20.7	55.4
1977	10.3	21.2	55.9
1978	10.6	23.7	61.5
1979	11.2 (estimate)	25.0 (estimate)	63.1 (estimate)

Source: Airline Transport Association

These figures comprise somewhat less than 4 percent of the total fuel consumed annually in the United States (4).

Fuel consumption per seat mile, on the other hand, has decreased. Increased use of larger aircraft, longer stage lengths, and higher load factors have resulted in a significant increase in passenger seat miles per gallon of fuel consumed. Figure 1 illustrates the relationship between fuel consumption per seat mile and stage length. (5)

The Economy

The provision and use of scheduled air service is dependent, to a great extent, on economic factors. One component of air service demand is quite insensitive to price and is related to real gross national product (GNP). During the past decade real GNP and enplaned passengers paralleled one another until 1977. Since then the growth of the national economy has tapered off while enplanements have increased markedly (see Figure 2). Discretionary air travel is highly sensitive to fare structure and recent experiments in fare reductions for certain kinds of passengers have resulted in dramatic increases in demand. Because it is difficult to estimate the national economy and what will happen to fare structures in the future, it is unclear whether recent trends in enplanements will continue.

THE FLEET AND ITS USE

The domestic trunk and local service carrier fleet in the United States is becoming an all-jet aircraft fleet. Nearly 90 percent of the fleet (see Table 2) is comprised of turbojet aircraft with the percentage leveling off in recent years,

Table 2. Composition of U.S.[1/] Air Carrier Fleet, 1960-79

Type of Aircraft	1960		1965		1970		1975		1979	
	No.	%	No.	%	No.	%	No.	%	No.	%
Turbojet	202	9.5	725	34.1	2136	79.7	2114	84.7	2291	87.3
Turboprop	230	10.7	312	14.7	374	14.0	260	10.4	256	9.8
Piston	1678	78.6	1067	50.2	153	5.7	114	4.6	73	2.8
Rotary-wing	25	1.2	21	1.0	16	0.6	7	0.3	3	0.1
Total	2135	100.0	2125	100.0	2679	100.0	2495	100.0	2623	100.0

Note: 1/ Includes Certificated Route Air Carriers; Supplemental Air Carriers, and Commercial Operators

Source: Department of Transportation, Federal Aviation Administration

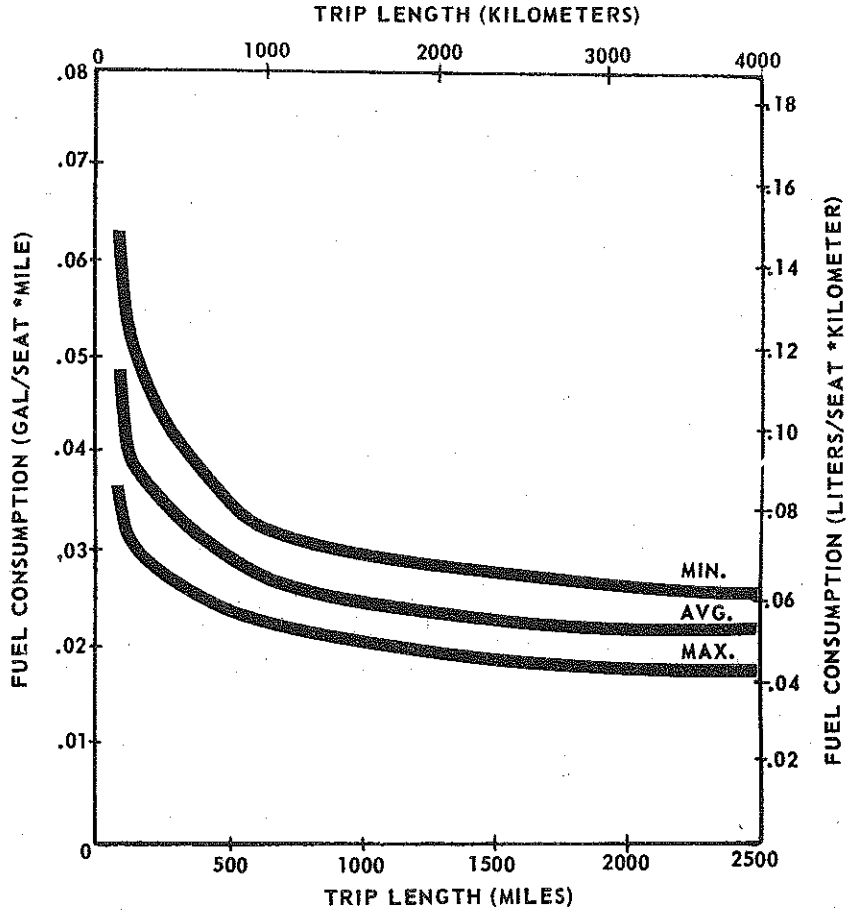


FIGURE 1. FUEL CONSUMPTION OF COMPOSITE COMMERCIAL PASSENGER AIRCRAFT AS INFLUENCED BY TRIP LENGTH

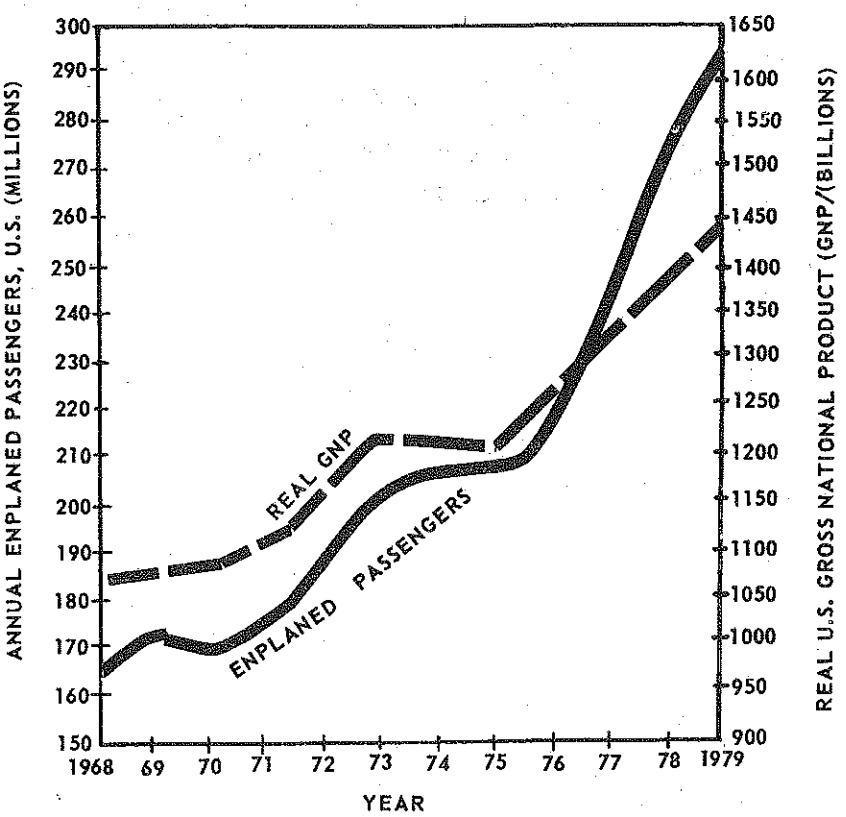


FIGURE 2. ANNUAL ENPLANED PASSENGERS AND REAL U.S. GROSS NATIONAL PRODUCT, 1968-79.

These large transport-type aircraft operate most efficiently at high speeds and altitudes. To achieve these features, route segments must be long.

An aviation firm chooses its fleet mix based upon the market segments it wishes to serve. In general, the domestic trunk carriers operate three and four engine, high capacity aircraft over relatively long route segments between the largest cities in the country. The local service carriers operate two and three engine, smaller capacity aircraft over shorter route segments connecting medium-sized communities to the largest cities in the country. The short-haul (commuter) air carriers operate one and two engine, small capacity aircraft over very short route segments connecting the smaller communities with the medium-sized communities and largest cities in the country. An overview of the nature of these three types of carriers is presented in Table 3.

Table 3. Comparative Data for U.S. Air Carriers, 1978

	Domestic Trunk	Local Service	Short Haul (Commuters)
Number of Operators	11	9	258
Passenger Enplanements (millions)	196.1	48.6	10.2
Passenger Miles (billions)	163.6	16.7	1.1
Airports Served	189	484	819
Stage Length (miles)	602	213	111
Average Annual Passenger Growth Rate	6.8%	8.7%	11.1%

Sources: Air Transport Association and Commuter Airline Association

Use of larger aircraft on route segments for which they are not designed results in operating costs diseconomies and aircraft underutilization. Shorter route segments result in ground times approaching flight times. This means the aircraft produces revenues a small portion of the time and, therefore, the return on investment for this aircraft is reduced. The result is an increase in that portion of direct operating costs related to aircraft depreciation. Consequently, it is rational for management to seek maximum aircraft utilization to reduce operating costs and keep fares reasonable, thereby maximizing revenues and profits.

Rising fuel costs and an uncertain future regarding fuel availability have been other determinants in a move toward longer route segments. Both domestic trunk and local service carriers have sought to reduce the number of short route segments by terminating some routes entirely and eliminating intermediate stops on others.

THE NET EFFECT

Service

The effect on small community air service is ominous. The economics of the larger air carrier firms are dictating service curtailments in these markets resulting in poorer quality air service. This is not unique to air transportation. Intercity bus, intercity rail, and local bus systems have been faced with similar conditions. Nor is it one that was unexpected. The Civil Aeronautics Board studied the economics of small community air service as early as 1971 (6).

United Airlines has curtailed some of its service from Michigan communities to two major hubs, Chicago and Cleveland. Though the reasons for the actions of the airline may be understood in light of the above factors, the affected communities may be left with less than satisfactory air service for passengers, cargo, and mail. The accessibility of these communities to national and international markets could be severely decreased. The net result of the projected service cutbacks at Lansing alone will be a 38 percent reduction in enplanement capacity with similar effects to cargo and mail service. For an airport which enplanes about 220,000 passengers annually, this can be devastating.

136,000 (LOSS = 84,000)
= 1615 / WK
= 230 / DAY

The User

Major reductions in seat availability will likely lead to serious difficulties in procuring seat reservations on many flights and connections at gateway airports (large hubs) for continuing flights are likely to be less convenient. This can result in long passenger delays at nearby airports, increased travel times and costs for the passenger, and trips which may result in overnight stays which might have otherwise been avoided. But the air traveler is not the only segment of the community adversely affected.

The Community and Its Airport

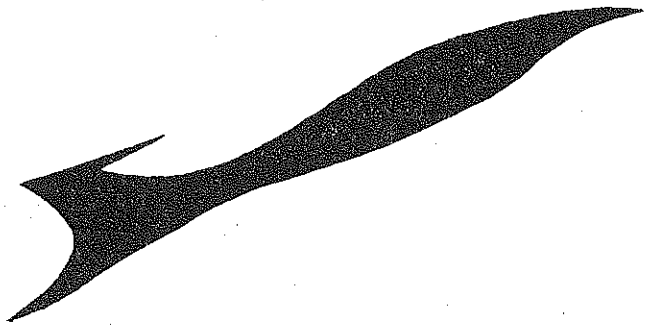
The airport and scheduled air service stimulate the economic environment of the region they serve. They provide employment and attract industry which in turn provides employment. Less service to a community will adversely impact the economy of the community and the state.

Earlier decisions to invest in the improvement and expansion of airports are being questioned. Airport activities generate significant revenues through Federal enplanement funds, landing fees, space rental, parking and other concessions. These revenues finance airport construction and operations to a significant degree. A loss in these revenue sources could increase the cost burden on the community.

The Need For Planning

The problems facing Michigan communities now are not unique. Service curtailments and service abandonments have occurred frequently throughout the United States. The concerns being expressed by the Michigan citizenry now are not unlike those heard in the past. At the same time, short-haul aviation services have proven to be a valuable transportation service in many locations. Successful short-haul services are being provided by domestic trunk, local service, and commuter carriers. The type of service provided is dictated by many factors including available aircraft equipment, demand level and density, direct and indirect operating costs, fares, and service segment lengths. The key to meeting immediate and future air transportation needs of Michigan is matching service design to service needs.

SERVICE
SUPPLY AND DEMAND



part two

PART TWO

SERVICE SUPPLY AND DEMAND

The quality and level of scheduled air service should be commensurate with demand. In order to determine whether a balance exists between supply and demand, one must examine the extent of service areas and their characteristics, inventory the existing service (quantity and quality), and estimate the demand for scheduled air service.

SERVICE AREAS

Michigan has been divided into 21 service areas for analysis purposes. These areas were determined using 60 minute travel times on the State highway system from each of Michigan's 22 air carrier airports. County boundaries were honored where possible because of the ready availability of forecast data for counties, and counties often provide the best basis for financing airports and air service. In the case of the Detroit metropolitan area, it was assumed that the area is served by both Detroit Metropolitan and Detroit City airports. Figure 3 depicts the 21 service areas and 22 air carrier airports.

These service areas have been classified as low, moderate, and high activity areas. Population, population density, and annual enplanements were used to determine the level of activity characterizing each service area (see Table 4). One service area (metropolitan Detroit) is classified as a high activity area, 10 as moderate, and 10 as low activity service areas. All but one of the moderate activity service areas are located in the southern half of Michigan's lower peninsula (see Figure 3*). Each service area is listed by activity classification in Appendix C together with the number of counties comprising each service area and existing and forecasted population figures.

Table 4. Characteristics of Service Area Types

Type of Service Area	Population (000)	1/ Population Density (Pop/Sq Mi)	Annual Enplanements (000)	Associated Cities
Low Activity	Under 100	Under 50	Under 50	Alpena, Escanaba, Hancock/ Houghton, Iron Mountain, Ironwood, Manistee, Marquette, Menominee, Pellston, Sault Ste. Marie
Moderate Activity	100-1000	50-1000	50-1000	Battle Creek, Benton Harbor, Flint, Grand Rapids, Jackson, Kalamazoo, Lansing, Muskegon, Traverse City, Tri-City
High Activity	1000+	1000+	1000+	Detroit

Note: 1/ Population per square mile for the county in which the airport is located.

Source: Michigan Department of Transportation, Aviation Planning Section.

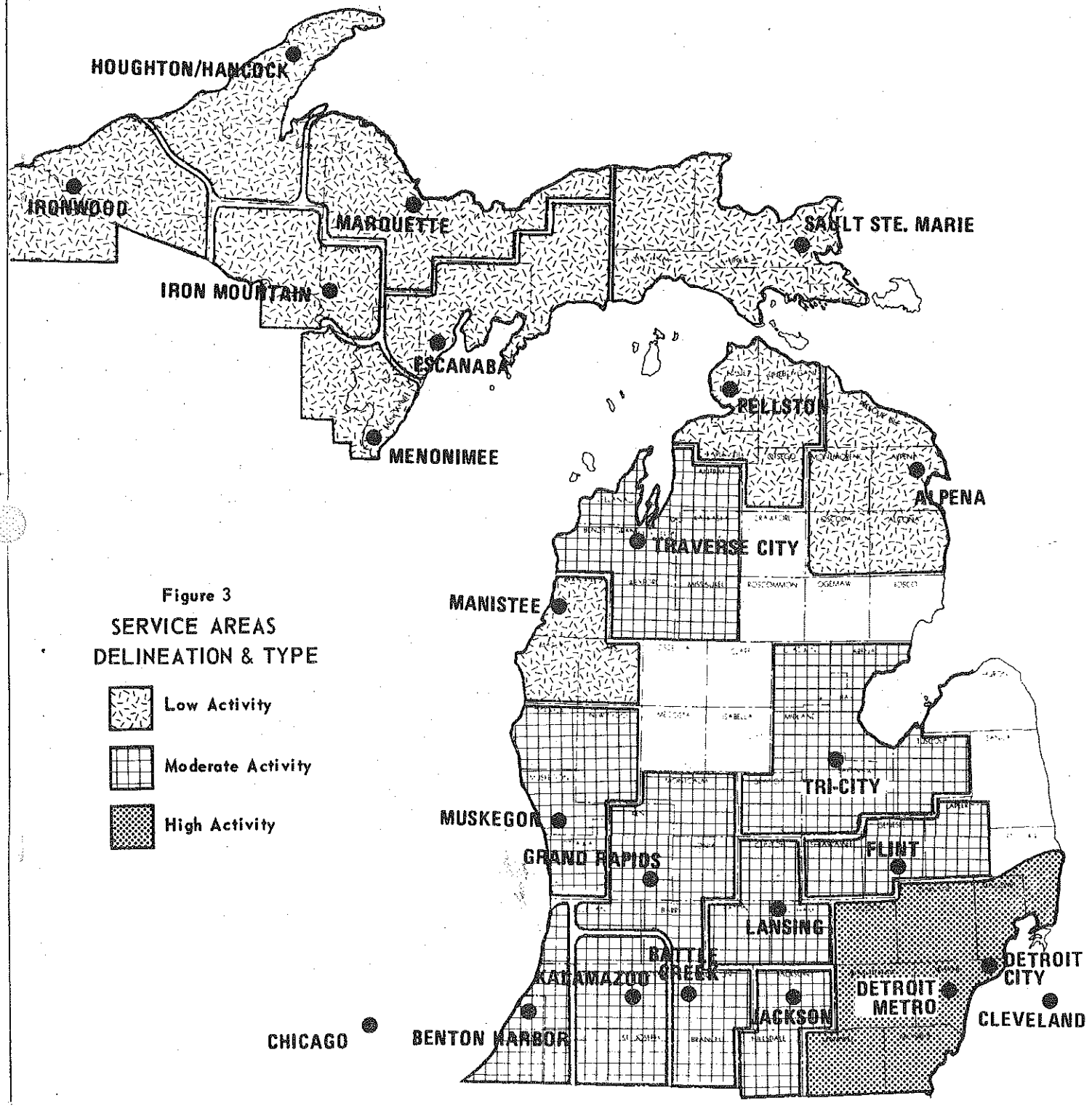


Figure 3

SERVICE AREAS
DELINEATION & TYPE

EXISTING SCHEDULED AIR SERVICE

Certificated Air Carriers

Michigan, excepting Detroit-Metro, is presently served by several certificated air carriers including: Republic, United, Air Wisconsin and Wright Airlines. Republic Airlines provides scheduled air service to 20 of the 21 service areas and 20 of the 22 Michigan air carrier airports (all but Battle Creek and Detroit City). United Airlines serves five of Michigan's service areas and air carrier airports (Detroit Metro, Flint, Grand Rapids, Lansing and Tri-City). Air Wisconsin serves two areas (Battle Creek and Detroit). Wright Airlines provide service to one service area and air carrier airport (Detroit City). Appendix D depicts the routes flown and communities served by the four airlines.

Frequency of service varies greatly. Daily departures provided by certificated air carriers at low activity service areas range from one at Manistee to six in several Upper Peninsula service areas. In moderate activity service areas, the number of daily departures ranges from 4 at Jackson to 34 at Grand Rapids. Over 300 departures occur daily in Detroit.

Nearly 7 million passengers were enplaned on certificated air carrier flights departing from the 21 service areas in 1979 . . . a 9.5 percent increase over 1978. Of these, the high activity service area realized nearly 5.4 million enplanements, the 10 moderate activity service areas over 1.4 million, and the 10 low activity service areas 0.2 million.

Air mail and air cargo (enplaned and deplaned) in the 21 service areas by the certificated air carriers declined by 1.2 and 11.1 percent respectively in 1979 as compared to 1978. Some 96.2 million pounds of mail and nearly 190 thousand tons of cargo were enplaned and deplaned during the past year. Of this 190 thousand tons of cargo, the high activity service area experienced an enplaning and deplaning of 93.7 percent the moderate activity service areas 5.3 percent and the low activity service areas 1.0 percent. Passenger, mail and cargo figures for the 3 service area types and the 22 Michigan air carrier airports are presented in Table 5 and Appendix E respectively.

Table 5. Enplaned Passengers, Mail and Cargo Tons (000) for Certificated Air Carriers, 1970-1979

Type of Service Area	1970			1975			1979		
	Pass.	Mail	Cargo	Pass.	Mail	Cargo	Pass.	Mail	Cargo
Low Activity	118	910	2	145	1,167	2	190	1,431	2
Moderate Activity	767	6,864	17	985	6,411	10	1,415	4,870	10
High Activity	3,546	47,104	155	3,673	74,967	138	5,372	89,913	178
Total	4,431	54,878	174	4,803	82,545	150	6,977	96,214	190

Source: Michigan Department of Transportation, Aviation Planning Section

Short-Haul (Commuter) Airlines

Michigan is presently served by six short-haul airlines including Coleman Air Transport, Comair, Heussler Air Service, Midstate Airlines, Simmons Airlines, and Skyline Motors Aviation Service. Simmons Airlines provides service to 4 of the 21 service areas (Hancock/Houghton, Lansing, Marquette and Traverse City). Midstate Airlines serves the Muskegon service area. The other commuter airlines serve the Detroit service area using Detroit Metro. Appendix F displays the routes flown and communities served as of March, 1980.

The highest daily service frequency provided by these airlines at any Michigan community is three flights per day. This is less than that provided by certificated air carriers in most cases. Lower air service demand in the short-haul airlines' markets due to smaller community size, the supplemental nature of the short-haul airlines' service in some areas, smaller craft size, and smaller fleets contribute to the relatively low number of departures and passengers carried. Only 64,000 passengers were transported in 1979 by short-haul carriers serving Michigan with two-thirds of these enplaned or deplaned at Detroit Metro Airport. Passengers and cargo carried in 1979 by short-haul carriers to and from Michigan communities are presented in Appendix G.

SERVICE QUALITY CONCERNS

Many characteristics of scheduled air service reflect its quality and service quality affects patronage. Nine of the more important characteristics are discussed below.

Frequency

Frequent departures and arrivals per day will probably better meet the transportation demand of a particular service area. Often a community requiring 100 seats per day is poorly served if these seats are provided by a single flight using a 100 passenger aircraft. This need would be better met with 5 flights per day averaging 20 available seats.

Timing

The scheduled times of flight departures and arrivals are important to the air traveler. Two considerations for the timing are direct flights to communities of interest and connecting flights. The direct flights preferably provide the business traveler the opportunity to leave home in the morning, fly to the community of interest, conduct a day's business, and return home the same day. Flights to hub airports should be timed to provide the maximum number of connections with the minimum lay-over time.

Sometime airlines provide air service based on convenience of aircraft scheduling and positioning with little or no regard to the true needs of the community. The result is often inadequate service and low boarding figures as many potential air travelers use other modes of transportation to make the entire trip or to access a more distant airport with better service.

Equipment

The size, type, and condition of the aircraft used to provide the service are of critical importance to the service provider and user. The size of the equipment should be matched to the market requirements to achieve the most economical utilization. It is unrealistic to ask for jet service using 100 passenger aircraft if the market will only produce 10,000 enplanements per year.

Also, the CAB does not require pressurized aircraft for replacement carriers providing Essential Air Service. The reasons given were the shortage of pressurized equipment and the fact that pressurization is not needed on short-haul flights except under extreme flying conditions such as high altitude locations.

Likewise, the CAB does not consider air freight transportation needs in its determinations of Essential Air Service. This could lead to problems in locations where smaller aircraft might adequately satisfy passenger demand but their limited lift capabilities might not permit the meeting of air freight demands. This problem could be overcome by scheduling separate freight runs or having an air freight operator provide air freight service.

In addition, the condition of the equipment is an important factor in gaining and retaining public acceptance. Faded paint, dirty aircraft, and torn upholstery will diminish public confidence in the airline's operation.

Markets

Accessibility to communities of interest by scheduled air service is a vital concern of many air travelers. These communities could be either final destinations or transfer points. Sometimes these city-pairs are obvious; other times an intensive market study might be needed in locations without air service, or where the existing service has not been responsive to the market, to determine the principal communities of interest.

Intersystem Compatibility

Airlines providing service to a community should be compatible with the entire system so as to provide convenient access to the national air transportation network. This is especially essential for commuter airlines which are often not housed in the main terminal of a major airport, but are relegated to inadequate quarters in a corner of the field. This compatibility includes interline agreements with major carriers for baggage transfer and through-ticketing, access to the computerized reservations network, passenger transfer between commuter terminal and main terminal, and joint fare agreements.

Joint fare agreements are of special importance to the budget-minded traveler. The impact of joint fares can be illustrated using a Lansing to Atlanta flight.

The cost of two separate tickets would be:

Lansing - Detroit	$ 41.00
Detroit - Atlanta	104.00
Total	$145.00

The joint fare or connecting ticket Lansing - Atlanta is $112.00 . . . a savings of $33.00.

Safety

Establishing and maintaining an excellent safety record is necessary for a successful airline operation. This requires not only compliance with the federal and state regulations governing operations and maintenance of aircraft in scheduled service, but also often exceeding minimum standards set by such regulations for pilot training, aircraft equipment (weather radar, etc.), preventive maintenance, and other. Operational safety can also be affected by the airport facilities, length and condition of the runway, adequate snow removal, runway lighting, and radio communications.

The 1979 scheduled air service accident figures are slightly higher than the average over the last five years. Certificated air carriers, using the five year averages (see Table 6), account for 85 percent of the fatalities. However, the commuter airlines account for 76 percent of the accidents. One trend of note is that the number of certificated air carrier accidents are decreasing while the reverse is true for commuter airlines. This is partly due to the entry of a substantial number of additional commuter airlines into the scheduled air service market place, and a 40 percent increase in the number of hours flown by commuter airlines during this period. (7) Compared to other transportation modes, scheduled air service has fewer passenger fatalities per 100 million passenger mile (see Appendix H).

Table 6. Air Transportation Accidents Throughout the World, 1975-1979

	Certificated Air Carrier			Commuter		
Year	Total Accidents	Fatal Accidents	Fatalities	Total Accidents	Fatal Accidents	Fatalities
1979	18	3	280	73	18	77
1978	25	6	163	56	15	63
1977	26	5	655	41	8	30
1976	28	4	45	41	11	34
1975	45	3	124	50	12	26
Total	142	21	1,267	261	64	230
U.S. 5 Year Avg.	28	4	253	52	13	46
Mich. 5 Year Avg.	0.4	0	0	1.6	0.2	0.8

Source: Federal Aviation Administration, Flight Standards Service.

Dependability

Nothing erodes public confidence in scheduled air service faster than lack of dependability. Examples of this can be pointed to in some commuter air service operations who have served Michigan. Dependability is influenced by a variety of factors, many of which also relate to the safety of the operation. Proper scheduling, well-trained flight crews, adequate on-board equipment (de-icing, navaids, communications), and a good maintenance program are among them. Also of great importance are precision instrument landing systems at the airports served by air carriers to minimize the impact of adverse weather conditions on flight schedules.

Public Relations

Public relations can mean the success or failure of scheduled air service. One aspect of public relations is actively advertising and marketing the service to create public interest and stimulate demand. The latter could lead to improved service. A second aspect is cooperating with travel agencies, local governmental units, chambers of commerce and other business organizations, and service clubs. A third aspect of public relations is keeping ticket holders, travel agents, and airport management informed when cancellations, delays or other problems occur. Also, the stranded traveler appreciates any extra effort the airlines make to help the person arrive safely at his or her destination in spite of the problem.

Non-Stop and Single Plane Service

Non-stop or one-stop service to one or more gateways and single plane service to gateways and points beyond are desirable service features. These items increase the comfort and convenience of the air traveler. Eight Michigan air carrier airports have non-stop service to two or more gateways, seven to one gateway, and seven have no non-stop service to gateways. Figure 4 indicates the quality of airport access to gateways and the number of daily departures toward gateways for each of the service areas. Figure 5 depicts non-stop service from selected gateways serving Michigan to destinations throughout the country.

SERVICE DEMAND ESTIMATES

Demand has been estimated for enplaned passengers and cargo tons for the year 1990. Figures are for low and moderate activity service areas only. Estimates for the high activity service area, Detroit, have been developed as part of airport master plan studies in progress for Detroit Metropolitan and Detroit City airports. Those portions of Michigan outside the 21 service areas, containing 3.9 percent of the State's population, have not been included in the demand estimation process. For estimating purposes it is assumed scheduled air service will continue to be provided to all communities now served, but not to any additional communities.

Assumptions

The demand estimates will be valid only if the following assumptions hold:

- Population changes will occur as presented in Appendix C.
- All 21 service areas will continue to receive scheduled air service.
- The level of service provided will be within ranges specified in Table 7.
- No significant changes in existing service areas will occur during the eighties.
- The relationship between socio-economic conditions, energy cost and supply and scheduled air service will follow the trends of the 1970's through the 1980's.

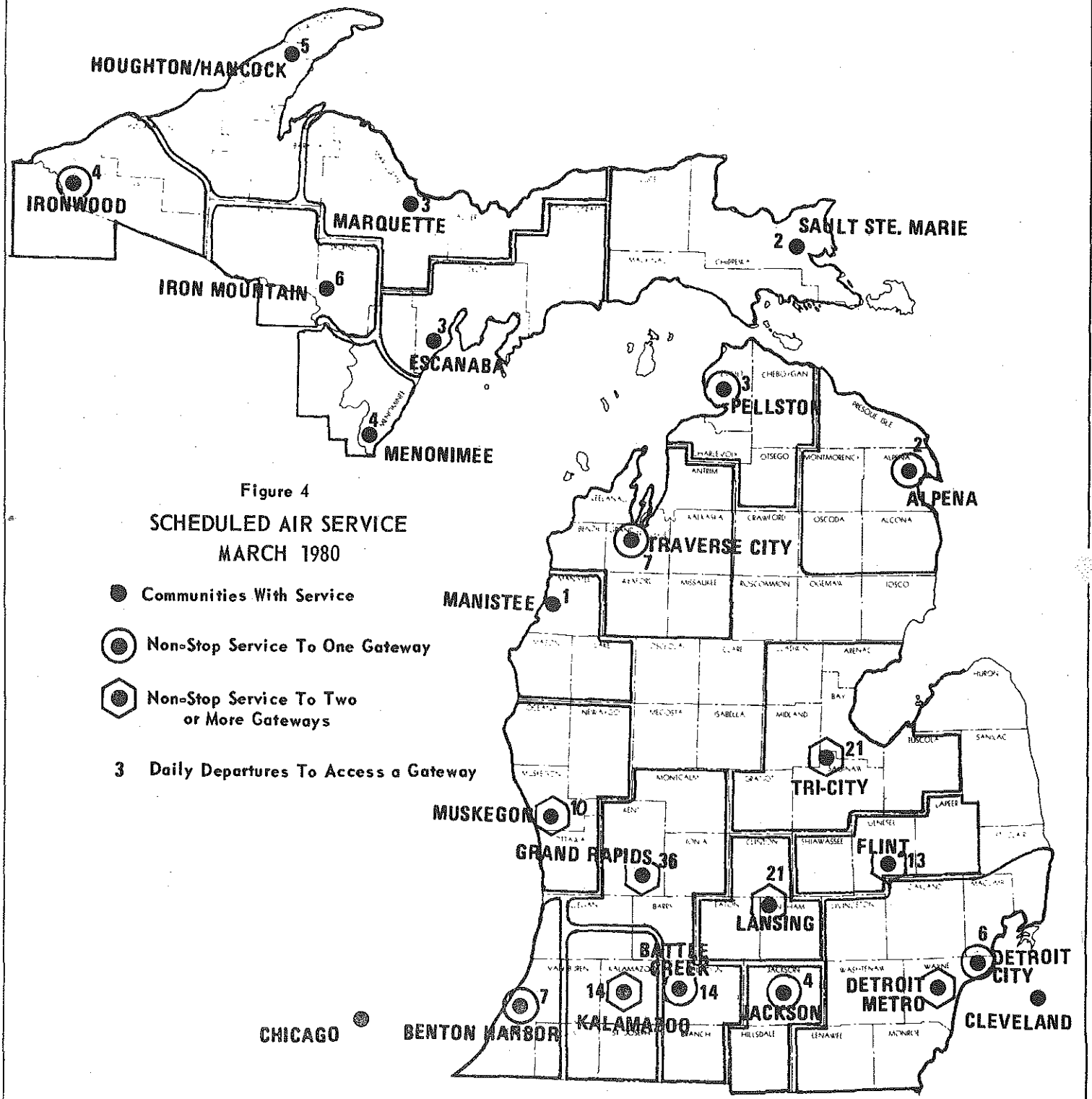
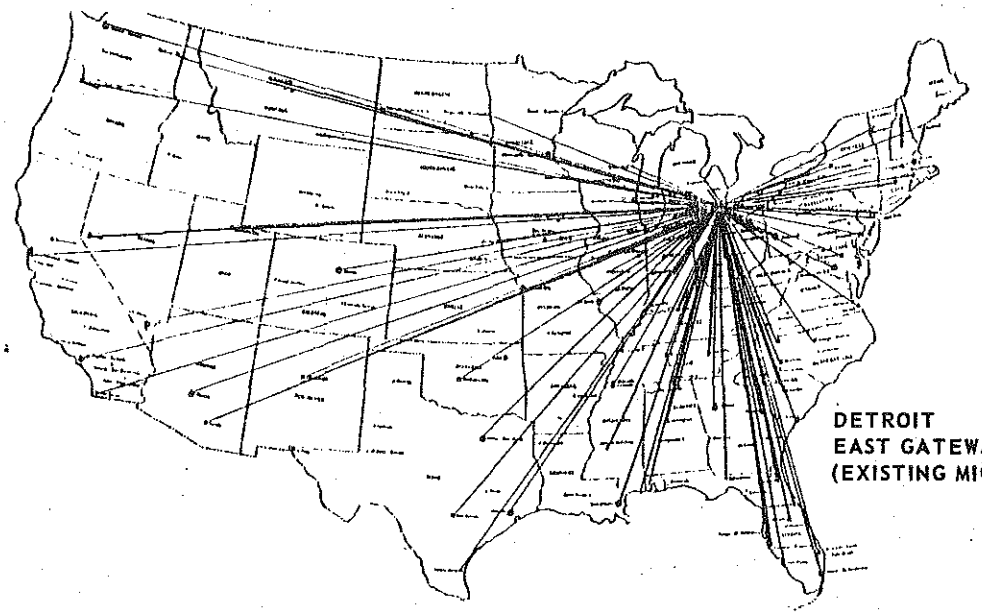


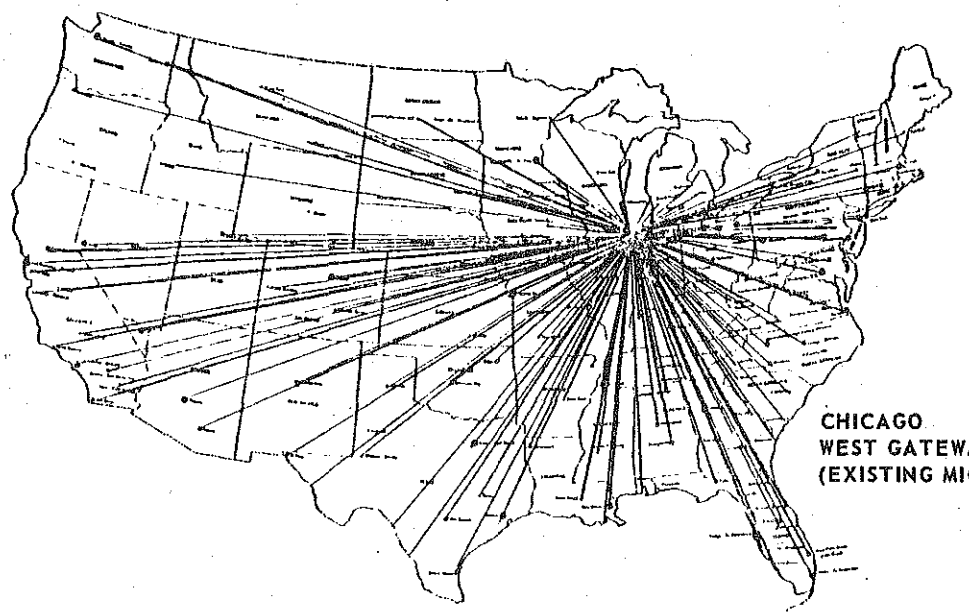
Figure 4

SCHEDULED AIR SERVICE
MARCH 1980

- Communities With Service
- Non-Stop Service To One Gateway
- Non-Stop Service To Two or More Gateways
- 3 Daily Departures To Access a Gateway

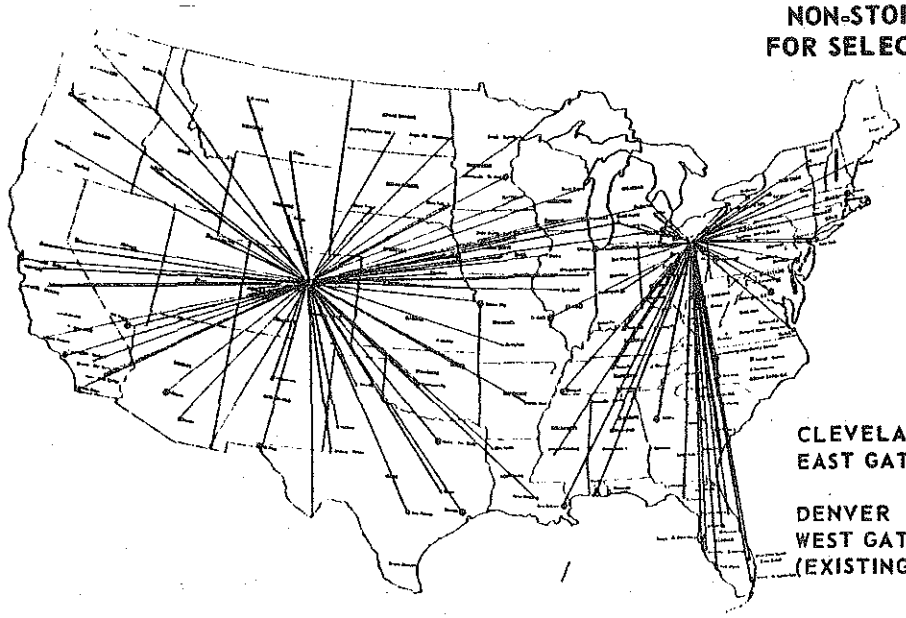


DETROIT
EAST GATEWAY
(EXISTING MICHIGAN ACCESS)



CHICAGO
WEST GATEWAY
(EXISTING MICHIGAN ACCESS)

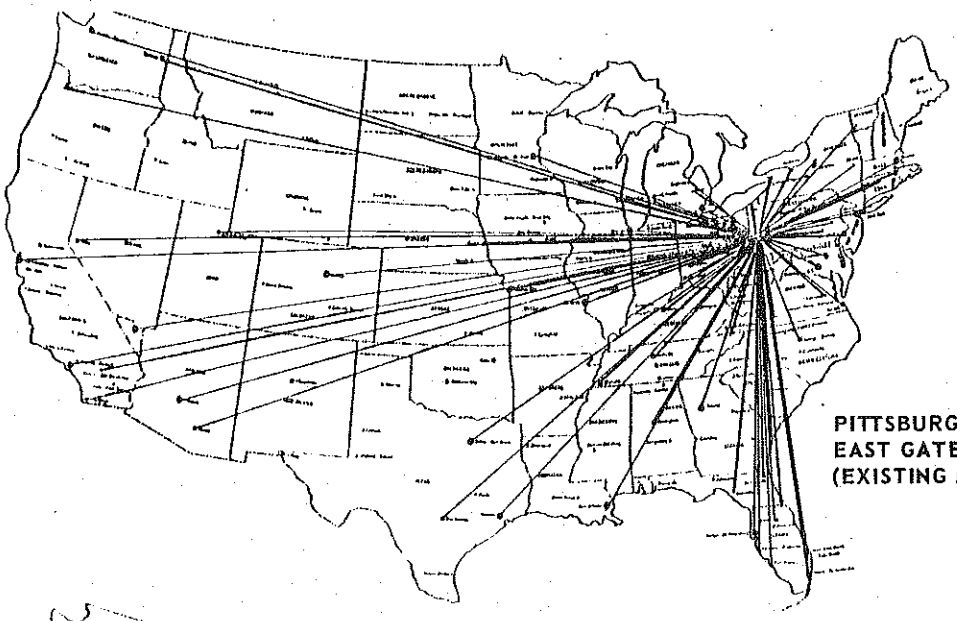
Figure 5
NON-STOP SCHEDULED AIR SERVICE FOR SELECTED GATEWAYS, MARCH 1980



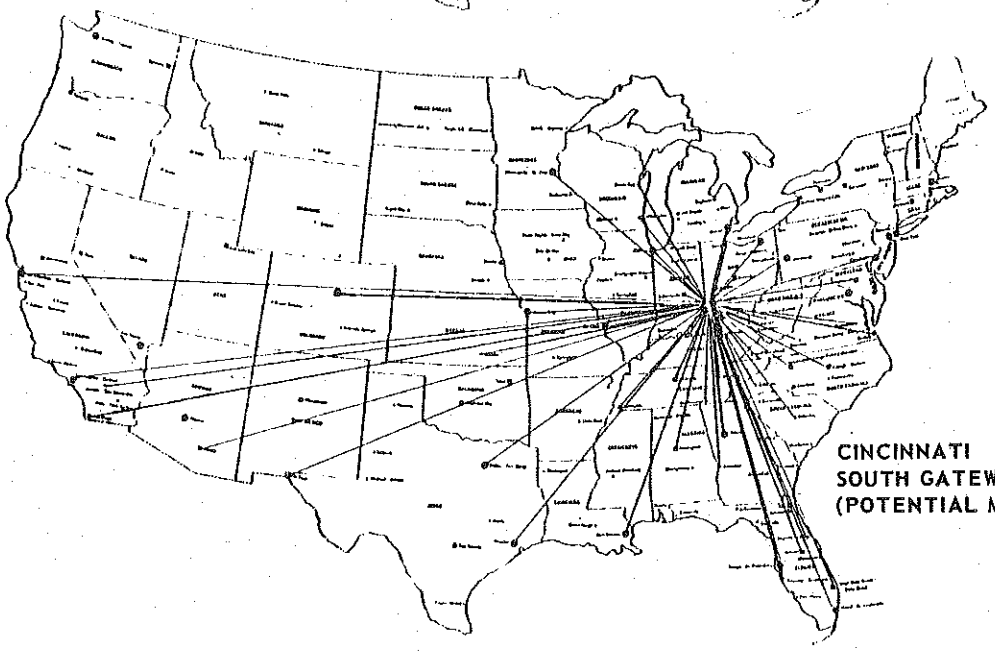
CLEVELAND
EAST GATEWAY

DENVER
WEST GATEWAY
(EXISTING MICHIGAN ACCESS)

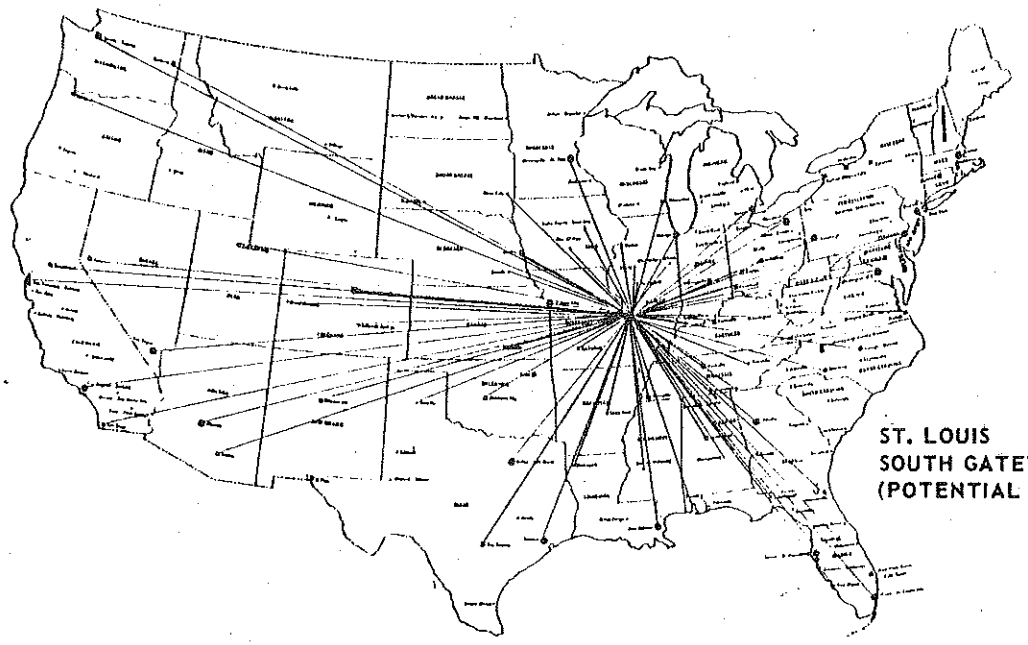
Low Activity									
Alpena		88	132	132	176	3	6	220	395
Escanaba		58	86	82	115	3	6	145	259
Hancock/Houghton		63	94	94	126	3	6	158	283
Iron Mountain		55	82	77	109	3	6	138	246
Ironwood		61	91	91	121	3	6	153	272
Manistee		67	101	100	135	3	6	168	303
Marquette		96	145	144	193	3	6	240	434
Menominee		62	93	93	125	3	6	155	280
Pellston		77	115	115	154	3	6	193	346
Sault Ste. Marie		54	80	81	107	3	6	135	241
r-5									
Total	1990	681	1,019	1,009	1,361	30	60	1,697	3,059
	1979	611		1,021		41		1,524	
	1970	379		633				2,147	
Moderate Activity									
Battle Creek		182	365	273	456	12	24	547	1,094
Benton Harbor		278	556	417	695	12	24	834	1,668
Flint		623	1,246	935	1,558	12	24	1,869	3,739
Grand Rapids		647	1,299	974	1,624	12	24	1,948	3,897
Jackson		204	409	306	511	12	24	613	1,226
Kalamazoo		393	787	589	982	12	24	1,178	2,356
Lansing		467	936	700	1,167	12	24	1,401	2,801
Muskegon		412	823	618	1,029	12	24	1,235	2,470
Saginaw		589	1,178	884	1,472	12	24	1,767	3,534
Traverse City		172	344	258	430	12	24	516	1,031
Total	1990	3,967	7,943	5,954	9,924	120	240	11,913	23,816
	1979	4,537		6,058		158		9,923	
	1970	2,459		3,283				16,655	



PITTSBURGH
EAST GATEWAY
(EXISTING MICHIGAN ACCESS)



CINCINNATI
SOUTH GATEWAY
(POTENTIAL MICHIGAN ACCESS)



ST. LOUIS
SOUTH GATEWAY
(POTENTIAL MICHIGAN ACCESS)

Low Activity

Alpena		88	132	132	176	3	6	220	395
Escanaba		58	86	82	115	3	6	145	259
Hancock/Houghton		63	94	94	126	3	6	158	283
Iron Mountain		55	82	77	109	3	6	138	246
Ironwood		61	91	91	121	3	6	153	272
Manistee		67	101	100	135	3	6	168	303
Marquette		96	145	144	193	3	6	240	434
Menominee		62	93	93	125	3	6	155	280
Pellston		77	115	115	154	3	6	193	346
Sault Ste. Marie		54	80	81	107	3	6	135	241
r-5									
Total	1990	681	1,019	1,009	1,361	30	60	1,697	3,059
	1979	611		1,021		41		1,524	
	1970	379		633				2,147	

Moderate Activity

Battle Creek		182	365	273	456	12	24	547	1,094
Benton Harbor		278	556	417	695	12	24	834	1,668
Flint		623	1,246	935	1,558	12	24	1,869	3,739
Grand Rapids		647	1,299	974	1,624	12	24	1,948	3,897
Jackson		204	409	306	511	12	24	613	1,226
Kalamazoo		393	787	589	982	12	24	1,178	2,356
Lansing		467	936	700	1,167	12	24	1,401	2,801
Muskegon		412	823	618	1,029	12	24	1,235	2,470
Saginaw		589	1,178	884	1,472	12	24	1,767	3,534
Traverse City		172	344	258	430	12	24	516	1,031
Total	1990	3,967	7,943	5,954	9,924	120	240	11,913	2 16
	1979	4,537		6,058		158		9,923	
	1970	2,459		3,283				16,655	

Demand Estimation Process

Population forecasts prepared by the Michigan Department of Management and Budget were utilized as the basis for making estimates. The following ratios, developed using relationships experienced during the 1970's, were applied to 1990 population forecasts to determine demand estimates.

- Daily enplaned passengers/1000 population was used to determine demand for passenger service.
- Daily available seats/1000 population was used to determine needed capacity.
- Annual cargo tons/1000 population was used to determine demand for cargo transport using scheduled air service.

Daily departure ranges were developed from records of the number of daily departures occurring at Michigan air carrier airports during the seventies. These parameters are presented in Table 7. Future daily enplanements and seats for each low activity service area were estimated using a market share similar to that now assumed by that service area when compared to all other low activity service areas (8). The same method was used to estimate daily enplanements and seats for the ten moderate activity service areas. The results of the process were compared to the figures contained in the Essential Air Service determination (9), the FAA Aviation Forecasts: 1980-1991 (10), and the Michigan State Airport System Plan (11).

Table 7. Michigan Air Service Demand Parameters

Type of Service Area	Population (000)	Demand (Daily Enplane-ments/ 1000 Pop.)	Capacity (Daily Seats/1000 Pop.)	Frequency (Daily Deps.)	Annual Cargo Tons/ 1000 Pop.
Low Activity	Under 100	1.0-1.5	1.5-2.0	3-6	2.5-4.5
Moderate Activity	100-1000	1.2-2.0	1.5-2.5	12-24	3.0-6.0
High Activity	Over 1000	3.5+	5.0+	300+	35+

Source: Michigan Department of Transportation, Aviation Planning Section.

Demand Estimates

Demand estimates for each low and moderate activity service area are presented in Table 8. For low activity service areas the number of daily enplaned passengers will increase up to 67 percent, and annual cargo tons will increase up to 100 percent by 1990. Daily available seats and daily departures are also likely to increase. In moderate activity service areas, daily enplaned passengers will increase up to 75 percent and annual cargo tons could more than double.

Table 8. Scheduled Air Service Demand Estimates, 1990

Service Area		Daily Enplaned Passengers Min.	Max.	Daily Available Seats Min.	Max.	Daily Departures Min.	Max.	Annual Cargo Tons Min.	Max.
Low Activity									
Alpena		48	71	81	96	3	6	220	395
Escanaba		75	112	112	150	3	6	145	259
Hancock/Houghton		99	148	148	198	3	6	158	283
Iron Mountain		65	97	97	130	3	6	138	246
Ironwood		41	61	61	82	3	6	153	272
Manistee		10	15	15	20	3	6	168	303
Marquette		150	225	225	300	3	6	240	434
Menominee		37	56	56	74	3	6	155	280
Pellston		109	163	163	218	3	6	193	
Sault Ste. Marie		47	71	71	94	3	6	135	241
Total	1990	681	1,019	1,019	1,362	30	60	1,697	3,059
	1979	611		1,021		41		1,524	
	1970	379		633				2,147	
Moderate Activity									
Battle Creek		100	167	125	206	12	24	547	1,094
Benton Harbor		150	250	188	312	12	24	834	1,668
Flint		425	709	531	885	12	24	1,869	3,739
Grand Rapids		1,600	2,669	2,000	3,333	12	24	1,948	3,897
Jackson		50	83	63	104	12	24	613	1,226
Kalamazoo		500	834	625	1,042	12	24	1,178	2,356
Lansing		775	1,293	969	1,615	12	24	1,401	2,801
Muskegon		300	500	375	625	12	24	1,235	2,470
Traverse City	300	500	375	625	12	24	516	1,031	
Tri-City	800	1,334	1,000	1,667	12	24	1,767	3,534	
Total	1990	5,000	9,849	6,251	9,924	120	240	11,913	23,816
	1979	4,537		6,058		158		9,923	
	1970	2,459		3,283				16,655	

Source: Michigan Department of Transportation, Aviation Planning Section.

Both existing services and the 1990 demand estimates are considerably higher than those provided for by the Civil Aeronautics Board as Essential Air Service (EAS). Essential Air Service guarantees about 70 percent of seats available today and some 50 percent of the departures.

10 Low Activity Service Areas	Total Daily Seats Available	Total Daily Departures
Existing Service (1979)	1,021	41
EAS	697	21
Demand Estimates (1990)	1,019-1,362	30-60
5 Moderate Activity Service Areas		
Existing Service (1979)	1,418	56
EAS	376	not specified
Demand Estimates (1990)	1,376-2,283	60-120

A service area comparison to the Essential Air Service determinations (9) is presented in Appendix I.

It should be noted that the enplaned passengers and cargo ton estimates reflect percentage increases somewhat higher than the revised FAA Aviation Forecasts for the nation (10). The FAA forecasts for the United States domestic revenue passenger enplanements for the year 1990 are 64 percent higher than the 1979 estimated figures and the cargo ton estimate is 94 percent higher.

	1979 to 1990 % Increase		
	10 Low Activity Service Areas	10 Moderate Activity Service Areas	FAA United States
Enplaned Passengers	Up to 67%	Up to 75%	64%
Cargo Tons	Up to 100%	Up to 140%	94%

While the upper limit of the 1990 cargo ton estimate for the 10 moderate activity service areas is 140 percent over the 1979 figures, this actually is only a 43 percent increase when compared to 1970.

Service Points

Several additional communities should be considered for scheduled air service. These communities are generally located outside or near the periphery of the 21 existing service areas. Figure 6 depicts these communities. Some of these have had scheduled air service in the past but do not have service now.

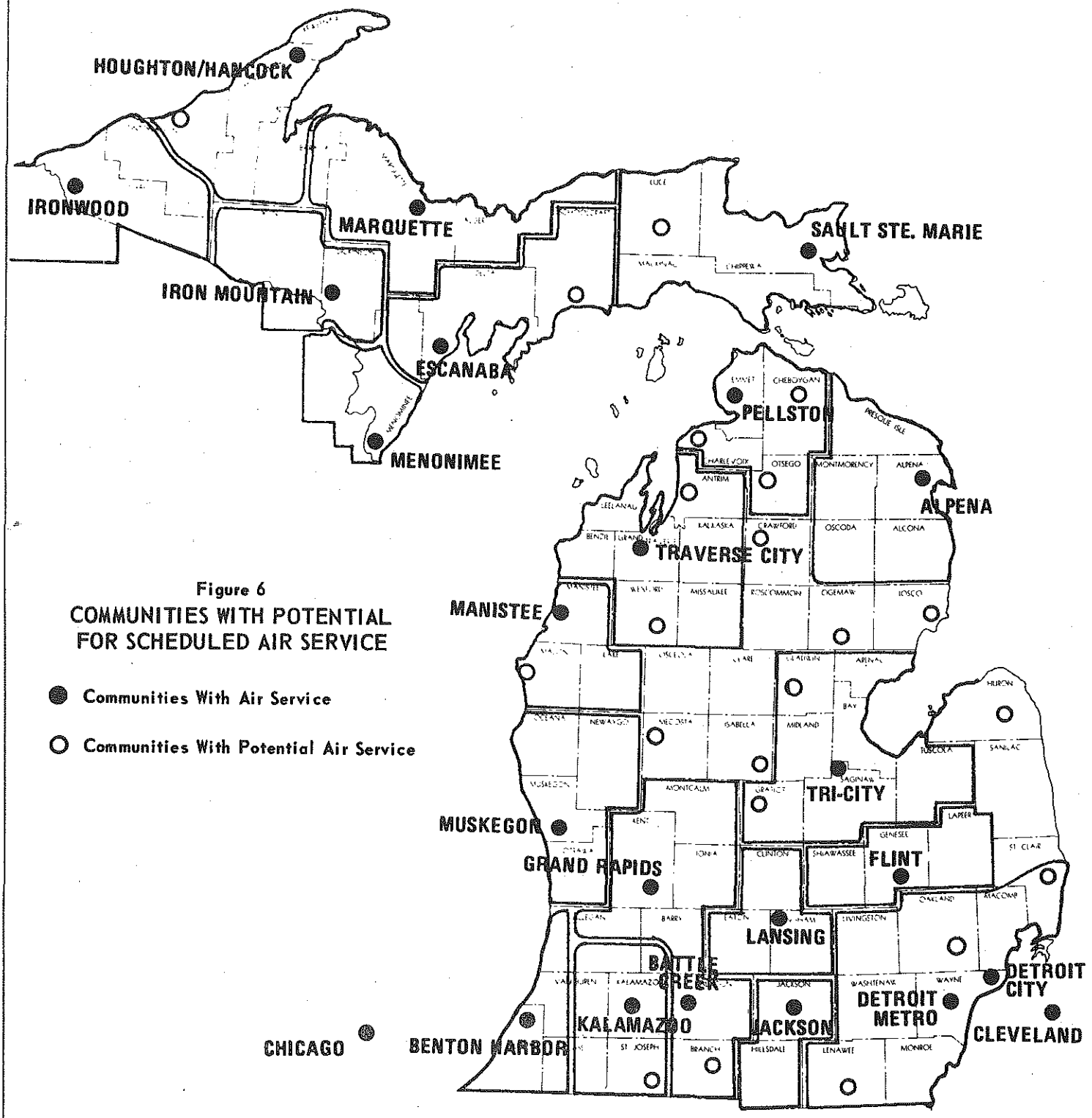


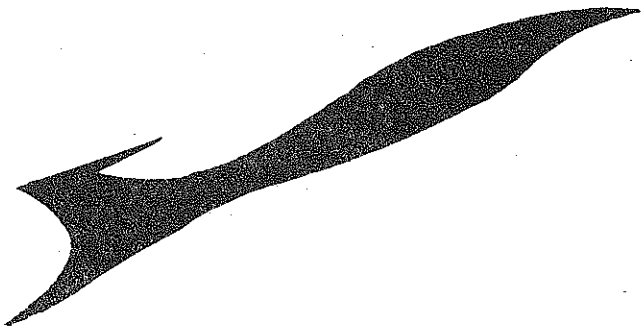
Figure 6

COMMUNITIES WITH POTENTIAL FOR SCHEDULED AIR SERVICE

● Communities With Air Service

○ Communities With Potential Air Service

ALTERNATIVES ANALYSIS



part three

PART THREE

ALTERNATIVES ANALYSIS

A variety of concepts that might be useful to influence scheduled air service should be explored. This involves consideration of alternate modes as well as several air transportation service level options. In order to manage this complex analysis, a series of steps must be undertaken:

1. Identifying a range of possible service levels,
2. Exploring fleet considerations, and
3. Establishing and applying a set of criteria in evaluating all options.

SERVICE CONCEPTS

Several alternatives may be considered for state level action that could be taken to influence future scheduled air service. These would range from a "do nothing" approach to exercising direct intervention in a variety of ways. The following six categories of potential actions are not mutually exclusive. Some may work well in some circumstances and in other instances another alternative or combination of actions may be most useful.

Do Nothing

The do nothing concept involves allowing scheduled air service to be shaped in the future in the way it has in the past. Regulatory reform in the form of free market entry and exit and Essential Air Service guarantees will continue to influence the level and extent of Michigan's air service system as will fuel availability, fuel price, and economic conditions. Advantages of this approach include: (1) cost effectiveness as the free enterprise system and the law of supply and demand will shape scheduled air service, (2) fuel efficiency as smaller airdraft will probably continue to replace larger aircraft on the shorter route segments, and (3) little burden economically on already limited State and Federal funds. Disadvantages include: (1) inconvenience and delays caused by continued congestion at some gateways, (2) no assurance that a suitable level of scheduled air service will be maintained on a continuous basis particularly in smaller markets, and (3) difficulty in increasing scheduled air service to presently served communities or providing service to new communities when demand warrants, due to the trend of airlines to consolidate and use larger aircraft.

In Michigan this could mean lower levels of service and loss of jet service for many communities. Also, several communities with no scheduled air service at the present time may have difficulty obtaining such service due to lack of Federal,

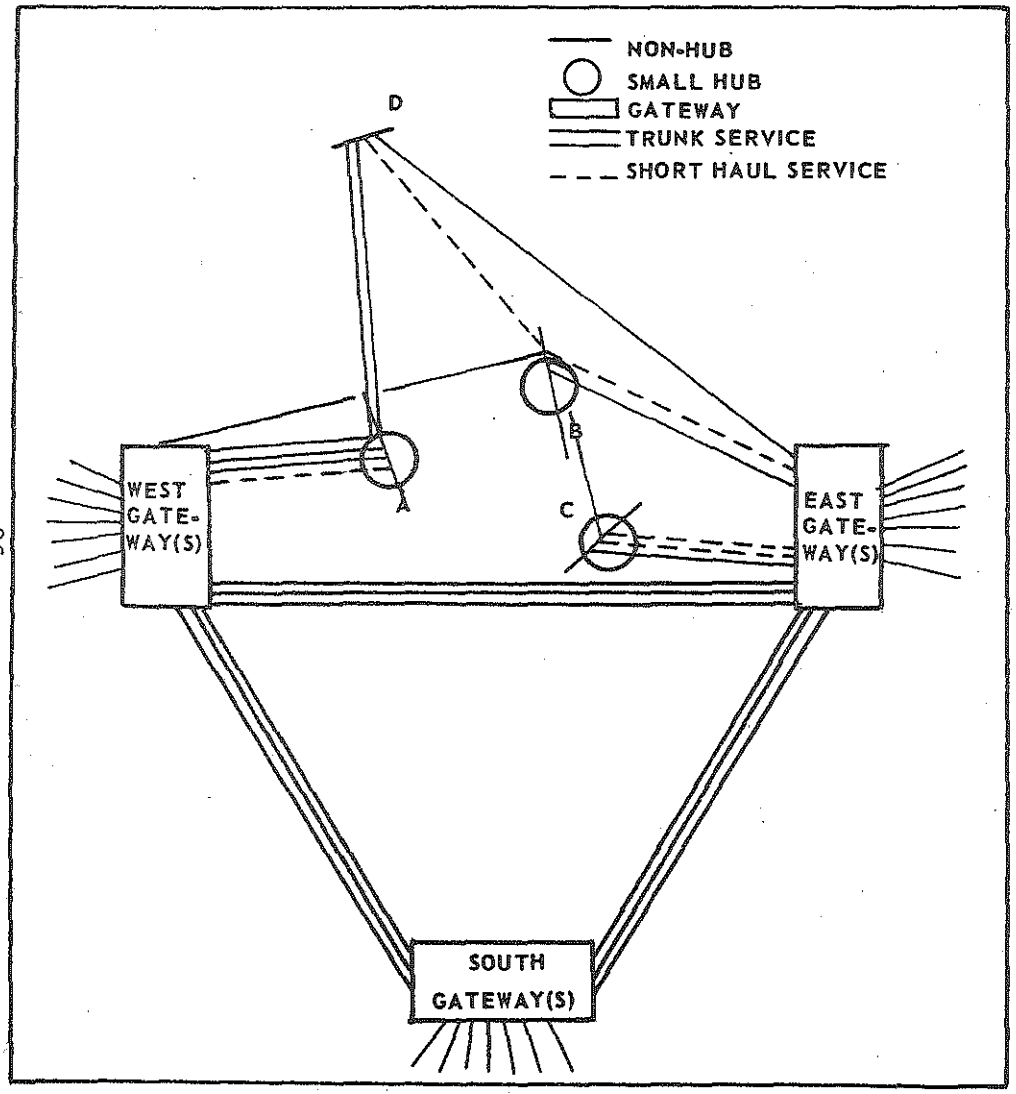


FIGURE 7. DO NOTHING SERVICE CONCEPT

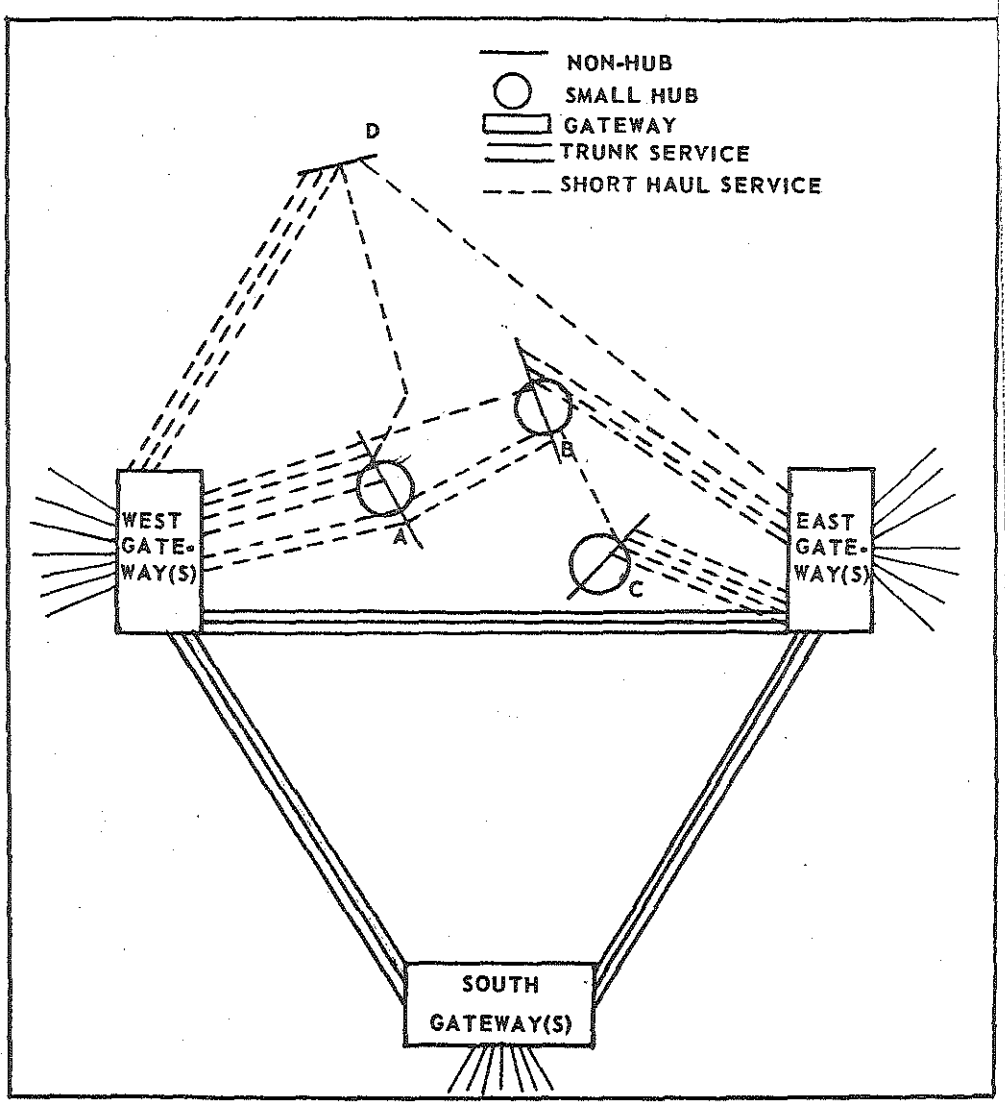


FIGURE 8. TRUNK-FEEDER SERVICE CONCEPT

State and local funding. Congestion at Chicago's O'Hare Airport will continue to cause delays even with some relief provided by continued coupling of communities to bypass Chicago in favor of a more distant gateway (see Figure 7).

Michigan's existing scheduled air service system is a mix of trunk and short-haul carrier service. East and west gateways are accessed by Michigan communities using both types of service. Access to southern gateways is afforded only through the east and west gateways. One example of this is the single plane service provided to the south from Grand Rapids to Miami through Pittsburg. Much of the short-haul service feeds the trunk carrier system with this primarily occurring at the near gateways and to a lesser extent at Michigan's small hubs. Some service segments are extensions of the trunk system beyond the gateways to selected Michigan communities.

Trunk-Feeder

Trunk-feeder service describes a feeder system consisting primarily of smaller aircraft flying short stage lengths. Air passengers are transported from non-gateway communities to the gateways where connections are made with the trunk carrier system. The feeder service is different from the trunk carrier system, which is comprised primarily of larger aircraft flying longer stage lengths to reach the passenger's ultimate destination. The feeder system can be operated by either short-haul or trunk carriers. This concept has been successfully pioneered by Allegheny Airlines and the Allegheny commuter system in the eastern United States. Some advantages of the trunk feeder concept are: (1) cost effectiveness gained through using smaller aircraft and minimum crews, (2) fuel efficiency realized using smaller aircraft, and (3) more frequent service as required to meet the demand. Disadvantages include: (1) inconvenience and delays caused by the need to transfer to a different aircraft and perhaps, different airline at the gateway without the benefit of interline services, and (2) increased congestion and demand for time slots and gates at the gateways.

In Michigan, this would mean passengers from such cities as Alpena, Battle Creek, Marquette, and Traverse City flying in 20-50 passenger aircraft to Chicago and boarding a 100 plus seat aircraft before continuing westward or to Detroit or Cleveland before continuing eastward. As the craft size used in feeder service would be smaller than those presently used, more daily departures would be required to accommodate the same demand. The number of flights from Community C to the eastern gateway would be increased in the trunk-feeder option when compared to the do nothing option (see figures 7 and 8).

Much of Michigan's existing service "feeds" the trunk carrier system at Chicago, Detroit, and Cleveland. Simmons Airlines feeds Detroit from Hancock-Houghton, Marquette, Traverse City and Lansing. Many Republic and some United flights feed these gateways from Michigan communities. Midstate Airlines feeds Chicago from Muskegon and Freedom Airlines feeds Cleveland from Flint, Grand Rapids, Lansing and Tri-City.

Trunk Extensions

Another way scheduled air service is provided to small and non-hub communities is to extend the route of a trunk carrier beyond the gateway to one or more of the smaller communities. Some advantages of the trunk extensions service concept are: (1) increased convenience afforded by the same airline and often single plane service and (2) reduced airspace and gate demand at gateways gained by using aircraft with 100 plus seats. Some disadvantages are: (1) increased fuel consumption resulting from the use of large aircraft on short stage lengths, (2) less frequent service to meet the same demand than if smaller aircraft were used, and (3) scheduling which may not meet community needs as it would be dictated by the longer stage length service.

Within this concept, service by 100 plus seat aircraft would extend beyond Chicago, Detroit, or Cleveland to such Michigan communities as Lansing, Muskegon and Tri-City, also, the trunk carrier service between such gateways as Chicago and Detroit could serve communities in the I-94 corridor: Battle Creek, Jackson and Kalamazoo. Service frequency would probably be less than that afforded by the trunk-feeder concept. For instance as depicted in figures 8 and 9, Community C's service to the east gateway could be substantially reduced.

Several Michigan communities today are served using this trunk extension concept. Lansing to Miami is achieved by extending the Chicago to Miami flight to begin in Lansing instead of Chicago. Tri-City is served by a Detroit to Atlanta flight that begins in Tri-City. Grand Rapids gains access to Boston by a Detroit to Boston Flight extended west to begin in Grand Rapids.

Community Coupling

The community coupling concept is the serving of two or more communities at one end of a route with a long stage length between the second community and the destination. Advantages of this concept include: (1) justifying service where none would otherwise be possible due to insufficient demand in either of the two communities, (2) shorter travel times resulting from bypassing congested gateways and proceeding to more distant gateways or final destinations, and (3) increased comfort afforded by single-plane, jet service from origin to destination. Disadvantages include: (1) inefficient use of fuel by using a large aircraft on a short stage length, and (2) reduced service frequency to those destinations not reasonably accessible from the more distant gateways.

In Michigan, two of the small hubs (Flint, Grand Rapids, Lansing, and Tri-City) or possibly a small hub and non-hub could be joined together and be served by a single plane which could then bypass Chicago or Detroit and continue to a more distant gateway or destination such as Washington, D.C. Service frequency would be less to the near gateways. For instance, as shown by Figure 10, Community A would have fewer daily flights to the immediate west gateway under the community coupling concept than if either the trunk extension or trunk-feeder concepts were employed.

Some community coupling is being done in Michigan today. Tri-City and Flint are coupled to justify a direct flight to Denver bypassing Chicago. Flint and Grand Rapids are coupled for the same reason. Until recently, Tri-City and Flint were coupled to warrant a direct flight to Pittsburgh bypassing Cleveland.

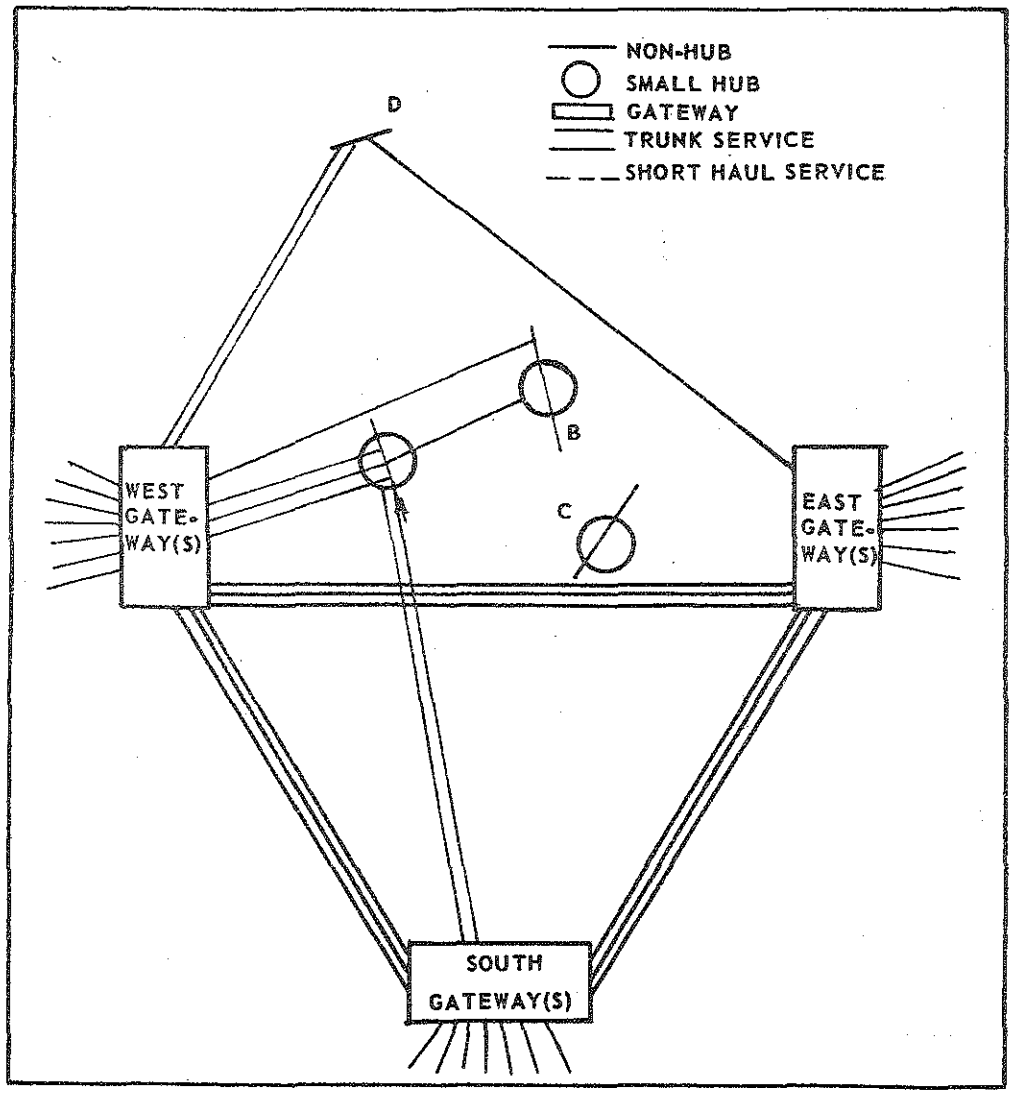


FIGURE 9. TRUNK-EXTENSIONS SERVICE CONCEPT

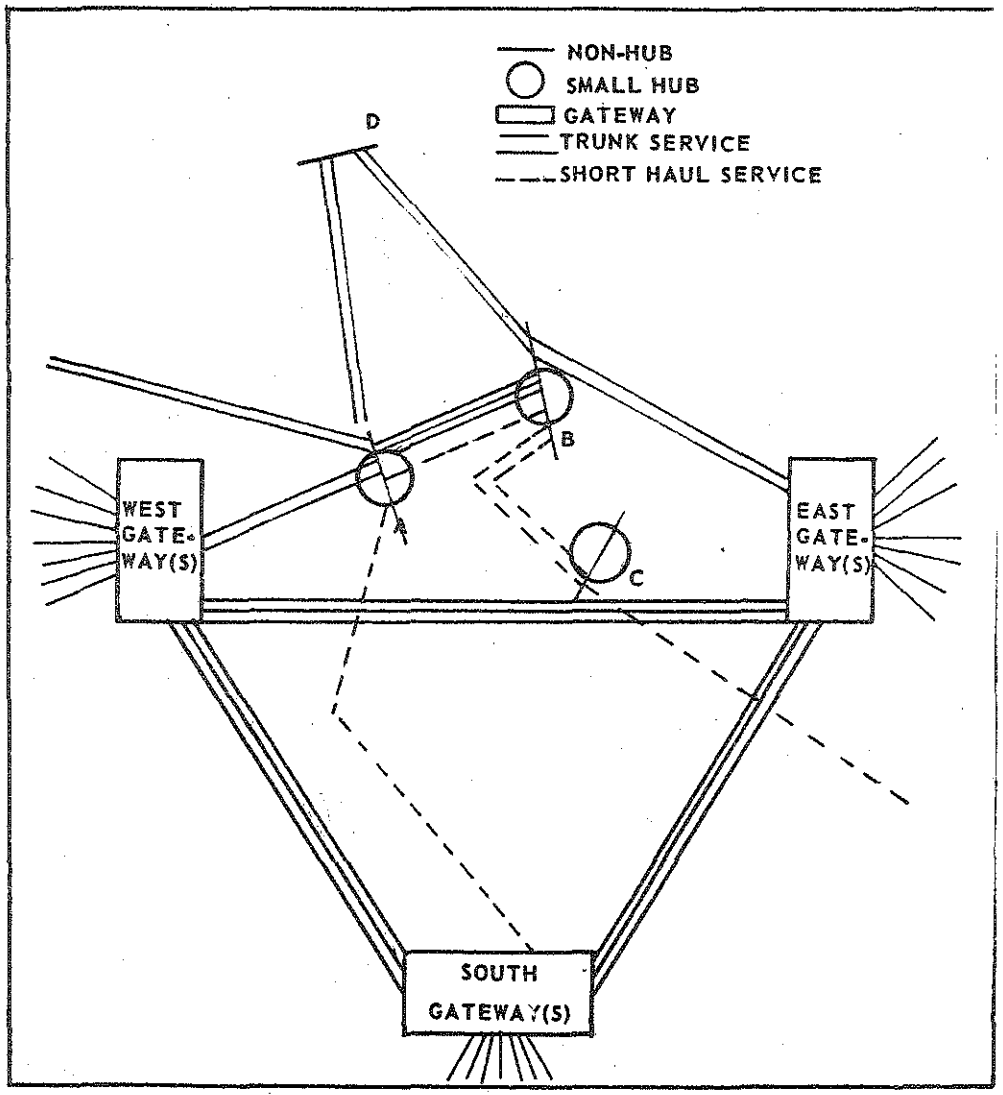


FIGURE 10. COMMUNITY COUPLING SERVICE CONCEPT

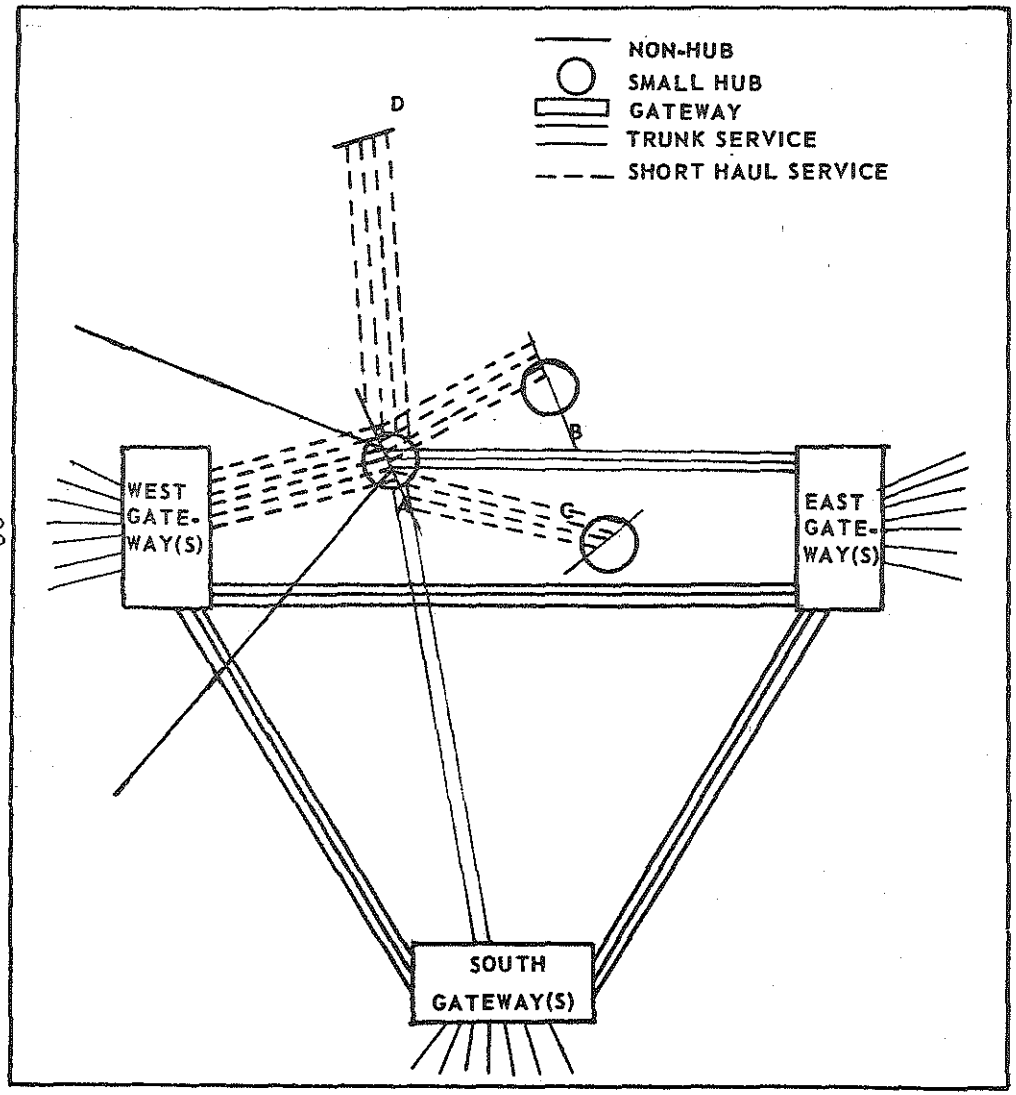


FIGURE 11. REGIONAL AIRPORT SERVICE CONCEPT

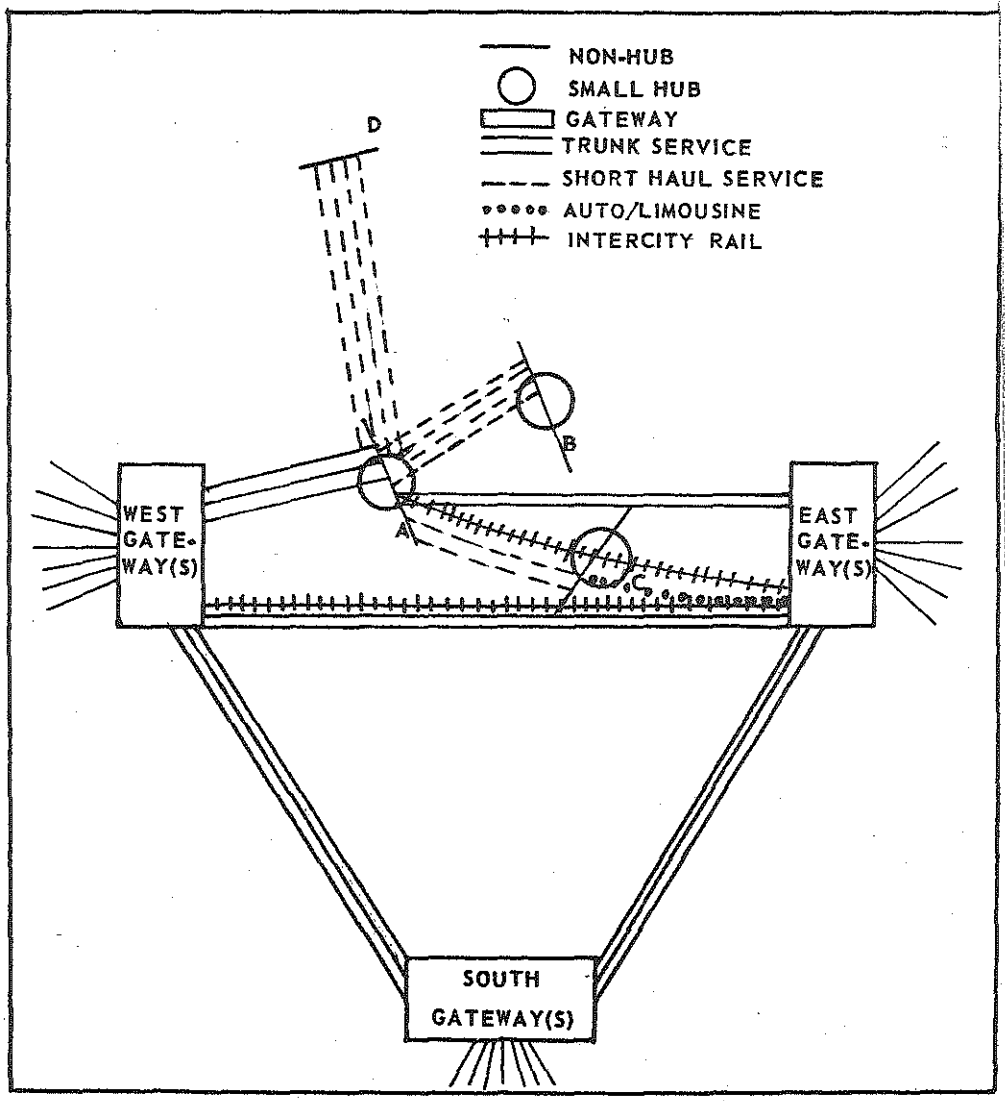


FIGURE 12. ALTERNATE MODES SERVICE CONCEPT

Regional Airport

A regional airport is one serving several communities as a collection point and providing flights with longer stage lengths to more distant gateways (see Figure 11). It may also provide services to nearby gateways. The regional airport functions as a mini-gateway in that smaller aircraft are used to feed the regional airport from nearby community airports with a significant number of departures from the regional airport being made by trunk carriers. Some advantages of the regional airport concept are: (1) congestion relief to the gateways by providing a substantial range of flight destinations thereby reducing air traffic to the gateways, (2) increased convenience gained by eliminating the delays often encountered at the gateways, and (3) the cost effectiveness and fuel efficiency characterizing the trunk-feeder concept. One disadvantage is the inconvenience caused by one additional stop if the desired flight connection is not provided.

Michigan communities such as Grand Rapids, Lansing, Traverse City, and Tri-City have airports which might be considered for utilization as regional airports. Increased non-stop and one-stop jet service to the more distant gateways and hubs could be provided. Smaller 8-50 passenger aircraft could bring travelers from the smaller Michigan markets to the regional airports. This would result in more daily flights to the gateway from the regional airport and fewer, if any, from the communities using the regional airport.

A few elements of the regional airport concept are in evidence in Michigan. Simmons Airlines feeds Lansing and Traverse City departures to Chicago and Detroit. Grand Rapids now provides non-stop service to Denver and Kansas City. The Tri-City International Airport serves the cities of Bay City, Midland and Saginaw.

Integrated Alternate Modes

The alternate modes concept consists of complementing scheduled air service with other transportation modes either as feeder or supplemental systems. Some advantages are: (1) reduced travel times using a coordinated express bus and non-stop air service, (2) reduced user costs, (3) reduced air traffic congestion at gateways, and (4) increased energy efficiency gained by using express buses for shorter route segments. These advantages assume the express bus service would be coordinated with airline schedules, and interline ticket and baggage service would be provided. Some disadvantages are: (1) inconvenience due to the transfer from the ground vehicle at the gateway as opposed to single plane service at the point of origin, (2) increased travel time when the ground segment of the trip is longer and the transfer poorly coordinated, and (3) possible passenger resistance to the ground mode. Improved rail passenger service in selected corridors also offers a potential alternative to certain air services.

In Michigan, this could mean express bus and rail passenger service to nearby gateways and to any regional airports. This could involve several of the communities in the I-96 and I-94 corridors. For example, in Figure 12, these alternate modes could eliminate the need for air passenger service between Community C and Detroit.

The I-94 corridor offers the best example of alternate modes complementing one another in a single corridor. Scheduled air service, express intercity bus, and intercity rail service provide transportation for travelers between Detroit, Chicago and communities located between these two gateways. However, much more needs to be done toward fully integrating these modes into the complementary systems.

FLEET OPTIONS

The composition of the fleet used to provide scheduled air service is critical to service concepts. For instance, the trunk-feeder service concept would be difficult to effect if the present trend toward an all-jet fleet continues. In essence, the number of smaller aircraft needed to economically provide short-haul (feeder) service is expected to fall short of meeting feeder service demand. Programmed and planned aircraft acquisitions by trunk carriers for the next decade indicate a continued dominance of jet aircraft in the nation's fleet . . . 85 to 90 percent (13).

Several new aircraft are being designed and manufactured which will meet some existing and emerging air transportation needs. The medium and long-range aircraft are designed to meet FAA noise guidelines and provide greater fuel efficiency. Others will fill the 20-50 passenger aircraft gap in the existing fleet. A number of in service and new aircraft, together with their characteristics, are presented in Tables 9 and 10.

Different fleet configurations could be considered by the State to promote implementation of preferred scheduled air service concepts. These include at least two options . . . the do nothing and the reduced jet dominance.

Do Nothing Option

The do nothing fleet option consists of allowing past trends to continue with the law of supply and demand governing the composition of the nation's aircraft fleet. The fleet will continue to be dominated by jet aircraft, 85 to 90 percent of the fleet, operating over longer stage lengths. This will, in turn, result in service reductions and discontinuance to smaller communities. Trunk carriers will continue to accommodate 90 percent of the passenger miles flown and 80 percent of the enplanements.

Table 9 Selected Aircraft Currently in Scheduled Service

Type	Passenger Capacity	1/Range (Miles)	1/Speed (Mph)	1/Fuel Consumption (Gals./Blk. Hr.)
Intercontinental Jets				
B-707	131 - 202	4,155 - 7,610	600	1,600
B-747	357 - 500	6,220 - 8,350	560	3,259
DC-8	128 - 259	3,750 - 7,000	600	1,879
DC-10	238 - 380	2,700 - 5,930	577	2,189
L-1011	247 - 400	2,340 - 5,980	593	2,338

Long and Medium Range Jets				
A-300	220 - 320	2,025 - 3,685	567	1,800
B-727	94 - 189	1,130 - 2,300	600	1,300
B-737	97 - 115	1,035 - 1,610	570	857
DC-9	70 - 150	1,830 - 2,515	560	854
BAe BAC-111	74 - 89	875 - 2,130	548	778
Shortrange and Commuter Aircraft				
F-28 (J)	60 - 85	1,150	525	--
F-27 (TP)	40 - 60	1,250	265	237
CV-580 (TP)	44 - 56	1,100	350	300
HS-748 (TP)	40 - 50	850	275	--
DHC-7 (TP)	50	810	274	250
SD 330 (TP)	30	770	218	100
SAC Metro II (TP)	19	685	295	79
CASA C-212 (TP)	19	370	226	--
DHC-6 (TP)	18	745	200	80
EMB-110 (TP)	18	400	253	63
GAF Nomad 24 (TP)	16	350	180	60
BN Trislander (P)	16	650	180	42
Beech 99 (TP)	15	997	280	70
C-402 C (P)	8	562	239	38
Piper Chieftain (P)	8	1,019	254	40

Table 10. Selected Aircraft Under Development

Type	Passenger Capacity	1/ Range (Miles)	1/ Speed (Mph)	Expected Delivery
Medium Range Jets				
B-757	175	2,500	535	1983
B-767	210	3,300	535	1982
DC-9-80	172	3,450	560	1980 (late)
A-310	210	3,500	540	1983
Shortrange and Commuter Aircraft				
BAe 146 (J)	70 - 100	1,380	435	1982
CAC-100 (TP)	40	--	310	1984
GAC-159C (TP)	38	715	355	1981
DHC-8 (TP)	32	690	300	1984
Fairchild/Saab (TP)	30	800	300	1984
EMB-120 (TP)	30	300	320	1984

AR-404 (TP)		30	1,000	195	1981
AR-402 (TP)		27	770	215	--
Do LTA (TP)	19 -	24	560	273	1982
Beech 1900 (TP)		19	600	300	1983
BAe Jetstream 31 (TP)		18	300	300	1982
Beech 99C (TP)		15	1,150	290	1981

Notes: 1/ Range, speed and fuel consumption vary greatly depending on equipment, payload, weather and stage length. The figures listed should not be used for performance comparison, because some of them are averages and others are optimum figures from manufacturers' data.

Abbreviations:

A	Airbus Industrie
AR	Ahrens Aircraft Co.
B	Boeing Co.
BAe	British Aerospace, Inc.
BN	Britten Norman Pilatus
Beech	Beechcraft Corp.
C	Cessna Aircraft Co.
CAC	Commuter Aircraft Corp. CASAConstrucciones Aeronauticas S.A.
CV	Convair (General Dynamics)
DC	McConnell Douglas
DHC	DeHavilland of Canada
Do	Dornier GmbH
EMB	Embraer Aircraft Corp.
F	Fokker/VFW
GAC	Gulfstream American Corp.
GAF	Government Aircraft Factories
HS	Hawker-Siddeley
J	Jet Aircraft
L	Lockheed
P	Piston-engine Aircraft
SAC	Swearingen Aircraft Corp.
SD	Shorts Bros.
TP	Turbo-prop Aircraft

Sources: CAB Aircraft Operating Cost and Performance Report Vol. XIII, July, 1979
Commuter Air Magazine, various issues
Air Transport World, March 1980
Time Magazine, April 7, 1980
Business and Commercial Aviation, April, 1980

This fleet option favors three of the service concepts: do nothing, trunk-extensions and community coupling. All three embody the move toward longer stage lengths and increased jet usage. The trunk-feeder and regional airport concepts would be difficult to implement. The smaller aircraft needed to economically provide service on the shorter stage lengths characteristic of these two service concepts would probably continue to be in short supply. The impact on the integrated alternative modes option would be mixed. Greater reliance on alternate modes would occur between community pairs relatively close to one another. Where community pairs are widely separated, the loss of air service would be difficult to replace by alternate modes when time is important to the traveler.

Reduced Jet Dominance Option

The reduced jet dominance fleet option consists of significantly increasing the number of turboprop aircraft to 15 to 20 percent of the nations fleet with jet aircraft comprising 75 to 80 percent. This would constitute a return to the fleet mix experienced in the late sixties and early seventies. Service to smaller communities could be more economically provided as shorter stage lengths could be flown using the smaller aircraft. Short-haul carriers would accommodate a larger percentage of the passenger miles flown and enplanements, with the trunk carriers' percentage being reduced when compared to the do nothing fleet option. One concern associated with increased use of smaller aircraft in scheduled air service is whether such aircraft are pressurized. Pressurized equipment should be utilized on most route segments where smaller aircraft are warranted.

The reduced jet dominance fleet option facilitates implementation of the trunk-feeder and regional airport service concepts. The short stage lengths characteristic of a feeder system could readily be accomodated by turboprop aircraft more economically than if jets were used. At the same time, the fleet mix under this option does not hinder implementation, or continuation, of the trunk-extension and community coupling service concepts. This is because the focus of this option is not to decrease the number of jets in service; rather to increase significantly the number of turboprop aircraft. The integrated alternative modes service concept is better supported under this fleet option than the do nothing. Scheduled air service in the short and medium stage length corridors would be more likely to continue and perhaps increase using smaller aircraft. It is in many of these same corridors where the alternate modes and air transportation could provide service in an integrated manner.

EVALUATION CRITERIA AND TECHNIQUES

Several factors influence service and fleet options suited to Michigan. These include cost effectiveness, user concerns (cost and time), level of service, energy efficiency, environmental impacts, and community benefits.

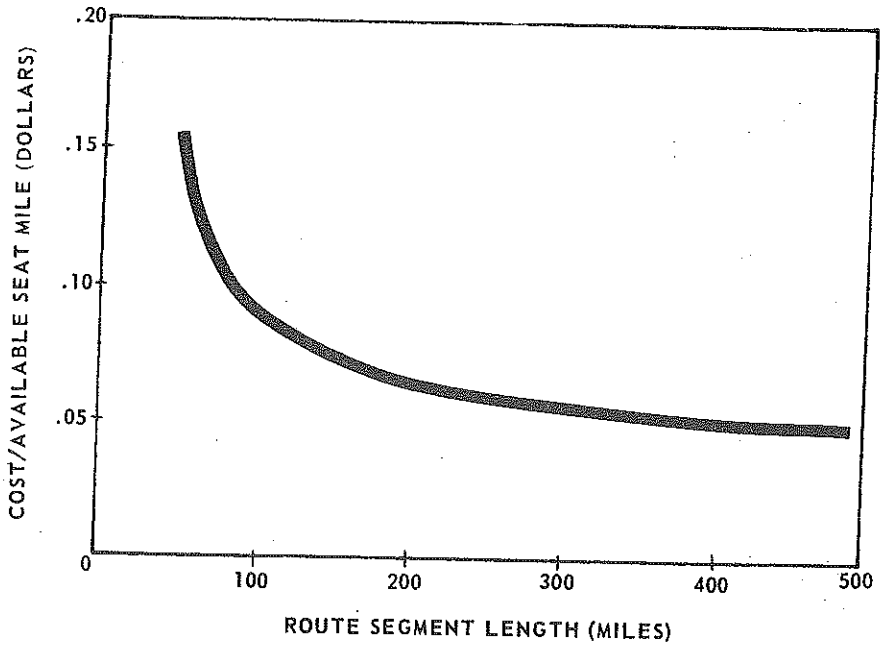


FIGURE 13. DIRECT OPERATING COSTS FOR A BOEING 737–200, 1977 (11)

Cost Effectiveness

The cost of providing scheduled air service compared to the level of service provided is critical to the airline and the general public. The airline cannot afford to operate a particular stage length or route segment at a loss unless subsidized. The general public and communities cannot afford to lose scheduled air service below an essential level or to bear the burden of higher taxes to underwrite seat guarantee agreements or finance subsidies.

One measure of cost effectiveness is direct operating cost per passenger mile. This increases significantly as the stage length decreases. This principle is illustrated in Figure 13 for a two engine Boeing 737-200 turbojet . . . an aircraft often used on shorter stage length routes in the United States. As the stage length is reduced from 200 to 100 miles, the cost increases approximately 40 percent. Therefore, higher fares must be charged for the shorter stage lengths if costs are to be recovered through revenues. This is also due, in part, to the easing of CAB control of fares resulting from the Airline Deregulation Act of 1978. This makes air transportation for shorter trips less attractive to the traveling public. A second measure is total aircraft operating cost per block hour.

Such costs vary depending on aircraft size, the airline providing the service, and stage lengths. The Swearingen Metro II and the DeHavilland Twin Otter have total aircraft operating costs per block hour of less than $300, whereas the Boeing 737 and McDonnell Douglas DC-9 are over $1,300. The Boeing 747 has a total aircraft operating cost per block hour exceeding $4,000 (12).

Cost effectiveness dictates that smaller aircraft be used on shorter route segments. As the cost per passenger mile is higher for short stage lengths, it is vital to use aircraft with relatively low total operating costs per block hour. This means aircraft with 50 seats or less on most feeder routes.

User Concerns

The cost and travel time involved in making a trip are major user concerns. The question of whether to drive, take a bus or train, or fly is often made by comparing the time and cost involved as well as other factors. Sometimes the decision is not to make the trip. Travel time and cost ratios have been developed for air and each of the three other modes (auto, bus and rail) to assist in assessing choice among modes. Absolute time and cost differences between modes have also been noted.

Fares have been used to represent trip costs for air, bus and rail, and 12.3 cents per mile for the automobile. Fares and travel times were compiled for selected city pairs . . . all 21 service areas and Chicago. Distances used were city center to city center for the automobile and terminal to terminal for the air, bus, and rail modes.

Three matrices have been prepared depicting travel time and fare ratios for each service area pair. Figure 14 presents air to intercity bus ratios, Figure 15 air to automobile ratios, and Figure 16 air to rail ratios. In these analyses service area pairs are designated as where the ratios are favorable to scheduled air service when the air to other mode travel time ratio is 1:5 or more, or travel time difference between the modes exceeds four hours, and/or the cost ratio is 2:1 or 1:1. That is, scheduled air service between these pairs offers a marked travel time advantage over the comparative mode and/or the fare is competitive with the comparative mode. On the other hand, service area pairs have been designated as corridors favorable to the alternative mode when the travel time ratio is 1:1 or 1:2, and/or the trip cost ratio is 1:5 or higher. In these corridors, modes other than air could be considered to complement the air transportation mode or perhaps replace it in some cases.

Table 11. Existing Scheduled Air Service to Chicago and Detroit Gateways Compared to Other Modes, March 1980

	To Chicago						To Detroit					
	Air/Bus		Air/Auto		Air/Rail		Air/Bus		Air/Auto		Air/Rail	
Community	Time	Fare	Time	Fare	Time	Fare	Time	Fare	Time	Fare	Time	Fare
Alpena	o	o	o	o			o	o	+	+		
Battle Creek	+	o	o	o	o	o	+	-	+	o	+	o
Benton Harbor	o	-	o	o			+	o	o	+		
Escanaba	+	o	+	+			+	+	+	+		
Flint	+	+	+	+	+	+	o	-	o	-	o	o
Grand Rapids	+	+	+	+			o	o	+	+		
Houghton/Hancock	o	o	+	+			+	+	+	+		
Iron Mountain	o	o	+	+			+	+	+	+		
Ironwood	+	+	+	+			+	+	+	+		
Jackson	o	o	o	+	o	o	o	-	o	o	o	-
Kalamazoo	+	o	o	o	o	o	+	o	+	o	+	o
Lansing	+	+	+	+	+	+	o	-	o	o	o	o
Manistee	+	+	+	+			o	+	o	o		
Marquette	o	o	o	+			+	+	+	+		
Menominee	o	o	+	+			+	+	+	+		
Muskegon	o	+	o	+			o	o	o	+		
Pellston	+	+	+	+			+	o	+	+		
Saginaw	+	o	+	+			+	o	o	o		
Sault Ste. Marie	+	+	+	+			+	o	+	+		
Traverse City	+	+	+	+			+	o	+	+		

Note: 1/ If scheduled air service is favorable compared to other modes a "+" is used, if neutral an "o," and if the ratio is favorable to the comparative made a "-" is used.

2/All values were derived from figures 14, 15 and 16.

Source: Michigan Department of Transportation, Aviation Planning Section

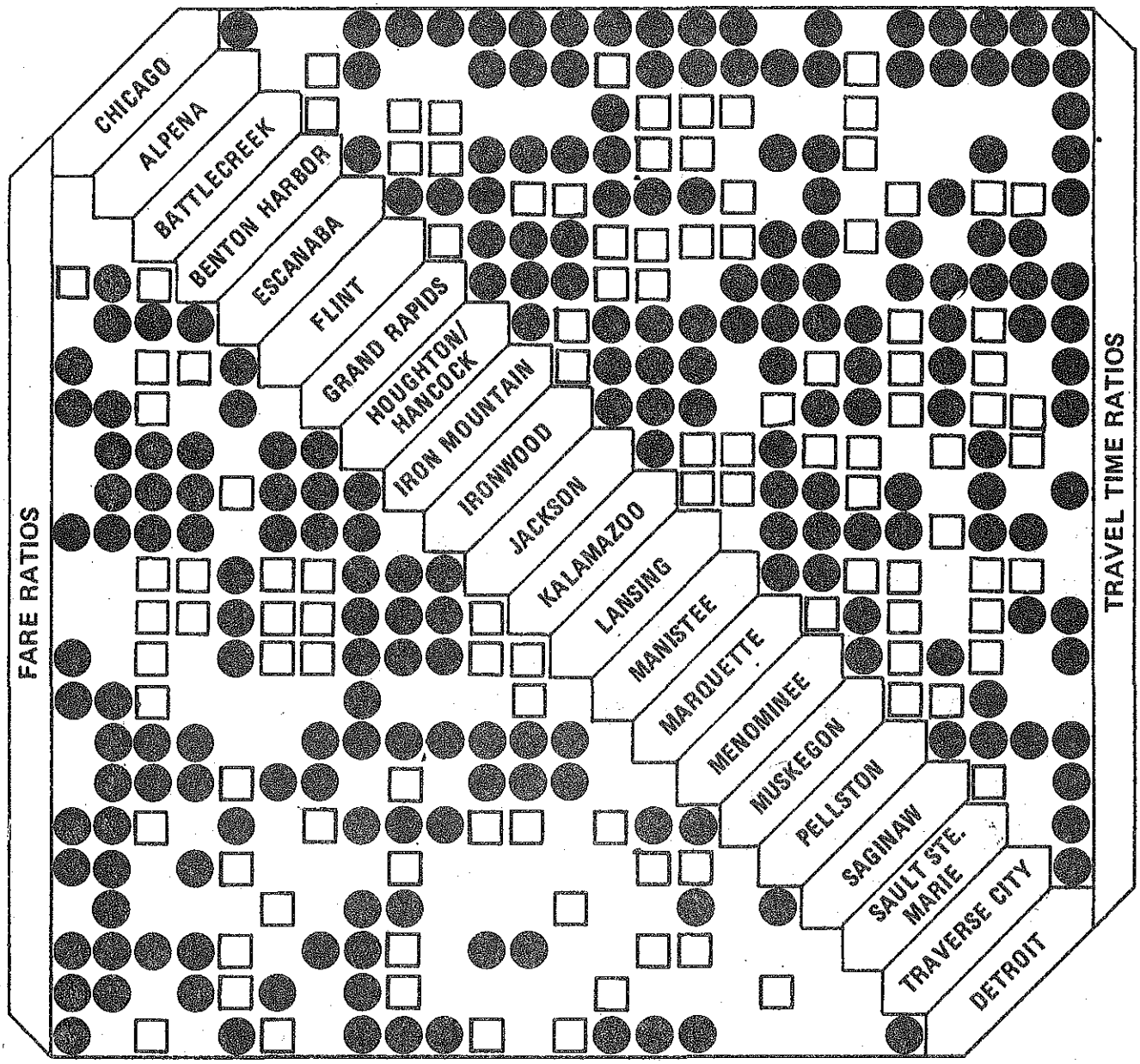


Figure 14
MODAL COMPARISON MATRIX FOR
AIR AND INTERCITY BUS TRANSPORTATION

● Ratios Favorable To Scheduled Air Service

□ Ratios Favorable To The Alternate Mode

Ratios favorable to scheduled air service are those where the (1) air fare to comparative mode fare ratio is 2:1 or 1:1 or (2) air travel time to comparative mode travel time is 1:5, 1:6 or more, or the travel time difference exceeds four hours.

Ratios favorable to the alternative mode are those where the (1) air fare to comparative mode fare ratio is 5:1, 6:1 or higher or (2) air travel time to comparative mode travel time 1:1 or 1:2.

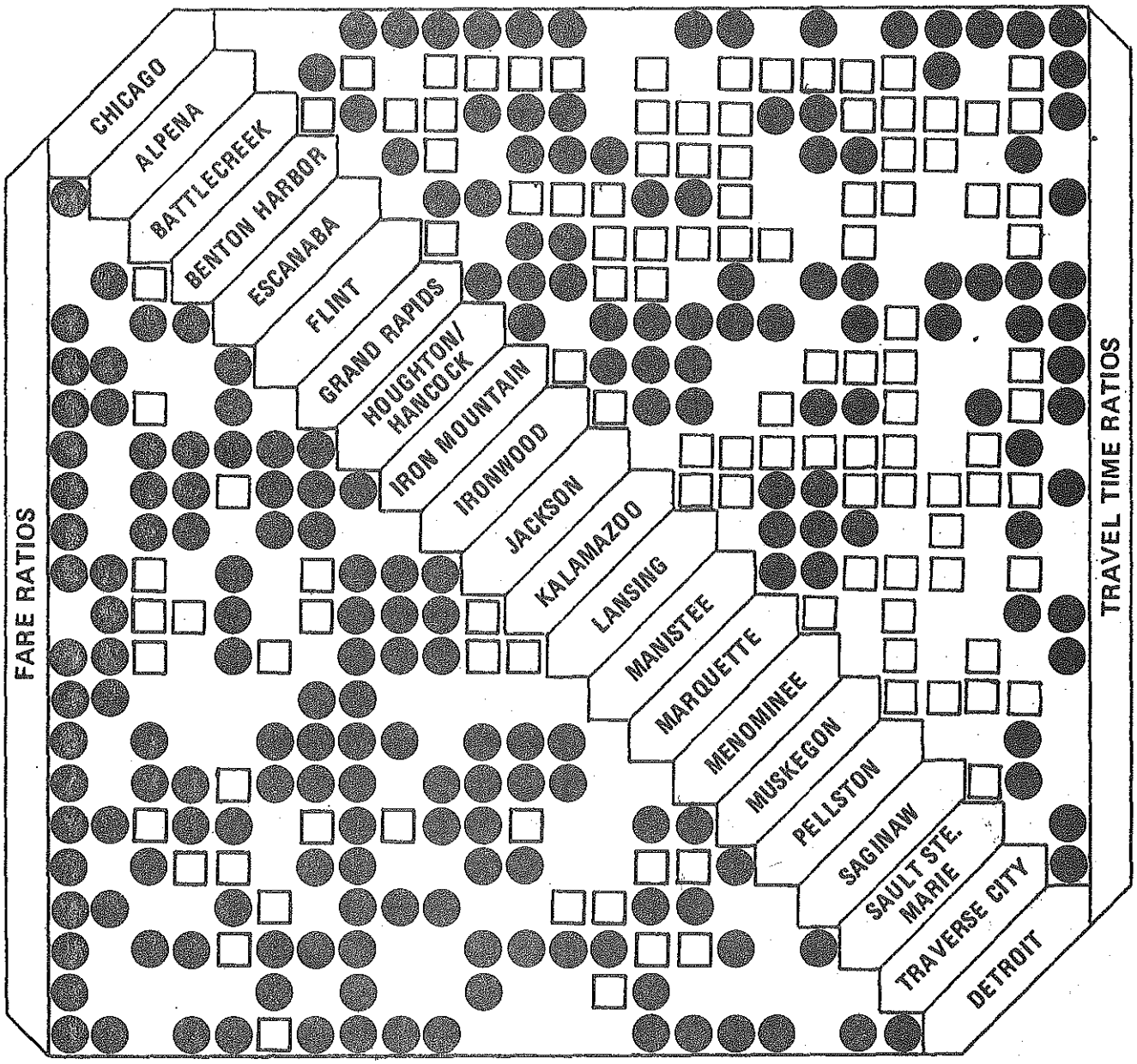


Figure 15
MODAL COMPARISON MATRIX FOR
AIR AND AUTOMOBILE TRANSPORTATION

● Ratios Favorable To Scheduled Air Service

□ Ratios Favorable To The Alternate Mode

Ratios favorable to scheduled air service are those where the (1) air fare to comparative mode fare ratio is 2:1 or 1:1 or (2) air travel time to comparative mode travel time is 1:5, 1:6 or more, or the travel time difference exceeds four hours.

Ratios favorable to the alternative mode are those where the (1) air fare to comparative mode fare ratio is 5:1, 6:1 or higher or (2) air travel time to comparative mode travel time 1:1 or 1:2.

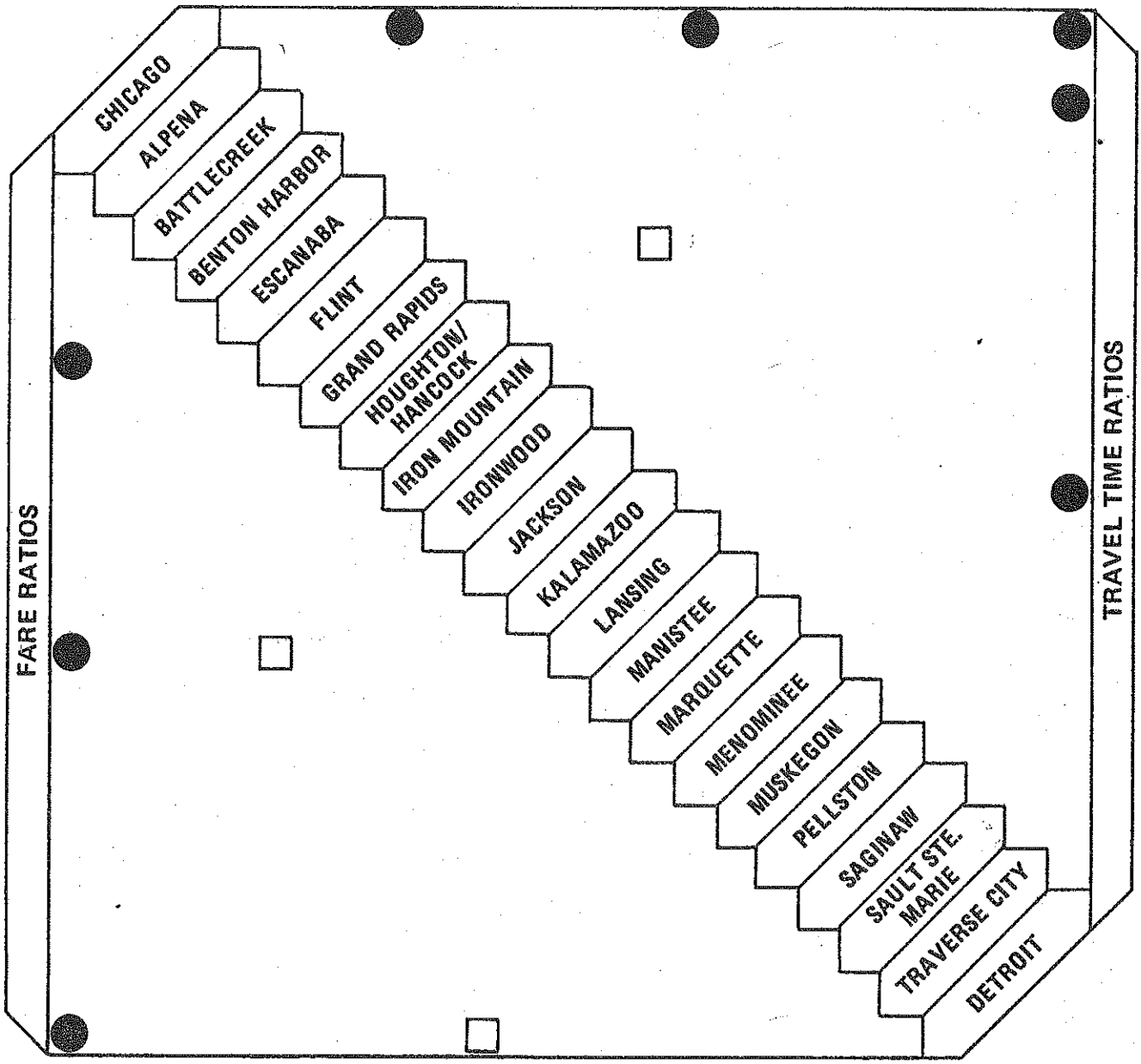


Figure 16
MODAL COMPARISON MATRIX FOR
AIR AND INTERCITY RAIL TRANSPORTATION

● Ratios Favorable To Scheduled Air Service

□ Ratios Favorable To The Alternate Mode

Ratios favorable to scheduled air service are those where the (1) air fare to comparative mode fare ratio is 2:1 or 1:1 or (2) air travel time to comparative mode travel time is 1:5, 1:6 or more, or the travel time difference exceeds four hours.

Ratios favorable to the alternative mode are those where the (1) air fare to comparative mode fare ratio is 5:1, 6:1 or higher or (2) air travel time to comparative mode travel time 1:1 or 1:2.

Using the ratios discussed above, Lansing-Marquette, Grand Rapids-Chicago, Traverse City-Detroit, and Flint-Chicago have air to automobile and air to bus ratios favorable to scheduled air service. At same time, Flint-Lansing is identified by this technique as a corridor favorable to the alternate mode based on air to automobile, air to bus, and air to rail ratios. Others could be favorable to scheduled air service or other modes, but are not identified by this process as such.

Portions of Figures 14, 15, and 16 have been translated into tabular form in Table 11 to evaluate access to the nearby gateways by scheduled air service compared to using bus, auto or rail. Communities like Flint with all pluses in the "To Chicago" columns indicate that scheduled air service compares favorably with bus, auto and rail based on travel time and fare. Flint-Chicago and Lansing-Chicago are examples of this case. Quite the opposite is true for Flint and Lansing regarding access to the Detroit gateway where all values are "0" or "-".

User concerns regarding trip cost and travel time indicate the need to retain and improve scheduled air service in some corridors. In other corridors, the use of various transportation modes to complement one another could be promoted as a reasonable alternative.

Level of Service

The frequency and quality of scheduled air service to Michigan communities should be commensurate with demand. This service includes access to gateways, other Michigan communities, and selected communities in neighboring states. Demand estimates for each Michigan service area have been presented earlier (see Table 8). Present access to the gateways and non-stop service afforded at those gateways have also been identified (see Figures 4 and 5).

In general, service frequency would be increased using smaller aircraft to meet a given demand. The reduced jet-dominance fleet option lends itself to this increased service frequency. However, service quality could be sacrificed in terms of safety, travel time and dependability unless attention is given to regulating aircraft selection and airline performance. Today's scheduled air service in Michigan is characterized by dependable and comfortable equipment, safety, on-time performance, and good public relations. And the existing fleet is a jet-dominant one. Also, scheduled air service is too important to Michigan communities to be solely determined by profit-maximizing considerations. It may be that there is a level of service essential to many of the service areas that exceeds the profit-making level.

Energy Efficiency

Energy efficiency can be measured in terms of passenger miles per gallon, gallons consumed per block hour (see Table 9), and total fuel consumption nationwide by the scheduled air service fleet. While fuel consumption by the fleet has increased,

several steps have been, and are being, taken to increase the efficient use of aviation fuel. These include producing more fuel efficient aircraft, increasing stage lengths where larger aircraft are involved, and using smaller aircraft on the shorter stage lengths. These moves toward increased fuel efficiency favor the trunk-feeder and regional airport service concepts and the reduced jet dominance fleet option which are characterized by increased utilization of smaller aircraft.

Environmental Impacts

The principal impacts of scheduled air service on the environment are aircraft noise and land use restrictions. Some measures being taken to reduce the perceived level of noise are variations in landing and take-off profiles such as: (1) increased rate of ascent on take-off, (2) modifications of aircraft engines such as insulating and quieting engine operation, (3) development of STOL aircraft, and (4) restriction of hours of operation to daylight and near-daylight hours.

The trunk-feeder, regional airport, and integrated alternate modes concepts would have the least impact on the environment. The increased use of smaller aircraft, realized by implementing the first two of these, would generate less noise and require shorter runways thereby using less land for airport use. The integrated alternate modes option involves a reduction in flights in some corridors thereby reducing the period of time when aircraft noise is a problem.

Community Benefits

Community benefits of improved scheduled air service include (1) the potential of an increased tax base resulting from new business and industry locating in the community, (2) increased accessibility, and (3) improved airport facilities. One type of equipment necessary for dependable scheduled air service are precision instrument landing systems. Two-thirds of the airports used by commuter airlines to provide scheduled air service are not equipped with precision instrument landing systems (14) thereby preventing their use when visibility is poor. Benefits to industry and business could include reduced cost of, and time spent in business travel.

Different service concepts benefit communities in different ways. The community coupling concept provides more direct access to selected other cities as the nearby gateway could be bypassed. The trunk-feeder and regional airport concepts rely on smaller aircraft to provide service to many of the Michigan service areas. These aircraft require shorter runways then the larger aircraft; consequently, more communities might be able to afford upgrading their airports to accommodate these smaller scheduled air service aircraft.

Impact Analysis

A "first cut" impact analysis for each of the alternatives can be structured by applying the above criteria (see Table 12). This analysis is an approximation of impacts relative to the perceived overall objectives of society and the airline industry. These impacts are viewed as either favorable or unfavorable to the generalized objectives, or neutral if the impact is not clearly favorable or unfavorable. The impacts are also evaluated on the national and local scale, the latter consists of the perspective of the local community, region, or state directly affected by the impact.

1. National Scale - Public Sector

    a. Energy Efficiency - to increase transport output for a fixed quantity of fuel consumption.

    b. Transport Costs - to reduce unit costs of transport.

2. National Scale - Airline Industry

    a. Aircraft Utilization - to maximize utilization, as expressed in revenue-hours or load factors.

    b. Energy Efficiency - to increase transport output relative to fuel consumption.

    c. Energy Allocation - to allocate fuel within the airline industry to those sectors which maximize output per unit of fuel consumed.

    d. Operating Costs - to lower unit operating costs.

    e. Energy Availability - to increase the availability and decrease the cost of fuel.

3. Local Scale - Public Sector

    a. Transport Costs - to lower the overall costs of transport for society.

    b. Accessibility - to increase the accessibility of local areas to regional, national, and international markets.

    c. Convenience - to make transportation service to and from a local area more convenient through increased frequency, destinations and modes, and through ease of transfer within or between modes.

d. Safety - to make travel less susceptible to accidents.

e. Airport Investments - to make prudent investment decisions and, once made, to make optimal use of the investment.

f. Economic Development - to stimulate the economic development of a local area.

4. Local Scale - Airline Operators

a. Energy Availability - to make sufficient fuel available to airlines willing to meet needs of a local area.

b. Image - to enhance the airline operator's image in a local community.

c. System Loads - to increase system load factors by attracting travelers from local markets.

d. Local Loads - to maximize the demand for service to local areas.

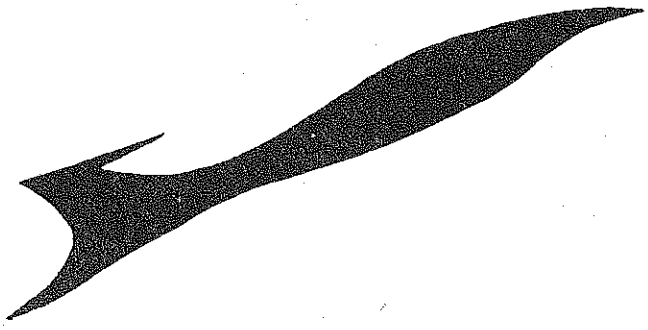
TABLE 12. Impact Analysis Results for Each Service Concept

Impacts	Do Nothing	Trunk-Feeder	Trunk Extensions	Community Coupling	Regional Airport	Alternative Modes
National Scale						
Public						
Energy Efficiency	+	+	-	-	+	+
Transport Costs	-	-	-	+	+	+
Airline						
Aircraft Utilization	+	+	-	+	+	+
Energy Efficiency	+	+	-	+	+	+
Energy Allocation	+	0	0	+	+	+
Operating Cost	+	+	-	0	+	+
Energy Availability	0	-	0	0	0	+
Local Scale						
Public						
Transport Costs	-	-	0	-	0	+
Accessibility	-	+	0	-	0	-
Convenience	-	-	+	-	+	-
Safety	0	-	+	-	-	+
Airport Investments	-	0	+	0	+	+
Economic Development	0	+	+	0	0	-
Airline						
Energy Availability	0	-	0	0	+	+
Image	-	-	+	-	0	-
Loads - System	-	-	+	+	-	-
Loads - Local	-	+	+	0	+	+

Note: Favorable (+), Non-Favorable (-), and Neutral (0).

Source: Michigan Department of Transportation, Aviation Planning Section.

RECOMMENDATIONS



part four

PART FOUR

RECOMMENDATIONS

Several findings, conclusions and recommendations emerged in exploring the Michigan scheduled air service crisis. The findings and conclusions capsulize those noted in earlier parts of the report and provide part of the basis for the recommendations.

FINDINGS AND CONCLUSIONS

1. Level of Scheduled Air Service. Twenty-two Michigan communities have scheduled air service with 21 having at least three departures daily. The exception is Manistee with one daily departure. Fifteen have non-stop service to one or more gateways (see Figure 4).

2. Population Served by Scheduled Air Service. Over 95 percent of Michigan's residents have some scheduled air service within 60 minutes of their home or business. This percentage has declined slightly since 1970 due to the population increases outside the 60 minute service areas.

3. Enplanements. The number of passengers enplaning at Michigan airports has increased by 58 percent since 1970 (see Table 5). With population increasing by 9 to 10 percent by 1990, further substantial increases will occur. However, 1980 first quarter enplancements are about five percent below the same quarter in 1979 for moderate activity service areas and down three percent at Detroit Metro. By some estimates, 1990 enplanements in Michigan's low activity service areas may increase by as much as 67 percent and moderate activity service area enplanements may double.

4. Air Mail. The number of pounds of mail transported by scheduled air service in Michigan since 1970 has increased by 75 percent (see Table 5). In the 1980 first quarter, air mail transported to and from moderate activity service areas increased by nearly 50 percent, primarily due to designation of Grand Rapids as a regional mail sorting center. Detroit Metro increased by 7 percent which is typical for a large hub.

5. Cargo Tons. Cargo tons transported by scheduled air service in Michigan increased by 9 percent during the 1970's (see Table 5). The low and moderate activity service areas realized no change or decreased, and Detroit Metro increased by 15 percent. In the first quarter of 1980, air cargo tonnage in the moderate activity service areas and at Detroit Metro decreased by 25 percent. The principal reason for these decreases is the current economic recession. However, there is ample reason to believe that by 1990 cargo tons transported by scheduled air service in Michigan could double.

6. Impact of Regulatory Reform. Under regulatory reform now in effect, service levels could decline to approximately 50 percent of today's departures at communities now served by a single certificated air carrier (see Appendix I).

7. Short-Haul Carrier Failure Rate. Past Michigan experience has shown that short-haul carriers discontinue service at the rate of about one per year. However, two carriers which served Michigan communities have suspended operations in the last six months (see Appendix J).

8. Fleet Mix. The domestic trunk and local service carrier fleet in the United States is comprised of 87 percent jets, compared to 80 percent at the beginning of the seventies decade. Both turboprop and piston aircraft have decreased markedly during this period (see Table 2). Some reversal of this trend may occur in the 1980's as several types of short and medium range aircraft are being constructed at the present time (see Table 10). Use of these aircraft could improve the present level of scheduled air service in Michigan.

9. Safety. Certificated air carriers have half as many accidents as short-haul carriers (see Table 6) and fewer fatalities per 100 million passenger miles.

10. Energy Efficiency. The number of gallons of fuel used annually by scheduled air carriers has increased from 9.5 billion in 1974 to 11.2 billion in 1979 which is somewhat less than 4 percent of all fuel consumed annually in the United States. During the same period, fuel consumed per seat mile of scheduled air service has decreased by about 20 percent.

11. Cost Effectiveness. Smaller aircraft have lower total operating costs than larger aircraft over a fixed stage length. For a given aircraft, operating costs per mile for longer stage lengths are lower than for shorter stage lengths. Therefore, fares for short trips will increase more than for longer trips.

RECOMMENDATIONS

The intent of these recommendations is to assist in outlining actions which could influence the future course of scheduled air service in the State of Michigan. Some of these are mutually exclusive, while others complement one another. Actions should be considered in at least three major areas: scheduled air service, legislative/regulatory, and programming/planning.

Scheduled Air Service

1. Promote the regional airport concept to relieve congestion at Chicago's O'Hare Airport and improve passenger convenience. The existence of one or more regional airports in Michigan would reduce the total number of daily flights to O'Hare by (1) collecting air passengers from many smaller aircraft onto fewer larger aircraft before proceeding to Chicago and (2) bypassing Chicago and flying directly to more distant gateways.

2. Promote the concept of community coupling to provide direct access to more distant gateways. This would relieve congestion at nearby gateways and increase passenger convenience. Medium and long-haul aircraft would be used for these flights.

3. Promote the trunk-feeder service concept in those parts of Michigan not served by the regional airport. This includes selected communities in the southern half of the Lower Peninsula, much of the northern half of the Lower Peninsula, and all of the Upper Peninsula.

4. Promote complementary non-air transportation modes in selected corridors. This could call attention to choices in mode and price, reductions in travel time, and increased convenience to travelers in corridors warranting use of more than one public transportation mode. Complementing modes corridors identified in Part Three should be considered as candidate corridors. These include the I-94 and I-96 corridors in Michigan.

5. Promote service quality which is consistent with the needs of Michigan communities as determined by Michigan Department of Transportation. Generally, this means maintaining or increasing the frequency of scheduled air service now provided. This will result in adequate access to other Michigan communities, to communities throughout the nation and in the preservation of the economic vitality of the communities served. Daily departures should be in the range indicated for each community in Table 8. Particular consideration should be given to providing frequent service in those corridors identified as "air critical" in PART THREE.

6. Promote the introduction or restoration, of scheduled air service to selected Michigan communities without service if a need exists. Three Michigan communities have lost all scheduled air service since January, 1980, and several have suffered service reductions. Loss of a key industry is a possibility in one of these communities unless service is restored. Other communities may warrant scheduled air service (see Figure 6).

7. Assist short-haul carriers in developing and maintaining public awareness and confidence in their scheduled air service. This includes publishing and distributing easy-to-use flight schedules, departing and arriving on time, adhering to an aircraft maintenance program, establishing a good safety record, and providing adequate back-up equipment and aircraft. It could also involve actual state supported publicity programs.

8. Promote interline agreements between short-haul and trunk carriers. This will increase convenience and reduce costs for the air traveler, promote use of short-haul carriers, and assure trunk carriers of higher load factors. Many of these are in effect today and should be continued and expanded when opportunities to do so arise.

9. Promote ticket and baggage coordination between the non-air transportation mode and short-haul and trunk carriers. This would encourage use of the non-air transportation mode to access the air transportation mode. An example is the limousine service between Jackson and Detroit Metropolitan Airport. Convenience to the air traveler results if ticketing and baggage handling between the bus service and the short-haul or trunk carriers are coordinated.

10. Encourage integration and coordination of smaller commuter airlines under a single management structure. Close cooperation between small commuter airlines or their integration under a single management system would create a broader and more stable financial base, eliminate duplication of ground support services, and assure greater dependability through shared back-up equipment.

Legislative/Regulatory

11. Investigate regulations necessary to assure safe and dependable service by short-haul carriers serving Michigan communities. Short-haul carriers have a higher accident rate than certificated carriers nationally, and in Michigan a relatively high business failure rate both of which should be lowered. One Michigan short-haul carrier accident, in 1979, claimed four lives. Commuter airlines in Michigan have a failure rate of about one per year. Safe service includes adequate pilot training and experience, well-maintained aircraft, and serviceable equipment. The solvency of a short-haul carrier should be reasonably assured before that carrier is permitted to initiate service to Michigan communities.

12. Investigate the need for a State subsidy program to assure provision of minimum scheduled air service to Michigan communities. A subsidy to provide service between specific community pairs should be considered. Minimum scheduled air service could be the minimum number of daily departures listed for each service area in Table 8. Until October, 1988, communities with Essential Air Service determinations could receive a state subsidy equal to the difference between the Federal EAS subsidy and that funding required to upgrade or maintain the service at the "minimum" level. One form of this type of subsidy program is in effect in Michigan . . . a limited-time, start-up assistance program for intercity buses. Until recently, a similar federal program funded scheduled air service to several northern Michigan communities to encourage economic development in those areas.

13. Investigate the potential for a State aircraft lease-purchase program to promote entry of short-haul carriers into Michigan markets and assure use of suitable aircraft. One obstacle to unestablished, but capable, firms is capital with which to begin the provision of scheduled air service. Leasing aircraft from the state with the option to purchase would eliminate much of the capital outlay required to begin operation. Also, needed aircraft replacement would not be delayed due to lack of funds if such a program were available. There are similar programs in effect at the present time for intercity bus operators.

14. Develop a fuel priority rating system to assure an adequate supply of fuel for all carriers serving Michigan communities, trunk and short-haul. The fuel allocation should be sufficient in quantity to guarantee the minimum level of air service (see Table 8) to each community receiving scheduled air service.

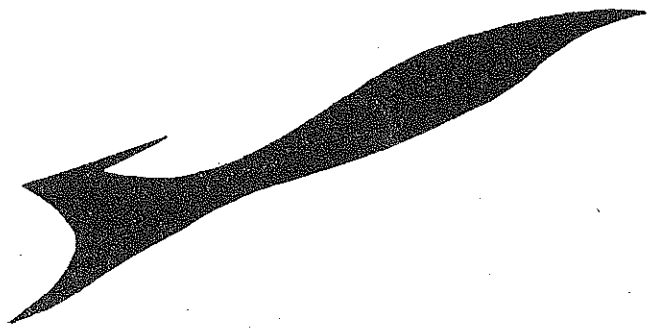
Planning/Programming

15. Provide coordinated State planning and programming advisory services regarding scheduled air service. This should be available to short-haul and trunk carriers interested in or already serving Michigan communities, local governmental units, and regional planning agencies. Such services could include providing information on airport facilities, scheduled air service use, potential service opportunities, State air service regulations, State aid programs, and economic considerations. This could involve the Office of the Governor, the Department of Commerce, and the Department of Transportation (Bureau of Aeronautics, Bureau of Transportation Planning, and Bureau of Urban and Public Transportation).

16. Monitor Michigan's scheduled air service use and characteristics. This will generate a valuable data base for use by existing and prospective service providers, by those planning and programming service and airport improvements, and those administering State assistance and loan programs. Data items which should be monitored include enplaned and deplaned passengers, inbound and outbound mail, inbound and outbound cargo, number of flights per day, routes, type of aircraft used, and airline performance (on-time service, cancelled flights).

17. Establish a process for determining communities where new scheduled air service should be offered or existing service upgraded. Communities which should be considered for service include those portrayed in Figure 6. Several communities with existing service may warrant upgraded service (see Table 8).

APPENDICES



APPENDIX A

GLOSSARY

Air Carrier: Aircraft operators certificated by the Federal Aviation Administration for transportation by air of persons, property, and mail.

Air Traffic Hub: A community which generates 0.05 percent of total domestic online enplaned passengers within the 50 states. Type of hub is classified as follows:

Large	-	1.00% or more
Medium	-	0.25% to 0.99%
Small	-	0.05% to 0.24%
Non Hubs	-	Less than 0.05%

Cargo Tons: The total of freight and express tons.

Certificated Route Air Carrier: An air carrier holding a certificate of public convenience and necessity issued by the Civil Aeronautics Board to conduct scheduled services over specified routes. Certain non-scheduled or charter operations may also be conducted by these carriers.

Commercial Operator: One of a class of air carriers operating on a private for-hire basis, as distinguished from a public or common air carrier, holding a commercial operator certificate, issued by the administrator of the Federal Aviation Administration (pursuant to part 45 of the Civil Air Regulations) authorizing it to operate aircraft in air commerce for the transportation of goods or passengers for compensation or hire.

Community: A city, group of cities, or a standard metropolitan statistical area receiving scheduled air service by a certificated route air carrier.

Enplaned Passengers: The number of revenue passengers boarding aircraft including originating, stopover, and transfer passengers, in scheduled and nonscheduled services.

Gateway: A large hub that provides convenient access to domestic and international markets.

Local Service Carrier: Certificated domestic route air carriers operating routes of lesser density between the smaller traffic centers and between those centers and principal centers.

Piston Powered Aircraft: An aircraft operated by engines in which pistons moving back and forth work upon a crankshaft or other device to create rotational movement.

Revenue Passenger Load Factor: The percentage of seating capacity which is actually sold and utilized. Computed by dividing revenue passenger miles flown by available seat miles flown in scheduled revenue passenger service.

APPENDIX B

REFERENCES

1. Michael J. Murphy, "Airline Deregulation: Its Impact on the Upper Midwest," A Report of the Upper Midwest Council, November, 1979.

2. Letter from John P. Woodford, Director, MDOT, to the Honorable Frank J. Kelley, Attorney General, November 23, 1979.

3. U.S. Department of Energy.

4. California Department of Transportation, Division of Construction, "Energy and Transportation Systems: Final Report," December, 1978.

5. Commuter Airline Association of America, "Creating a New Era," Commuter Airline Industry 1979 Annual Report, October, 1979.

6. U.S. Department of Transportation, Federal Aviation Administration, Flight Standards Service.

7. Francis X. McKelvey, "Aviation Planning and Design," Course notes: Michigan State University, College of Engineering, September, 1979.

8. Civil Aeronautics Board, "Essential Air Transportation Determination," Dockets EAS 445-459, March 4, 1980.

9. U.S. Department of Transportation, Federal Aviation Administration, FAA Aviation Forecasts: 1980-1991, September, 1979.

10. Michigan Department of Transportation, Michigan State Airport System Plan, 1974.

11. Civil Aeronautics Board, Aircraft Operating Cost and Performance Report, July 1976 and 1979.

12. "Air Transport World," March, 1978.

13. Commuter Airline Association of America, "1979 Annual Report."

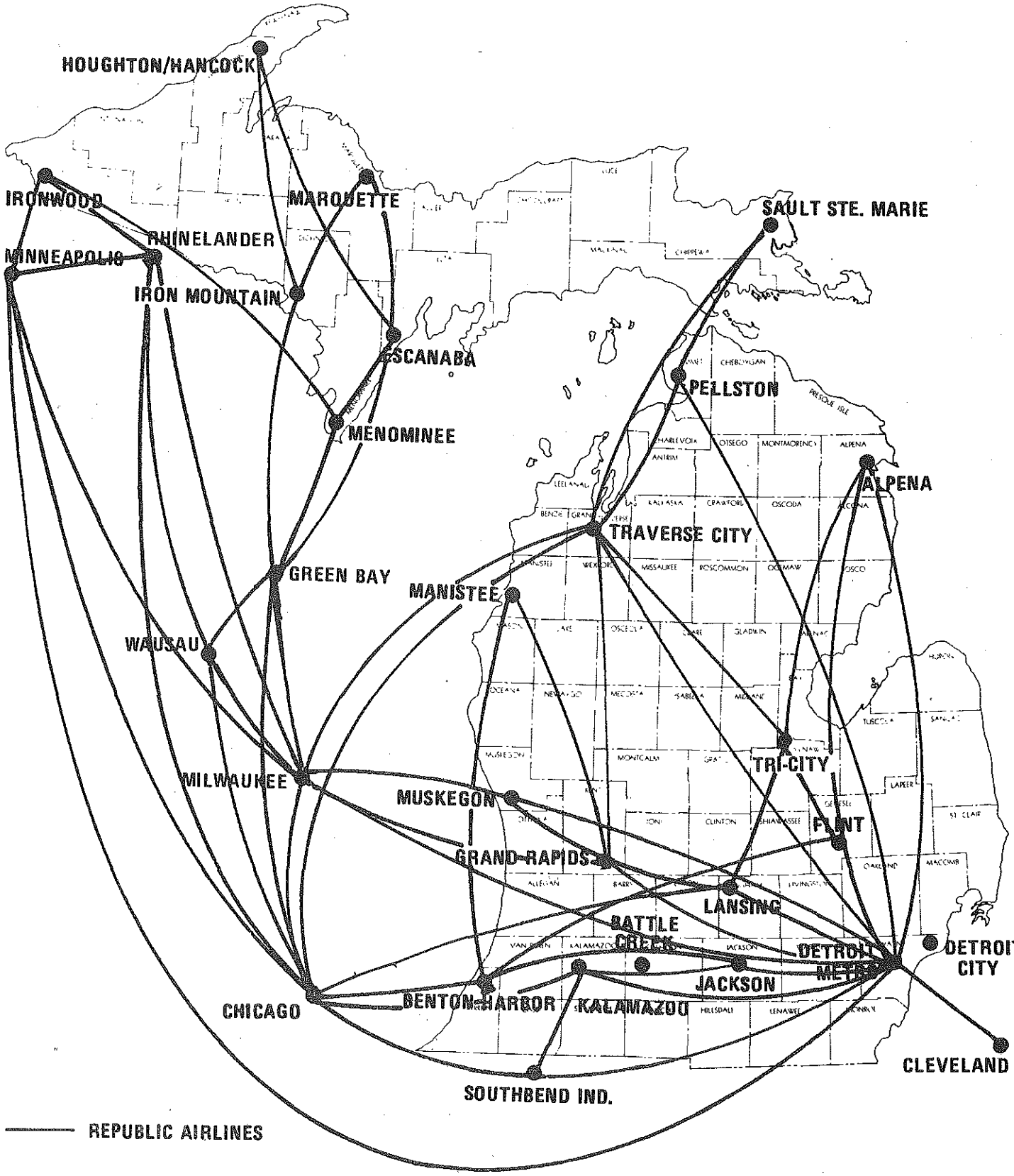
APPENDIX C

SERVICE AREA POPULATION, 1970-90

Associated City	1/ Number of Counties Served	2/ 1970 (Actual)	2/ 1978 (Estimated)	3/ 1990 (Forecast)
Low Activity				
Alpena	5	60,630	71,300	87,800
Escanaba	3	45,379	50,925	57,575
Hancock/Houghton	3	49,476	52,800	62,860
Iron Mountain	5	46,003	50,006	54,585
Ironwood	5	59,854	61,480	60,520
Manistee	3	48,666	54,200	67,300
Marquette	3	74,813	85,520	96,520
Menominee	2	57,318	56,079	62,345
Pellston	3	51,445	60,700	76,800
Sault Ste. Marie	3	48,861	49,000	53,500
Subtotal		542,445	592,010	679,805
Moderate Activity				
Battle Creek	2	179,869	179,600	182,300
Benton Harbor	4	235,653	245,570	278,047
Flint	3	561,025	588,400	623,100
Grand Rapids	5	547,812	588,225	649,456
Jackson	2	180,445	191,400	204,300
Kalamazoo	6	330,196	348,795	392,597
Lansing	3	378,423	408,100	466,900
Muskegon	4	331,583	362,600	411,700
Traverse City	7	103,467	132,600	171,900
Tri-City	7	513,320	545,200	589,000
Subtotal		3,361,793	3,590,490	3,969,300
High Activity				
Detroit	8	4,758,319	4,726,550	5,013,000
Michigan Population Served		8,585,199	8,830,840	9,583,308
Michigan Population Not Served		296,627	358,550	462,500
Total		8,881,826	9,189,000	10,046,000
% Michigan Population Served		96.7%	96.1%	95.4%

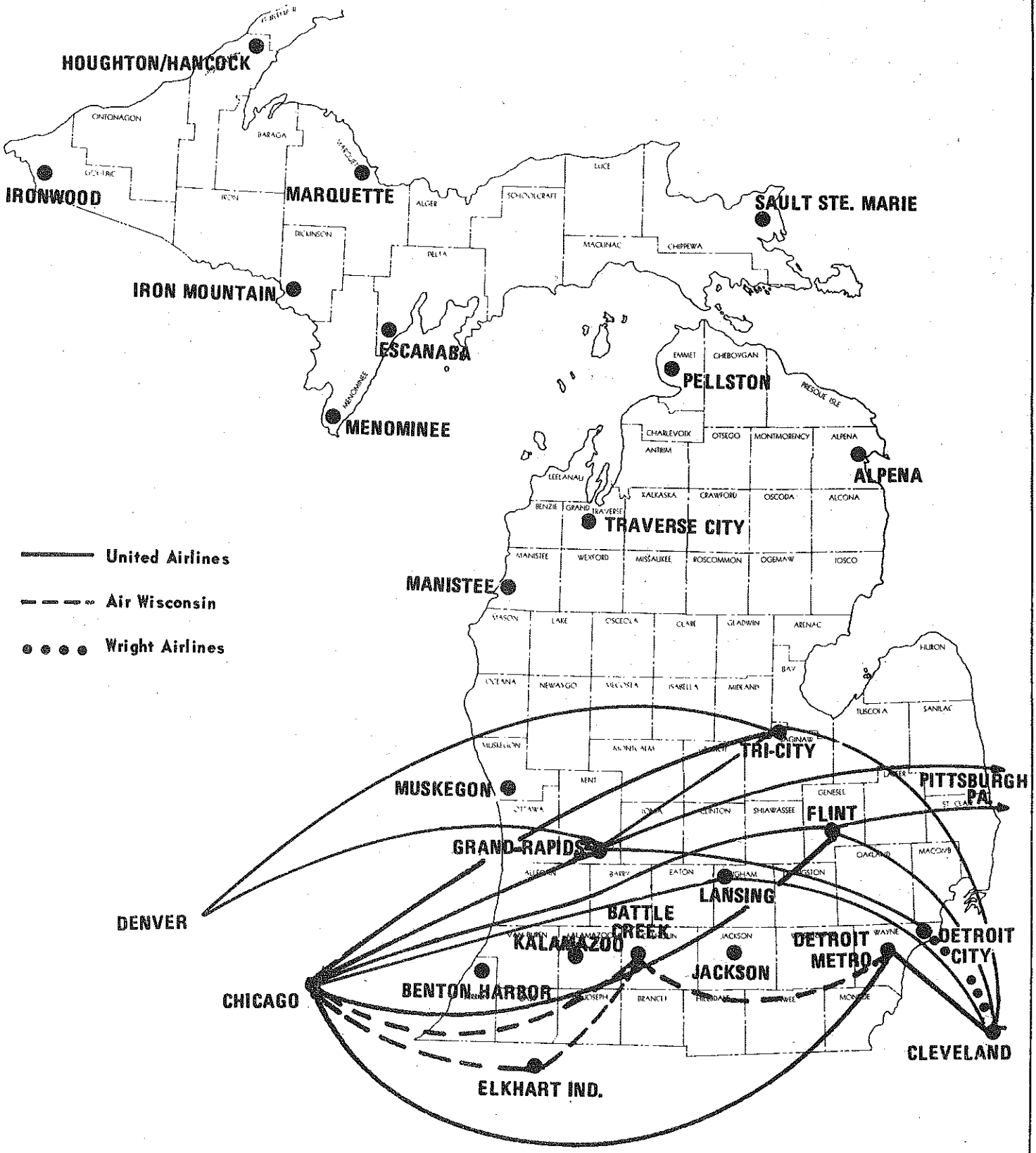
APPENDIX D

CERTIFICATED AIR SERVICE IN MICHIGAN, MARCH 1980



APPENDIX D (CONT)

CERTIFICATED AIR SERVICE IN MICHIGAN, MARCH 1980



APPENDIX E

PASSENGERS, MAIL & CARGO FOR AIR CARRIER AIRPORTS..... JAN-DEC, 1979
(AIRPORTS LISTED ALPHABETICALLY)

AIRPORT NAME (COMMUNITY)	JAN THRU DEC	PASSENGERS DEPLANED	PASSENGERS ENPLANED	PASSENGERS TOTAL	PASS RANK MICH	MAIL(POUNDS) INBOUND	MAIL(POUNDS) OUTBOUND	MAIL(POUNDS) TOTAL	CARGO(TONS) INBOUND	CARGO(TONS) OUTBOUND	CARGO(TONS) TOTAL
PHELPS COLLINS (ALPENA)	1979	13,117	13,020	26,137	17	0	0	0	120.7	25.9	146.6
	1978	12,397	12,615	25,012	17	0	0	0	156.9	29.3	186.2
	%CHG	+ 5.8%	+ 3.2%	+ 4.5%		+ 0.0%	+ 0.0%	+ 0.0%	- 23.1%	- 11.6%	- 21.3%
W. K. KELLOGG REGIONAL (BATTLE CREEK)	1979	28,389	28,369	56,758	13	0	0	0	493.4	621.6	1,115.0
	1978	28,915	30,582	59,497	13	0	0	0	275.4	535.8	811.2
	%CHG	- 1.8%	- 7.2%	- 4.6%		+ 0.0%	+ 0.0%	+ 0.0%	+ 79.2%	+ 16.0%	+ 37.5%
ROSS FIELD (BENTON HARBOR)	1979	36,167	37,508	73,675	11	73	4,692	4,765	116.9	180.7	297.6
	1978	34,707	34,431	69,138	11	6,122	119	6,241	242.4	282.0	524.4
	%CHG	+ 4.2%	+ 8.9%	+ 6.6%		- 98.8%	+842.9%	- 23.7%	- 51.8%	- 35.9%	- 43.2%
DETROIT CITY (DETROIT)	1979	36,978	38,597	75,575	10	0	0	0	475.5	366.8	842.3
	1978	35,526	35,483	71,009	10	0	0	0	572.9	355.7	928.6
	%CHG	+ 4.1%	+ 8.8%	+ 6.4%		+ 0.0%	+ 0.0%	+ 0.0%	- 17.0%	+ 3.1%	- 9.3%
DETROIT METROPOLITAN (DETROIT)	1979	5,348,007	5,333,450	10,681,457	1	45,130,781	44,782,110	89,912,891	67,440.5	110,003.9	177,444.4
	1978	4,818,434	4,769,762	9,588,196	1	43,634,833	45,312,372	88,947,205	78,571.2	119,430.6	198,001.8
	%CHG	+ 11.0%	+ 11.8%	+ 11.4%		+ 3.4%	- 1.2%	+ 1.1%	- 14.2%	- 7.9%	- 10.4%
DELTA COUNTY (ESCANABA)	1979	21,377	21,471	42,848	15	2,784	12,064	14,848	123.1	46.8	169.9
	1978	17,570	17,317	34,887	16	1,009	13,912	14,921	116.3	30.6	146.9
	%CHG	+ 21.7%	+ 24.0%	+ 22.8%		+175.9%	- 13.3%	- 0.5%	+ 5.8%	+ 52.9%	+ 15.7%
BISHOP (FLINT)	1979	126,360	119,763	246,123	6	99,292	347,464	446,756	894.9	127.9	1,022.8
	1978	141,931	138,213	280,144	5	140,284	459,433	599,717	1,262.5	222.7	1,485.2
	%CHG	- 11.0%	- 13.3%	- 12.1%		- 29.2%	- 24.4%	- 25.5%	- 29.1%	- 42.6%	- 31.1%
KENT COUNTY INTERNATIONAL (GRAND RAPIDS)	1979	463,136	459,268	922,404	2	491,256	1,289,301	1,780,557	1,556.6	1,290.5	2,847.1
	1978	420,607	420,709	841,316	2	810,186	1,951,901	2,762,087	1,961.0	1,631.6	3,592.6
	%CHG	+ 10.1%	+ 9.2%	+ 9.6%		- 39.4%	- 33.9%	- 35.5%	- 20.6%	- 20.9%	- 20.8%
HOUGHTON COUNTY MEMORIAL (HOUGHTON/HANCOCK)	1979	26,081	27,614	53,695	14	0	18,568	18,568	85.5	71.7	157.2
	1978	25,543	26,281	51,824	14	0	15,371	15,371	95.6	139.2	234.8
	%CHG	+ 2.1%	+ 5.1%	+ 3.6%		+ 0.0%	+ 20.8%	+ 20.8%	- 10.6%	- 48.5%	- 33.0%
FORD (IRON MOUNTAIN)	1979	17,816	17,883	35,699	16	1,243,171	20,456	1,263,627	149.4	87.8	237.2
	1978	21,926	22,265	44,191	15	1,563,728	26,323	1,590,051	303.4	203.4	506.8
	%CHG	- 18.7%	- 19.7%	- 19.2%		- 20.5%	- 22.3%	- 20.5%	- 50.8%	- 56.8%	- 53.2%
GOGEBIC COUNTY (IRONWOOD)	1979	12,390	11,796	24,186	19	0	0	0	30.0	12.3	42.3
	1978	10,386	10,125	20,511	20	29	2,176	2,205	34.3	6.7	41.0
	%CHG	+ 19.3%	+ 16.5%	+ 17.9%		-100.0%	-100.0%	-100.0%	- 12.5%	+ 83.6%	+ 3.2%
JACKSON COUNTY REYNOLDS (JACKSON)	1979	8,341	8,651	16,992	21	52,470	20,928	73,398	92.0	28.7	120.7
	1978	9,710	10,196	19,906	21	59,445	30,642	90,087	105.3	33.3	138.6
	%CHG	- 14.1%	- 15.2%	- 14.6%		- 11.7%	- 31.7%	- 18.5%	- 12.6%	- 13.8%	- 12.9%
KALAMAZOO MUNICIPAL (KALAMAZOO)	1979	141,410	141,677	283,087	5	286,963	461,942	748,905	377.6	331.4	709.0
	1978	138,673	135,815	274,488	6	342,407	451,882	794,289	429.9	350.7	780.6
	%CHG	+ 2.0%	+ 4.3%	+ 3.1%		- 16.2%	+ 2.2%	- 5.7%	- 12.2%	- 5.5%	- 9.2%

PASSENGERS, MAIL & CARGO FOR AIR CARRIER AIRPORTS..... JAN-DEC, 1979
(AIRPORTS LISTED ALPHABETICALLY)

AIRPORT NAME (COMMUNITY)	JAN THRU DEC	PASSENGERS DEPLANED	PASSENGERS ENPLANED	PASSENGERS TOTAL	PASS RANK MICH	MAIL(POUNDS) INBOUND	MAIL(POUNDS) OUTBOUND	MAIL(POUNDS) TOTAL	CARGO(TONS) INBOUND	CARGO(TONS) OUTBOUND	CARGO(TONS) TOTAL
CAPITAL CITY	1979	224,178	220,046	444,224	4	395,267	897,220	1,292,487	846.7	463.9	1,310.6
(LANSING)	1978	225,958	221,301	447,259	4	584,446	970,149	1,554,595	1,164.0	445.9	1,609.9
	%CHG	- 0.8%	- 0.6%	- 0.7%		- 32.4%	- 7.5%	- 16.9%	- 27.3%	+ 4.0%	- 18.6%
MANISTEE COUNTY-BLACKER	1979	2,867	2,877	5,744	22	106	3,452	3,558	25.0	13.8	38.8
(MANISTEE)	1978	2,888	2,844	5,732	22	127	8,735	8,862	53.8	30.8	84.6
	%CHG	- 0.7%	+ 1.2%	+ 0.2%		- 16.5%	- 60.5%	- 59.9%	- 53.5%	- 55.2%	- 54.1%
MARQUETTE COUNTY	1979	43,092	41,840	84,932	9	3,345	24,251	27,596	271.0	64.4	335.4
(MARQUETTE)	1978	42,927	42,569	85,496	9	1,664	35,278	36,942	260.0	59.9	319.9
	%CHG	+ 0.4%	- 1.7%	- 0.7%		+101.0%	- 31.3%	- 25.3%	+ 4.2%	+ 7.5%	+ 4.8%
MENOMINEE-MARINETTE	1979	11,183	10,468	21,651	20	63	21,433	21,496	64.6	37.5	102.1
(MENOMINEE)	1978	11,521	10,978	22,499	19	458	19,703	20,161	90.4	62.6	153.0
	%CHG	- 2.9%	- 4.6%	- 3.8%		- 86.2%	+ 8.8%	+ 6.6%	- 28.5%	- 40.1%	- 33.3%
MUSKEGON COUNTY	1979	86,509	81,159	167,668	8	1,787	1,907	3,694	355.2	370.1	725.3
(MUSKEGON)	1978	87,400	85,832	173,232	7	9,623	905	10,528	404.0	700.3	1,104.3
	%CHG	- 1.0%	- 5.4%	- 3.2%		- 81.4%	+110.7%	- 84.9%	- 12.1%	- 47.2%	- 34.3%
EMMET COUNTY	1979	30,509	30,096	60,605	12	654	443	1,097	113.4	116.3	229.7
(PELLSTON)	1978	30,537	30,128	60,665	12	266	106	372	130.0	99.7	229.7
	%CHG	- 0.1%	- 0.1%	- 0.1%		+145.9%	+317.9%	+194.9%	- 12.8%	+ 16.6%	+ 0.0%
TRI-CITY INTERNATIONAL	1979	217,020	229,629	446,649	3	59,293	239,694	298,987	671.8	275.7	947.5
(SAGINAW)	1978	225,416	226,745	452,161	3	67,316	388,259	455,575	945.1	506.8	1,451.9
	%CHG	- 3.7%	+ 1.3%	- 1.2%		- 11.9%	- 38.3%	- 34.4%	- 28.9%	- 45.6%	- 34.7%
CHIPPEWA CO INTERNATIONAL	1979	13,828	13,019	26,847	17	49,252	30,628	79,880	49.2	18.9	68.1
(SAULT STE. MARIE)	1978	13,210	12,179	25,389	17	36,131	40,853	76,984	52.2	22.4	74.6
	%CHG	+ 4.7%	+ 6.9%	+ 5.7%		+ 36.3%	- 25.0%	+ 3.8%	- 5.7%	- 15.6%	- 8.7%
CHERRY CAPITAL	1979	82,638	89,060	171,698	7	191,042	29,293	220,335	476.0	389.5	865.5
(TRAVERSE CITY)	1978	74,652	78,067	152,719	8	349,155	20,094	369,249	510.9	502.4	1,013.3
	%CHG	+ 10.7%	+ 14.1%	+ 12.4%		- 45.3%	+ 45.8%	- 40.3%	- 6.8%	- 22.5%	- 14.6%
TOTAL	1979	6,991,393	6,977,261	13,968,654		48,007,599	48,205,846	96,213,445	74,829.0	114,946.1	189,775.1
(MICHIGAN)	1978	6,430,834	6,374,437	12,805,271		47,607,229	49,748,213	97,355,442	87,737.5	125,682.4	213,419.9
	%CHG	+ 8.7%	+ 9.5%	+ 9.1%		+ 0.8%	- 3.1%	- 1.2%	- 14.7%	- 8.5%	- 11.1%

PASSENGERS, MAIL & CARGO FOR AIR CARRIER AIRPORTS..... JAN-DEC, 1975
(AIRPORTS LISTED ALPHABETICALLY)

AIRPORT NAME (COMMUNITY)	JAN THRU DEC	PASSENGERS DEPLANED	PASSENGERS ENPLANED	PASSENGERS TOTAL	PASS RANK MICH	MAIL(POUNDS) INBOUND	MAIL(POUNDS) OUTBOUND	MAIL(POUNDS) TOTAL	CARGO(TONS) INBOUND	CARGO(TONS) OUTBOUND	CARGO(TONS) TOTAL
PHELPS COLLINS	1975	8,915	8,871	17,786	17	8,742	15,642	24,384	101.9	27.4	129.3
(ALPENA)	1974	9,299	9,151	18,450	17	11,703	10,226	21,929	125.0	41.7	166.7
	%CHG	- 4.1%	- 3.1%	- 3.6%		- 25.3%	+ 53.0%	+ 11.2%	- 18.5%	- 34.3%	- 22.4%
W. K. KELLOGG REGIONAL	1975	17,982	19,704	37,686	14	0	0	0	55.5	47.1	102.6
(BATTLE CREEK)	1974	18,739	19,863	38,602	13	7,665	100,576	108,241	47.9	21.7	69.6
	%CHG	- 4.0%	- 0.8%	- 2.4%		-100.0%	-100.0%	-100.0%	+ 15.9%	+117.1%	+ 47.4%
ROSS FIELD	1975	26,265	27,854	54,119	10	51,745	123,300	175,045	196.8	168.6	365.4
(BENTON HARBOR)	1974	27,491	29,916	57,407	11	65,086	233,696	298,782	315.6	170.4	486.0
	%CHG	- 4.5%	- 6.9%	- 5.7%		- 20.5%	- 47.2%	- 41.4%	- 37.6%	- 1.1%	- 24.8%
DETROIT CITY	1975	26,601	25,711	52,312	11	0	0	0	342.7	229.5	572.2
(DETROIT)	1974	31,397	30,359	61,756	9	0	0	0	663.7	358.9	1,022.6
	%CHG	- 15.3%	- 15.3%	- 15.3%		+ 0.0%	+ 0.0%	+ 0.0%	- 48.4%	- 36.1%	- 44.0%
DETROIT METROPOLITAN	1975	3,706,751	3,647,616	7,354,367	1	37,389,613	37,577,759	74,967,372	70,085.5	66,904.5	136,990.0
(DETROIT)	1974	3,867,245	3,818,177	7,685,422	1	35,804,600	36,633,467	72,438,067	95,172.1	102,144.9	197,317.0
	%CHG	- 4.2%	- 4.5%	- 4.3%		+ 4.4%	+ 2.6%	+ 3.5%	- 26.4%	- 34.5%	- 30.6%
DELTA COUNTY	1975	14,562	14,424	28,986	16	24,837	28,017	52,854	138.8	39.7	178.5
(ESCANABA)	1974	15,136	15,378	30,514	16	54,945	66,610	121,555	141.5	47.3	188.8
	%CHG	- 3.8%	- 6.2%	- 5.0%		- 54.8%	- 57.9%	- 56.5%	- 1.9%	- 16.1%	- 5.5%
BISHOP	1975	96,333	96,537	192,870	5	221,356	407,543	628,899	740.8	163.8	904.6
(FLINT)	1974	102,508	100,708	203,216	5	280,343	322,722	603,065	1,069.1	292.3	1,361.4
	%CHG	- 6.0%	- 4.1%	- 5.1%		- 21.0%	+ 26.3%	+ 4.3%	- 30.7%	- 44.0%	- 33.6%
KENT COUNTY INTERNATIONAL	1975	286,622	285,336	571,958	2	348,108	560,024	908,132	1,615.6	1,373.4	2,989.0
(GRAND RAPIDS)	1974	279,973	280,862	560,835	2	269,180	237,417	506,597	2,191.3	1,986.0	4,177.3
	%CHG	+ 2.4%	+ 1.6%	+ 2.0%		+ 29.3%	+135.9%	+ 79.3%	- 26.3%	- 30.8%	- 28.4%
HOUGHTON COUNTY MEMORIAL	1975	19,594	19,112	38,706	13	22,325	21,588	43,913	205.0	120.0	325.0
(HOUGHTON/HANCOCK)	1974	18,847	18,902	37,749	14	50,606	51,392	101,998	213.6	144.2	357.8
	%CHG	+ 4.0%	+ 1.1%	+ 2.5%		- 55.9%	- 58.0%	- 56.9%	- 4.0%	- 16.8%	- 9.2%
FORD	1975	16,278	16,479	32,757	15	673,819	21,244	695,063	174.7	104.2	278.9
(IRON MOUNTAIN)	1974	15,904	16,317	32,221	15	650,464	18,732	669,196	140.5	110.1	250.6
	%CHG	+ 2.4%	+ 1.0%	+ 1.7%		+ 3.6%	+ 13.4%	+ 3.9%	+ 24.3%	- 5.4%	+ 11.3%
GOGEBIC COUNTY	1975	8,296	8,230	16,526	21	1,615	6,029	7,644	40.6	8.5	49.1
(IRONWOOD)	1974	8,506	8,700	17,206	20	1,958	9,004	10,962	749.0	20.1	769.1
	%CHG	- 2.5%	- 5.4%	- 4.0%		- 17.5%	- 33.0%	- 30.3%	- 94.6%	- 57.7%	- 93.6%
JACKSON COUNTY REYNOLDS	1975	8,326	8,610	16,936	20	179,185	65,652	244,837	124.7	39.3	164.0
(JACKSON)	1974	8,513	8,644	17,157	21	209,939	80,410	290,349	176.5	37.1	213.6
	%CHG	- 2.2%	- 0.4%	- 1.3%		- 14.6%	- 18.4%	- 15.7%	- 29.3%	+ 5.9%	- 23.2%
KALAMAZOO MUNICIPAL	1975	93,069	92,522	185,591	6	576,888	1,517,170	2,094,058	400.7	199.0	599.7
(KALAMAZOO)	1974	100,738	101,167	201,905	6	764,950	1,288,944	2,053,894	608.8	306.0	914.8
	%CHG	- 7.6%	- 8.5%	- 8.1%		- 24.6%	+ 17.7%	+ 2.0%	- 34.2%	- 35.0%	- 34.4%

PASSENGERS, MAIL & CARGO FOR AIR CARRIER AIRPORTS..... JAN-DEC, 1975
(AIRPORTS LISTED ALPHABETICALLY)

AIRPORT NAME (COMMUNITY)	JAN THRU DEC	PASSENGERS DEPLANED	PASSENGERS ENPLANED	PASSENGERS TOTAL	PASS RANK MICH	MAIL(POUNDS) INBOUND	MAIL(POUNDS) OUTBOUND	MAIL(POUNDS) TOTAL	CARGO(TONS) INBOUND	CARGO(TONS) OUTBOUND	CARGO(TONS) TOTAL
CAPITAL CITY	1975	166,657	160,519	327,176	4	649,993	522,414	1,172,407	968.8	442.6	1,411.4
(LANSING)	1974	164,482	162,081	326,563	4	744,358	553,582	1,297,940	1,280.1	718.5	1,998.6
	%CHG	+ 1.3%	- 1.0%	+ 0.2%		- 12.7%	- 5.6%	- 9.7%	- 24.3%	- 38.4%	- 29.4%
MANISTEE COUNTY-BLACKER	1975	2,763	2,857	5,620	22	918	8,197	9,115	58.7	13.7	72.4
(MANISTEE)	1974	3,284	3,385	6,669	22	197	8,084	8,281	103.1	34.5	137.6
	%CHG	- 15.9%	- 15.6%	- 15.7%		+366.0%	+ 1.4%	+ 10.1%	- 43.1%	- 60.3%	- 47.4%
MARQUETTE COUNTY	1975	31,994	31,399	63,393	9	54,050	27,179	81,229	247.8	67.7	315.5
(MARQUETTE)	1974	30,347	29,620	59,967	10	54,489	28,918	83,407	252.0	51.6	283.6
	%CHG	+ 5.4%	+ 6.0%	+ 5.7%		- 0.8%	- 6.0%	- 2.6%	+ 6.8%	+ 31.2%	+ 11.2%
MENOMINEE-MARINETTE	1975	9,936	9,256	19,192	18	13,803	38,593	52,396	103.4	62.3	165.7
(MENOMINEE)	1974	9,795	9,145	18,940	18	34,333	49,401	83,734	99.4	98.5	197.9
	%CHG	+ 1.4%	+ 1.2%	+ 1.3%		- 59.8%	- 21.9%	- 37.4%	+ 4.0%	- 36.8%	- 16.3%
MUSKEGON COUNTY	1975	72,620	72,047	144,667	7	37,232	37,676	74,908	332.7	685.7	1,018.4
(MUSKEGON)	1974	73,156	73,334	146,490	7	66,735	65,455	132,190	429.9	729.5	1,159.4
	%CHG	- 0.7%	- 1.8%	- 1.2%		- 44.2%	- 42.4%	- 43.3%	- 22.6%	- 6.0%	- 12.2%
EMMET COUNTY	1975	22,628	21,892	44,520	12	71,494	13,037	84,531	104.3	58.9	163.2
(PELLSTON)	1974	21,811	22,126	43,937	12	105,130	43,184	148,314	83.4	52.5	135.9
	%CHG	+ 3.7%	- 1.1%	+ 1.3%		- 32.0%	- 69.8%	- 43.0%	+ 25.1%	+ 12.2%	+ 20.1%
TRI-CITY INTERNATIONAL	1975	163,122	165,371	328,493	3	236,292	448,547	684,839	971.7	378.5	1,350.2
(SAGINAW)	1974	171,561	172,608	344,169	3	259,395	425,478	684,873	952.9	492.3	1,445.2
	%CHG	- 4.9%	- 4.2%	- 4.6%		- 8.9%	+ 5.4%	- 0.0%	+ 2.0%	- 23.1%	- 6.6%
CHIPPEWA CO INTLRNATIONAL	1975	14,140	12,448	26,588	17	64,801	50,881	115,682	62.3	12.0	74.3
(SAULT STE. MARIE)	1974	14,412	12,486	26,898	17	65,881	37,712	103,593	60.9	16.0	76.9
	%CHG	- 1.9%	- 0.3%	- 1.2%		- 1.6%	+ 34.9%	+ 11.7%	+ 2.3%	- 25.0%	- 3.4%
CHERRY CAPITAL	1975	51,918	56,216	108,134	8	378,608	49,648	428,256	443.1	332.8	775.9
(TRAVERSE CITY)	1974	50,374	54,457	104,831	8	246,827	158,571	405,398	371.7	362.9	734.6
	%CHG	+ 3.1%	+ 3.2%	+ 3.2%		+ 53.4%	- 68.7%	+ 5.6%	+ 19.2%	- 8.3%	+ 5.6%
TOTAL	1975	4,865,372	4,803,011	9,668,383		41,005,424	41,540,140	82,545,564	77,516.1	71,479.2	148,995.3
(MICHIGAN)	1974	5,043,518	4,997,386	10,040,904		39,748,784	40,423,581	80,172,365	105,228.0	108,237.0	213,465.0
	%CHG	- 3.5%	- 3.9%	- 3.7%		+ 3.2%	+ 2.8%	+ 3.0%	- 26.3%	- 34.0%	- 30.2%

PASSENGERS, MAIL & CARGO FOR AIR CARRIER AIRPORTS..... JAN-DEC, 1970
(AIRPORTS LISTED ALPHABETICALLY)

AIRPORT NAME (COMMUNITY)	JAN THRU DEC	PASSENGERS DEPLANED	PASSENGERS ENPLANED	PASSENGERS TOTAL	PASS RANK MICH	MAIL(POUNDS) INBOUND	MAIL(POUNDS) OUTBOUND	MAIL(POUNDS) TOTAL	CARGO(TONS) INBOUND	CARGO(TONS) OUTBOUND	CARGO(TONS) TOTAL
PHELPS COLLINS (ALPENA)	1970	6,525	6,397	12,922	17	8,943	20,044	28,987	117.9	143.2	261.1
	1969	5,958	5,960	11,918	17	25,838	24,829	50,667	93.7	67.1	160.8
	%CHG	+ 9.5%	+ 7.3%	+ 8.4%		- 65.4%	- 19.3%	- 42.8%	+ 25.8%	+113.4%	+ 62.4%
W. K. KELLOGG REGIONAL (BATTLE CREEK)	1970	30,077	27,387	57,464	10	151,486	578,474	729,960	326.3	85.5	411.8
	1969	37,790	33,062	70,852	9	196,291	763,058	959,349	461.3	206.2	667.5
	%CHG	- 20.4%	- 17.2%	- 18.9%		- 22.8%	- 24.2%	- 23.9%	- 29.3%	- 58.5%	- 38.3%
ROSS FIELD (BENTON HARBOR)	1970	21,357	22,931	44,288	12	63,473	211,319	274,792	328.5	248.3	576.8
	1969	20,935	22,277	43,212	12	71,099	206,645	277,744	304.3	226.4	530.7
	%CHG	+ 2.0%	+ 2.9%	+ 2.5%		- 10.7%	+ 2.3%	- 1.1%	+ 8.0%	+ 9.7%	+ 8.7%
DETROIT CITY (DETROIT)	1970	50,157	51,244	101,401	8	0	0	0	707.7	445.1	1,152.8
	1969	74,485	72,824	147,309	6	0	0	0	602.9	377.8	980.7
	%CHG	- 32.7%	- 29.6%	- 31.2%		+ 0.0%	+ 0.0%	+ 0.0%	+ 17.4%	+ 17.8%	+ 17.5%
DETROIT METROPOLITAN (DETROIT)	1970	3,544,994	3,495,003	7,039,997	1	23,563,851	23,539,759	47,103,610	72,929.9	81,083.8	154,013.7
	1969	3,734,480	3,681,809	7,416,289	1	24,864,977	24,178,868	49,043,845	70,604.6	86,855.4	157,460.0
	%CHG	- 5.1%	- 5.1%	- 5.1%		- 5.2%	- 2.6%	- 4.0%	+ 3.3%	- 6.6%	- 2.2%
DELTA COUNTY (ESCANABA)	1970	14,228	13,941	28,169	15	27,657	45,083	72,740	108.0	49.3	157.3
	1969	11,797	12,138	23,935	15	64,584	59,307	123,891	82.3	47.1	129.4
	%CHG	+ 20.6%	+ 14.9%	+ 17.7%		- 57.2%	- 24.0%	- 41.3%	+ 31.2%	+ 4.7%	+ 21.6%
BISHOP (FLINT)	1970	77,450	79,542	156,992	5	183,691	387,419	571,110	1,533.3	814.0	2,347.3
	1969	89,071	89,248	178,319	5	272,507	523,117	795,624	1,524.8	968.0	2,492.8
	%CHG	- 13.0%	- 10.9%	- 12.0%		- 32.6%	- 25.9%	- 28.2%	+ 0.6%	- 15.9%	- 5.8%
KENT COUNTY INTERNATIONAL (GRAND RAPIDS)	1970	221,641	215,579	437,220	2	745,003	694,956	1,439,959	2,853.9	2,792.0	5,645.9
	1969	223,484	221,248	444,732	2	686,042	767,564	1,453,606	2,478.8	2,689.6	5,168.4
	%CHG	- 0.8%	- 2.6%	- 1.7%		+ 8.6%	- 9.5%	- 0.9%	+ 15.1%	+ 3.8%	+ 9.2%
HOUGHTON COUNTY MEMORIAL (HOUGHTON/HANCOCK)	1970	17,506	17,377	34,883	13	221,490	49,754	271,244	206.3	113.9	320.2
	1969	17,772	17,749	35,521	13	259,422	97,770	357,192	173.2	109.5	282.7
	%CHG	- 1.5%	- 2.1%	- 1.8%		- 14.6%	- 49.1%	- 24.1%	+ 19.1%	+ 4.0%	+ 13.3%
FORD (IRON MOUNTAIN)	1970	13,018	12,886	25,904	16	135,400	20,741	156,141	287.6	70.5	358.1
	1969	11,006	11,869	22,875	16	97,114	68,806	165,920	221.1	129.2	350.3
	%CHG	+ 18.3%	+ 8.6%	+ 13.2%		+ 39.4%	- 69.9%	- 5.9%	+ 30.1%	- 45.4%	+ 2.2%
GOGEBIC COUNTY (IRONWOOD)	1970	7,560	7,925	15,485	19	2,473	17,208	19,681	72.1	11.6	83.7
	1969	6,978	7,415	14,393	19	2,887	27,219	30,106	62.4	32.5	94.9
	%CHG	+ 8.3%	+ 6.9%	+ 7.6%		- 14.3%	- 36.8%	- 34.6%	+ 15.5%	- 64.3%	- 11.8%
JACKSON COUNTY REYNOLDS (JACKSON)	1970	5,021	5,733	10,754	21	191,471	52,641	244,112	227.5	83.8	311.3
	1969	5,344	6,070	11,414	21	215,841	74,783	290,624	219.2	68.8	288.0
	%CHG	- 6.0%	- 5.6%	- 5.8%		- 11.3%	- 29.6%	- 16.0%	+ 3.8%	+ 21.8%	+ 8.1%
KALAMAZOO MUNICIPAL (KALAMAZOO)	1970	65,440	60,296	125,736	6	381,211	524,723	905,934	734.1	617.9	1,352.0
	1969	61,430	63,304	124,734	8	802,874	536,289	1,339,163	756.7	1,155.4	1,912.1
	%CHG	+ 6.5%	- 4.8%	+ 0.8%		- 52.5%	- 2.2%	- 32.4%	- 3.0%	- 46.5%	- 29.3%

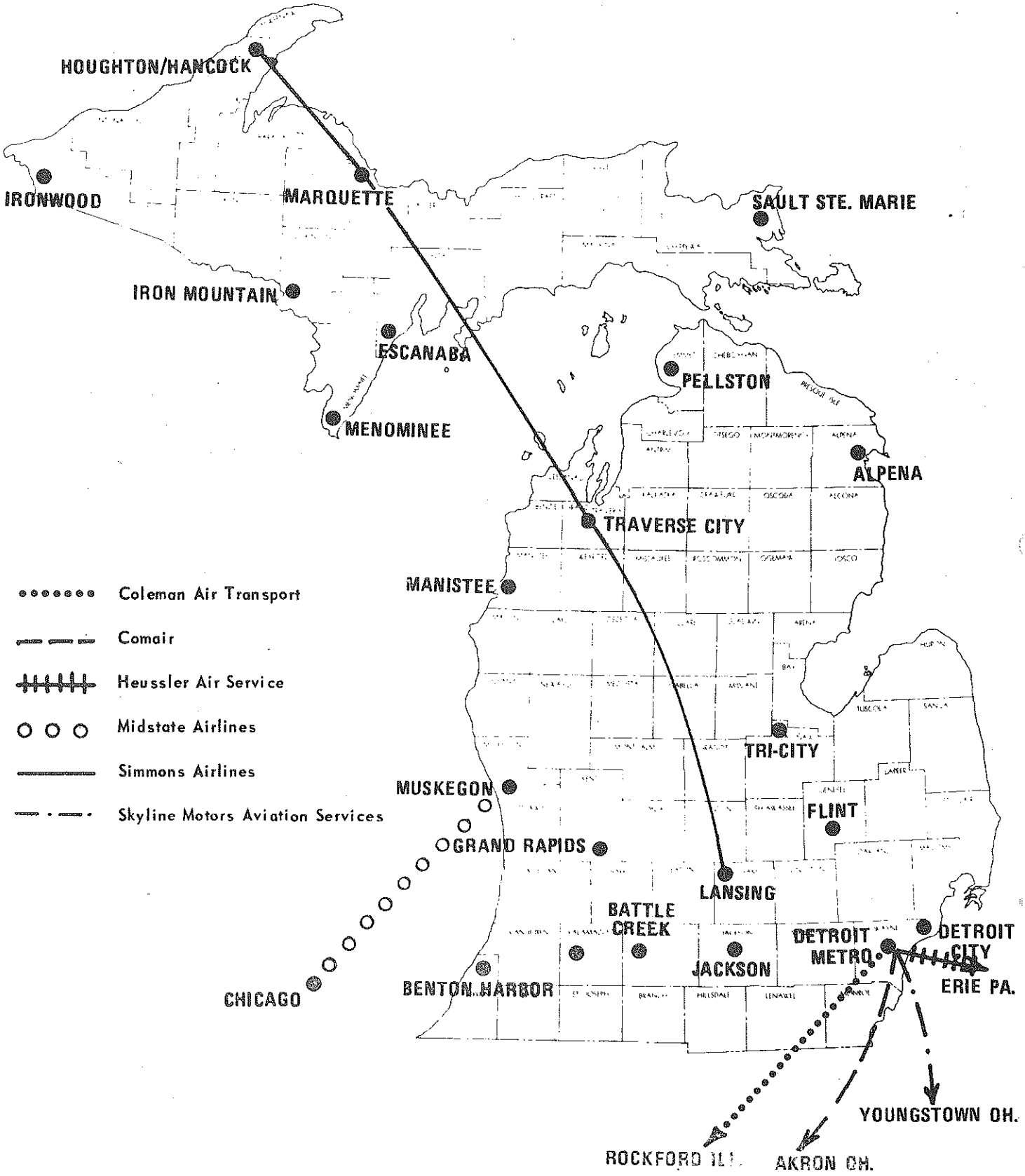
PASSENGERS, MAIL & CARGO FOR AIR CARRIER AIRPORTS..... JAN-DEC, 1970

(AIRPORTS LISTED ALPHABETICALLY)

AIRPORT NAME (COMMUNITY)	JAN THRU DEC	PASSENGERS DEPLANED	PASSENGERS ENPLANED	PASSENGERS TOTAL	PASS RANK MICH	MAIL (POUNDS) INBOUND	MAIL (POUNDS) OUTBOUND	MAIL (POUNDS) TOTAL	CARGO (TONS) INBOUND	CARGO (TONS) OUTBOUND	CARGO (TONS) TOTAL
CAPITAL CITY	1970	120,523	117,642	238,165	4	569,311	612,049	1,181,360	1,083.1	659.5	1,742.6
(LANSING)	1969	135,721	127,869	263,590	4	718,193	1,093,190	1,811,383	1,308.6	1,019.9	2,328.5
	%CHG	- 11.2%	- 8.0%	- 9.6%		- 20.7%	- 44.0%	- 34.8%	- 17.2%	- 35.3%	- 25.2%
MANISTEE COUNTY-BLACKER	1970	2,086	2,367	4,453	22	805	13,364	14,169	67.2	52.4	119.6
(MANISTEE)	1969	4,084	4,168	8,252	22	5,807	19,653	25,460	72.9	39.8	112.7
	%CHG	- 48.9%	- 43.2%	- 46.0%		- 86.1%	- 32.0%	- 44.3%	- 7.8%	+ 31.7%	+ 6.1%
MARQUETTE COUNTY	1970	24,749	24,301	49,050	11	91,241	82,158	173,399	183.8	95.2	279.0
(MARQUETTE)	1969	22,194	21,745	43,939	11	96,512	135,781	232,293	150.3	46.3	196.6
	%CHG	+ 11.5%	+ 11.8%	+ 11.6%		- 5.5%	- 39.5%	- 25.4%	+ 22.3%	+105.6%	+ 41.9%
MENOMINEE-MARINETTE	1970	8,208	8,332	16,540	18	13,198	36,475	49,673	102.3	114.8	217.1
(MENOMINEE)	1969	8,557	8,614	17,171	18	28,224	15,984	44,208	110.1	132.7	242.8
	%CHG	- 4.1%	- 3.3%	- 3.7%		- 53.2%	+128.2%	+ 12.4%	- 7.1%	- 13.5%	- 10.6%
MUSKEGON COUNTY	1970	61,696	62,755	124,451	7	98,543	335,149	433,692	616.5	1,303.4	1,919.9
(MUSKEGON)	1969	63,015	64,707	127,722	7	114,376	516,576	630,952	582.4	1,179.4	1,761.8
	%CHG	- 2.1%	- 3.0%	- 2.6%		- 13.8%	- 35.1%	- 31.3%	+ 5.9%	+ 10.5%	+ 9.0%
EMMET COUNTY	1970	15,954	15,457	31,411	14	10,555	13,538	24,093	120.6	133.7	254.3
(PELLSTON)	1969	15,732	16,572	32,304	14	17,116	20,611	37,727	96.1	58.1	154.2
	%CHG	+ 1.4%	- 6.7%	- 2.8%		- 38.3%	- 34.3%	- 36.1%	+ 25.5%	+130.1%	+ 64.9%
TRI-CITY INTERNATIONAL	1970	138,934	138,762	277,696	3	570,062	337,538	907,600	816.8	1,021.7	1,838.5
(SAGINAW)	1969	146,401	165,965	312,366	3	334,143	578,507	912,650	1,113.1	889.2	2,002.3
	%CHG	- 5.1%	- 16.4%	- 11.1%		+ 70.6%	- 41.7%	- 0.6%	- 26.6%	+ 14.9%	- 8.2%
CHIPPEWA CO INTERNATIONAL	1970	9,290	9,173	18,463	17	59,998	39,996	99,994	76.9	20.0	96.9
(SAULT STE. MARIE)	1969	10,187	10,272	20,459	17	107,561	77,241	184,802	83.7	35.9	119.6
	%CHG	- 8.8%	- 10.7%	- 9.8%		- 44.2%	- 48.2%	- 45.9%	- 8.1%	- 44.3%	- 19.0%
CHERRY CAPITAL	1970	36,225	36,610	72,835	9	126,827	49,008	175,835	266.2	265.0	531.2
(TRAVERSE CITY)	1969	35,460	34,441	69,901	10	183,126	124,255	307,381	244.8	234.4	479.2
	%CHG	+ 2.2%	+ 6.3%	+ 4.2%		- 30.7%	- 60.6%	- 42.8%	+ 8.7%	+ 13.1%	+ 10.9%
TOTAL	1970	4,492,639	4,431,640	8,924,279		27,216,689	27,661,396	54,878,085	83,766.5	90,224.6	173,991.1
(MICHIGAN)	1969	4,741,881	4,699,326	9,441,207		29,164,534	29,910,053	59,074,587	81,347.3	96,568.7	177,916.0
	%CHG	- 5.3%	- 5.7%	- 5.5%		- 6.7%	- 7.5%	- 7.1%	+ 3.0%	- 6.6%	- 2.2%

APPENDIX F

SHORT-HAUL (COMMUTER) AIR SERVICE, MARCH 1980



APPENDIX G

MICHIGAN SHORT-HAUL (COMMUTER) AIR SERVICE

January 1 through December 31, 1979

Location	Passengers In	Passengers Out	Passengers Total	Freight (Lbs) In	Freight (Lbs) Out	Freight (Lbs) Total	Remarks	
Alpena	288	232	520	176	65	241		
Big Rapids	87	94	181	40	150	190	Sv. term.	10/1
Cadillac	564	584	1,148	368	253	621		
Detroit Metro	22,436	22,334	44,770		Not reported			
Gaylord	107	100	207	50	25	75	Sv. term.	10/1
Grand Rapids	1,604	2,121	3,725	85	153	238	Sv. term.	6/30
Hancock/Houghton	Not reported		843		Not reported			
Lansing	Not reported		3,302		Not reported			
Mackinac Island	24	42	66		None		Sv. term.	10/15
Marquette	Not reported		2,6577		Not reported			
Mt. Pleasant	311	343	654	10	20	30		
Muskegon	2,047	3,143	5,190	8,779	494	9,273	Sv. eff.	6/1
Oscoda (Wurtsmith)	447	492	939	61	71	132		
Traverse City	367	394	761		Not reported		Sv. eff.	10/1
TOTAL:			64,693					

Source: Michigan Department of Transportation, Bureau of Urban and Public Transportation.

APPENDIX H

COMPARATIVE ACCIDENT DATA, 1969-78

(Passenger Fatalities per 100 Million Passenger Miles)

	Passenger Automobiles and Taxis	Buses	Railroad Passenger Trains	Domestic Scheduled Air Transport Planes
1969	2.30	.19	.07	.13
1970	2.10	.19	.09	.00
1971	1.90	.19	.24	.15
1972	1.90	.19	.53	.13
1973	1.70	1/ .24	.07	.10
1974	1/ 1.50	.21	.07	.12
1975	1.40	.15	.08	.08
1976	1/ 1.34	1/ .17	.05	.003
1977	1.33	.13	.05	.04
1978	1.30	.17	.13	.01

Note: 1/ Revised figure.

Sources: Motor vehicle (automobiles, taxis, and buses) and railroad passenger train data from the National Safety Council. Domestic scheduled air transport data from the Natonal Transportation Safety Board.

APPENDIX I

DEMAND ESTIMATES FOR LOW AND MODERATE ACTIVITY SERVICE AREAS-1990

Service Area	Year	Population	Demand (Daily Enplanements) Min	Max	Actual	EAS	Capacity (Daily Available Seats) Min	Max	Actual	EAS	Frequency (Daily Departures) Min	Max	Actual	EAS
Low Activity Service Areas														
Alpena	C	71,300	42	62	42	35	62	83	104	70	3	6	3	2
	1990	87,800	48	71	--	--	71	96	--	--	3	6	--	--
Escanaba	C	50,925	65	98	69	35	98	130	140	80	3	6	6	2
	1990	57,575	75	112	--	--	112	150	--	--	3	6	--	--
Hancock/Houghton	C	52,800	86	129	89	70	129	168	100	80	3	6	6	2
	1990	62,860	99	148	--	--	148	198	--	--	3	6	--	--
Iron Mountain	C	50,006	57	85	57	59	85	113	165	80	3	6	6	2
	1990	54,585	65	97	--	--	97	130	--	--	3	6	--	--
Ironwood	C	61,480	36	53	38	36	53	71	48	71	3	6	4	2
	1990	60,520	41	61	--	--	61	82	--	--	3	6	--	--
Manistee	C	54,200	9	13	9	8	13	17	12	32	3	6	1	1/2
	1990	67,300	10	15	--	--	15	20	--	--	3	6	--	--
Marquette	C	85,520	130	196	134	113	196	261	165	80	3	6	3	2
	1990	96,520	150	225	--	--	225	300	--	--	3	6	--	--
Menominee	C	56,079	32	49	35	28	49	64	60	57	3	6	5	2
	1990	62,345	37	56	--	--	56	74	--	--	3	6	--	--
Pellston	C	60,700	95	142	96	72	142	190	177	80	3	6	5	3
	1990	76,800	109	163	--	--	163	218	--	--	3	6	--	--
Sault Ste. Marie	C	49,000	41	62	42	34	62	82	50	67	3	6	2	2
	1990	53,500	47	71	--	--	71	94	--	--	3	6	--	--
Total	C	592,010	592	888	611	490	888	1,184	1,021	697	30	60	41	21
	1990	679,805	681	1,019	--	--	1,019	1,362	--	--	30	60	--	--

APPENDIX I (continued)

DEMAND ESTIMATES FOR LOW AND MODERATE ACTIVITY SERVICE AREAS - 1990

Service Area	Year	Population	Demand (Daily Enplanements)				Capacity (Daily Available Seats)				Frequency (Daily Departures)			
Moderate Activity Service Areas			Min	Max	Actual	EAS	Min	Max	Actual	EAS	Min	Max	Actual	EAS
Battle Creek	C	179,600	90	151	91	94	113	186	113	80	12	24	14	--
	1990	182,300	100	167	--	--	125	206	--	--	12	24	--	--
Benton Harbor	C	245,570	136	226	120	86	170	282	168	80	12	24	7	2
	1990	278,047	150	250	--	--	188	312	--	--	12	24	--	--
Flint	C	588,400	384	641	384	NA	480	800	735	NA	12	24	14	NA
	1990	623,100	425	709	--	--	531	885	--	--	12	24	--	--
Grand Rapids	C	588,225	1,447	2,414	1,472	NA	1,809	3,014	1,640	NA	12	24	34	NA
	1990	649,456	1,600	2,669	--	--	2,000	3,333	--	--	12	24	--	--
Jackson	C	191,400	45	75	28	28	57	94	96	56	12	24	5	4
	1990	204,300	50	83	--	--	63	104	--	--	12	24	--	--
Kalamazoo	C	348,795	452	754	454	344	564	942	649	80	12	24	13	--
	1990	392,597	500	834	--	--	625	1,042	--	--	12	24	--	--
Lansing	C	408,100	701	1,170	705	NA	877	1,099	966	NA	12	24	24	NA
	1990	466,900	775	1,293	--	--	969	1,215	--	--	12	24	--	--
Muskegon	C	362,600	271	452	262	NA	339	565	306	NA	12	24	11	NA
	1990	411,700	300	500	--	--	375	625	--	--	12	24	--	--
Traverse City	C	132,600	271	452	285	187	339	565	392	80	12	24	17	--
	1990	171,900	300	500	--	--	375	625	--	--	12	24	--	--
Tri-City	C	545,200	723	1,388	736	NA	905	1,508	993	NA	12	24	19	NA
	1990	589,000	800	1,534	--	--	1,000	1,667	--	--	12	24	--	--
Total	C	3,590,490	4,309	7,181	4,537	--	5,386	8,976	6,058	--	120	240	158	--
	1990	3,969,300	4,763	7,939	--	--	5,954	9,924	--	--	120	240	--	--

Notes: 1/ "Counties Served" includes those counties served entirely or partially by an airport including Wisconsin counties served by Michigan airports.

2/ U.S. Department of Commerce, Bureau of the Census "Estimates of the Population of Michigan Counties and Metropolitan Areas: July 1, 1977 (Revised) and 1978 (Provisional)."

3/ Michigan Department of Management and Budget, "Population Projections for Michigan to the Year 2000: Summary Report (State, Regions, Counties)."

Source: Michigan Department of Transportation, Aviation Planning Section.

APPENDIX J

HISTORY OF SCHEDULED COMMUTER SERVICE - 1968-80

Community	Years Served	Carriers Served	Average Number of Weekday Departures
Alpena	1969	Trans-Michigan Airlines	2
	1977-80	SEACO Airlines	1
Battle Creek	1972-73	Hub Airlines	8
	1974	Skystream Air Lines	6
	1974-present 1/	Air Wisconsin	12
Benton Harbor	1969	Time Airlines	3
	1970-71	Air Michigan	5
Big Rapids	1978-79	SEACO Airlines	2
Cadillac/Reed City	1969	Miller Airlines	N/A
	1977-80	SEACO Airlines	3
Detroit	1968	Standard Airways	5
	1968-69	Commuter of Chicago	11
	1968-69	Tag Airlines	23
	1968-69	Time Airlines	6
	1968-71	Air Michigan	3
	1968-73	Hub Airlines	5
	1969	Miller Airlines	3
	1969-73	Trans-Michigan Airlines	5
	1972	Manufacturer's Air Transport Service	2
	1972-74	Shorter Airways	2
	1974-80	Skystream Air Lines	6
	1976	Air Metro	4
	1977	CommutAire of Michigan	6
	1977	Lake Central Aviation	1
	1977	Michigan Airways Internt'l	1
	1977-1978	Chippewa Airlines	1
	1979-80	SEACO Airlines	2
	1979-present	Heussler Air Service	2
	1977-present	Comair	20
	1979-present	Coleman Air Transport	2
	1979-present	Skyline Motors Aviation Services	2
	1969-70, 1974-present 1/	Air Wisconsin	7
	1980-present	Simmons Airlines	
	1968-present 2/	Wright Airlines	6

Escanaba	1970-73	Trans-Michigan Airlines	4
Flint	1969-73	Trans-Michigan Airlines	6
	1976-77	CommutAire of Michigan	4
Gaylord	1977-79	SEACO Airlines	1
Grand Rapids	1968-69	Miller Airlines	5
	1970-72	Trans-Michigan Airlines	4
	1971	Air Michigan	10
	1976	Air Metro	4
	1977-79	Skystream Air Lines	5
Hancock/Houghton	1968-73	Trans-Michigan Airlines	2
	1974	Skystream Air Lines	4
	1976	Air Metro	2
	1977	Lake Central Aviation	2
	1977	Michigan Airways Internt'l	1
	1979-present	Simmons Airlines	2
Iron Mountain	1971	Trans-Michigan Airlines	2
Ironwood	1971	Trans-Michigan Airlines	1
Kalamazoo	1969-71	Air Michigan	9
Lansing	1969-73	Trans-Michigan Airlines	8
	1971	Air Michigan	11
	1974	Skystream Air Lines	8
	1976	Air Metro	5
	1977	Lake Central Aviation	1
	1979-80	SEACO Airlines	4
	1978-present	Simmons Airlines	4
Mackinaw Island	1979	SEACO Airlines	1
Manistee	1977-78	Chippewa Airlines	1
Marquette	1970-73	Trans-Michigan Airlines	4
	1974	Skystream Air Lines	8
	1976	Air Metro	4
	1977	Lake Central Aviation	5
	1977	Michigan Airways Internt'l	1
	1978-present	Simmons Airlines	4
Menomineee	1971	Trans-Michigan Airlines	1

Mount Pleasant	1977-78	Chippewa Airlines	2
	1978-80	SEACO Airlines	3
Muskegon	1979-present	Midstate Airlines	3
Oscoda	1977-80	SEACO Airlines	2
Pellston	1969, 1972-75	Shorter Airways	5
	1970-72	Phillip's Flying Service	2
	1971	Trans-Michigan Airlines	4
Sault Ste. Marie	1971	Trans-Michigan Airlines	2
	1974	Shorter Airways	2
Traverse City	1969-73	Trans-Michigan Airlines	8
	1974	Skystream Airlines	4
	1976	Air Metro	6
	1977	Lake Central Aviation	4
	1977	Michigan Airways Internt'l	4
	1979-80	SEACO Airlines	3
	1979-present	Simmons Airlines	4
Tri-City	1969, 71	Trans-Michigan Airlines	12

Notes: 1/ Air Wisconsin became a certificated air carrier in October 1978.

2/ Wright Airlines is now a certificated air carrier and has six daily departures from Detroit City airport.

Source: Michigan Department of Transportation.