

Air Cargo in the Mid-America Freight Coalition Region

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16. Abstract <p>This report contains a contextual review of air cargo transportation in the 10-state Mid-America Freight Coalition (MAFC) region including the industry's recent history, security implications, and integration within the greater MAFC economy. The report contains an inventory of air cargo facilities throughout the 10-states, including airports, air cargo screening facilities, and foreign trade zones. The researchers analyzed air cargo activity by weight at the region-wide, state, and individual airport levels. An analysis of air cargo movement patterns by tonnage is also provided. Similarly the report contains analyses of MAFC air cargo movements by value and commodity.</p> <p>In the MAFC region, major metropolitan areas such as Chicago, IL; Minneapolis, MN; Detroit, MI; Indianapolis, IN; and Louisville, KY form the core markets for the air cargo industry. An important component of this study focuses on the improved or expanded role smaller general aviation (GA) airports can play to enhance air cargo opportunities for themselves and their community. The report contains insights into how general aviation airports can play a role within the MAFC air cargo industry. The study contains case studies of exceptional air cargo stories including the experience of airports in St. Louis, MI and Fort Wayne, IN; the role of air cargo in supporting auto manufacturing, regional contexts and considerations, and multi-airport "twinning" arrangements.</p> <p>Recommendations and conclusions are intended to be suggestive considerations for integration into the greater decision-making process.</p>			
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Chapter 1: Introduction

Objectives and Purpose

The Mid America Freight Coalition (MAFC) region has long been an integral component of U.S. and global freight infrastructure. The region's freight history has largely centered on railroads, an understandable storyline considering many of the country's critical rail hubs call the MAFC home: Chicago, St. Louis, Kansas City, and several others. The region's role in maritime freight and heavy truck traffic creates an infrastructure logistics package capable of handling any freight demand. This report, however, focuses on a less-studied yet critical component of freight infrastructure in the MAFC, air cargo.

The MAFC is an expansive region. It is home to almost 68 million people and covers about 640,000 square miles, approximately 22 percent of the total population and 17 percent of the total land area in the United States. Considering the magnitude of the 10-state MAFC region, this report focuses on portraying the larger trends and patterns of the air cargo industry within the region. While certain states and metropolitan areas have a greater contribution to the region's freight picture, every state plays a critical role in creating a functioning air cargo system. This report intends to capture and interpret the larger air cargo story for the MAFC region while emphasizing the handful of existing and future critical centers of air cargo activity.

Implementing improvements and the expansion of aviation infrastructure facilities is a critical role of aviation officials. Such decisions are particularly difficult in the context of shrinking budgets and an aviation market that many observers note is approaching maturity. As such, critical air cargo infrastructure decisions must be made carefully to maximize facility efficiency and enhance a community's opportunity for economic development. Consequently, this report also considers the trends, factors, and regional contexts aviation officials must consider for the continued operation of their air cargo facilities. The air cargo industry is comprised of many anecdotes that together form a complex narrative. Thus, it is important for decision-makers to acknowledge the anecdotal and location-specific nature of the industry before making general conclusions.

It is common for air cargo research to center around the activities of large commercial airports in major metropolitan regions. This is indeed the case for the MAFC region as well, where markets such as Chicago, IL; Minneapolis, MN; Detroit, MI; Indianapolis, IN; and Louisville, KY form the core of the air cargo industry. It is also important however, to consider the role that smaller airports can fulfill to complement the operations at larger commercial airports. Every airport operates in a unique environment defined by geography, demographics, local economy, supporting infrastructure, and proximity to other airports. An important component of this study focuses on the improved or expanded role smaller general aviation (GA) airports can play to enhance air cargo opportunities for themselves and their community.

Ultimately, this research intends to paint a clear picture of the air cargo story for the MAFC region. By outlining the large-scale past, present and future of the air cargo industry, aviation and transportation stakeholders within the region will gain a better sense of context to knowledgeably frame critical decisions.

Study Methodology

This report utilizes information culled from a variety of sources. The synthesis of a large amount of quantitative and qualitative data produces conclusions and recommendations presented throughout the report.

Qualitative information was derived from academic papers, trade journals, newspapers, airport master plans, and interviews with industry contacts. Interviews were conducted with a variety of general aviation airport directors and fixed-base operators (FBO) throughout the MAFC region.

Other private sector contacts including aviation consultants and cargo carrier employees were contacted to address greater industry dynamics.

Quantitative data used for analysis are derived from publicly available datasets. These datasets include the Bureau of Transportation Statistics (BTS) Office of Airline Information Air Carriers Data T-100 database for air cargo tonnage figures and the Federal Highway Administration (FHWA) Freight Analysis Framework, Version 3.2 (FAF3) for air cargo commodity and value figures.

All aviation facilities included within the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS) inventory were eligible for inclusion in this report. As such, it is important to note that many private aviation facilities were not specifically included in analyses.

Qualitative and quantitative data were analyzed in order to maximize the geographic coverage of the MAFC and wide breadth of contemporary issues in regional air cargo. Recommendations and conclusions drawn within this report are therefore not intended to be decisive statements. Rather, they are intended to be suggestive points for aviation decision-makers to integrate into their greater decision-making process.

Report Organization

The following report consists of seven chapters.

Chapter 2 presents a contextual review of the air cargo industry to provide a foundation in which later chapters are rooted. It is essential to understand the industry's recent history, security implications, and integration within the greater MAFC economy before considering its specific statistics and anecdotes that make it such a complex industry.

Chapter 3 presents an inventory of air cargo facilities throughout the MAFC, including airports, air cargo screening facilities, and foreign trade zones.

Chapter 4 presents an analysis of MAFC air cargo activity by weight. The scope of the analysis includes the region-wide level, state level, and the individual airport level. An analysis of air cargo movement patterns by tonnage is also provided. These data are from the Bureau of Transportation Statistics, Office of Airline Information (BTS).

Chapter 5 presents an analysis of MAFC air cargo activity by value and commodity. The scope of the analysis includes the value of cargo being transported in the MAFC as well as the type of commodities being transported by air. These data are from the Federal Highway Administration's Freight Analysis Framework, Version 3.2 (FAF).

Chapter 6 presents insights into how general aviation airports can play a role within the MAFC air cargo industry. With information culled from FAF, BTS, and interview sources, this chapter offers an interpretive window into the less-commonly studied aspects of the air cargo industry.

Chapter 7 presents several case studies of exceptional air cargo stories from different airports and regions throughout the MAFC. Case studies include the experience of airports in St. Louis, Missouri and Fort Wayne, Indiana; the role of air cargo in supporting auto manufacturing in the MAFC, regional contexts and considerations, and multi-airport "twinning" arrangements.

Chapter 8 presents the conclusions of this study, recommendations for implementation of the study results, and suggestions for future research.

Chapter 2: Air Cargo in Context

Overview of the Air Cargo Industry

This report examines air cargo transportation in the MAFC region. To provide a foundation for understanding the analysis presented in subsequent chapters of this report, this section provides a brief history and overview of the air cargo industry. The overview includes airlines that transport air cargo, aircraft used by these airlines, and the type of goods that are typically transported via air.

The U.S. air cargo industry dates back to the early 1900s with the establishment of air mail routes across the country. The *Airmail Act* of 1925 established nationwide air mail service for the United States Postal Service, which indirectly helped to establish many of the passenger air carriers that exist today. World War II established the critical value of aircraft for hauling cargo efficiently and in a timely manner. Post-World War II, speed and efficiency of air cargo transportation improved dramatically. The advent of containerization for cargo transport in the late 1950s allowed for increased efficiency of loading and unloading aircraft while the introduction of jet airplanes improved the overall speed of delivery. In the early 1970s, the first Boeing 747 wide-body aircraft was introduced for air cargo. The 1970s also saw the emergence of express parcel service as a major component of air cargo transportation, driven by the emergence of service industries and an increasingly globalized economy. A major landmark for the express parcel business was the formation of Federal Express in 1972 by F.W. Smith. Deregulation of the airline industry in 1978 removed many limitations to industry growth, allowing airlines greater flexibility to select the routes flown and the rates charged for passenger and cargo¹. Many aspects of the modern air cargo industry have evolved from these events which took place over the last century, while some aspects (such as issues related to air cargo security) have emerged more recently. Interested readers are encouraged to consult *The History of Air Cargo and Airmail* for a more detailed history of the air cargo industry².

Airlines

The companies involved in the movement of goods in the air cargo business include combination carriers, all-cargo carriers, and freight forwarders. All-cargo carriers can be further classified as integrated carriers or traditional/line-haul carriers. Table 1 shows the types and characteristics of air cargo carriers. Combination carriers are defined as passenger airlines that transport cargo below the main deck. They are also referred to as belly cargo carriers. Most major passenger airlines have significant cargo operations. Some airlines have separate operations that transport cargo on the main decks of all-cargo aircraft in addition to the bellies of their passenger service aircraft. These carriers are sometimes referred to as mixed carriers.

The growing demand for air cargo has created a strong market for more all-cargo and integrated carriers. Unlike the combination carriers that carry both passengers and belly freight, all-cargo carriers transport only cargo on the main decks of the aircraft. All-cargo carriers can be further classified as integrated carriers or traditional/line-haul carriers. Integrated carriers are those that provide door-to-door service such as UPS and FedEx. The air distribution networks of integrated carriers resemble a hub-and-spoke system similar to that of passenger airlines. Traditional/line-haul carriers are those that typically provide airport-to-airport service and include carriers like Polar and BAX Global. These carriers, especially those providing express service, account for a significant portion of the air cargo industry and have spurred market growth significantly in the last 10 years. Express carriers provide “guaranteed or time definite” service and utilize passenger/cargo aircraft, all-cargo aircraft, and integrated carriers. FedEx, UPS, DHL, and others continue to provide express service and have been a catalyst for improved cargo services at

¹ Radnoti, G. *Profit Strategies for Air Transportation*. Chapter 5

² Allaz, C. *The History of Air Cargo and Airmail from the 18th Century*. Christopher Foyle Publishing, 2004.

passenger hubs and also at specialized airports. Integrated carriers may have a “one-stop shop” approach and provide air and trucking services under one company. Providing seamless shipping gives them a competitive advantage over other carriers. All-cargo and integrated carriers can offer speed that other modes, such as trucking, cannot provide, and the dedicated service focus that belly cargo carriers are unable to provide. Additionally, the ability of air cargo to bypass distribution centers and move products directly from the manufacturer to the retail store is becoming more common as savings in handling costs offset air transport costs.

Table 1: Types and Characteristics of Air Cargo Carriers

Type of Carrier	Example of Carrier	Characteristics	Customers	Market/ Movement	Type of Cargo
Combination Carrier	Most passenger airlines	Baggage hold of passenger aircraft	Wholesale, mail, retail	Airport to airport	Mail, freight
Integrated Carrier	UPS, FedEx	Main decks of all-cargo aircraft	Retail	Door to door	Packages, Express
Traditional/ Line-Haul Carrier	Polar, Kalitta, World Airways, BAX Global	Main decks of all-cargo aircraft	Wholesale	Airport to airport	Larger, specialized freight
Freight Forwarders	Panalpina, Forward Air	All-cargo and passenger aircraft	Wholesale	Feeder services (pickup and delivery)	Ocean and air freight pickup and delivery

Source: Compiled by TTI, Air Transport Association, International Air Cargo Association

Air freight forwarders operate a business that assembles items for shipment by air transport. Forwarders can be considered an indirect air carrier or can operate like an integrated carrier. The forwarder coordinates connections between “point of receipt to point of destination,” which may involve air and trucking transport. The forwarder may utilize its own aircraft and trucks or connect with other air or trucking providers. It is important for airports to provide good connections to the forwarders in order for the shipments to efficiently reach their final destinations. These companies operate their own fleets of trucks and aircraft. They may also purchase capacity on other carriers, including passenger carriers, to accommodate their customers.

Aircraft

There are three types of aircraft typically used for air cargo: passenger, freighter, and combination. All types of passenger aircraft are used for cargo transport, with the belly area of the aircraft used for cargo. Freighter aircraft are similar to their passenger counterparts but are configured for freight-only operations. On freighter aircraft, cargo is transported on both the main deck and the lower deck. Combination aircraft are aircraft that can be configured for either passenger or cargo operations, with the option of converting between the two as needed.

Figure 1 and Figure 2 show examples of freighter aircraft. Note the presence of aircraft-specific containers (known as “igloos”) which are shaped to conform to the dimensions of the aircraft. Figure 3 shows an example of a smaller freighter aircraft, the Cessna 208 Caravan. This type of aircraft is used on “feeder” flights connecting between local airports and primary or secondary hubs. Figure 4 shows an example of an aircraft used by freight forwarder or charter cargo airline.

Boeing estimates that over the next 20 years, the global air cargo freighter fleet will grow by more than two-thirds, from 1,755 airplanes in 2009 to 2,967 airplanes in 2029. Of these new freighters, approximately 70 percent will be modified passenger or combination airplanes³.

³ Boeing World Air Cargo Forecast 2010-2011. URL: <http://www.boeing.com/commercial/cargo/wacf.pdf>



Figure 1: UPS Airlines Boeing 747F Loading through Nose Cargo Door



Figure 2: FedEx Express Airlines Boeing MD-11F Loading through Main Cargo Door



Figure 3: FedEx Feeder Airlines Cessna 208 Caravan



Figure 4: Kalitta Charters Dassault Falcon 20

Types of Air Cargo

Table 2 shows the types of cargo that are typically transported by air. There are two types of air cargo: time-sensitive cargo and value-sensitive cargo⁴. Time-sensitive air cargo includes items that are perishable (i.e. flowers, food products) as well as cargo with a high urgency (e.g. emergency items or documents). Express parcel shipments also fit into the time-sensitive air cargo

⁴ See supra note 1

category. These products are shipped by air due to the speed advantages of shipping by air instead of other modes. Time-sensitive air cargo also includes seasonal items, such as apparel or shipments of gifts/purchases, with demand peaking around the end-of-year holiday season.

Table 2: Types and Examples of Cargo Transported by Air

Time-Sensitive Cargo	Value-Sensitive Cargo
Perishables (e.g. flowers, fruits, or vegetables)	Medicines
Live Animals	Electronic Components
Bakery/Other Food Products	Photographic Equipment
Express Parcels/Documents/Newspapers	Chemicals
Obsolescent Items (e.g. apparel or footwear)	Machine Parts
Emergency Items (e.g. drugs or machinery parts)	Fragile Goods
Humanitarian Aid	

The speed advantages of air cargo transport are also critical in supporting industries that employ “just-in-time” supply chain techniques, such as manufacturing. Specifically, if inventory levels of a particular part or component in the assembly line are low due to unplanned circumstances, new parts can be ordered and delivered overnight via air to replenish the inventory of that part and ensure that there is no down time incurred in the manufacturing process. The economics for this situation are straightforward: the cost of an unplanned overnight air shipment of a part is less than the costs of assembly line down time. Aircraft such as the one shown in Figure 4 operating on an unscheduled basis are typically used for this type of flight.

Value-sensitive air cargo items are high in value and relatively lightweight, and include pharmaceuticals and electronic equipment. These items also benefit from the speed advantage of air cargo transportation, as the high-value products are not exposed to long travel times and thus have less exposure to issues related to security or handling across multiple modes.

Some differences between the transport of cargo by air and the transport of passengers by air should be noted. The exact routing of a cargo shipment is not known to the shipper and is typically at the discretion of the air carrier providing the service – the routing itself is not important for air cargo, only that the shipment arrives at the specified destination at the specified time. Conversely, the routing of an airline passenger is important to that passenger and he/she will make conscious choices about their trip based on the available routes. Air cargo is also typically a one-way move; that is to say, the cargo is consumed at the destination. Passengers, on the other hand, typically make round-trip flights. A majority of air cargo is typically transported at night while passengers generally prefer to travel during the day if given the option.

Overview of Recent History

It is well-known within freight logistics that the health of the industry shadows the greater economy. A review of industry numbers published by various organizations, government agencies, and corporations tell this story of industry decline in acute detail. The air cargo industry is one of global proportions. On an international scale, this decrease in air cargo activity correlated with the economic bust that began October of 2008. The consequences of this global economic decline are evident in recent global air cargo trends. Economists at the International Air Transport Association estimated a 15 percent reduction in air cargo activity in 2009⁵. Boeing reports a smaller, albeit still

⁵ Dunn, Graham. “Forecasts 2010: The only way is up.” *Airline Business*. 22 December 2009.

significant decrease in air cargo activity at 11.3 percent⁶. This correlates to a global decrease in gross domestic product (GDP) of 2.1 percent in 2009 over 2008⁷.

Considering the prevailing economic climate, forecasts have understandably been adjusted from pre-decline projections. What is interesting, however, is how unfazed the air cargo industry is about potential long-term effects a poor economy might have on business. In 2010, Boeing forecasted an annual growth rate (AGR) for global air cargo activity at 5.9 percent over the next 20 years, amounting to a tripling of the industry's market size⁸. This compares to the company's pre-decline forecast, developed in 2006, which had a projected annual growth rate in global air cargo activity of 6.1 percent⁹. A two-tenths percentage difference juxtaposed against the enormity of the global financial crisis is an internal vote of confidence on the viability of the air cargo industry. The two-tenths percentage point gains are evidence of industry well-being considering Boeing initially pegged the 20-year AGR at 5.4 percent. What becomes a key issue is estimating the time needed to reach pre-downturn activity levels. This recuperation period can affect the chronology of decisions of air cargo carriers and individual airports addressing air cargo infrastructure needs. Interestingly, in their widely cited biennial *World Cargo Forecast* from 2010-2011, Boeing projected a relatively rapid complete recovery of air cargo traffic, with volumes restored to peak 2007 levels by the end of 2010¹⁰.

Of particular interest for this report, however, is data pertaining to the MAFC region. Once these global air cargo numbers are reduced to North American activity, the numbers tell a slightly different story. Boeing's projected global 20-year AGR of 5.9 percent shrinks to 2.9 percent when only U.S. domestic activity is considered¹¹. Removing the rapid growth of the Asian air cargo market is a main reason for this reduction in the U.S. domestic AGR when compared to the global forecast. The relative maturity of American air cargo infrastructure in comparison to expanding markets like those in Asia result in slower, albeit constant, growth in the industry.

It is important to note that recent years have demonstrated the difficulties experienced throughout the transportation and infrastructure logistics fields in making confident long-term forecasts. Officials must fully understand the inherent risk behind air cargo operations before committing to specific endeavors. Brief periods of volatile economic activity can render projections worthless at points in time. This is particularly true if volatility occurs in conjunction with an airport, air carrier, or aviation agency's plans to expand infrastructure. As investigated in subsequent sections of the report, many airports schedule anticipated air cargo infrastructure improvements to correlate with the expected industry growth forecasted from various sources. It is important, therefore, that airports adjust these investments, often outlined in master plans, to the current industry climate. It becomes readily apparent that the often decades-long gap between airport master plan updates relegates these planned air cargo infrastructure improvements as marginally significant. This is support to encourage aviation officials to revise airport master plans to better gauge airport facility needs in written documentation. This supporting documentation can become an important factor when applying for various grants and discretionary funds.

One of the most vital issues in the air cargo industry is the fluctuating but ultimately rising price of fuel. The inclusion of a cost premium for jet fuel that has historically reached \$30 per barrel makes the industry's bottom line increasingly difficult to compromise. Figure 5 shows the historical prices for crude oil and jet fuel from 1990 to 2010. Over this 20-year time span, jet fuel prices rose from \$32.89 per barrel in 1990 to \$94.25 per barrel in 2010, a growth of approximately 187 percent.

⁶ Boeing Company. "World Air Cargo Forecast: 2010-2011." October 2010. Page 3.

⁷ See supra note 6.

⁸ See supra note 6.

⁹ Boeing Company. "World Air Cargo Forecast: 2006-2007." October 2006. Page 1.

¹⁰ Boeing Company. "World Air Cargo Forecast: 2006-2007." October 2006. Page 2.

¹¹ Boeing Company. "World Air Cargo Forecast: 2006-2007." October 2006. Page 23.

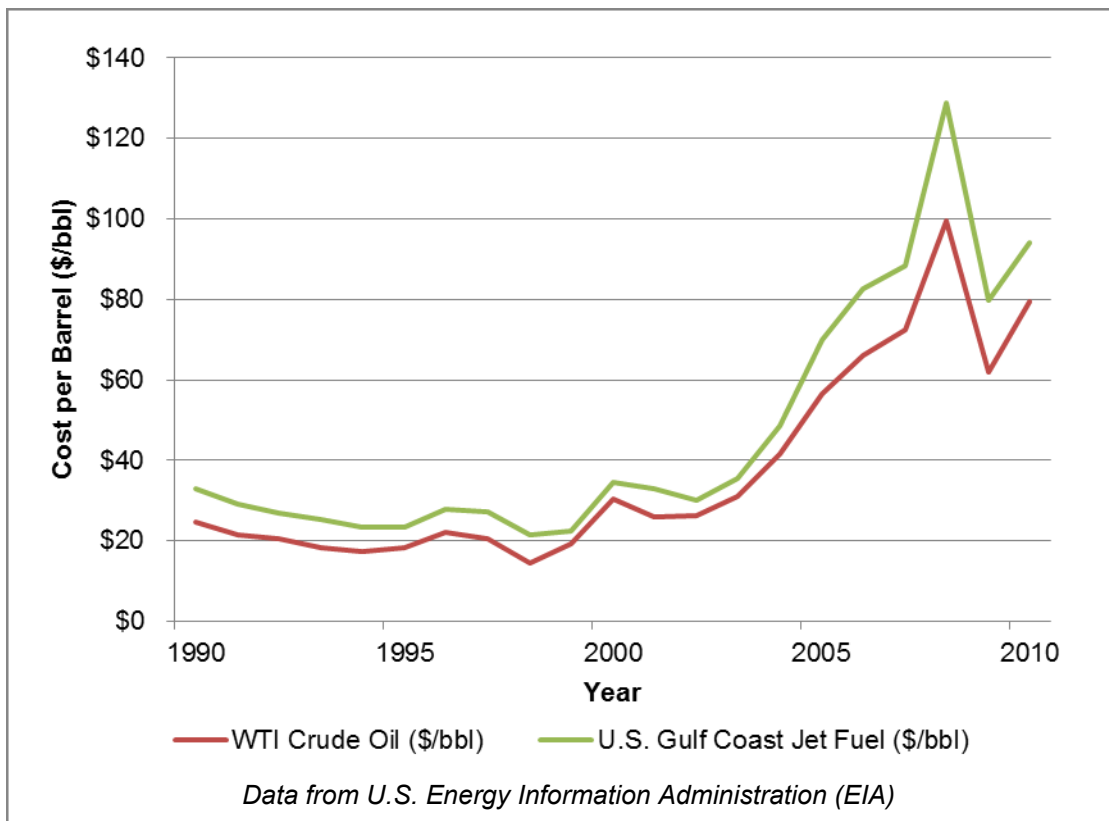


Figure 5: Historical Crude Oil and Jet Fuel Prices per Barrel, 1990-2010

The ever-present threat of terrorist activity has caused security expenditures to drastically increase since 2001, beginning with the creation of the Transportation Security Administration (TSA). These aviation security concerns stemming from the events of 9/11 and subsequent attempted attacks within the air cargo system have triggered significant security implementations within the air cargo industry that will ultimately change the fabric of the industry. It is these security concerns that form one of the single greatest challenges to the future of air cargo.

Industry Implications of Air Cargo Security

The security of shipments has become a major aspect of the air cargo industry in recent years. Recent federal legislation mandating strict security screenings of cargo screenings has significantly impacted the industry, and will continue to play a role in the dynamics of the industry. The MAFC is not insulated from the impacts of these security requirements. Headlines periodically appear throughout the media as a reminder of the ramifications of tight air cargo security. Planned terrorism attempts centered on the exploitation of the international air cargo system were thwarted in October of 2010. The United Kingdom temporarily suspended UPS shipments through some of its facilities due to security concerns. The company's global airline operations hub is located in the MAFC-located city of Louisville, Kentucky.

The key federal legislation involved is the *Implementing Recommendations of the 9/11 Commission Act of 2007*, commonly referred to as the "9/11 Act," that former President George W. Bush signed into law August 3, 2007. Embedded within this bill is the mandate that 100 percent of the cargo carried in the belly of passenger aircraft be screened starting August 1, 2010. While all-cargo flights are currently exempt from 100 percent screening, the mandate for cargo on passenger aircraft caused a significant shift in air cargo logistics that required three years of planning to implement.

Implementation efforts are ongoing. While 100 percent of domestic air cargo is screened, not all cargo on airplanes landing at U.S. airports from international origins is screened. The TSA is working with international air cargo operators to increase the share of cargo placed on passenger flights that is screened, but 100 percent screening may not be achieved until August 2013. The international scale of the air cargo industry makes this a considerable weakness.

It is important to understand how the current system operates. U.S. Customs and Border Patrol (CBP) uses two primary means to screen and scan cargo containers destined for the United States. The Container Security Initiative places US agents at foreign seaports to ensure that high-risk cargo is scanned prior to departing for the United States. The Customs-Trade Partnership Against Terrorism (CT-PAT) works to develop voluntary partnerships among the international community, including private companies that negotiate for benefits (such as reduced cargo inspection), in exchange for providing cargo information for screening and improving internal security practices. These practices have prevented any major disasters in the ports related to importing dangerous items.

The policy change has prompted an increase in the third-party air cargo security screening business. Carriers have the option to become a Certified Cargo Screener, essentially fulfilling all federal requirements for air cargo security in-house. Another option for cargo carriers is to utilize the growing number of Independent Cargo Screening Facilities (ICSFs) to fulfill cargo security requirements. Facilities operated by companies that also provide freight forwarding services are known as Indirect Air Carriers (IACs).

It is also important to understand the implications of 100 percent screening on the future of MAFC air cargo. From a logistical perspective, few freight facilities, especially international ports, in the United States have the available land space to adopt the processes required for 100 percent screening. Containers flow through ports in a systematic manner, spending as little time as possible in the port or other intermodal yards. The layouts required for one hundred percent screening would entail tremendous facility design changes and increased costs.

More importantly, a worldwide focus on the security of the supply chain is required to make this screening work. Not one country, port, or operator has complete responsibility for commodity security because of the way in which goods move through the supply chain. Cargo security needs to be engrained and be a part of the shipping transportation process. It is a continual multilateral process. Some of our trading partners have even considered the unilateral one hundred percent screening initiative as an unfair trade practice. If considered to be a type of protectionism, the screening initiative may impact our global trade agreements and stifle opportunities to increase trade with developing nations.

Air Cargo and the Broader MAFC Economy

Air cargo has historically served as a reliable indicator of international economic trends. It is no surprise the biannual forecasts Boeing publishes remain a popular and oft-cited publication throughout the business world. The international penetration of the air cargo industry transforms it into a litmus test frequently summoned to provide insight on global market trends. The shipments of specific commodities, like microchips and electronic devices, are frequently tracked to gauge future shifts in the global economy¹².

While international facets of the industry are commonly mined for various business analyses, it is also important to apply this international barometer on a smaller, national scale. The tables below provide a context in which to view the composition of economies within the MAFC. They connote

¹² In addition, arguments have been made that while microchips and electronic devices serve as reliable indicators of global markets, they are also simultaneously detriments to air freight services with their ever-increasing miniaturization. See Jindel, Satish, "How the iPod is Killing Airfreight," SJ Consulting Group, Inc., Pittsburgh, 2008.

likely areas of stable consumption within the MAFC that could help drive demand for air cargo services.

Table 3: GDP by State, MAFC States, 1990-2010

State Name	GDP (1990)	GDP (2000)	GDP (2010)	Percent Change		
				1990-2000	2000-2010	1990-2010
Illinois	279,019	474,444	651,518	70.0%	37.3%	133.5%
Indiana	110,860	198,020	275,676	78.6%	39.2%	148.7%
Iowa	56,121	93,287	142,698	66.2%	53.0%	154.3%
Kansas	51,874	85,742	127,170	65.3%	48.3%	145.2%
Kentucky	68,412	113,108	163,269	65.3%	44.3%	138.7%
Michigan	193,103	336,786	384,171	74.4%	14.1%	98.9%
Minnesota	102,757	188,449	270,039	83.4%	43.3%	162.8%
Missouri	103,566	180,982	244,016	74.8%	34.8%	135.6%
Ohio	227,413	381,175	477,699	67.6%	25.3%	110.1%
Wisconsin	100,236	177,638	248,265	77.2%	39.8%	147.7%
Total MAFC	1,293,361	2,229,631	2,984,521	72.4%	33.9%	130.8%

Source: Bureau of Economic Analysis, GDP in 2010 \$Millions

Table 4 displays the population of each state in the MAFC.

Table 4: Population by State, MAFC States, 1990-2010

State Name	U.S. Census			Percent Change		
	1990	2000	2010	1990-2000	2000-2010	1990-2010
Illinois	11,430,602	12,419,293	12,830,632	8.6%	3.3%	12.2%
Indiana	5,544,159	6,080,485	6,483,802	9.7%	6.6%	16.9%
Iowa	2,776,755	2,926,324	3,046,355	5.4%	4.1%	9.7%
Kansas	2,477,574	2,688,418	2,853,118	8.5%	6.1%	15.2%
Kentucky	3,685,296	4,041,769	4,339,367	9.7%	7.4%	17.7%
Michigan	9,295,297	9,938,444	9,883,640	6.9%	-0.6%	6.3%
Minnesota	4,375,099	4,919,479	5,303,925	12.4%	7.8%	21.2%
Missouri	5,117,073	5,595,211	5,988,927	9.3%	7.0%	17.0%
Ohio	10,847,115	11,353,140	11,536,504	4.7%	1.6%	6.4%
Wisconsin	4,891,769	5,363,675	5,686,986	9.6%	6.0%	16.3%
Total MAFC	60,440,739	65,326,238	67,953,256	8.1%	4.0%	12.4%

Source: United States Census Bureau

State GDP and population have a strong, logical correlation. The air cargo industry does not follow the same trends due to the progression toward hub operation implementations by the large air carriers. Decisions by these companies have resulted in more drastic percentage changes in air cargo activity in certain states when compared to the more consistent increases in GDP values and population across time. As such, these numbers are more representative of potential air cargo demand as produced by the industrial, manufacturing, and population composition of any given state, not any particular state's viability to host hub operations.

MAFC Population and GDP Context

It is important to consider population trends to better conceptualize the expansions and contractions of air cargo markets that correlate with the inherent consumption requirements of large populations. Figure 6 shows the county-level percent change in population in the MAFC between 2000 and 2010. The average percent population change throughout the 963 counties of the MAFC is 2.16 percent. The median is 0.90 percent. Kiowa County in Kansas posted the largest percent decrease, losing 22.12 percent of its population, moving from 3,278 to 2,553 people. Of the 10 biggest percentage population losers, 7 of are located in Kansas. Kendall County in Illinois experienced the largest percent increase, at 110.35 percent, moving from 54,544 to 114,736 residents. This is the largest county increase within the United States.

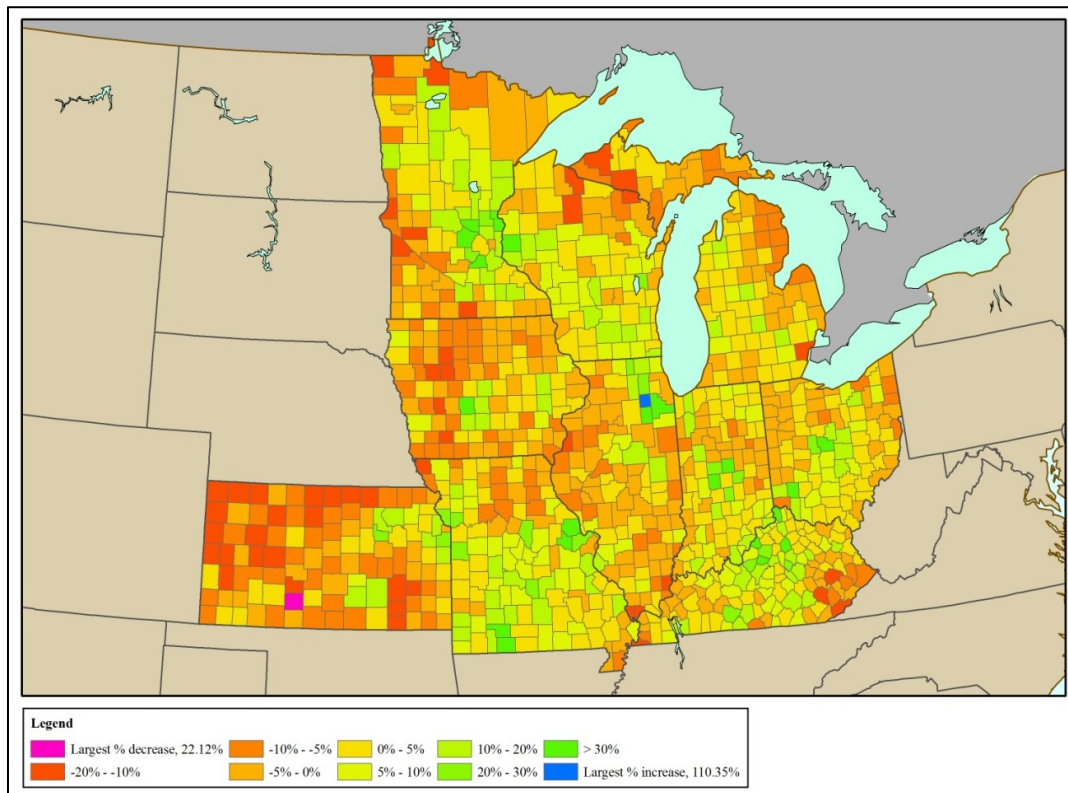


Figure 6: MAFC Percent Population Change, 2000-2010

Population trends include higher population growth for metropolitan areas in counties surrounding the area's core county. Milwaukee, Minneapolis-St. Paul, Indianapolis, and most importantly, Chicago, share these characteristics. Rural areas experienced slower population growth, and often more significant population losses than their urban counterparts. Kansas, Iowa, the rural areas of Minnesota, Illinois, Indianapolis, Ohio, and eastern Kentucky experienced notable growth problems in the ten years between 2000 and 2010.

It is important for air cargo decision makers to familiarize themselves with Midwestern population trends for several reasons. Population shifts allude to potential expanding and contracting markets for consumer goods, a core facet of air cargo operations. Population analysis provides a context to understand potential labor pools that provide essential labor. Lastly, it can connote supporting evidence to substantiate air cargo investment opportunities, particular those located on the fringes of established and expanding metropolitan areas. One can claim the rapidly expanding population centers developing around Chicago, the Minneapolis-St. Paul area, and Columbus, OH as evidence to support expanded infrastructure in those locations.

Existing Transportation Infrastructure

The MAFC region historically has served as an essential component of American freight infrastructure. The region maintains and operates significant facilities accommodating all modes of freight transportation. Figure 7 shows an overview of freight infrastructure throughout the region.

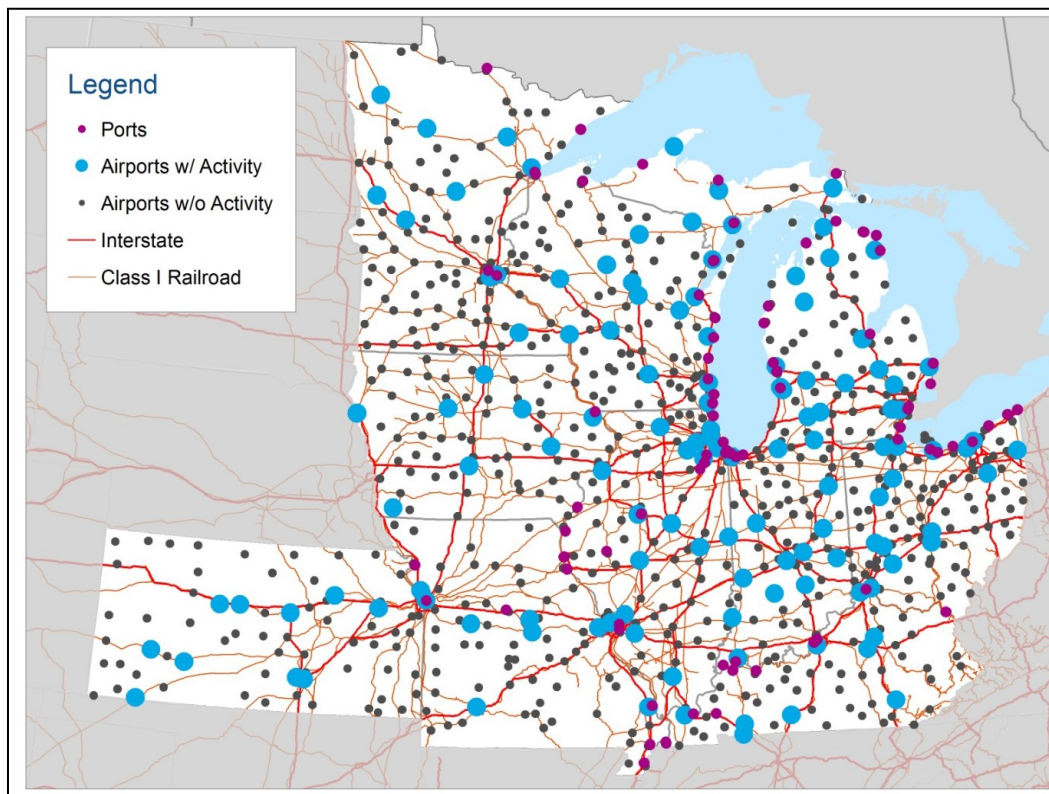


Figure 7: Existing Transportation Infrastructure in MAFC Region

The region contains rail lines from all eight Class I railroads. There are 84 inland ports scattered throughout the region's major lakes and rivers. The interstate system is extensive. Figure 7 demonstrates there are no major coverage issues in freight connectivity throughout the region. Many areas contain potential for significant intermodal possibilities. Only a handful of airports recording air cargo activity in 2010 have limited access to the region's major transportation infrastructure. These facilities are predominantly located in more remote and rural areas of northern Michigan and Minnesota. Foundational, macro-level intermodal access is not an issue within the MAFC. This aligns with analysis provided by several industry contacts. The maturity of the air cargo industry makes it unlikely for significant new infrastructure facilities to be built. Primary goals of the air cargo industry will be rooted in efficiency measures.

Chapter 3: Inventory of MAFC Air Cargo Facilities

This chapter provides an inventory of the air cargo facilities in the 10-state MAFC region. The inventory includes airports, air cargo screening facilities, and foreign trade zones.

Airports

This scope this report includes every airport, private and public, eligible for Airport Improvement Program (AIP) funding through the Federal Aviation Administration (FAA) within the 10-state MAFC region. The FAA considers all “public-use airports” eligible for AIP funding. The FAA defines a “public-use airport” as an airport which must be “publicly owned, or privately owned but designated by FAA as a reliever, or privately owned but having scheduled service at least 2,500 annual enplanements.”¹³ Airports eligible for AIP funding are included in a biennial *National Plan of Integrated Airport Systems* (NPIAS). The most recent NPIAS covers the time period 2011 through 2015, and was published in October 2010 by the FAA¹⁴.

MAFC Region Airports

Airports included in the NPIAS are classified as commercial service, reliever, or general aviation airports. Commercial service airports are defined as any airport with schedule passenger service with 2,500 or more enplaned passengers per year. Commercial service airports are further classified as large hub, medium hub, small hub, and non-hub airports, based on the number of annual passenger enplanements. Reliever airports are specialized high-capacity airports typically located in major metropolitan areas that serve general aviation access. General aviation airports are smaller airports that do not meet the criteria for commercial or reliever classification. Table 5 shows the total number of commercial, reliever, and general aviation airports in the MAFC states.

Table 5: MAFC-Region Airports by NPIAS Classification

State Name	Commercial	Reliever	General Aviation	Total
Illinois	10	9	66	85
Indiana	5	7	53	65
Iowa	8	1	69	78
Kansas	7	4	68	79
Kentucky	4	1	50	55
Michigan	16	9	70	95
Minnesota	9	7	81	97
Missouri	6	6	63	75
Ohio	7	12	81	100
Wisconsin	8	6	74	88
Total MAFC	80	62	675	817

Source: FAA National Plan of Integrated Airport Systems, 2011-2015

¹³ “Overview: What is AIP?” Federal Aviation Administration. URL: <http://www.faa.gov/airports/aip/> Accessed 7 January 2010.

¹⁴ National Plan of Integrated Airport Systems 2011-2015. Federal Aviation Administration. URL: http://www.faa.gov/airports/planning_capacity/npias/reports/

There are a total of 817 airports in the MAFC region that are included in the NPIAS. This figure does not include heliports or seaplane bases, and there are other airports such as military airports or other non-public use airports. Of these 817 airports, 675 (82.6 percent) are classified as general aviation airports. Figure 8 shows a map of the airports in the MAFC region by classification and whether air cargo activity was recorded at the airport in 2010. Airport-level air cargo activity will be discussed in greater detail in Chapter 4 of this report.

Airport coverage is extensive throughout the MAFC region. Southwest Minnesota, the Iowa-Illinois-Missouri tri-state region, and southern Missouri are areas with limited coverage in terms of commercial service or reliever airports. It is important to note, though, that the strong intermodal connectivity throughout the MAFC region leaves few geographic areas detached from the extensive reach of air cargo service areas.

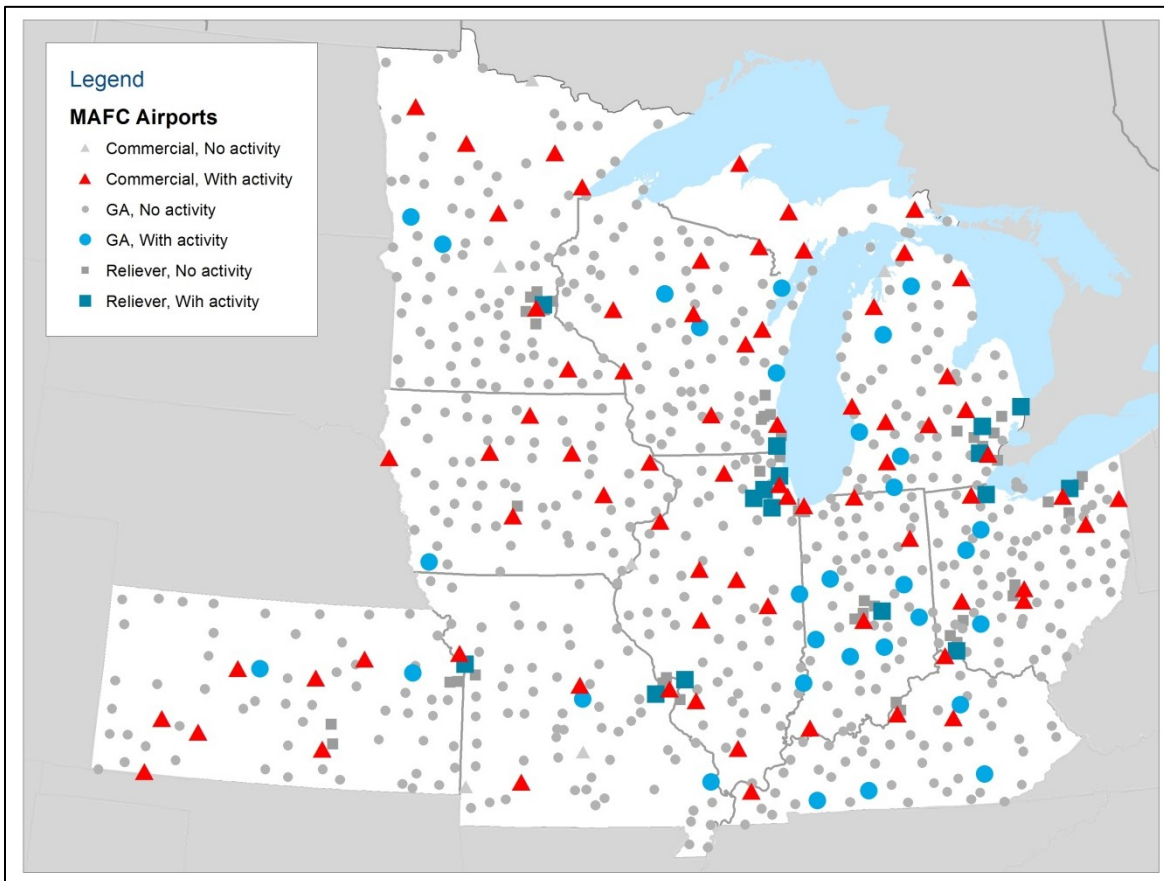


Figure 8: MAFC Airports Facilities Inventory by NPIAS Classification and Activity Status

MAFC Region Air Cargo Hubs

Several airports located within the MAFC region are critical for U.S. and international air cargo industry operations. Major express cargo airline hubs exist in Louisville, Kentucky for UPS and Indianapolis, Indiana for FedEx.

The global hub for UPS Airlines is located on the grounds of Louisville International Airport (SDF). Known as the UPS “Worldport,” the Louisville facility is the largest fully-automated package handling facility in the world. The Worldport was opened in 2002 with a sort capacity of 304,000 packages per hour and expanded in 2010 to its current sort capacity of 416,000 packages per hour. Current operations include more than 130 aircraft turns and processing an average of 1.6

million packages each day¹⁵. UPS also operates a secondary or regional hub facility at Chicago Rockford International Airport in Rockford, Illinois (RFD).

The FedEx Express hub in Indianapolis (IND) is the second-largest airport hub in the company. The Indianapolis hub opened in 1988 and currently has more than 650 flights per month. More than 4,000 employees support the operations with an average of 50,000 packages daily¹⁶.

Cincinnati-Northern Kentucky International Airport (CVG) is a hub for ABX Air. In addition to these express cargo airline hubs, airports such as Chicago O'Hare International, Detroit Wayne County International, and Minneapolis/St. Paul International are major hubs for passenger airlines. Chicago O'Hare in particular is also a major destination for international all-cargo flights from Asia and Europe. Major regional airports such as Milwaukee General Mitchell International and Des Moines International also have substantial air cargo operations.

A Note about Memphis

The research team ultimately decided to largely exclude Tennessee's Memphis International Airport (MEM) from our analysis for several reasons. While the importance of MEM within the context of American and international air cargo is well-documented throughout the industry, the objective of this study centers on the 10-state MAFC region. As such, it is important to focus on the unique role the 130 MAFC airports with cargo activity play throughout the industry. Including MEM expands the research objectives to something far greater than a regional study. The research team recognizes that air cargo defies traditional boundaries. Limits, however, had to be taken in order to refine the direction of research.

The data surrounding MEM air cargo operations speak to its central role in the industry. With over 4 million tons of cargo moving through the airport's cargo facilities, MEM was the 2nd busiest air cargo airport in the world behind only Hong Kong International. MEM is also home to the world headquarters for FedEx's air cargo operations. Immense amounts of FedEx packages comprise the bulk of MEM's annual tonnage statistics. There are 180 unique airports that MEM received shipments from in 2010. MEM shipped air cargo to 209 unique airports. The combination of possible airport segments that air cargo can travel on via MEM makes the airport a true global facility. MEM becomes a critical global link to smaller airports within the MAFC, providing connections to all points throughout the world. Many airports in the MAFC have significant amounts of their air cargo activity being sent to MEM as feeder flights. Goods are then sorted and shipped to their final destinations from the Memphis facility.

Undoubtedly, the capture area of MEM encroaches upon the confines of the MAFC. However, given the nuances of the industry and the unique qualities of every air cargo facility, it is important to focus on the entirety of the system. The MAFC plays a far greater role in air cargo that better reveals itself when MEM is not dominating the attention of analysis. However, it is important for decision-makers to keep the presence of MEM throughout MAFC air cargo in their considerations about local air cargo issues. When applicable, MEM's relationship within the air cargo dynamics of the MAFC will be highlighted throughout the report. The bulk of attention, however, will be given to the facilities located within the 10-state boundary of the MAFC.

Air Cargo Screening Facilities

Chapter 2 discussed the issues related to air cargo security and the use of Independent Air Cargo Screening Facilities (ICIFs) and Indirect Air Carriers (IACs) in support of air cargo security. The physical location of these ICSFs and IACs is a natural indicator of where prominent origin-based air cargo markets reside. Table 6 shows ICSF locations and Table 7 shows IAC locations. As shown, the majority of ICSFs and IACs serve a limited number of airports that account for the bulk

¹⁵ <http://www.pressroom.ups.com/Fact+Sheets/UPS+Worldport+Facts>

¹⁶ <http://news.van.fedex.com/files/FedEx%20Express%20Hub%20in%20Indianapolis.pdf>

of MAFC air cargo activity. Chicago O'Hare International Airport (ORD) is the prominent magnet for these FAA-approved operations. Airports including Detroit, Minneapolis/St. Paul, and Cleveland, and Cincinnati, among others, are also attracting air cargo security operations. Interestingly, while Louisville International Airport (SDF) is the most dominant air cargo airport in the MAFC region, only four ICSFs and no IACs serve the needs of the airport. SDF serves as the hub of global operations for UPS. Comparatively little freight originates or terminates within the Louisville region, as non-100 percent screened all-cargo flights dominate the airspace.

Table 6: Independent Cargo Screening Facility Locations in MAFC Region

Airport	Facility Name	Location
Chicago O'Hare International	Beaver Packaging & Crating of IL, Inc.	Bensenville, IL
	Global CFS, Inc.	Bensenville, IL
	Transtar International, Inc.	Elk Grove Village, IL
	R&M Freight DBA R&M Trucking	Franklin Park, IL
	Satellite Air-Land Motor Service, Inc.	Wood Dale, IL
Cuyahoga County	Philips Medical Systems Cleveland, Inc.	Highland Heights, OH
Detroit Metro Wayne County	Accurate Expediting, Inc.	Romulus, MI
	Beaver Logistics Services, Inc.	Taylor, MI
Minneapolis-St. Paul	Axis Global Logistics	Bloomington, MN
Data Source: Directory of Certified Cargo Screening Program Independent Cargo Screening Facilities, TSA URL: http://www.tsa.gov/what_we_do/layers/aircargo/certified_screening.shtm		

Freight forwarder screening locations listed in Table 7 reveal that certain municipalities have approached critical mass in attracting screening location businesses. While proximity to airport facilities is the main driver in the locations of freight forwarder screening locations, other factors are also important. Local communities may choose to provide incentives to industrial operations. For example, municipalities located within Cook County have the advantage of offering tax abatements, like the Class 6B Abatement, that encourage the development of industrial businesses within the county¹⁷. Other communities rely upon other development tactics. DuPage County's Wood Dale reaps the benefits of a Thorndale Corridor Master Plan that outlines the connection of the corridor to ORD's South Cargo area, as well as newfound access to the airport from the West, a move to "significantly change the business environment for the communities located between York Road and I-290/Illinois Route 53."¹⁸ This implementation of the master plan legitimizes the often-overlooked ramifications of a solid airport master plan. Regardless, strategies exist for communities to strategize potential air cargo developments.

¹⁷ "Class 6B Eligibility Bulletin," Development Incentives Department of the Office of the Cook County Assessor, 5 May 2009.

¹⁸ Thorndale Corridor Master Plan: Wood Dale, Illinois: Final Draft for Council/Commission Review, The Lakota Group, S.B. Friedman & Company, TranSystems, June 2009.

As the MAFC air cargo market either diversifies into other metropolitan areas or densifies in the handful of existing large origin-destination markets (non-hub operations), IFSCs and IACs will likely follow. Airports with heavy air cargo use not already attracting cargo screening facilities are strong candidates to experience an establishment of market presence. Such a presence may result in additional local truck traffic around airport facilities.

Table 7: Freight Forwarder Screening Facility Locations in MAFC Region

Airport	Location	Number
Chicago O'Hare International	Addison, IL	1
	Bensenville, IL	8
	Des Plaines, IL	4
	Elk Grove Village, IL	19
	Elmhurst, IL	1
	Franklin Park, IL	1
	Itasca, IL	7
	Mount Prospect, IL	1
	Roselle, IL	2
	Schiller Park, IL	1
	Wood Dale, IL	10
Cincinnati/Northern KY International	Erlanger, KY	2
	Hebron, KY	2
Cleveland-Hopkins International	Berea, OH	1
	Brookpark, OH	1
	Middleburg Heights, OH	3
Dayton International	Vandalia, OH	1
Detroit Metro Wayne County	Romulus, MI	4
	Van Buren Township, MI	1
Indianapolis International	Indianapolis, IN	2
	Plainfield, IN	1
Kansas City International	Kansas City, MO	2
Lambert-St Louis International	Hazelwood, MO	1
	St. Louis, MO	1
Minneapolis-St. Paul International	Eagan, MN	4
Data Source: Directory of Certified Cargo Screening Program Freight Forwarder Facilities, TSA URL: http://www.tsa.gov/what_we_do/layers/aircargo/certified_screening.shtm		

Foreign Trade Zones

Foreign Trade Zone 101

Foreign Trade Zones (FTZs) are foreign trade tools utilized by local governments offering flexibility and incentives for local and national businesses to locate international trade operations and goods storage in their communities. FTZs offer delayed duty payments on imported goods and opportunities for duty exemptions on certain exports. FTZs also importantly streamline the lengthy customs process that can delay shipments. Goods scheduled for foreign and domestic export but held within FTZ facilities are exempt from any state and local inventory taxes. There are significant economic and logistical benefits for businesses to consider in their utilization of FTZ facilities. Further trade flexibility is gained with the implementation of FTZ subzones. Subzones are typically reserved for specific, single-company use. This allows flexibility for larger businesses to utilize existing facilities, streamlining their international trade operations.

These incentives are particularly suited for traditional air cargo commodities. An analysis of existing subzones within the MAFC reveals significant subzone utilization by companies producing core goods demanding air cargo services. Table 8 displays a sampling of subzones in the MAFC. Note the focus on automotive and pharmaceutical companies. Many subzones, however, involve oil refining companies, retailers, and other manufacturing companies.

Table 8: Sampling of MAFC FTZ Subzones

Subzone	FTZ No.	Zone	CBP Port of Entry	State
Ford	22	Chicago	Chicago	IL
DaimlerChrysler	31	Granite City	St. Louis	IL
Eli Lilly	72	Indianapolis	Indianapolis	IN
Toyota Motor Manufacturing	177	Evansville	Evansville	IN
Pfizer Inc	177	Evansville	Evansville	IN
Deere & Company	133	Quad Cities	Quad-Cities	IL
Deere & Company	175	Cedar Rapids	Des Moines	IA
Bayer Health Care group	17	Kansas City	Kansas City	KS
Mazda	70	Detroit	Detroit	MI
GM	70	Detroit	Detroit	MI

Source: U.S.-Foreign Trade Zones Board, URL: <http://ia.ita.doc.gov/ftzpage/letters/ftzlist-map.html>

FTZs are frequently used to advocate for the freight logistics merits of a community. In some cases, local and state officials advocate for the implementation of an FTZ as a critical component of an air cargo initiative. This is best represented in Missouri’s continual efforts to secure frequent and consistent air cargo activity with China at STL in St. Louis. After changes in FTZ regulations loosened limits of zone boundaries to include entire counties, the door has widened for major metropolitan areas to apply for vast swaths of land to become FTZ-eligible. This is exactly what happened in 2011 in St. Louis, when Mayor Francis Slay and County Executive Charlie Dooley successfully expanded what was an 800 acre FTZ surrounding Lambert-St. Louis International Airport to include the entirety of St. Louis County¹⁹. Traditional perceptions of FTZ boundaries have recently been transformed with similar FTZ expansions like the one in Louisville, which now encompasses six counties. While FTZs are expanding to include entire metropolitan areas,

¹⁹ Logan, Tim. 5 October 2011. “Region bids to boost foreign trade zone.” *St. Louis Post-Dispatch*. Newspaper.

potentially dampening the regional benefits of FTZs through their ubiquity, they are still potent tools for smaller metropolitan areas. Wisconsin's Dane County successfully implemented a FTZ in south central Wisconsin that unlocks over 500 acres throughout the region that stretches into eight eligible counties. In a moderately populated, well-positioned region like south central Wisconsin that straddles the major metropolitan areas of Minneapolis-St. Paul, Milwaukee, and Chicago, an FTZ adds competitive qualities to an area that otherwise might have been overlooked by large companies.

FTZ Inventory

FTZs must be located within 60 statute miles or a 90-minute drive of a Customs and Border Protection (CBP) Port of Entry. This limits the geographic extent in which FTZs can be implemented to appropriate mileage radii around the 47 CBP ports of entry within the MAFC.

There are a total of 48 FTZs located within the MAFC. Table 9 displays an inventory of the 48 FTZs located in the MAFC. Ohio has 10 FTZs, the most of any state in the MAFC. Kansas has two FTZs, the fewest in the MAFC. FTZ No. 161 in Sedgwick County and affiliated with the Wichita CBP, however, represents the power of FTZs in accommodating air cargo commodities. Hospira, Inc., one of the world's largest pharmaceutical companies, operates a subzone within the FTZ. Wichita-based Hawker Beechcraft aircraft company operates another subzone with the Sedgwick County FTZ.

There are a total of 156 subzones serving 116 different companies within the MAFC. The Detroit FTZ, FTZ No. 70, has the most subzones in the MAFC with 19. Sixteen of these subzones serve automotive companies. 2 serve pharmaceutical or chemical companies. FTZs are particularly suited for centers of manufacturing like Detroit. By concentrating the bulk of the benefits within the exportation of goods, FTZs offer a competitive advantage to locating business operations within America as opposed to internationally where goods might be subject to foreign duties and tariffs. The Detroit FTZ is a prime example of the logical implementation of FTZs within the MAFC.

There are a total of 47 CBP ports of entry serving the MAFC. 32 of these ports of entry are located within, directly adjacent to, or near airports. It is difficult to outline specific boundaries for FTZs, as their lines typically morph and expand throughout their life. For example, the Minneapolis-St. Paul FTZ, No. 119, began as a 300 acre parcel and has grown to encompass over 4,000 scattered acres.²⁰ It is clear that a significant degree of flexibility is allowed, as determined by the granting authority of the application process and the Foreign-Trade Zones Board of U.S. Customs and Border Protection.

²⁰ Sullivan, Elizabeth. 2000. "Foreign Trade Zones: Profitable Port to Market." *Plants, Sites and Parks* 27(6):99-104.

Table 9: Inventory of FTZs Located in the MAFC Region

FTZ. No.	Zone	CBP Port of Entry	State
107	Polk County	Des Moines	IA
133	Quad Cities, Iowa/Illinois	Quad-Cities	IA
175	Cedar Rapids	Des Moines	IA
22	Chicago	Chicago	IL
31	Granite City	St. Louis	IL
114	Peoria	Peoria	IL
133	Quad Cities, Iowa/Illinois	Quad-Cities	IL
146	Lawrence County	Evansville	IL
176	Rockford	Rockford	IL
245	Decatur	Peoria	IL
271	Jo-Daviess & Carroll Counties	Davenport, IA/Moline & Rock Island, IL	IL
72	Indianapolis	Indianapolis	IN
125	South Bend	Chicago	IN
152	Burns Harbor	Chicago	IN
170	Clark County	Louisville	IN
177	Evansville	Evansville	IN
182	Fort Wayne	Fort Wayne	IN
17	Kansas City	Kansas City	KS
161	Sedgwick County	Wichita	KS
29	Louisville	Louisville	KY
47	Boon County	Cincinnati	KY
278	Greenup & Boyd Counties	Charleston	KY
16	Sault Ste. Marie	Sault St. Marie	MI
43	Battle Creek	Battle Creek	MI
70	Detroit	Detroit	MI
140	Flint	Saginaw/Bay City/Flint	MI
189	Kent/Ottawa/Muskegon Counties	Grand Rapids	MI
210	St. Clair County	Port Huron	MI
275	Lansing	Lansing	MI
51	Duluth	Duluth	MN
119	Minneapolis-St Paul	Minneapolis	MN
259	Koochiching County	International Falls	MN
15	Kansas City	Kansas City	MO
102	St. Louis	St. Louis	MO
225	Springfield	Springfield	MO
8	Toledo	Toledo-Sandusky	OH
40	Cleveland	Cleveland	OH
46	Cincinnati	Cincinnati	OH
100	Dayton	Dayton	OH
101	Clinton County	Dayton	OH
138	Franklin County	Columbus	OH
151	Findlay	Toledo-Sandusky	OH
181	Akron/Canton	Cleveland	OH
264	Washington County	Charleston	OH
270	Lawrence County	Charleston	OH
41	Milwaukee	Milwaukee	WI
167	Brown County	Green Bay	WI
266	Dane County	Milwaukee	WI

U.S.-Foreign Trade Zones Board, URL: <http://ia.ita.doc.gov/ftzpage/letters/ftzlist-map.html>

Visualizing MAFC FTZs

The following maps visualize the siting potential for FTZs throughout the MAFC within the context of CBP ports of entry and required maximum distances of 60 statute miles and 90-minute drive times from ports of entry. Important points of the displayed maps are outlined below.

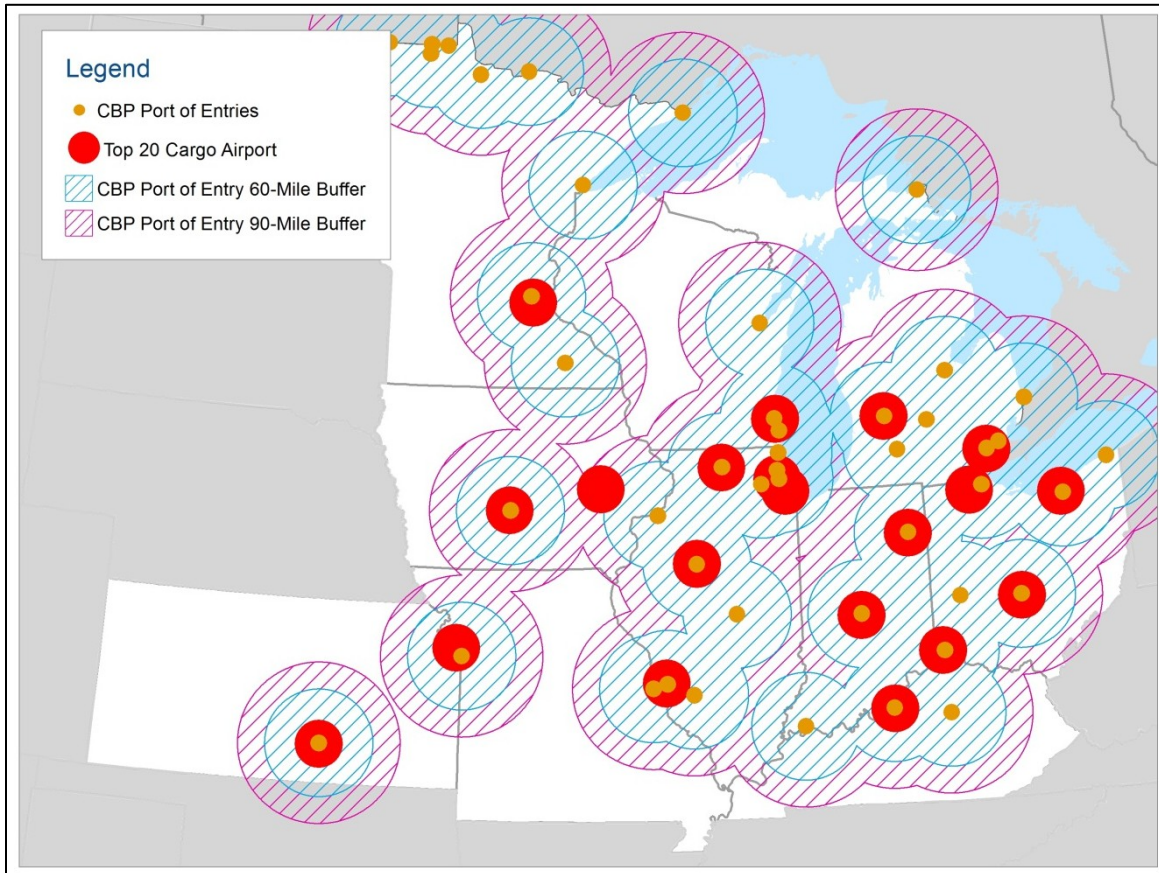


Figure 9: FTZ and CBP Contexts of the Top 20 Cargo Airports by Tonnage

Figure 9 shows that all but one of the top 20 cargo airports in the MAFC have an adjacent CBP port of entry. This airport, CID in Iowa's Cedar Rapids, however, is included within the city's FTZ No. 175. As such, all of the top 20 air cargo airports are affiliated with FTZs.

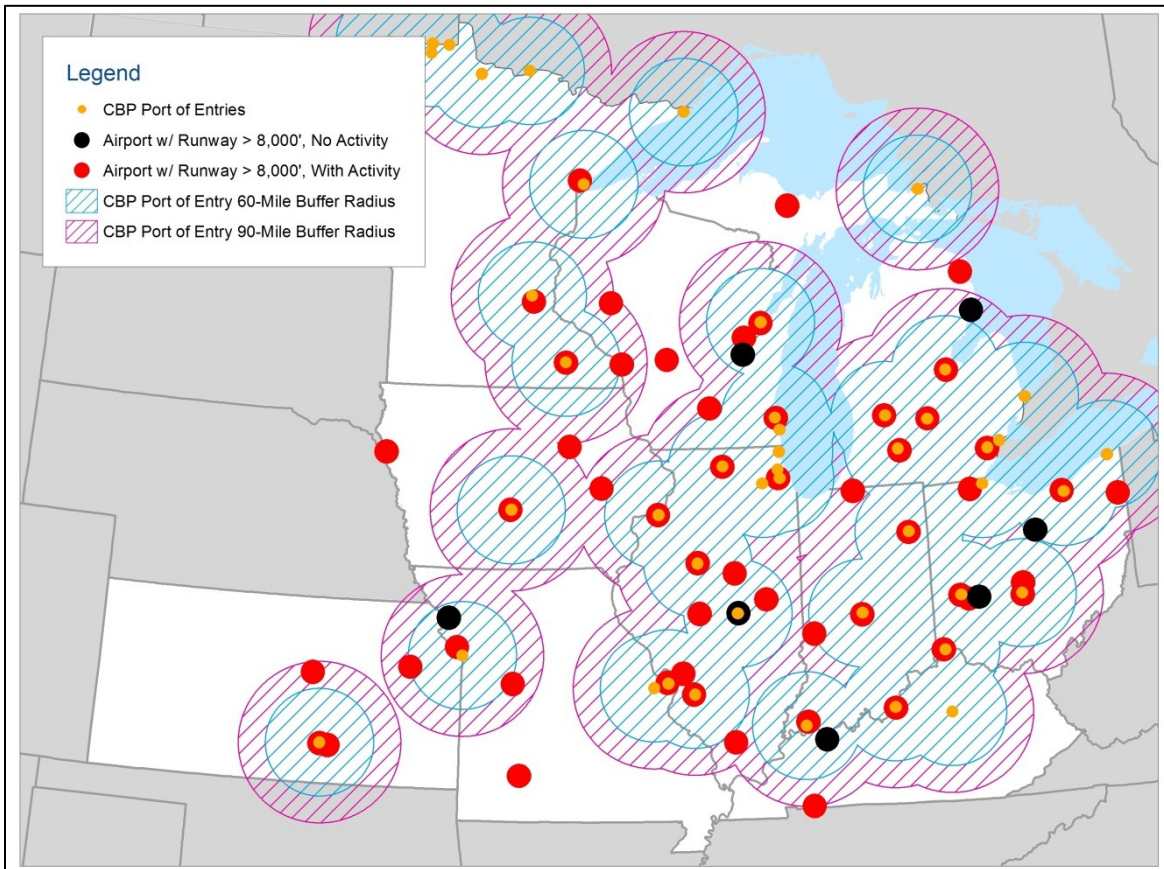


Figure 10: FTZ and CBP Contexts of Airports with Runways Greater than 8,000'

Airports with runways 8,000 feet and longer are considered to have the most potential in accommodating the greatest variety of air cargo and air cargo planes. The above graphic displays that the majority of runways longer than 8,000 feet are already handling air cargo activity and that most of the airports with 8,000' or greater runways are eligible to be sited within a FTZ. Interestingly, one airport, DEC in Decatur, hosts a CBP port of entry on airport grounds but did not record air cargo activity in 2010.

Much of the MAFC land coverage is eligible to be declared a FTZ. The eastern half of the MAFC suggests over 90 percent of its land is eligible to be approved as a FTZ. It is in the rural areas of Minnesota, Missouri, Iowa, Wisconsin, and Kansas where the implementation of FTZs within a community's economic development portfolio is likely not an option. For the vast majority of communities, however, FTZs are a real policy option to consider in bolstering the viability of air cargo operations and international trade if not done so already. With the increased flexibility in FTZ boundaries, it is likely options exist for communities to provide themselves and their businesses with the economic benefits FTZs offer in conjunction with air cargo facilities.

Chapter 4: MAFC Air Cargo Activity – Weight

This chapter provides an analysis of the air cargo activity in the 10-state MAFC region with a focus on the weight of air cargo that is handled by airports in the region. All data analyzed in this chapter is culled from the “Air Carrier Statistics” database, published by the U.S. Department of Transportation’s Bureau of Transportation Statistics (BTS), Office of Airline Information (OAI). This database, also known as the T-100 data bank, reports data on the number of passengers and total weight of freight and mail transported by large certified air carriers with annual operating revenues of \$20 million or more²¹. Because this data set represents a 100 percent census of all air carrier flights (i.e. it is not derived from random samples or surveys), it is the most accurate and reliable publicly-available data set on air cargo activity by weight. The geographic scope of the analysis presented in this chapter includes the entire MAFC region, state-level analysis, airport-level analysis, and analysis of individual airport pairs.

The scope of the T-100 data includes “non-stop segment” and “on-flight market” data. Non-stop Segment data refers to every revenue flight between two points and the number of passengers, freight, and mail carried on these flights, including diversions and emergency landings. On-flight Market data are the number of passengers, freight, and mail carried between two points regardless of the number of stops made by the aircraft. Markets are defined by a flight number, that is to say, if the flight number assigned to a particular aircraft changes, a new market will begin. The On-flight Market data are primarily presented in this chapter because it provides a slightly more accurate picture of air cargo activity attributed to a geographic region (i.e. state or airport).

Region-Wide Analysis

Table 10 shows the total air cargo activity in the 10-state MAFC region for the calendar year 2010. In 2010, a total of 7,002,396 tons of air cargo (freight plus mail) were enplaned or landed at airports in the MAFC region. This amount represented approximately 23 percent of the total amount of air cargo enplaned or landed at all U.S. airports in 2010.

Table 10: Total Air Cargo Activity in MAFC Region, 2010

	MAFC Region (Tons)	Total U.S. (Tons)	MAFC Share of U.S. Total
Enplaned Freight	3,347,559	14,071,570	23.8%
Enplaned Mail	102,559	543,355	18.9%
<i>Total Enplaned Air Cargo</i>	<i>3,450,118</i>	<i>14,614,925</i>	<i>23.6%</i>
Landed Freight	3,475,031	15,181,535	22.9%
Landed Mail	77,248	479,907	16.1%
<i>Total Landed Air Cargo</i>	<i>3,552,279</i>	<i>15,661,443</i>	<i>22.7%</i>
<i>Total Mail</i>	<i>179,807</i>	<i>1,023,262</i>	<i>17.6%</i>
Total Air Cargo Activity	7,002,396	30,276,367	23.1%
Percent Enplaned	49.3%	48.3%	
Percent Mail	2.6%	3.4%	
Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data			

²¹ Bureau of Transportation Statistics, Office of Airline Information. “T-100 Traffic Reporting Guide.” U.S. Department of Transportation, January 2010. URL: http://www.bts.gov/programs/airline_information/traffic_reporting_guide/2010/

Of the total air cargo activity in the MAFC region, a slightly greater amount of cargo was landed (i.e. had a destination at an MAFC airport) than was enplaned (i.e. originated at an MAFC airport).

The total air cargo tonnage is divided into two components: mail, which is defined as all mail for which transportation by air is provided, including U.S. and foreign mail; and freight, which is defined as all property other than mail and passenger baggage that is transported by air²². On a tonnage basis, mail represents 179,807 tons, or approximately 2.6 percent, of all air cargo activity in the MAFC region. Mail represented approximately 3.4 percent of all U.S. air cargo activity by weight in 2010. Due to mail comprising such a minor amount of total air cargo activity in the MAFC region and the U.S. as a whole, the remainder of this chapter will report on air cargo activity as the total of freight plus mail tonnage without regard to the variation in the amount of mail that might be evident in particular geographic levels.

Figure 11 shows the total air cargo tonnage activity in the 10-state MAFC region and the percentage of all U.S. air cargo activity attributed to MAFC states for the period between 1990 and 2010. In the period between 1990 and 2010, total air cargo tonnage activity in the 10-state MAFC region grew from 1.76 million tons in 1990 to more than 7 million tons in 2010, or more than 7.3 percent annually. The percentage of all U.S. air cargo activity attributed to MAFC states grew from approximately 16 percent in the years between 1990 and 2000 to approximately 23 percent from 2000 to 2010. This growth corresponds roughly with the opening of major air cargo hubs at several airports in the MAFC region around 2000.

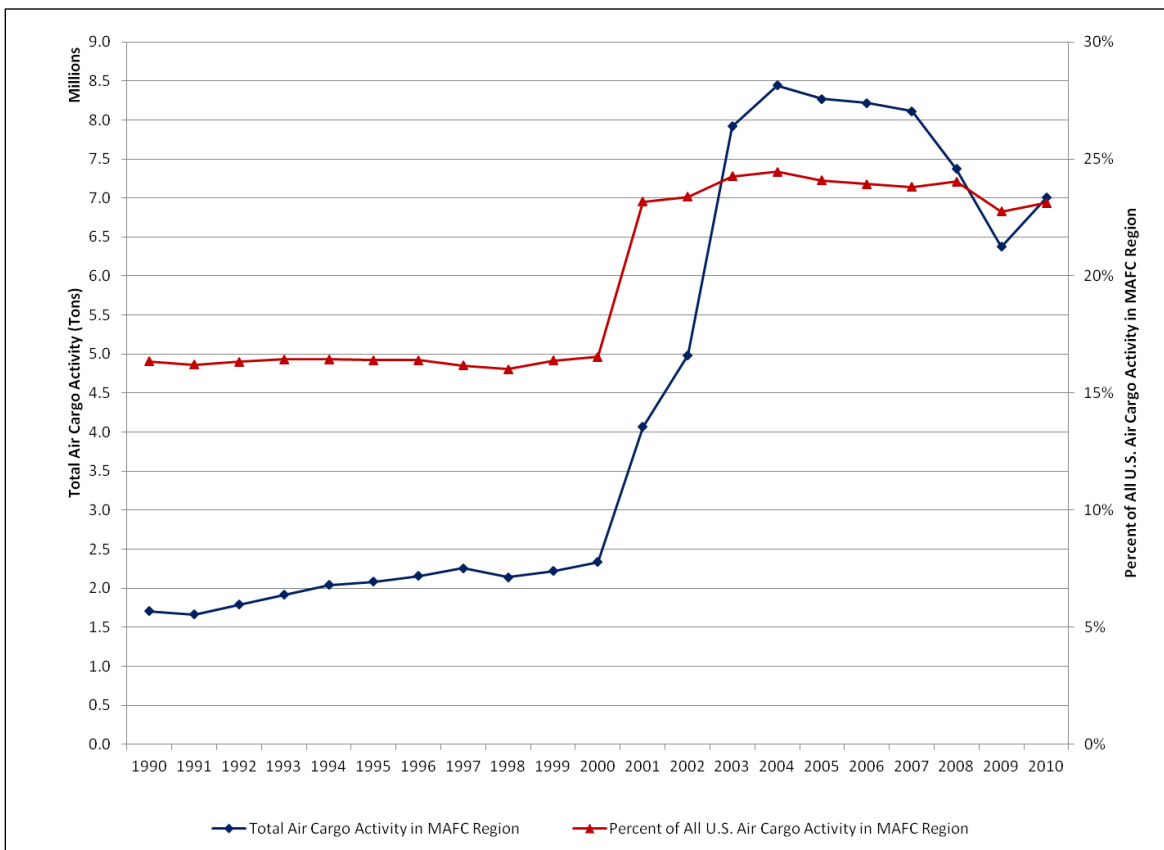


Figure 11: Trends in Air Cargo Activity in MAFC Region, 1990-2010

Examining the trends presented in Figure 11, it is apparent that the past two decades of air cargo in the MAFC region can be divided into five periods, as follows:

²² See supra note 21.

- 1990 to 2000, characterized by steady growth, with between 1.5 and 2.5 million tons of air cargo activity in the MAFC annually and the 10 states accounting for roughly 16 percent of all U.S. air cargo activity.
- 2000 to 2004, characterized by rapid growth in air cargo activity from 2.3 million tons in 2000 to a peak of 8.4 million tons in 2004, and a growth in the MAFC share of U.S. air cargo activity from 16 to 23 percent. Growth generally attributed to the establishment of new air cargo hubs at several airports in the MAFC region.
- 2004 to 2007, characterized by a slight decline from the 2004 peak of 8.4 million tons to 8.1 million tons in 2007. Decline attributed to market correction (i.e. maturing demand and exiting of marginal express carriers from the market).
- 2007 to 2009, characterized by a more rapid decline from 8.1 million tons in 2007 to 6.4 million tons in 2009. This decline corresponded to the U.S. and global economic recession, which resulted in lower volumes and the closing or contraction of several air cargo operations in the MAFC region.
- 2009 to 2010, characterized by a slight increase in air cargo activity from 6.4 million tons in 2009 to 7.0 million tons in 2010. Increase could be attributed to an overall improvement in the economy as it emerges from the recession.

State-Level Analysis

Table 11 shows the total air cargo activity for each of the 10 states in the MAFC region for the year 2010 and the share of the total activity accounted for by each state. For 2010, more than 2.8 million tons of air cargo (approximately 40 percent of all MAFC region activity) were enplaned or landed in the state of Kentucky. Kentucky is home to Louisville International Airport, which is the main global hub and processing center for UPS Airlines.

Table 11: Air Cargo Activity in MAFC States, 2010

State Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)	MAFC Share
Kentucky	1,432,657	1,370,455	2,803,112	40.0%
Illinois	791,565	957,976	1,749,541	25.0%
Indiana	546,405	509,747	1,056,153	15.1%
Ohio	203,091	191,379	394,470	5.6%
Michigan	123,702	161,248	284,950	4.1%
Minnesota	124,860	131,251	256,111	3.7%
Missouri	100,436	102,037	202,473	2.9%
Wisconsin	57,300	58,533	115,834	1.7%
Iowa	58,401	52,341	110,742	1.6%
Kansas	11,700	17,311	29,011	0.4%
Total MAFC	3,450,118	3,552,279	7,002,396	100.0%

Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data

The second-largest state in the MAFC in terms of air cargo activity in 2010 was Illinois, which had approximately 1.75 million tons of air cargo enplaned or landed, representing approximately 25 percent of the MAFC totals. Illinois is home to a major hub for international cargo flights (Chicago – O’Hare International Airport) as well as a secondary hub for UPS Airlines (Chicago – Rockford International Airport). The third-largest state in terms of air cargo activity in the MAFC in 2010 was Indiana, which had approximately 1.1 million tons of air cargo enplaned or landed, representing approximately 15 percent of the MAFC totals. Indiana is home to a regional hub for FedEx Airlines at Indianapolis International Airport. Collectively, the top three states (Kentucky, Illinois, and Indiana) account for more than 80 percent of all air cargo activity in the MAFC region. Kentucky, Indiana, and Ohio have a higher amount of enplaned air cargo while Illinois and Michigan have a higher amount of landed air cargo.

Table 12 complements the region-wide growth analysis presented in Figure 11, reporting the annual growth in air cargo activity by state between 1990 and 2010 and also for the five periods of activity within that 20-year period as previously described. Between 1990 and 2010, air cargo activity in the 10-state MAFC region grew more than 7.3 percent annually. Growth was highest in the states of Indiana and Kentucky, approximately 18 percent annually, due to the presence of air cargo hub airports in those states. Between 2000 and 2004, each of the 10 states experienced growth in air cargo activity ranging from 10 percent to more than 100 percent annual growth. Industry contraction and the recent economic recession resulted in declines in air cargo activity between 2004 and 2009. However, air cargo activity levels increased nearly 10 percent between 2009 and 2010, signaling a possible recovery for air cargo demand. The largest growth among the 10 states between 2009 and 2010 was in Wisconsin, which realized a 33 percent growth in air cargo activity during this time period. Ohio, and to a lesser extent, Iowa, were the two states that recorded a decline in air cargo activity between 2009 and 2010. Over the past two decades, air cargo activity in the MAFC region has grown (and also contracted, in the case of 2004-2009) faster than the air cargo activity of the U.S. as a whole.

Table 12: Annual Growth in Air Cargo Activity by State

State Name	1990-2010	1990-2000	2000-2004	2004-2007	2007-2009	2009-2010
Illinois	3.5%	3.2%	14.3%	2.0%	-15.2%	11.2%
Indiana	18.5%	6.7%	104.9%	1.0%	-9.9%	7.0%
Iowa	8.7%	-3.4%	74.2%	-0.9%	-7.6%	-2.1%
Kansas	5.4%	-3.5%	55.3%	-6.9%	-9.7%	6.1%
Kentucky	18.8%	10.7%	77.0%	-1.7%	0.6%	19.7%
Michigan	3.2%	3.9%	10.3%	-0.5%	-13.9%	16.9%
Minnesota	2.3%	0.9%	17.5%	-5.6%	-10.8%	11.6%
Missouri	0.5%	0.1%	16.1%	-6.8%	-12.7%	-2.7%
Ohio	5.4%	2.0%	71.6%	-5.6%	-32.2%	-29.8%
Wisconsin	6.2%	0.0%	37.4%	-2.3%	-13.2%	33.0%
Total MAFC	7.3%	3.2%	37.9%	-1.3%	-11.4%	9.9%
Total U.S.	5.5%	3.1%	25.1%	-0.4%	-9.3%	8.1%

Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data

Airport-Level Analysis

Table 13 reports the total air cargo activity for 2010 in the 10-state MAFC region by airport type and sub-type, as defined by the NPIAS classification system. Also shown in Table 13 is the total number of airports of each classification and the percentage share of the total activity attributed to each classification. In addition to the three NPIAS airports classifications (commercial, reliever, and general aviation), air cargo activity was reported for 5 military and 4 unclassified airports in the MAFC region. While these 9 airports are outside of the scope of this report, they are included here for the purposes of completeness and consistency with the state-level air cargo activity levels.

In 2010, a total of 130 airports reported some level of air cargo enplanement or landing activity. Of these, 75 (approximately 58 percent) were commercial airports. These 75 commercial airports accounted for 6,972,412 tons of air cargo activity in 2010, or approximately 99.6 percent of all activity in the MAFC region by weight. The largest share of activity within the commercial airports classification type was the small hub sub-type, which reported 2,637,947 tons of air cargo enplaned or landed in 2010. Louisville International Airport, home to the UPS Airlines hub, is classified as a “Commercial/Small Hub” airport. The “Commercial/Large Hub” sub-type reported the second-highest level of air cargo activity in 2010, with 1,987,408 tons of cargo processed.

Table 13: Air Cargo Activity in MAFC States by NPIAS Airport Classification, 2010

Airport Type/Sub-Type	Number of Airports	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)	Share
Commercial/Large Hub	4	884,666	1,102,742	1,987,408	28.4%
Commercial/Medium Hub	7	910,457	878,009	1,788,466	25.5%
Commercial/Small Hub	14	1,350,868	1,287,079	2,637,947	37.7%
Commercial/Non-Hub	37	238,052	213,281	451,333	6.4%
Commercial/Non-Primary	13	54,331	52,927	107,258	1.5%
Total Commercial	75	3,438,374	3,534,038	6,972,412	99.6%
Reliever	16	986	4,094	5,080	0.1%
General Aviation	30	135	181	316	<0.1%
Military	5	833	587	1,420	<0.1%
Unclassified	4	9,789	13,330	23,168	0.3%
Total All Sub-Types	130	3,450,118	3,552,279	7,002,396	100.0%
Note: Military and unclassified airports not included in the NPIAS airport classification system but are included in this table to ensure consistency with the state-level air cargo activity levels previously reported.					
Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data					

Air cargo activity was reported at 16 airports classified as “Reliever” airports, with total activity of 5,080 tons of air cargo in 2010. Notable among “Reliever” airports include Willow Run and Oakland County International airports in the Detroit, Michigan region, which accounted for more than 90 percent of the air cargo activity at reliever airports by weight. It is also noted that reliever airports had a high percentage of landed air cargo. This is likely due to the use of these airports by the manufacturing sector to support just-in-time assembly line operations, which occasionally require time-sensitive (typically overnight) shipments of parts to ensure continuous operations and avoid costly downtime. This type of activity would likely generate a high amount of landed air cargo, which is the case at these two airports (Willow Run and Oakland County).

Air cargo activity was reported at 30 airports classified as “General Aviation” airports, with total activity of 316 tons of air cargo in 2010. The split of enplaned and landed air cargo at general aviation airports was 181 tons landed (57.2 percent) and 135 tons enplaned (42.8 percent).

Table 14 shows the 20 airports in the 10-state MAFC region with the highest levels of air cargo activity in 2010. Collectively, the 20 airports listed in Table 14 reported a total of 6,851,264 tons of air cargo enplaned or landed in 2010, accounting for approximately 97.8 percent of the total air cargo activity in the MAFC region during 2010. Among the Top 20 airports reported in Table 14 include primary and regional hubs for express carriers (Louisville and Rockford for UPS Airlines, Indianapolis for FedEx Express) as well as larger passenger and cargo hubs such as Chicago – O’Hare International, Cincinnati/Northern Kentucky International, Minneapolis-St. Paul International, and Detroit Metro Wayne County.

Table 14: Top 20 Airports in MAFC Region for Air Cargo Activity, 2010

Rank	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)	Share
1	Louisville International	1,228,786	1,162,648	2,391,434	34.2%
2	Chicago O’Hare International	664,088	846,033	1,510,121	21.6%
3	Indianapolis International	528,308	491,452	1,019,760	14.6%
4	Cincinnati/Northern KY International	203,357	207,128	410,485	5.9%
5	Minneapolis-St. Paul International	120,162	126,135	246,297	3.5%
6	Detroit Metro Wayne County	87,173	117,647	204,820	2.9%
7	Toledo Express	99,997	90,046	190,042	2.7%
8	Chicago/Rockford International	88,789	69,588	158,378	2.3%
9	Rickenbacker International	53,936	52,275	106,211	1.5%
10	Kansas City International	47,576	47,853	95,429	1.4%
11	General Mitchell International	45,035	45,241	90,276	1.3%
12	Cleveland-Hopkins International	43,204	42,127	85,331	1.2%
13	Lambert-St Louis International	41,094	41,302	82,396	1.2%
14	Des Moines International	43,455	36,252	79,706	1.1%
15	Gerald Ford International	19,587	20,766	40,353	0.6%
16	The Eastern Iowa	14,943	16,068	31,011	0.4%
17	Greater Peoria Regional	15,076	15,031	30,106	0.4%
18	Wichita Mid-Continent	10,833	16,576	27,409	0.4%
19	Chicago Midway International	13,242	12,928	26,170	0.4%
20	Fort Wayne International	12,296	13,234	25,530	0.4%
Total Top 20 Airports		3,380,936	3,470,328	6,851,264	97.8%
Remaining 110 Airports		69,182	81,951	151,133	2.0%
Total All MAFC Airports		3,450,118	3,552,279	7,002,396	100.0%

Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data

Air Cargo Movement Patterns

The data analyzed in this chapter also allow for some insight into the movement patterns for air cargo in the MAFC region. Information from the BTS data includes details of the air carrier and also the origin and destination market for air cargo.

Airline Analysis

The BTS classifies each flight in its database into one of four “service class” categories based on whether the flight is operating based on a published flight schedule (“scheduled” or “non-scheduled”) and the aircraft’s configuration (“passenger/cargo” configuration or “all cargo” configuration). Table 15 reports the amount of air cargo activity to or from airports in the 10-state MAFC region for each of the four service class categories. A majority (more than 90 percent) of air cargo tonnage transported to or from airports in the MAFC region is handled on flights that operate according to a published schedule within an all cargo-configured aircraft. The largest share of air cargo activity is in the “Scheduled All Cargo” service classification, which transported more than 81 percent of all air cargo by weight in 2010. It is not surprising that this service class has the highest share of air cargo activity by weight as it includes most air cargo transported by express carriers and all-cargo airlines. Air cargo transported on “Scheduled Passenger/Cargo” flights accounted for slightly less than 10 percent of the total air cargo by weight in 2010. Interestingly, 11.5 percent of this cargo was classified as mail, indicative of the contracts held by passenger carriers to transport mail. Air cargo transported on “Non-Scheduled All Cargo Flights” accounted for approximately 8.8 percent of MAFC air cargo activity.

Table 15: Air Cargo Activity in MAFC States by Airline Service Class, 2010

Service Class	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)	Share	Percent Mail
Scheduled Passenger/Cargo	312,139	384,075	696,214	9.9%	11.5%
Scheduled All Cargo	2,870,689	2,818,883	5,689,572	81.3%	1.7%
Non-Scheduled Passenger/Cargo	1,001	1,084	2,084	0.0%	0.0%
Non-Scheduled All Cargo	266,288	348,238	614,526	8.8%	0.0%
Total All Service Classes	3,450,118	3,552,279	7,002,396	100.0%	2.6%
Percent Scheduled	92.3%	90.2%	91.2%		
Percent All Cargo	90.9%	89.2%	90.0%		
Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data					

Table 16 shows the total air cargo enplaned and number of departures for air cargo flights at MAFC airports in 2010. It is important to note that these data are based on the BTS T-100 *segment* data rather than the *market* data which has been analyzed in other parts of this chapter. Information on aircraft type and number of departures is not available from the market data because a single market could be comprised of many segments and served by several different types of aircraft²³. A majority of departures (91.4 percent) from MAFC airports transporting air cargo were twin-engine jet aircraft types, accounting for more than 1.6 million departures in 2010. However, the twin-engine jet aircraft type only accounted for slightly more than half of the total enplaned air cargo tonnage from MAFC airports in 2010. Slightly less than half (47.5 percent) of the total enplaned air cargo tonnage was carried by the three-engine or four to six-engine jet aircraft types, although these aircraft types accounted for less than 3 percent of all departures.

²³ While not relevant for this report, interested readers are directed to see supra note 21, Chapter 1 for more details on the differences between the BTS T-100 “Non-Stop Segment” and “On-Flight Market” data sets.

This suggests that larger aircraft are used for transporting heavy amounts of cargo on a relatively infrequent basis. This contrast is reflected in the average tons per departure by aircraft type, which was estimated at 1.12 tons per departure for the twin-engine aircraft type and approximately 37 tons per departure for the larger aircraft types. The piston or turbo-prop aircraft type accounted for 0.3 percent of all enplaned tons but 6.1 percent of departures, carrying an average of 0.11 tons (approximately 220 pounds) of air cargo per departure. The piston or turbo-prop aircraft typically operate as feeder services to smaller markets across the MAFC region and therefore the lower average weight per departure is not surprising.

Table 16: Aircraft Type of MAFC Air Cargo Flights, 2010

Aircraft Type	Total Enplaned (Tons)	Share (Tons)	Number of Departures	Share (Departures)	Tons per Departure
Piston or Turbo-Prop	12,361	0.3%	111,741	6.1%	0.11
Jet (2 Engines)	1,879,660	52.1%	1,681,096	91.4%	1.12
Jet (3 Engines)	1,063,407	29.5%	29,307	1.6%	36.29
Jet (4 or 6 Engines)	649,918	18.0%	17,175	0.9%	37.84
Total All Aircraft Types	3,605,346	100.0%	1,839,319	100.0%	1.96
Note: Only the number of departures with air cargo (freight or mail) included in this analysis.					
Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Segment Data					

Table 17 displays the top 20 air carriers serving the MAFC region in terms of total air cargo tonnage for the calendar year 2010. A total of 101 unique carriers reported transporting air cargo to or from airports in the MAFC region in 2010, with the 20 largest air carriers accounting for more than 90 percent of the total air cargo activity in the region. Express package and cargo airlines United Parcel Service (UPS) and Federal Express transported the most air cargo to or from airports in the MAFC region, accounting for more than two-thirds of all air cargo in 2010 by weight. UPS has the largest market share due to its major hub in Louisville, KY and regional hub in Rockford, IL. The remainder of the top 20 contains a mix of airlines including:

- Passenger airlines with a strong presence and hub operations at airports in the MAFC region (i.e. United, Delta, American, Southwest);
- All-cargo airlines which operate hubs or otherwise have a strong regional presence (i.e. ABX Air, Polar Air Cargo, Capital Cargo International, Southern Air); and
- International airlines, some of which maintain separate cargo operations in addition to passenger flights (i.e. Lufthansa, Korean Air, Cathay Pacific).

The types of carriers among the remaining 81 air carriers not shown in Table 17 include international passenger airlines transporting cargo in the belly of inter-continental flights, domestic passenger airlines with less presence within the MAFC, regional carriers that operate passenger flights as feeder to major hubs in the region, and regional cargo airlines that have smaller-scale operations (i.e. fleets, network structure) and carry smaller loads.

Table 17: Top 20 Air Carriers in MAFC Region for Air Cargo Activity, 2010

Rank	Air Carrier Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)	Share
1	United Parcel Service	1,515,526	1,421,970	2,937,496	41.9%
2	Federal Express	960,368	912,597	1,872,965	26.7%
3	United Air Lines	80,139	98,048	178,187	2.5%
4	ABX Air	84,241	72,473	156,715	2.2%
5	Polar Air Cargo Airways	55,363	77,811	133,174	1.9%
6	Capital Cargo International	64,676	61,672	126,348	1.8%
7	Delta Air Lines	51,376	73,969	125,345	1.8%
8	American Airlines	55,680	61,903	117,583	1.7%
9	Air Transport International	57,674	49,957	107,631	1.5%
10	Atlas Air	35,485	63,785	99,270	1.4%
11	Lufthansa German Airlines	37,768	42,663	80,431	1.1%
12	Korean Air Lines	26,210	46,250	72,460	1.0%
13	China Airlines	23,555	47,809	71,364	1.0%
14	Eva Airways	26,704	39,108	65,812	0.9%
15	Cathay Pacific Airways	27,912	37,471	65,383	0.9%
16	Nippon Cargo Airlines	25,793	24,814	50,607	0.7%
17	Southwest Airlines	21,673	24,459	46,131	0.7%
18	Air France	18,414	25,695	44,109	0.6%
19	Astar Air Cargo	25,175	18,024	43,199	0.6%
20	Southern Air	14,887	27,101	41,989	0.6%
Remaining 81 Air Carriers		241,498	324,700	566,199	8.1%
Total Top 20 Air Carriers		3,380,936	3,470,328	6,851,264	91.9%
Total All Air Carriers		3,450,118	3,552,279	7,002,396	100.0%
Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data					

Routes Analysis

Analysis of air cargo routes focuses on three geographic levels:

- Domestic air cargo routes between airports within the MAFC region;
- Domestic air cargo routes between airports within the MAFC region and airports in the U.S. outside the 10-state MAFC region; and
- International air cargo routes between airports with the MAFC region and non-U.S. locations.

Table 18 displays the top 20 within-MAFC air cargo routes by tonnage for 2010. A total of 645,284 tons of air cargo were transported between airports within the 10-state MAFC region in 2010,

encompassing 409 unique routes (i.e. airport market pairs). Of these 409 routes, the top 20 accounted for 453,136 tons, or approximately 70.2 percent, of all air cargo transported within the MAFC region. Among the top 20, 18 of the routes had one or both ends at one of the major express cargo airline hubs (Louisville, KY or Indianapolis, IN). The only two routes in the top 20 not associated with these hubs were routes connecting Cincinnati, OH with Toledo, OH and Chicago, IL, ranked number 14 and 19, respectively.

Table 18: Top 20 Intra-MAFC Air Cargo Routes, 2010

Rank	Route/Airport Pair	Total Activity (Tons)	Share
1	Louisville, KY – Minneapolis, MN	49,285	7.6%
2	Chicago, IL – Louisville, KY	44,797	6.9%
3	Chicago, IL – Indianapolis, IN	34,626	5.4%
4	Louisville, KY – Milwaukee, WI	26,163	4.1%
5	Cleveland, OH – Louisville, KY	26,093	4.0%
6	Indianapolis, IN – Minneapolis, MN	24,803	3.8%
7	Kansas City, MO – Louisville, KY	24,159	3.7%
8	Detroit, MI – Louisville, KY	24,059	3.7%
9	Louisville, KY – St. Louis, MO	23,006	3.6%
10	Columbus, OH – Louisville, KY	21,334	3.3%
11	Detroit, MI – Indianapolis, IN	20,153	3.1%
12	Lansing, MI – Louisville, KY	19,841	3.1%
13	Indianapolis, IN – St. Louis, MO	19,365	3.0%
14	Cincinnati, OH – Toledo, OH	16,202	2.5%
15	Cleveland, OH – Indianapolis, IN	15,206	2.4%
16	Louisville, KY – Peoria, IL	14,679	2.3%
17	Indianapolis, IN – Kansas City, MO	14,543	2.3%
18	Cedar Rapids/Iowa City, IA – Louisville, KY	12,394	1.9%
19	Chicago, IL – Cincinnati, OH	11,381	1.8%
20	Louisville, KY – Springfield, MO	11,048	1.7%
Total Top 20 Route/Airport Pairs		453,136	70.2%
Remaining 389 Route/Airport Pairs		192,147	29.8%
Total All Intra-MAFC Route/Airport Pairs		645,284	100.0%
Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data			

In 2010, a total of 4,222,621 tons of air cargo were transported between airports in the MAFC region and locations within the U.S. outside the MAFC region. Figure 12 displays the total air cargo activity between the MAFC and each region of the U.S. as well as the percentage share of the total attributed to each region. The regions shown in Figure 12 correspond with the FAA regions, with modifications to certain regions due to overlapping between the FAA region

boundaries and the 10 states in the MAFC region²⁴. The highest level of domestic air cargo activity was between the MAFC region and the Southern region, with 1,244,359 tons of air cargo transported between the two regions (approximately 30 percent of the domestic non-MAFC total). The second-highest level of domestic air cargo activity was the Western-Pacific region, with 777,533 tons of air cargo transported. The Eastern region (701,988 tons) and the Alaska region (495,860 tons) were third-highest and fourth-highest, respectively.

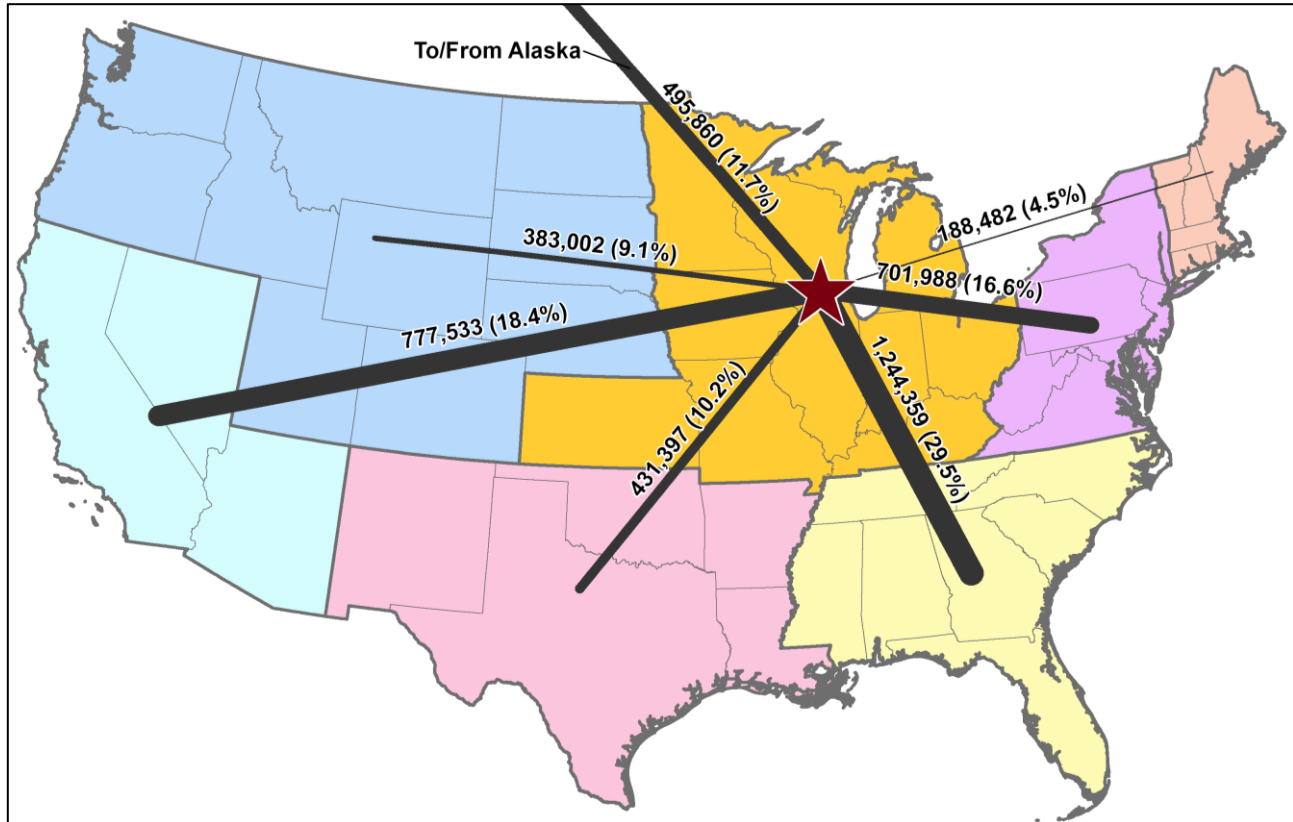


Figure 12: Domestic Air Cargo Activity to/from MAFC Region, 2010

Table 19 displays the top 20 domestic air cargo routes between MAFC airports and airports located in the U.S. outside the MAFC region. A total of 1,778 domestic route pairs reported air cargo activity in 2010, of which the top 20 accounted for 1,444,848 tons or approximately one-third of the total domestic (non-MAFC) air cargo activity. The top 20 routes displayed in Table 19 include the following:

- Major U.S. airports connecting to the UPS hub in Louisville, KY;
- Major airports within the MAFC connecting to the FedEx hub in Memphis, TN; and
- Four major cargo airports in the MAFC region (Louisville, KY; Cincinnati, OH; Chicago, IL; and Indianapolis, IN) connecting to Anchorage, AK.

It is noted that the Anchorage airport is a major hub for air cargo connecting between North America and Asia, thus it is not likely that all air cargo transported to or from Anchorage is being consumed by markets in Alaska.

²⁴ More information on the FAA region definitions can be found at: http://www.faa.gov/about/office_org/headquarters_offices/arc/

Table 19: Top 20 Domestic Air Cargo Routes to/from MAFC Airports, 2010

Rank	Route/Airport Pair	Total Activity (Tons)	Share
1	Louisville, KY – Anchorage, AK	248,765	5.9%
2	Cincinnati, OH – Anchorage, AK	111,069	2.6%
3	Louisville, KY – Dallas/Fort Worth, TX	87,457	2.1%
4	Louisville, KY – Newark, NJ	87,357	2.1%
5	Louisville, KY – Philadelphia, PA	82,245	1.9%
6	Chicago, IL – Memphis, TN	76,972	1.8%
7	Louisville, KY – Ontario, CA	71,241	1.7%
8	Indianapolis, IN – Los Angeles, CA	64,970	1.5%
9	Detroit, MI – Memphis, TN	60,536	1.4%
10	Louisville, KY – Oakland, CA	58,106	1.4%
11	Minneapolis, MN – Memphis, TN	56,839	1.3%
12	Louisville, KY – Memphis, TN	56,218	1.3%
13	Chicago, IL – Anchorage, AK	56,022	1.3%
14	Indianapolis, IN – Newark, NJ	51,938	1.2%
15	Indianapolis, IN – Anchorage, AK	51,263	1.2%
16	Indianapolis, IN – Memphis, TN	49,328	1.2%
17	Louisville, KY – Seattle, WA	44,090	1.0%
18	Louisville, KY – Houston, TX	43,626	1.0%
19	Louisville, KY – Hartford, CT	43,411	1.0%
20	Louisville, KY – Atlanta, GA	43,396	1.0%
Total Top 20 Route/Airport Pairs		1,444,848	34.2%
Remaining 1,578 Route/Airport Pairs		2,777,773	65.8%
Total All Domestic (Non-MAFC) Route/Airport Pairs		4,222,621	100.0%
Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data			

In 2010, a total of 1,488,207 tons of air cargo were transported between airports in the MAFC region and airports outside of the U.S. Figure 13 displays the total air cargo activity between the MAFC and international locations, as well as the percentage share of the total attributed to each international location. The international locations shown in Figure 13 correspond to the international analysis regions defined within the FHWA's Freight Analysis Framework (FAF) data²⁵.

The results displayed in Figure 13 indicate that a majority of the international air cargo activity at MAFC region airports is with Eastern Asia (697,288 tons) and Europe (553,638 tons). Collectively, these two regions accounted for more than 84 percent of the international air cargo activity in the MAFC region in 2010. The directional distribution of international air cargo with Eastern Asia primarily favored imports (approximately 63.3 percent of tonnage was landed at MAFC airports)

²⁵ More details on the FAF can be found in Chapter 5 or at: http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/

while the directional distribution with Europe was more balanced with approximately 50.9 percent landed at MAFC airports. Canada and Mexico recorded the third and fourth-highest levels of international air cargo activity, respectively.

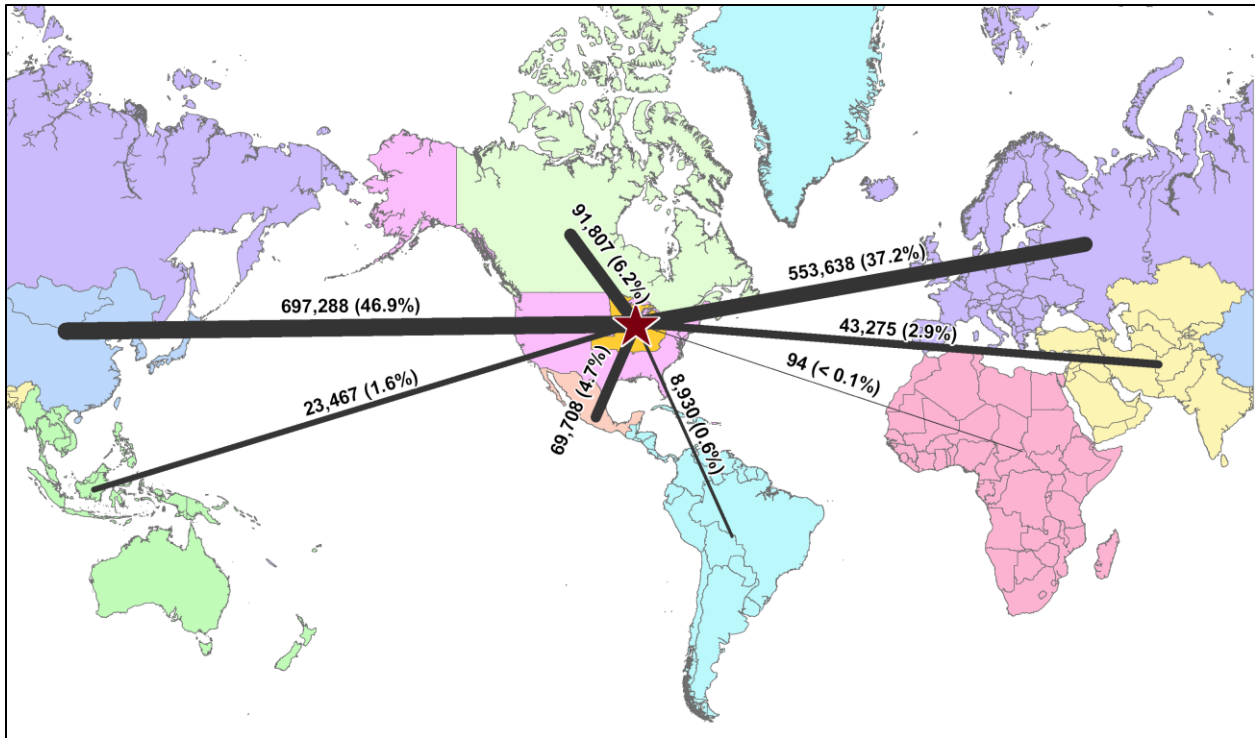


Figure 13: International Air Cargo Activity to/from MAFC Region, 2010

Table 20 displays the total air cargo activity for the top 20 international air cargo routes between MAFC airports and airports located outside the U.S. as well as percentage imported (i.e. percent landed at the MAFC airport) for each route. A total of 457 international route pairs reported air cargo activity in 2010, of which the top 20 accounted for 1,092,493 tons or approximately 73 percent of the total international air cargo activity. Approximately 55 percent of the international air cargo activity was imported. International air cargo activity between Chicago, IL and major international cities in Asia and Europe accounted for 12 of the top 20 routes, including all of the top 9. It is not surprising that Chicago, IL is a prominent contributor to international air cargo in the MAFC region, given that one of its airports (O'Hare International) is a major hub for all-cargo airline flights. The remainder of the top 20 includes four routes between Louisville, KY and locations in Europe and Canada as well as two routes each for Indianapolis, IN and Detroit, MI.

The percentage of air cargo landed at MAFC airports (i.e. imported to the U.S. from international locations) yields additional insight into the directional distribution of global air cargo tonnage flows. Air cargo activity with airports in Seoul, South Korea; Taipei, Taiwan; Hong Kong, Hong Kong; Paris, France; and Amsterdam, Netherlands have greater than 60 percent of tonnage imported (landed at MAFC airports). Conversely, the percentage of air cargo exported from the MAFC (enplaned at MAFC airports) to airports in Beijing, China; Luxembourg, Luxembourg; Mexico City, Mexico; and Toronto, Canada was more than 60 percent in 2010. Additional insights on international air cargo activity are provided in Chapter 5 of this report.

Table 20: Top 20 International Air Cargo Routes to/from MAFC Airports, 2010

Rank	Route/Airport Pair	Total Activity (Tons)	Percent Import
1	Chicago, IL – Seoul, South Korea	145,475	63.8%
2	Chicago, IL – Taipei, Taiwan	137,175	63.4%
3	Chicago, IL – Tokyo, Japan	125,073	56.2%
4	Chicago, IL – Frankfurt, Germany	102,226	55.3%
5	Chicago, IL – Hong Kong, Hong Kong	97,079	69.5%
6	Chicago, IL – Shanghai, China	95,982	79.0%
7	Chicago, IL – London, United Kingdom	75,163	50.2%
8	Chicago, IL – Paris, France	47,447	62.1%
9	Chicago, IL – Beijing, China	43,077	26.6%
10	Louisville, KY – Cologne, Germany	42,907	55.3%
11	Chicago, IL – Amsterdam, Netherlands	27,639	50.9%
12	Chicago, IL – Luxembourg, Luxembourg	22,477	24.2%
13	Detroit, MI – Amsterdam, Netherlands	20,002	62.3%
14	Louisville, KY – Mexico City, Mexico	19,336	37.2%
15	Louisville, KY – Toronto, Canada	18,633	45.7%
16	Detroit, MI – Frankfurt, Germany	15,420	56.2%
17	Indianapolis, IN – Toronto, Canada	15,000	38.7%
18	Chicago, IL – Munich, Germany	14,818	54.2%
19	Indianapolis, IN – Paris, France	14,582	0.0%
20	Louisville, KY – Montreal, Canada	12,983	42.6%
Total Top 20 Route/Airport Pairs		1,092,493	57.5%
Remaining 437 Route/Airport Pairs		395,714	49.7%
Total All International Route/Airport Pairs		1,488,207	55.4%
Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data			

Chapter 5: MAFC Air Cargo Activity – Value and Commodity

Overview of the Freight Analysis Framework Data

This chapter provides analysis of the air cargo activities in the MAFC utilizing the Federal Highway Administration Freight Analysis Framework (FAF). The Freight Analysis Framework 3 (FAF3) dataset is a rich database that integrates multiple publicly available data sources into a comprehensive picture of freight movements by all modes of transportation among 131 state, major metropolitan region, and international area zones; classified as one of 43 commodities.²⁶

Data Limitations

The diverse air cargo industry presents several challenges for comprehensively capturing the entire picture of shipments moved by the air mode. Shipments with a great variety of sizes and weights can be shipped over complex all cargo networks, such as those of UPS or FedEx; on small charter services; or as part of commercial service (passenger) air movements. Additionally, most shipments moved by air begin and end with truck movements. The FAF3 defines seven modes of transportation and an additional mode identified as “No Domestic Mode.” Based on the definitions in the FAF3, shipments moved by airplane can fall in the “Air (includes truck-air)” or “Multiple Modes and Mail” modes. The full definitions of these two modes are included in Table 21.

Table 21: FAF3 Air Cargo-Related Mode Definitions

Mode Name	Mode Description
Air (includes truck-air)	Includes shipments typically weighing more than 100 pounds that move by air or a combination of truck and air in commercial or private aircraft. Includes air freight and air express. Shipments typically weighing 100 pounds or less are classified with “Multiple Modes and Mail.”
Multiple Modes and Mail	Includes shipments by multiple modes and by parcel delivery services, U.S. Postal Service, or couriers. This category is not limited to containerized or trailer-on-flatcar shipments.

Source: Footnote 27

The inability to clearly decipher air movements within the “Multiple Modes and Mail” mode produces a situation where only the shipments identified with mode “Air (includes truck-air)” can be analyzed for this section. By doing so, the smaller weight items, such as the light-weight express parcel delivery items, are excluding from the FAF analysis. However, it should be emphasized that the previous analysis in Chapter 4 captures these shipments for airports in the MAFC area.

An additional FAF3 limitation is its ability to capture the full activity required for some air cargo shipments. The FAF3 database is set up to show the ultimate origin and destination of movements, so large cargo hub distribution efforts required to make air cargo movements happen, such as those by FedEx and UPS, are not fully represented in the FAF3 datasets.

Value of the FAF3 for MAFC Data Analysis

The analysis presented in Chapter 4 provides a thorough evaluation of the amount of air cargo tons moved at MAFC airports and the patterns of those movements. The FAF3 dataset contains

²⁶ F. Southworth, B. E. Peterson, H-L Hwang, S-M Chin, and D. Davidson. *The Freight Analysis Framework Version 3 (FAF3) – A Description of the FAF3 Regional Database and How it is Constructed*. Prepared for the Federal Highway Administration by Oak Ridge National Laboratory. Oak Ridge, TN, June 16, 2011. Online. Available: http://faf.ornl.gov/fafweb/Data/FAF3_Assumptions.pdf.

²⁷ Supra note 26.

information not provided by other publicly available dataset and not previously presented. Some of the positive aspects of the FAF3 database include:

- The movements are broken down by state-wide and major region area origins and destinations;
- The FAF3 dataset contains commodity specific movements;
- The database presents the dollar value associated with the shipments; and
- The data is projected out to 2040.

The FAF3 provides an avenue to further evaluate air cargo movements into, out of, and within the MAFC area otherwise not captured; therefore, providing a valuable level of content that furthers the understanding of the air cargo activity in the MAFC region.

Description of the FAF Data Utilized

The FAF3 version utilized for this analysis is version 3.2 released December 1, 2011, which reports the data in both annual tons and dollar values for shipments to, from, and within zones for 2007 (base year), 2010 (provisional estimate), and forecasts out to 2040.²⁸ Unless otherwise indicated, the analysis presented here utilizes the 2010 data instead of the 2007 data since it represents the most current estimate available. The dollar values are the constant dollar value, with base year for constant dollar of 2007. The shipment values are presented in millions of U.S. dollars.

FAF Overview Analysis

The FAF is a national database that allows for a comparison of the MAFC region to the entire U.S. freight movement activity. The FAF 2010 Provisional Database indicates the total freight originating or terminating in the MAFC region is valued at almost \$5 trillion, with air cargo shipments valued at \$155 billion of that total (see Table 22). That represents almost 31 percent of all U.S. movements by all modes and almost 16 percent for air cargo movements. When comparing the MAFC to the entire U.S. the most significant mode of transport is rail, with almost 48 percent of all rail shipments in the U.S. originating or terminating in the 10-state MAFC region.

Based on value, trucking for both the U.S. and MAFC region moves the highest percentage of freight shipments by a large margin (see Table 22). Nationally, shipments are moved via airplane for 6.2 percent of the cargo, by value. For the MAFC region that value is only 3.1 percent. The MAFC region does experience more freight by value moved by "Multiple Modes & Mail", which contains those air cargo shipments weighing less than 100 pounds, than the U.S. as a whole.

²⁸ "FAF3 Version Descriptions." *Freight Analysis Framework Version 3 (FAF3)*. Online. Available: <http://faf.ornl.gov/fafweb/News.aspx>. Accessed: April 27, 2012.

Table 22: Total U.S. and MAFC Region Freight Activity by Mode, 2010

FAF Modes of Transport	MAFC Movements		U.S. Totals	
	Value	% Value	Total Value	Total % Value
Air (includes truck-air)	155,350	3.1%	998,566	6.2%
Multiple modes & mail	693,671	14.0%	1,828,083	11.4%
No domestic mode	-	-	143,890	0.9%
Other and unknown	102,002	2.1%	365,343	2.3%
Pipeline	178,061	3.6%	795,683	5.0%
Rail	231,623	4.7%	484,216	3.0%
Truck	3,552,269	71.9%	11,248,071	70.0%
Water	25,348	0.5%	200,724	1.2%
Grand Total	4,938,324	100%	16,064,577	100%

Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars

An examination of the MAFC region movements by trade type indicates that for all modes domestic movements make up almost 88 percent of all shipments by value (see Table 23). The table shows that when focusing only on air cargo shipments, as defined by the FAF, the distribution greatly changes. For air cargo shipments in the MAFC, the domestic contribution lessens to 26 percent, while export and imports increase to 31 percent and 42 percent, respectively. Table 23 also shows the trade type distribution for the U.S. shipments. The MAFC region experiences a higher percentage level of domestic air cargo shipments measured by value than the entire U.S. air cargo movements.

Table 23: Total U.S. and MAFC Region Freight Activity by Trade Type, 2010

Trade Type	MAFC Movements		U.S. Totals	
	% Value All Modes	% Value Air Mode	% Value All Modes	% Value Air Mode
Domestic Only	87.6%	26.3%	81.1%	12.4%
Export	5.0%	31.4%	7.6%	41.0%
Import	7.3%	42.3%	11.3%	46.6%
Grand Total	100%	100%	100%	100%

Data from Freight Analysis Framework Version 3.2

Illinois captures the largest portion of the air cargo activity by value, with 43.5 percent of the originating air cargo and 65.0 percent of the terminating cargo, for a total of \$87.2 billion in total, or 55.1 percent of the value of all the air cargo shipments originating or terminating in the MAFC region (see Table 24). Kentucky is second with over 10 percent of the total value and Ohio is third with over 8 percent of the total. Comparing the air cargo mode totals between Table 22 and Table 24, it is revealed that shipments valued at \$2.86 billion (\$158,210 - \$155,350) originated and terminated within the MAFC region.

Table 24: MAFC State Air Cargo Totals, 2010

MAFC State	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Illinois	31,663	43.5%	55,576	65.0%	87,239	55.1%
Indiana	7,027	9.7%	3,348	3.9%	10,374	6.6%
Iowa	589	0.8%	545	0.6%	1,134	0.7%
Kansas	7,363	10.1%	1,262	1.5%	8,625	5.5%
Kentucky	10,026	13.8%	6,363	7.4%	16,389	10.4%
Michigan	2,749	3.8%	4,795	5.6%	7,545	4.8%
Minnesota	4,245	5.8%	3,015	3.5%	7,260	4.6%
Missouri	2,434	3.3%	1,135	1.3%	3,569	2.3%
Ohio	4,781	6.6%	8,171	9.6%	12,952	8.2%
Wisconsin	1,859	2.6%	1,264	1.5%	3,123	2.0%
Grand Totals	72,737	100%	85,473	100%	158,210	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars						

As indicated previously, the FAF breaks down the geographical area for some of the most significant markets around the country. Nine of the ten states have an FAF zone that allows for a finer geographic evaluation of the data. Table 25 contains the overall air cargo activity for the 27 total FAF zones in the MAFC region, including the State of Iowa, which is represented only at a state-wide level. There are three instances in the MAFC region where the major metropolitan areas spread over state lines. For those instances the FAF separates the zone and distributes the freight activity to the separate portions. The three areas where this occurs in the MAFC region are Chicago, Kansas City, and St. Louis. Each of these metropolitan zones has a different FAF zone identification number and is treated separately for this analysis.

For the FAF data presented by MAFC FAF zone contained in Table 25 the Chicago IL-IN-WI CSA (IL Part) zone makes up almost all of the air cargo shipped into and out of Illinois and also makes up most (54 percent) of the total air cargo activity by MAFC FAF zones. Louisville KY-IN CSA (KY Part) is second overall with 7 percent. Some states, such as Illinois have activity concentrated at one zone while others are dispersed over several zones. Kentucky and Ohio are examples are air cargo activity spread amongst more than one zone.

Table 25: MAFC FAF Zone Totals, 2010

State	FAF Zone ID	FAF Zone Short Name	From		To		Total	
			Value	% Value	Value	% Value	Value	% Value
IL	171	Chicago IL-IN-WI CSA (IL Part)	30,919	42.5%	54,580	63.9%	85,499	54.0%
	172	St. Louis MO-IL CSA (IL Part)	277	0.4%	116	0.1%	394	0.2%
	179	Remainder of Illinois	467	0.6%	880	1.0%	1,346	0.9%
IN	181	Chicago IL-IN-WI CSA (IN Part)	131	0.2%	45	0.1%	176	0.1%
	182	Indianapolis IN CSA	6,318	8.7%	2,527	3.0%	8,845	5.6%
	189	Remainder of Indiana	578	0.8%	775	0.9%	1,353	0.9%
IA	190	Iowa	589	0.8%	545	0.6%	1,134	0.7%
KS	201	Kansas City MO-KS CSA (KS Part)	302	0.4%	274	0.3%	577	0.4%
	209	Remainder of Kansas	7,061	9.7%	988	1.2%	8,048	5.1%
KY	211	Louisville KY-IN CSA (KY Part)	5,983	8.2%	5,138	6.0%	11,121	7.0%
	219	Remainder of Kentucky	4,044	5.6%	1,225	1.4%	5,269	3.3%
MI	261	Detroit MI CSA	1,267	1.7%	3,967	4.6%	5,234	3.3%
	262	Grand Rapids MI CSA	1,121	1.5%	338	0.4%	1,460	0.9%
	269	Remainder of Michigan	361	0.5%	490	0.6%	851	0.5%
MN	271	Minneapolis-St. Paul MN-WI CSA (MN Part)	3,953	5.4%	2,844	3.3%	6,798	4.3%
	279	Remainder of Minnesota	292	0.4%	171	0.2%	463	0.3%
MO	291	Kansas City MO-KS CSA (MO Part)	123	0.2%	227	0.3%	350	0.2%
	292	St. Louis MO-IL CSA (MO Part)	2,205	3.0%	612	0.7%	2,817	1.8%
	299	Remainder of Missouri	106	0.1%	295	0.3%	401	0.3%

State	FAF Zone ID	FAF Zone Short Name	From		To		Total	
			Value	% Value	Value	% Value	Value	% Value
OH	391	Cincinnati OH-KY-IN CSA (OH Part)	2,428	3.3%	3,096	3.6%	5,524	3.5%
	392	Cleveland OH CSA	713	1.0%	1,167	1.4%	1,880	1.2%
	393	Columbus OH CSA	262	0.4%	1,627	1.9%	1,889	1.2%
	394	Dayton OH CSA	216	0.3%	573	0.7%	789	0.5%
	399	Remainder of Ohio	1,162	1.6%	1,709	2.0%	2,871	1.8%
WI	551	Milwaukee WI CSA	290	0.4%	465	0.5%	755	0.5%
	559	Remainder of Wisconsin	1,569	2.2%	799	0.9%	2,367	1.5%
Grand Total			72,737	100%	85,473	100%	158,210	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars								

FAF Commodity Analysis

The FAF defines commodities using the 43 two-digit Standard Classification of Transported Goods (SCTG) commodity codes; the same classification used in the Commodity Flow Survey (CFS). The CFS also assembles the 43 commodities into nine commodity groups of similar commodities. The following section examines the FAF air cargo activity by commodity group in order to acquire some general commodity understandings. Specific commodities are examined following the group discussion.

Analysis by Commodity Group

The following table (Table 26) shows the air cargo activity for the nine commodity groups in terms of value and weight in order to show how some commodities rank differently according to how they are being evaluated. Commodity Group 8, Electronic, motorized vehicles, and precision instruments, is the most significant commodity group with 50 percent of the goods by value and 35 percent by weight. The wide difference in percent share by Commodity Group 8 between the value and weight of the goods indicates that the commodities within this group are light, high-value items. Commodity Groups 6 and 7 show an increase in share in terms of weight compared to value. Commodity Group 9, Furniture and miscellaneous manufactured products, maintains the same share.

Table 26: MAFC Air Cargo Shipments by Commodity Groups, 2010

Commodity Groups	Value	% Value	Tons	% Tons
1 Agriculture products and fish (SCTG Codes: 01-05)	664	0.4%	39	2.0%
2 Grains, alcohol, and tobacco products (SCTG Codes: 06-09)	280	0.2%	34	1.7%
3 Stones, non-metallic minerals, and metallic ores (SCTG Codes: 13-14)	14	0.0%	10	0.5%
4 Coal and petroleum products (SCTG Codes: 19)	10	0.0%	4	0.2%
5 Pharmaceutical and chemical products (SCTG Codes: 20-24)	25,040	16.1%	259	13.2%
6 Logs, wood products, and textile and leather (SCTG Codes: 26-30)	3,951	2.5%	181	9.2%
7 Base metal and machinery (SCTG Codes: 31-34)	35,629	22.9%	606	30.9%
8 Electronic, motorized vehicles, and precision instruments (SCTG Codes: 35-38)	78,263	50.4%	685	34.9%
9 Furniture and miscellaneous manufactured products (SCTG Codes: 39-43)	11,500	7.4%	145	7.4%
Grand Total	155,350	100%	1,963	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars; Weight in thousands of tons				

Further investigating the commodity group by trade type finds that Commodity Group 8, which experiences the highest overall level of air cargo by value, is generally evenly distributed by trade type. Several of the other major commodity groups are much more concentrated by trade type. Commodity Groups 5, 6, and 9 have 50 percent or more of the movements as international imports. Commodity Group 7 movements are mostly international, with a combined 91 percent.

Table 27: MAFC Air Cargo Trade Types by Commodity Group, 2010

Commodity Groups	Domestic		Export		Import		Total	
	Value	% Value	Value	% Value	Value	% Value	Value	% Value
1 Agriculture products and fish	187	28.2%	346	52.0%	131	19.8%	664	100%
2 Grains, alcohol, and tobacco products	115	40.9%	120	42.7%	46	16.5%	280	100%
3 Stones, non-metallic minerals, and metallic ores	5	38.1%	6	45.2%	2	16.7%	14	100%
4 Coal and petroleum products	3	33.7%	5	52.5%	1	13.8%	10	100%
5 Pharmaceutical and chemical products	4,226	16.9%	7,851	31.4%	12,963	51.8%	25,040	100%
6 Logs, wood products, and textile and leather	1,175	29.7%	638	16.2%	2,137	54.1%	3,951	100%
7 Base metal and machinery	3,157	8.9%	16,092	45.2%	16,381	46.0%	35,629	100%
8 Electronic, motorized vehicles, and precision instruments	28,163	36.0%	21,837	27.9%	28,262	36.1%	78,263	100%
9 Furniture and miscellaneous manufactured products	3,882	33.8%	1,869	16.2%	5,749	50.0%	11,500	100%
Grand Total	40,914	26.3%	48,763	31.4%	65,674	42.3%	155,350	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars								

The following table, Table 28, shows the share of movements for each commodity group by the trade type. For domestic movements Commodity Group 8 represents almost 69 percent of the movements, with Commodity Group 5 second with over 10 percent. The share distribution is concentrated with three commodity groups for both export and import movements.

Table 28: MAFC Air Cargo Shipments Commodity Groups by Trade Types, 2010

Commodity Groups	% Value		
	Domestic	Export	Import
1 Agriculture products and fish	0.5%	0.7%	0.2%
2 Grains, alcohol, and tobacco products	0.3%	0.2%	0.1%
3 Stones, non-metallic minerals, and metallic ores	0.0%	0.0%	0.0%
4 Coal and petroleum products	0.0%	0.0%	0.0%
5 Pharmaceutical and chemical products	10.3%	16.1%	19.7%
6 Logs, wood products, and textile and leather	2.9%	1.3%	3.3%
7 Base metal and machinery	7.7%	33.0%	24.9%
8 Electronic, motorized vehicles, and precision instruments	68.8%	44.8%	43.0%
9 Furniture and miscellaneous manufactured products	9.5%	3.8%	8.8%
Grand Total	100%	100%	100%
Data from Freight Analysis Framework Version 3.2			

By Specific Two-Digit SCTG Commodity Code

This section highlights the most significant commodities moving into and out of the MAFC region. Table 29 contains the top 5 commodities and indicates that combined Electronics, Machinery, Precision instruments, Pharmaceuticals, and Transportation equipment make up almost 78 percent of the total value of products shipped via air cargo into and out of the MAFC region. Electronics and Machinery alone make up almost 46 percent.

Table 29: Top 5 Air Cargo Commodities, 2010

Rank	Commodities	Value	% Value
1	35 Electronics	39,823	25.6%
2	34 Machinery	31,354	20.2%
3	38 Precision instruments	21,054	13.6%
4	21 Pharmaceuticals	14,797	9.5%
5	37 Transport equip.	13,612	8.8%
Top 5 Totals		120,638	77.7%
All Other Commodities		34,712	22.3%
Grand Total		155,350	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars			

Table 30: Top 5 Commodities by Trade Type, 2010

Rank	Commodities	Domestic		Export		Import		Value	% Value
		Value	% Value	Value	% Value	Value	% Value		
1	35 Electronics	9,366	23.5%	9,824	24.7%	20,633	51.8%	39,823	100%
2	34 Machinery	2,284	7.3%	14,070	44.9%	15,000	47.8%	31,354	100%
3	38 Precision instruments	5,940	28.2%	9,073	43.1%	6,041	28.7%	21,054	100%
4	21 Pharmaceuticals	2,844	19.2%	3,700	25.0%	8,254	55.8%	14,797	100%
5	37 Transport equip.	10,675	78.4%	2,189	16.1%	748	5.5%	13,612	100%
Top 5 Totals		31,109	25.8%	38,856	32.2%	50,676	42.0%	120,640	100%
All Other Commodities		9,805	28.2%	9,907	28.5%	15,000	43.2%	34,712	100%
Grand Total		40,914	26.3%	48,763	31.4%	65,674	42.3%	155,350	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars									

The breakdown of the top 5 commodities by trade type is contained in Table 30. For the top commodity, electronics, over half of the value is imported into the MAFC region, with the remaining portions equally split between domestic and export movements. In contrast, Transportation equipment movements are over 78 percent domestic and very little import. For Machinery, the second most valuable commodity, almost 93 percent of the product value is international. Combined the top 5 commodities are imported most (42.0 percent), followed by exported (32.2 percent) and moved domestically (25.8 percent). A further break down of the top 5 most valuable commodities per MAFC state is in Appendix A.

FAF Air Cargo Movement Analysis

The FAF analysis of movements to, from, and within the MAFC region registered 11,918 separate origin-destination pairs. The following section investigates the movement patterns of air cargo shipments in the MAFC region.

By Overall MAFC Region Movements

The following four tables include the top origins and destination for shipments to and from the MAFC region; considering the MAFC region as a whole. Table 31 provides the top 10 FAF zone destinations for MAFC originating air cargo in 2010. Slightly more than 50 percent of the value of the MAFC region originating air cargo travels to Europe and Eastern Asia. The top domestic destination is the Los Angeles FAF zone. The top 10 destinations are split evenly between international and domestic, as far as count is concerned. Combined, the top 10 represents over 76 percent of the commodity value originating from the MAFC region.

Table 31: Top 10 FAF Zone Destinations for MAFC Originating Air Cargo, 2010

Rank	Destination FAF Zone	Value	% Value
1	804 Europe	19,992	27.5%
2	807 Eastern Asia	17,199	23.6%
3	803 Rest of Americas	5,272	7.2%
4	061 Los Angeles-Long Beach-Riverside CA CSA	2,901	4.0%
5	801 Canada	2,880	4.0%
6	484 Dallas-Fort Worth TX CSA	2,026	2.8%
7	419 Remainder of Oregon	1,622	2.2%
8	411 Portland-Vancouver-Beaverton OR-WA MSA (OR Part)	1,286	1.8%
9	050 Arkansas	1,280	1.8%
10	808 South-Eastern Asia and Oceania	1,230	1.7%
Top 10 Totals		55,688	76.6%
All Other Destinations		17,048	23.4%
Grand Total		72,737	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars			

A more detailed evaluation of the commodities moving from the MAFC region to the top 2 destinations (see Table 32) indicates that Machinery makes up over a quarter of the goods value for each destination.

Table 32: Top 2 Destination FAF Zone Commodities, 2010

FAF Zone	Commodities	Value	% Value
804 Europe	34 Machinery	5,714	28.6%
	35 Electronics	4,077	20.4%
	38 Precision instruments	3,859	19.3%
	21 Pharmaceuticals	1,449	7.2%
	37 Transport equip.	864	4.3%
	Top 5 Total	19,992	79.9%
807 Eastern Asia	34 Machinery	4,734	27.5%
	38 Precision instruments	3,199	18.6%
	35 Electronics	3,098	18.0%
	21 Pharmaceuticals	1,711	9.9%
	20 Basic chemicals	878	5.1%
	Top 5 Total	17,199	79.2%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars			

Table 33 provides the top 10 FAF zone origins for the value of MAFC terminating air cargo in 2010. Over 67 percent of the air cargo goods value shipped to the MAFC region originated in Eastern Asia and Europe. Four of the top 10 origins are domestic FAF zones, with the Los Angeles and Memphis zones maintaining the fourth and fifth ranked spots, each with slightly more than \$2.260 billion worth of goods.

Table 33: Top 10 FAF Zone Origins for MAFC Terminating Air Cargo, 2010

Rank	Originating FAF Zone	Value	% Value
1	807 Eastern Asia	36,390	42.6%
2	804 Europe	21,001	24.6%
3	803 Rest of Americas	2,385	2.8%
4	061 Los Angeles-Long Beach-Riverside CA CSA	2,267	2.7%
5	471 Memphis TN-MS-AR MSA (TN Part)	2,261	2.6%
6	806 Southern-Central-Western Asia	2,041	2.4%
7	802 Mexico	1,796	2.1%
8	801 Canada	1,421	1.7%
9	251 Boston-Worcester-Manchester MA-NH CSA (MA Part)	1,036	1.2%
10	064 San Jose-San Francisco-Oakland CA CSA	957	1.1%
Top 10 Totals		71,555	83.7%
All Other Origins		13,918	16.3%
Grand Total		85,473	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars			

For air cargo shipments terminating in the MAFC region with origins at the top 2 ranked spots, Electronics is the most valuable commodity shipped (see Table 34). Electronics is followed by Machinery and Pharmaceuticals.

Table 34: Top 2 Originating FAF Zone Commodities, 2010

FAF Zone	Commodities	Value	% Value
807 Eastern Asia	35 Electronics	11,673	32.1%
	34 Machinery	8,057	22.1%
	21 Pharmaceuticals	5,308	14.6%
	38 Precision instruments	3,144	8.6%
	20 Basic chemicals	2,147	5.9%
	Top 5 Totals	36,390	83.3%
804 Europe	35 Electronics	6,225	29.6%
	34 Machinery	4,983	23.7%
	21 Pharmaceuticals	2,335	11.1%
	38 Precision instruments	2,046	9.7%
	43 Mixed freight	1,497	7.1%
	Top 5 Totals	21,001	81.4%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars			

By Specific FAF Zone Movements

The following four tables show the major routes utilized for air cargo shipments to and from the MAFC FAF regions. The first two address the routes that originate in the MAFC region, while the latter two contain the routes that terminate in the MAFC region.

The top domestic routes for originating MAFC movements are in Table 35, where the top route is from the Remainder of Kentucky FAF zone to the Remainder of Oregon FAF zone with SCTG 40, Miscellaneous manufactured products as the commodity. Six of the remaining nine commodities are SCTG 37, Transportation equipment; largely from the Remainder of Kansas FAF zone. Overall, the top 10 domestic routes are spread four separate MAFC region originating FAF zones.

For international shipments originating from the MAFC region, Table 36 shows the top 10 originating MAFC region FAF zones as either Chicago (with 8 spots) or Indianapolis (with 2 spots). Additionally, the international destinations are either Eastern Asia or Europe for the top 10 export routes. The commodities match the top commodities previously discussed, largely Machinery, Precision instruments, and Electronics.

Table 35: Top 10 Domestic Routes for Originating MAFC Movement, 2010

Originating FAF Zone	Destination FAF Zone	Commodities	Value	% Value
219 Remainder of Kentucky	419 Remainder of Oregon	40 Misc. mfg. prods.	1,598	6.7%
209 Remainder of Kansas	484 Dallas-Fort Worth TX CSA	37 Transport equip.	1,527	6.4%
292 St. Louis MO-IL CSA (MO Part)	61 Los Angeles CA CSA	37 Transport equip.	1,316	5.5%
209 Remainder of Kansas	050 Arkansas	37 Transport equip.	1,209	5.0%
209 Remainder of Kansas	411 Portland OR-WA MSA (OR Part)	37 Transport equip.	1,163	4.9%
209 Remainder of Kansas	100 Delaware	37 Transport equip.	499	2.1%
171 Chicago IL-IN-WI CSA (IL Part)	064 San Francisco CA CSA	35 Electronics	298	1.2%
171 Chicago IL-IN-WI CSA (IL Part)	392 Cleveland OH CSA	35 Electronics	296	1.2%
219 Remainder of Kentucky	061 Los Angeles CA CSA	30 Textiles/leather	260	1.1%
209 Remainder of Kansas	363 New York NY-NJ-CT-PA CSA (NY Part)	37 Transport equip.	244	1.0%
Top 10 Domestic Routes Total			8,410	35.1%
Remaining Domestic Routes			15,564	64.9%
Total Domestic			23,974	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars				

Table 36: Top 10 Export Routes for Originating MAFC Movement, 2010

Originating FAF Zone	Destination FAF Zone	Commodities	Value	% Value
171 Chicago IL-IN-WI CSA (IL Part)	807 Eastern Asia	34 Machinery	3,963	8.1%
171 Chicago IL-IN-WI CSA (IL Part)	804 Europe	34 Machinery	2,799	5.7%
171 Chicago IL-IN-WI CSA (IL Part)	807 Eastern Asia	38 Precision instruments	2,623	5.4%
171 Chicago IL-IN-WI CSA (IL Part)	807 Eastern Asia	35 Electronics	2,484	5.1%
171 Chicago IL-IN-WI CSA (IL Part)	804 Europe	38 Precision instruments	1,852	3.8%
171 Chicago IL-IN-WI CSA (IL Part)	804 Europe	35 Electronics	1,754	3.6%
171 Chicago IL-IN-WI CSA (IL Part)	807 Eastern Asia	21 Pharmaceuticals	1,626	3.3%
182 Indianapolis IN CSA	804 Europe	34 Machinery	1,284	2.6%
171 Chicago IL-IN-WI CSA (IL Part)	804 Europe	21 Pharmaceuticals	1,148	2.4%
182 Indianapolis IN CSA	804 Europe	35 Electronics	1,012	2.1%
Top 10 Export Routes Total			20,545	42.1%
Remaining Export Routes			28,218	57.9%
Total Export			48,763	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars				

For air cargo shipments terminating in the MAFC region, the following two tables contain the top 10 domestic and import routes. The top 10 domestic routes terminating in the MAFC region comprised \$19.8 billion worth of commodities in 2010 (see Table 37). Three of the top 10 ranked routes originate from the Memphis, TN FAF zone with shipments of Precision instruments. The three receiving MAFC region FAF zones are Chicago, Remainder of Ohio, and Remainder of Illinois. Shipments of electronics valued at \$296 million between the Chicago and Cleveland is the only internal MAFC region route captured in the top 10.

The commodities for the top 10 domestic routes into the MAFC region are Precision instruments, Electronic and Transportation equipment. The routes transporting Transportation equipment take up three of the last four top 10 slots. This compares differently with a previous table containing domestic routes out of the MAFC region (see Table 35) in which Transportation equipment is shown to be the most significant commodity, in terms of routes in the top 10.

Table 38 contains the top 10 international import routes to MAFC region FAF zones. Every top 10 route terminates in the Chicago FAF zone, with the originating foreign FAF zone as Eastern Asia or Europe. The top 3 routes travel from the Eastern Asia foreign FAF zone to the Chicago FAF zone, with the commodities of Electronics, Machinery and Pharmaceuticals. The top 10 international import routes to the MAFC region transport goods valued at over \$40.1 billion, which represents over 60 percent of all the value of goods.

Table 37: Top 10 Domestic Routes for Terminating MAFC Movement, 2010

Originating FAF Zone	Destination FAF Zone	Commodities	Value	% Value
471 Memphis TN-MS-AR MSA (TN Part)	171 Chicago IL-IN-WI CSA (IL Part)	38 Precision instruments	717	3.6%
330 New Hampshire	171 Chicago IL-IN-WI CSA (IL Part)	35 Electronics	609	3.1%
064 San Francisco CA CSA	182 Indianapolis IN CSA	35 Electronics	444	2.2%
41 Phoenix AZ MSA	171 Chicago IL-IN-WI CSA (IL Part)	35 Electronics	421	2.1%
471 Memphis TN-MS-AR MSA (TN Part)	399 Remainder of Ohio	38 Precision instruments	419	2.1%
471 Memphis TN-MS-AR MSA (TN Part)	179 Remainder of Illinois	38 Precision instruments	351	1.8%
531 Seattle WA CSA	211 Louisville KY-IN CSA (KY Part)	37 Transport equip.	346	1.8%
171 Chicago IL-IN-WI CSA (IL Part)	392 Cleveland OH CSA	35 Electronics	296	1.5%
061 Los Angeles CA CSA	394 Dayton OH CSA	37 Transport equip.	267	1.4%
341 New York NY-NJ-CT-PA CSA (NJ Part)	219 Remainder of Kentucky	37 Transport equip.	243	1.2%
Top 10 Domestic Routes Total			4,113	20.8%
Remaining Domestic Routes			15,687	79.2%
Total Domestic			19,800	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars				

Table 38: Top 10 Import Routes for Terminating MAFC Movements, 2010

Originating FAF Zone	Destination FAF Zone	Commodities	Value	% Value
807 Eastern Asia	171 Chicago IL-IN-WI CSA (IL Part)	35 Electronics	11,034	16.8%
807 Eastern Asia	171 Chicago IL-IN-WI CSA (IL Part)	34 Machinery	7,352	11.2%
807 Eastern Asia	171 Chicago IL-IN-WI CSA (IL Part)	21 Pharmaceuticals	5,205	7.9%
804 Europe	171 Chicago IL-IN-WI CSA (IL Part)	35 Electronics	4,337	6.6%
804 Europe	171 Chicago IL-IN-WI CSA (IL Part)	34 Machinery	2,890	4.4%
807 Eastern Asia	171 Chicago IL-IN-WI CSA (IL Part)	38 Precision instruments	2,817	4.3%
804 Europe	171 Chicago IL-IN-WI CSA (IL Part)	21 Pharmaceuticals	2,046	3.1%
807 Eastern Asia	171 Chicago IL-IN-WI CSA (IL Part)	20 Basic chemicals	1,957	3.0%
807 Eastern Asia	171 Chicago IL-IN-WI CSA (IL Part)	43 Mixed freight	1,444	2.2%
804 Europe	171 Chicago IL-IN-WI CSA (IL Part)	38 Precision instruments	1,107	1.7%
Top 10 Import Routes Total			40,189	61.2%
Remaining Import Routes			25,485	38.8%
Total Import			65,674	100%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars				

FAF Projected Air Cargo Activity

The long-range forecasts included in the FAF3 database were prepared by IHS Global Insight (USA) Inc. using their long-term projection of the U.S. economy. IHS Global Insights states that their macroeconomic, regional, inter-industry, and intrastate forecast modeling capabilities provides the “consistency across the forward-looking outlook.”²⁹ The following discussion analyzes the FAF3 projections of the air cargo activity in the for the MAFC region. The forecasts provide estimates of activities in 2040. Average Annual Growth Rate (AAGR), also referred to as the Compound Average Annual Growth Rate (CAGR), is utilized in this discussion in describing the average annual percent change in the air cargo activity.

General Overview of Changes in MAFC Air Cargo Activity

As indicated at the beginning of the FAF3 analysis, the FHWA FAF version 3.2 database has a base year of 2007, 2010 provisional estimates, and projections out to 2040. The following table, Table 39, contains the change in freight activity for both the entire U.S. and the MAFC region between 2007 and 2010 and between 2010 and 2040. The 2010 provisional estimates catch the reduction in overall freight activity in the entire U.S. between 2007 and 2010 levels. The overall reduction in the value of freight for all modes in the U.S. during that time frame was 3.5 percent and 7.3 percent for the FAF air cargo mode only.

The MAFC region over that same time period experienced a more drastic reduction in the value of goods moved compared to the U.S. with an overall reduction of 4.1 percent for all modes and 9.3 percent for the FAF air cargo mode. Additionally, Table 39 includes the general projected growth in the value of goods between 2010 and 2040. Over that 30-year forecast period the value of goods is expected to grow 145 percent in the U.S. for all modes and 335.7 percent for air cargo only. The MAFC region is expected to experience very similar annual growth with 3.2 percent for all modes and 4.9 percent for air cargo only.

Table 39: Change in Activity between 2007, 2010, and 2040

Year	MAFC		U.S.	
	Air	All Modes	Air	All Modes
2007 Value	171,197	5,149,520	1,077,344	16,650,594
2010 Value	155,350	4,938,324	998,566	16,064,577
2007-2010 % Change	-9.3%	-4.1%	-7.3%	-3.5%
2040 Value	660,174	12,676,765	4,350,377	39,440,629
2010-2040 % Change	325.0%	156.7%	335.7%	145.5%
2010-2040 AAGR	4.9%	3.2%	5.0%	3.0%

Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars

An investigation of the projected changes in the trade type between 2010 and 2040 shows that the value of goods in domestic air cargo movements will grow at the greatest level (see Table 40). The almost 427 percent overall 30-year growth translates as a 5.7 percent average annual growth rate. The higher growth of the domestic movements appears to come at the expense of export movement, which is expected to experience a reduction in share from 31 percent to almost 25 percent.

²⁹ IHS Global Insight (USA) Inc. *Freight analysis Framework Version 3 (FAF³) – Key Assumptions, Results, Methodology, and Data Sources Related to FAF³ Long-Term Forecasts*. Prepared for the Federal Highway Administration. April 11, 2011. Online. Available: http://faf.orl.gov/fafweb/Data/FAF3_Assumptions.pdf.

Table 40: Forecast MAFC Air Cargo Activity by Trade Type

Trade Type	2010		2040		2010-2040	
	Value	% Value	Value	% Value	% Change	AAGR
Domestic Only	40,914	26.3%	215,545	32.6%	426.8%	5.7%
Export	48,763	31.4%	164,062	24.9%	236.5%	4.1%
Import	65,674	42.3%	280,567	42.5%	327.2%	5.0%
Grand Total	155,350	100%	660,174	100%	325.0%	4.9%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars						

Projected Changes to the MAFC Region FAF Zones

The following table contains the expected commodity value and growth between 2010 and 2040 for each MAFC region state according to the FAF 3.2 estimates (see Table 41). The table presents an interesting picture of how air cargo is projected to be distributed in thirty years. Combined, Iowa is expected to experience the most change in air cargo activity, with an expected overall growth of 637 percent. This change is uneven in terms of direction however. The FAF3 database shows an expected increase of air cargo shipments to Iowa of 1246 percent, while the air cargo shipments from Iowa are only expected to grow 74 percent over the thirty years. Even with the tremendous percentage change in the value of Iowa air cargo goods, the state is expected to experience the least amount of air cargo amongst the MAFC states.

Only Minnesota and Ohio are expected to experience similar growth in air cargo movements from and to each state. The other states are projected to see significantly more growth, in terms of commodity value, in one direction over the other. The most active state remains Illinois with over \$404.6 billion worth of commodities moved by air cargo, followed by Ohio with \$61.5 billion according to the projections. Combined, the MAFC states are expected to experience an overall growth of 325.7 percent, which calculates to an AAGR of 4.9 percent. A table containing the total change between 2010 and 2040 and the AAGR for each state is included in Appendix A. These values are graphically depicted in the following sections.

Table 41: Total Value and Value Change between 2010 and 2040 by MAFC State

State	From			To			Total			
	2010	2040	% Change	2010	2040	% Change	2010	2040	% Change	AAGR
Illinois	31,663	123,445	289.9%	55,576	281,176	405.9%	87,239	404,621	363.8%	5.2%
Indiana	7,027	21,158	201.1%	3,348	15,696	368.9%	10,374	36,854	255.2%	4.3%
Iowa	589	1,026	74.1%	545	7,330	1246.2%	1,134	8,356	637.0%	6.9%
Kansas	7,363	23,504	219.2%	1,262	10,189	707.3%	8,625	33,692	290.6%	4.6%
Kentucky	10,026	15,858	58.2%	6,363	22,928	260.3%	16,389	38,786	136.7%	2.9%
Michigan	2,749	14,075	412.0%	4,795	13,426	180.0%	7,545	27,501	264.5%	4.4%
Minnesota	4,245	21,591	408.6%	3,015	15,630	418.4%	7,260	37,220	412.6%	5.6%
Missouri	2,434	6,525	168.0%	1,135	7,288	542.4%	3,569	13,813	287.0%	4.6%
Ohio	4,781	21,104	341.4%	8,171	40,354	393.8%	12,952	61,458	374.5%	5.3%
Wisconsin	1,859	3,222	73.3%	1,264	8,005	533.5%	3,123	11,227	259.5%	4.4%
Totals	72,737	251,507	245.8%	85,473	422,021	393.7%	158,210	673,528	325.7%	4.9%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars										

Projected Average Annual Growth Rates, 2010-2040: A Visual Representation

The figures below visually represent the projected air cargo value average annual growth rates for each MAFC FAF region for to/import, from/export, and total shipments. Comparing the projected long-term growth between FAF regions indicates which regions may be candidates for increased emphasis on maintaining or expanding air cargo infrastructure and operations. Furthermore, splitting analysis into *To/Import*, *From/Export*, and *Total* air cargo shipments provides more direct recommended approaches for how regions can accommodate expected growth within the industry.

Located within each figure are locations for all airports reporting cargo activity in 2010. The vast majority of activity, almost 98 percent of total MAFC tonnage, occurs within the top 20 airports, indicated by a large blue dot on the figures, all of which are classified as commercial service airports. The AAGRs for each MAFC FAF region have been classified according to the Natural Breaks (Jenks) method. The use of Natural Breaks categorizes the AAGRs relative to one another. The classification system and the accompanying color shading scheme do not produce AAGR thresholds with nuanced meaning or value judgments on the viability of air cargo operations of any particular region. Natural Breaks simply produces a 5-tier system of AAGR levels when all 26 MAFC FAF regions are compared to each other.

From/Export Shipments

The following discussion focuses on the projected growth rates for shipments originating from the MAFC FAF zones and is illustrated in Figure 14. The AAGR for all *From/Export* air cargo shipments in the MAFC is 4.2 percent. This lower AAGR compared to the import AAGR of 5.5 percent is reflective of the widely cited American trade gap. The Remainder of Indiana FAF region is projected to have the highest AAGR, at 8.5 percent. The St. Louis MO-IL CSA (IL Part) FAF region is projected to have the lowest AAGR, at -2.8 percent. The *From/Export* classification is a good indicator of export potential within a MAFC FAF region. Higher growth rates are projected to be concentrated within the eastern half of the MAFC. These areas have historically been American manufacturing centers. The Kansas City MO-KS CSA (MO Part) and Remainder of Kansas FAF regions, at 5.7 percent and 4.0 percent AAGR, are the lone western MAFC FAF regions with an above-average projected AAGR through 2040.

It is important to consider the baseline shares of activity in 2010 to better contextualize the significance of the AAGRs. Several interesting points manifest themselves when taking into account percentage shares in 2010 of overall MAFC activity. The impact of the St. Louis MO-IL CSA (IL Part) FAF region's MAFC-lowest AAGR of -2.8 percent is minimized considering the region's \$277 million air cargo activity value only comprises 0.4 percent of the total *From/Export* shipment value in the MAFC. On the contrary, the Remainder of Kentucky FAF region's \$4.04 billion in *From/Export* cargo shipments are projected to erode at an AAGR of -0.3 percent. This is a significant notion to consider as the FAF region's *From/Export* activity values represent over 5.5 percent of total *From/Export* activity in the MAFC. The ramifications of negative AAGRs are much greater for the Remainder of Kentucky than the St. Louis MO-IL CSA (IL Part). The dominant *From/Export* value FAF region, Chicago IL-IN-WI CSA (IL Part), is expected to grow its \$30.9 billion in value and 42.5 percent MAFC percentage *From/Export* value share at an AAGR of 4.7 percent. This bodes well for the vitality of export shipments coming out of the Chicago region.

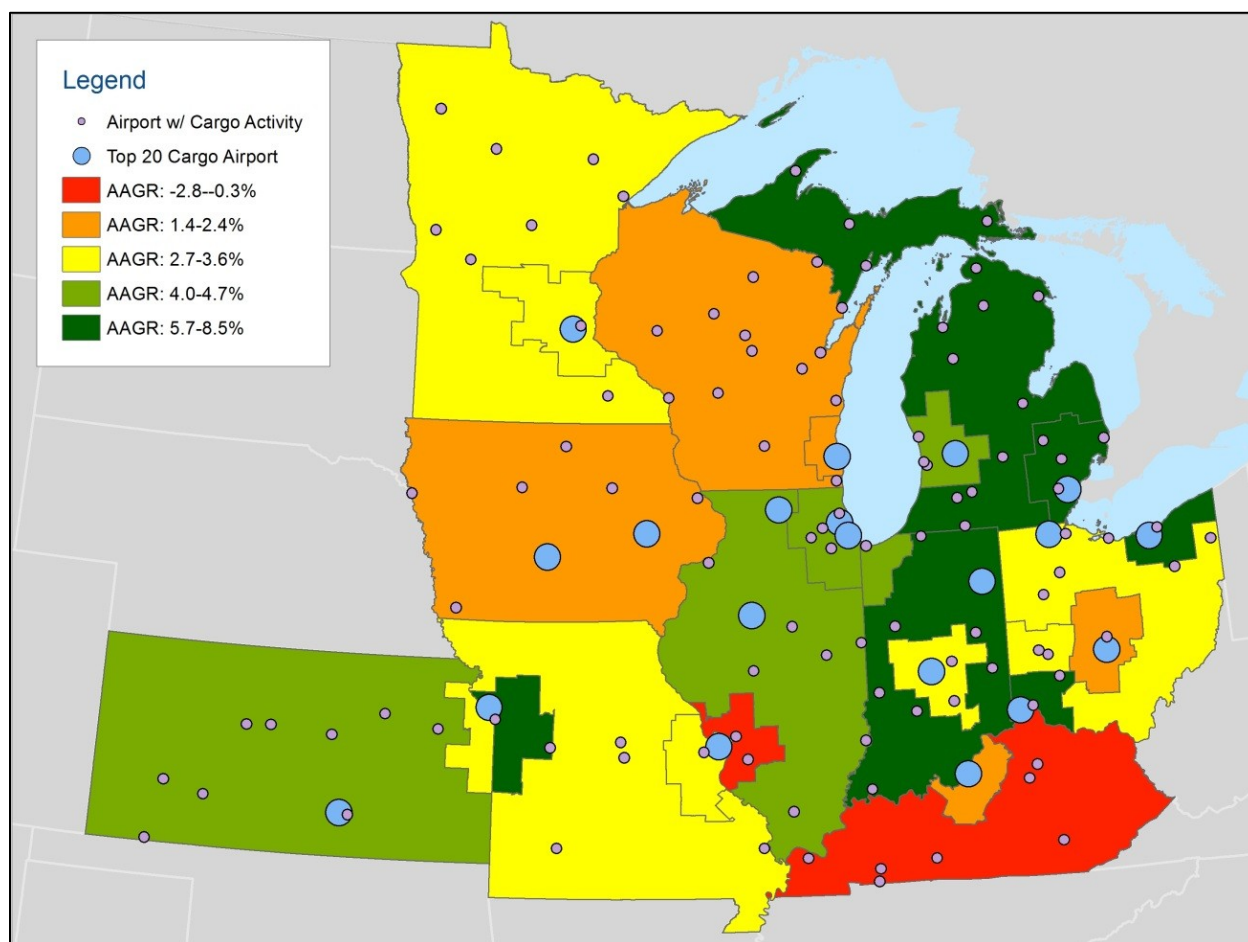


Figure 14: Projected 30-year Value AAGR by FAF Zone, From/Export, 2010-2040

To/Import Shipments

Figure 15 illustrates the AAGR for the shipments terminating in the MAFC. The average AAGR for MAFC *To/Import* shipments is 5.5 percent. The higher average percentage AAGR is reflective of the increasing import-export gap in American international trading. The MAFC FAF region with the highest projected *To/Import* AAGR over the 30 year period is the Remainder of Illinois, at 9.7 percent. The Remainder of Michigan FAF region has the lowest AAGR, at 2.5 percent. FAF projections indicate slow growth for the entire state of Michigan. Its three FAF regions represent three of the four lowest *To/Import* AAGRs in the MAFC. The low *To/Import* AAGRs correlate with the decline in population Michigan experienced between 2000 and 2010, when the state experienced the loss of almost 55,000 residents or about 0.55 percent of its population. Michigan is the only state in the country to experience a net population loss between 2000 and 2010.

Many of the *To/Import* growth rates suggest significant air cargo activity will shift away from major metropolitan areas and into more exurban and rural areas and the airports that serve them. Seven of the top 10 growth rates for *To/Import* shipments are within the Remainder FAF regions and the state Iowa. Some of the slowest *To/Import* AAGR occur in areas with large hub operations, like the Louisville KY-IN CSA (KY Part) and Cincinnati OH-KY-IN CSA (OH Part) that show AAGRs of 4.0 percent and 4.7 percent, respectively. The slower growth projected for the Louisville KY-IN CSA (KY Part) is particularly important to note when considering its total *To/Import* cargo values represent over \$5.1 billion or approximately 4.6 percent of total MAFC *To/Import* shipment values. The Chicagoland region's *To/Import* AAGRs in line with the MAFC average suggests little will impact their status of commanding almost two-thirds of all *To/Import* air cargo shipment values.

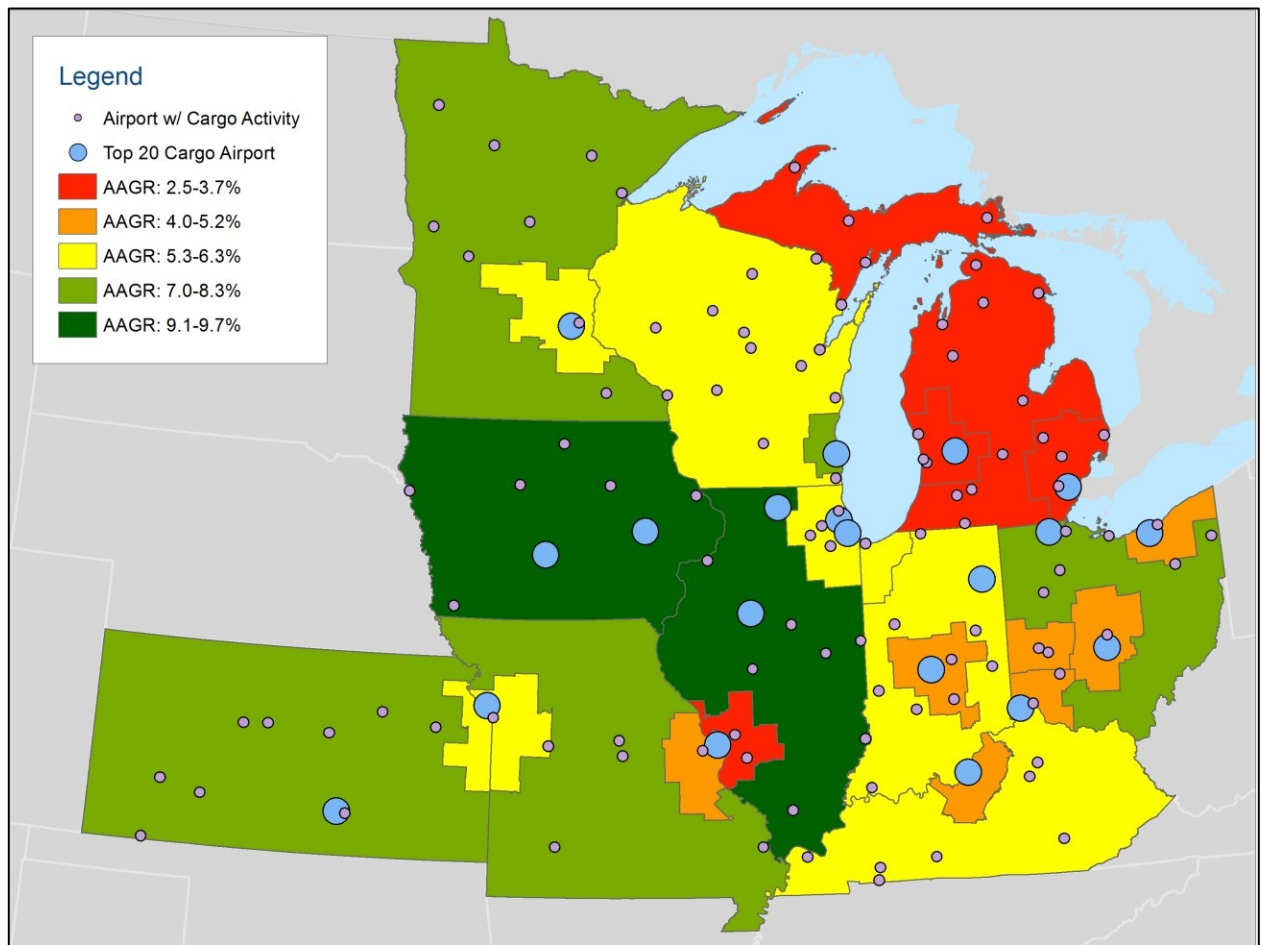


Figure 15: Projected 30-year Value AAGR by FAF Zone, To/Import, 2010-2040

Total Shipments

Figure 16 illustrates the AAGR for total shipment values to and from the MAFC. The AAGR for all shipments in all FAF regions is 4.9 percent, with the Remainder of Illinois FAF region is projected to have the highest AAGR at 8.4 percent. The St. Louis MO-IL CSA (IL Part) FAF region is projected to have the lowest AAGR at 0.2 percent. These FAF regions, however, have small total MAFC value percentage shares of less than 1 percent of the MAFC air cargo value. The Minneapolis-St. Paul MN-WI CSA (MN Part) FAF region is one of the highest value regions, recording approximately \$6.8 billion or 4.3 percent of total MAFC value in 2010, to project robust growth at 5.6 percent, significantly over the MAFC total AAGR value. The Cleveland OH CSA follows closely with a total AAGR of approximately 5.4 percent.

As aforementioned, FedEx and UPS established large global air cargo hub operations in Indianapolis and Louisville, respectively. Interestingly, both of these hub operation facilities are located within FAF regions showing low AAGRs. Out of 26 MAFC regions, Indianapolis and Louisville (KY Part) are projected to have the 22nd and 24th lowest AAGRs. It is possible air cargo decision makers could focus expansion on other areas of the MAFC like the peripherals of major population centers or in the handful of emerging metropolitan areas. Strong AAGRs in Minneapolis, Cleveland, and Cincinnati areas in conjunction with their already-significant 2010 percent value shares in total MAFC air cargo activity make them strong candidates for consideration in air cargo infrastructure improvements and other air cargo industry cluster economic development policies.

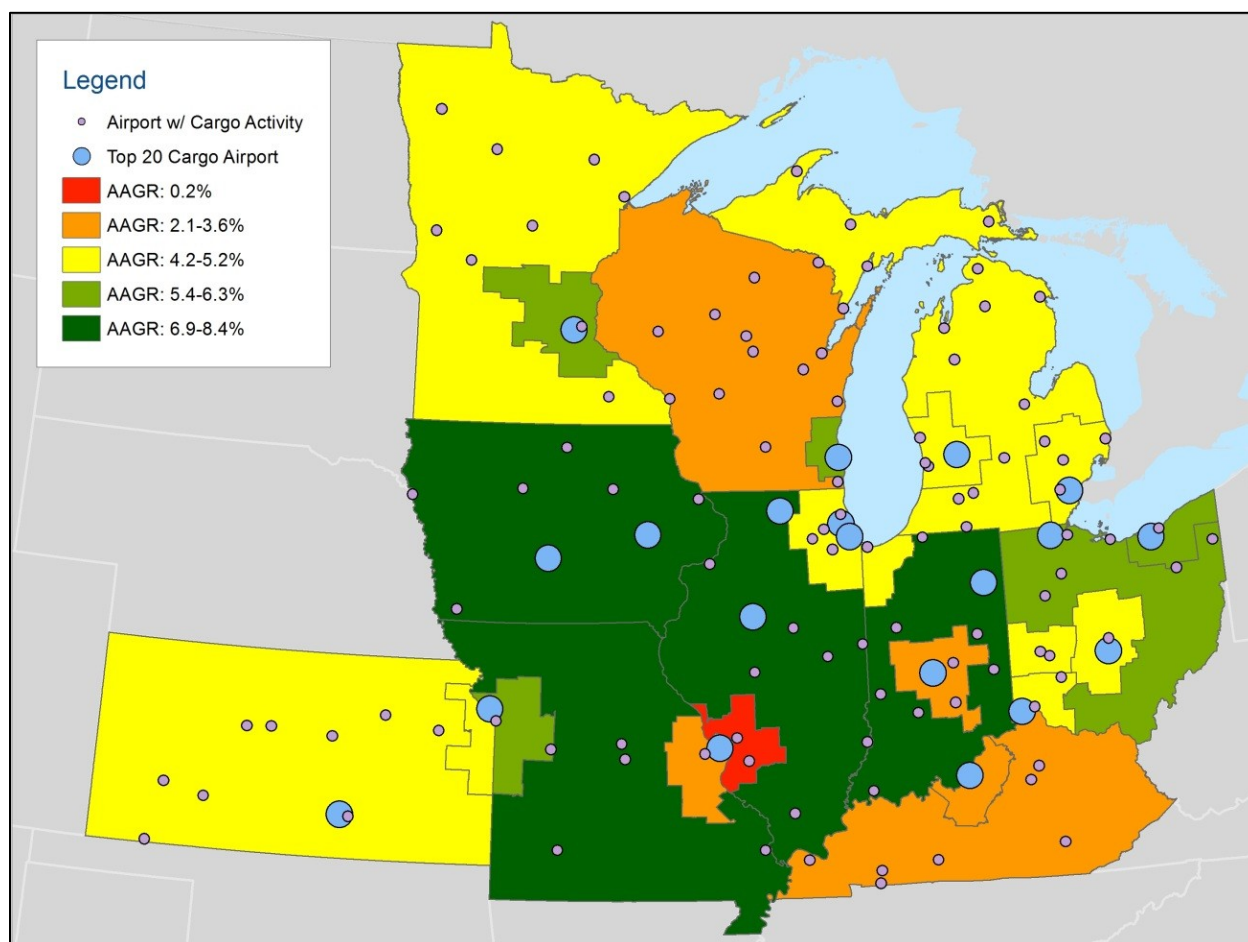


Figure 16: Projected 30-year Value AAGR by FAF Zone, Total, 2010-2040

On the contrary, low projected AAGRs in the St. Louis metropolitan region spanning the Missouri and Illinois borders confirm the justification behind the aggressive pursuit of air cargo legislation in the Missouri legislature. The St. Louis MO-IL CSA (IL Part) and St. Louis MO-IL (MO Part) have the lowest and 6th lowest AAGRs of 0.2 percent and 3.6 percent, respectively, in the MAFC. The attempts at establishing a sizeable international gateway for Chinese air cargo at STL through the establishment of the Midwest China Hub Commission were valid attempts to reverse what is projected to be a downward trend in air cargo activity for the St. Louis metropolitan region.

Projected Changes to Commodities Shipped into and out of the MAFC Region

This section addresses the projected changes to the commodity groups and top commodities shipped via air cargo in the MAFC region. Commodity group 8 Electronics, motorized vehicles, and precision instruments is expected to remain the most significant commodity group with over \$360 billion worth of air cargo (see Table 42). That translates into an expected AAGR of 5.2 percent. The highest percentage growth is expected to be Commodity group 5 Pharmaceutical and chemical products with an overall expected growth over the 30 years of 457.8 percent, which translates to a 5.9 percent average annual growth rate.

Table 42: Forecast Values by Commodity Groups

Commodity Groups	Value		Total	
	2010	2040	% Change	AAGR
1 Agriculture products and fish (SCTG Codes: 01-05)	664	1,851	178.7%	3.5%
2 Grains, alcohol, and tobacco products (SCTG Codes: 06-09)	280	824	194.2%	3.7%
3 Stones, non-metallic minerals, and metallic ores (SCTG Codes: 13-14)	14	41	204.2%	3.6%
4 Coal and petroleum products (SCTG Codes: 19)	10	17	70.1%	1.8%
5 Pharmaceutical and chemical products (SCTG Codes: 20-24)	25,040	139,662	457.8%	5.9%
6 Logs, wood products, and textile and leather (SCTG Codes: 26-30)	3,951	10,106	155.8%	3.2%
7 Base metal and machinery (SCTG Codes: 31-34)	35,629	116,107	225.9%	4.0%
8 Electronic, motorized vehicles, and precision instruments (SCTG Codes: 35-38)	78,263	362,421	363.1%	5.2%
9 Furniture and miscellaneous manufactured products (SCTG Codes: 39-43)	11,500	29,144	153.4%	3.1%
Grand Total	155,350	660,174	325.0%	4.9%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars				

The same top 5 commodities are expected to top the projected value of air cargo commodities in 2040, with a slight difference in order from 2010. Overall, the top 5 commodities are expected to grow a total of 370.3 percent, which represents a significantly higher level of growth than the other commodities. In 2010, the top 5 commodities comprised over 77 percent of the total air cargo value, while in 2040 this expands to almost 86 percent.

The most significant growth is expected to be seen in Precision instruments, with a 7.3 percent AAGR, followed by Pharmaceuticals with a 6.8 percent AAGR. The other three commodities in the top 5 show an expected average annual growth rate of around 4 percent.

Table 43: Forecast of Top 5 Commodities

Commodities	Rank		Value		Total	
	2010	2040	2010	2040	% Change	AAGR
35 Electronics	1	2	39,823	138,184	247.0%	4.2%
34 Machinery	2	4	31,354	104,208	232.4%	4.1%
38 Precision instruments	3	1	21,054	173,756	725.3%	7.3%
21 Pharmaceuticals	4	3	14,797	106,507	619.8%	6.8%
37 Transport equip.	5	5	13,612	44,735	228.6%	4.0%
Top 5 Totals			120,639	567,390	370.3%	5.3%
All Other Commodities			34,712	92,784	167.3%	3.3%
Grand Total			155,350	660,174	325.0%	4.9%
Data from Freight Analysis Framework Version 3.2; Value in million U.S. dollars						

Expected Origins and Destinations for MAFC Region Air Cargo

The following two tables provide a look into the top 10 origins and destinations for the value of goods shipped to and from the MAFC region. The FAF zones are ranked by the 2040 projected value. The tables present the rank order and the expected 30-year change between 2010 and 2040, along with the average annual growth rate. For Table 44, much of the top 10 destinations based on the value of goods forecasts to 2040 remain the same as in 2010, with some of the ordering changing.

Table 44: Top 10 FAF Zone Destinations for MAFC Originating Air Cargo - 2040

Rank	Destination FAF Zone	Trade Type	% Change 2010 - 2040	AAGR
1	807 Eastern Asia	Export	308.3%	4.8%
2	804 Europe	Export	215.6%	3.9%
3	803 Rest of Americas	Export	101.3%	2.4%
4	801 Canada	Export	222.9%	4.0%
5	808 SE Asia & Oceania	Export	435.0%	5.7%
6	061 Los Angeles CA CSA	Domestic	107.0%	2.5%
7	484 Dallas-Fort Worth TX CSA	Domestic	192.6%	3.6%
8	050 Arkansas	Domestic	319.0%	4.9%
9	363 New York NY-NJ-CT-PA CSA (NY Part)	Domestic	466.8%	6.0%
10	802 Mexico	Export	219.1%	3.9%
Top 10			238.3%	4.1%
Grand Total			245.8%	4.2%
Data from Freight Analysis Framework Version 3.2				

In 2010 Europe was the highest ranked, whereas Eastern Asia is expected to rank first. Air cargo shipments from the MAFC region to Southeast Asia & Oceania ranked tenth in 2010 and are

projected to be ranked fifth in 2040. That movement pattern is expected to grow at an average annual rate of 5.7 percent over the 30-year period. The expected most significant growth of the top 10 is from the MAFC region to the New York, NY FAF zone with an overall growth of 467 percent, or 6.0 percent average annual growth rate.

For air cargo shipments to the MAFC region (see Table 45) the 30-year growth projections show several significant growth rates compared to those shown in the previous table. Eastern Asia and Europe remain the top two ranked origins as ranked in 2010; however, this table shows significant growth by the domestic movements. The value of goods shipped from all of the domestic origins are expected to grow over 500 percent, with Memphis (2200 percent) and San Diego (1095 percent) expected to experience the greatest gains.

Table 45: Top 10 FAF Zone Origins for MAFC Terminating Air Cargo - 2040

Rank	Originating FAF Zone	Trade Type	% Change 2010 - 2040	AAGR
1	807 Eastern Asia	Import	320.2%	4.9%
2	804 Europe	Import	403.9%	5.5%
3	471 Memphis TN-MS-AR MSA (TN Part)	Domestic	2200.2%	11.0%
4	061 Los Angeles CA CSA	Domestic	623.5%	6.8%
5	803 Rest of Americas	Import	260.5%	4.4%
6	064 San Francisco CA CSA	Domestic	617.2%	6.8%
7	531 Seattle WA CSA	Domestic	856.6%	7.8%
8	063 San Diego CA MSA	Domestic	1095.3%	8.6%
9	801 Canada	Import	244.7%	4.2%
10	484 Dallas-Fort Worth TX CSA	Domestic	525.0%	6.3%
Top 10			431.1%	5.7%
Grand Total			393.7%	5.5%
Data from Freight Analysis Framework Version 3.2				

FAF Analysis Summary of Findings

The Federal Highway Administration Freight Analysis Framework dataset integrates multiple publicly available data sources into a comprehensive picture of freight movements by all modes of transportation in the U.S. It provides a wealth of valuable information for our analysis but does have its limitation. The “Air (includes truck-air)” mode is defined as shipments typically weighing more than 100 pounds with shipments typically weighing 100 pounds or less classified with “Multiple Modes and Mail,” which unfortunately includes more than just shipments by air. The inability to clearly decipher air movements within the “Multiple Modes and Mail” mode produces a situation where only the shipments identified with mode “Air (includes truck-air)” can be analyzed for this section. By doing so, the smaller weight items, such as the light-weight express parcel delivery items, are excluding from the FAF analysis. However, the air cargo data analyzed here provides a manner to paint an interesting picture of the MAFC air cargo activity. The following statements summarize the FAF air cargo analysis presented in this chapter.

Overall Evaluation

In 2010, the total freight (all modes) originating or terminating in the MAFC region is valued at almost \$5 trillion, with air cargo shipments valued at \$155 billion of that total. That represents almost 31 percent of all U.S. movements by all modes and almost 16 percent for air cargo movements. Nationally, shipments are moved via airplane for 6.2 percent of the cargo, by value. For the MAFC region that value is only 3.1 percent. The MAFC region does experience more freight by value moved by "Multiple Modes & Mail", which contains those air cargo shipments weighing under 100 pounds, than the U.S. as a whole. Illinois captures the largest portion of the air cargo activity by value, with 43.5 percent of the originating air cargo and 65.0 percent of the terminating cargo, for a total of \$87.2 billion in total, or 55.1 percent of the value of all the air cargo shipments originating or terminating in the MAFC region. Kentucky is second with over 10 percent of the total value and Ohio is third with over 8 percent of the total. The Chicago IL-IN-WI CSA (IL Part) zone makes up almost all of the air cargo shipped into and out of Illinois and also makes up most (54 percent) of the total air cargo activity by MAFC FAF zones. Louisville KY-IN CSA (KY Part) is second overall with 7 percent.

The top 5 commodities make up almost 78 percent of the total value of products shipped via air cargo into and out of the MAFC region. Electronics and Machinery alone make up almost 46 percent. The remaining three commodities include Precision instruments, Pharmaceuticals, and Transportation equipment. For the top commodity, Electronics, over half of the value is imported into the MAFC region, with the remaining portions equally split between domestic and export movements. In contrast Transportation equipment movements are over 78 percent domestic and very little import. Slightly more than 50 percent of the MAFC region originating air cargo travels to Europe and Eastern Asia; while over 67 percent of the air cargo goods value shipped to the MAFC region originated in from those two world regions. For specific routes, almost all of the major international routes travel from or to the Chicago FAF regions.

The MAFC region is expected to experience very similar average annual growth between 2010 and 2040 as the entire U.S. The MAFC is expected to experience higher growth in air cargo shipments than the overall expected growth (4.9 percent for air cargo only compared to 3.2 percent for all modes). For shipments originating from the MAFC, higher growth rates are projected to be concentrated within the eastern half of the region states. Shipments imported into the region are expected to grow a more significant rate than those originating in the MAFC. Michigan is projected to experience very little growth for shipments to the region; however, it ranks as one of the highest annual growth rates for shipments originating from the region. This perhaps captures the trend for reduced consumption in the state seen by the loss of population but also captures a trend of growth in manufacturing and production of goods.

Many of the import (both domestic and international) growth rates suggest significant air cargo activity will shift away from major metropolitan areas and into more exurban and rural areas and the airports that serve them. Seven of the top 10 growth rates from import shipments are within the Remainder FAF regions and the state of Iowa. Some of the slowest import AAGR values occur in areas with large hub operations. According to the projections, it appears that little will impact dominant status of the Chicago-area air cargo operations, which is projected to command almost 60 percent of all air cargo shipment values to and from the MAFC. In 2010, the top 5 commodities comprised over 77 percent of the total air cargo value, while in 2040 this expands to almost 86 percent. The most significant growth is expected to be seen in precision instruments, with a 7.3 percent AAGR, followed by pharmaceuticals with a 6.8 percent AAGR.

Chapter 6: Role of General Aviation Airports

Since 99.8 percent of all MAFC air cargo occurs at commercial service airports, it is easy to assume that GA airports have no role in air cargo operations throughout the MAFC. While commercial airports dominate the industry's landscape throughout the MAFC, the country, and world, GA airports have developed important niche roles to fill within the MAFC air cargo story. These are niche roles identified by the GA airports themselves as vital to community economies.

Methodology

The research team utilized several different resources, including large datasets, airport and state aviation department documents, and personal phone or email interviews with noteworthy GA airports to decipher any roles GA airports can begin or continue within the greater context of a constantly developing industry.

Interview Process

Preliminary research was conducted on airports with recorded air cargo activity in 2010. Before GA airports were contacted for interviews, critical air cargo information was obtained. Analyzed data included pounds of enplaned freight, enplaned mail, landed freight and landed mail. From these statistics, the research team calculated total levels of air cargo activity by tonnage, generating such information as total activity rankings, percentage shares, and levels of activity by tons per weekday. The percent of air cargo activity that was scheduled was also made available. This information allowed the research team to gain a sense of the context and scale of a specific airport's cargo operations. When an interview was conducted with an airport, the questions asked varied depending on the results of this preliminary analysis. Interviews consisted of three main categories of discussion, with several questions for each category. The following describes the three categories and their respective question prompts.

General Discussion

1. Our research indicates over (#)% of the air cargo activity at (AIRPORT CODE) involves mail, with (#)% of the cargo tonnage landed rather than enplaned. Considering these statistics, what is the role of air cargo at (AIRPORT CODE)?
2. What are the major factors that influence air cargo activity at (AIRPORT CODE)?

Commodity/Value Specifics

1. Aside from (cite known activity), are you aware of what commodities are being shipped through (AIRPORT CODE)?
2. Their value?
3. Are there any local businesses that account for a sizable portion of air cargo activity?

Future Air Cargo Potential

1. Are there plans to incorporate air cargo-related improvements in any future upgrades to (AIRPORT CODE)?
2. Why or why not?
3. How are these decisions made?

4. Are there any circumstances that would cause (AIRPORT CODE) to consider pursuing a larger role for air cargo?

Fixed-base operators (FBOs) of several airports were also contacted. Considering the small size of the typical GA facility and the minimal staff required to operate it, it is not uncommon for GA officials and airport managers to be unfamiliar with specific details about their facility's air cargo operations. To supplement initial interviews with GA airports, several FBOs were contacted to increase the understanding of a specific facility's air cargo function.

Airport managers were given the option of email or phone interviews, with preference for phone interviews. Email interviews consisted of three open ended questions addressing general air cargo trends, specific commodity and value inquires, and future air cargo potential perspectives. Question prompts shared similar characteristics but were tailored to the unique qualities of each airport the research team was interested in further exploring. Phone interviews consisted of identical prompts, coupled with the flexibility of follow-up questions.

Opportunities and Barriers

GA airport managers understand the foundation of their airport's success is not built around air cargo. With shorter runways, less capacity, and fewer resources than their commercial counterparts, GA airports will always find the root of their success in providing traditional general aviation services: personal aviation, flying schools, charter flights, and maintenance, repair, and fueling services. Accepting the most likely future role and business model of GA airports, officials also expressed significant interest in expanding periphery activities to their service portfolio. Air cargo finds itself in a prominent position of consideration for officials as an important, and potentially lucrative, venue to expand upon.

While GA airports are often viewed as an essential service to an area, they employ very few people with very limited resources. This makes it difficult for airports to swiftly implement changes in air cargo policy and operations. One director at a small airport in rural southern Illinois connoted that the airport can be viewed as a non-profit organization. Administrators work for what essentially can be described as half-salary. The facility's role is not a revenue-generator for the county but rather a growth facilitator. This becomes a key perspective in the discussions of GA role expansion.

Considering the ongoing federal legislative controversy over the Essential Air Service program subsidizing small-market passenger air transportation, it is possible GA airports will come under increased and continued scrutiny in the near future. Recent trends have transformed GA facilities from quietly operating community assets to political tools leveraged to symbolize broader government themes unrelated to their absolute function.

Funding reports provide specific dollar amounts that can be cited to elicit arguments that build a barrier to the facilitation of GA development. In FY2008, reliever and GA airports accounted for \$783 million of the approximately \$3.5 billion pool of money the AIP consists of. Airports with significant cargo activity, all commercial airports, received an additional \$118 million in entitlement funding. These are significant amounts of money that will likely receive scrutiny in the current climate of fiscal awareness.

Filling the Niche

Air cargo activity at GA airports tends to fill a niche role incapable of being provided at larger commercial airports. Circumstances dictating the location of air cargo activity are often out of the hands of GA airports themselves. Weather, proximity to other aviation facilities, and diversity of the local economy represent the largest factors that influence GA air cargo activity.

While proximity to urban centers can prove advantageous for GA facilities, it is more common for proximity to restrict the role GA airports can play within a region. Intuition suggests that larger cities can support larger facilities and provide the labor pools required to operate them. Considering the vast size of a functioning air cargo service radius for an airport, duplication of air cargo infrastructure is often unnecessary. Previous air cargo studies have utilized mileage radii of 100 miles to function as a barometer for regional air cargo accessibility.³⁰ Using this metric, the saturation of air cargo facilities readily manifests itself.

In addition, the Boeing forecasts referenced in Chapter 1 allude to the notion that the North American air cargo industry has matured in relation to the global market. This is seen in Boeing's 5.9 percent AGR for the global air cargo industry when juxtaposed against the North American AGR of 2.9 percent. Large infrastructure improvements in the past decade have centralized air cargo activity to a handful of airports capable of supporting the vast array of North American air cargo needs. GA airports have little chance of directly impacting the dynamics of regional air cargo trends. They must therefore operate on the fringes of influence.

Additional information about role of GA airports in supporting local manufacturing industries can be found in Chapter 7 of this report.

Importance of the Master Plan

Airport master plans are essential visioning documents that can drive the future of air cargo investments. Infrequently written, their authorship offers a unique opportunity to codify an airport's intention to integrate air cargo operations into the greater context of the airport's activity. This is particularly important for GA airports, as air cargo has historically received minimal recognition in previous airport master plans. Smaller airports routinely have outdated and essentially meaningless airport master plan documents that do little to support their present-day operations.

AIP offers entitlement and discretionary grants to fund specific projects for airports. While the majority of these grants are spent on capital projects, a significant number of airports receive funding and choose to use a portion of the money to update their airport master plan. These airports, typically smaller and classified as GA, give themselves a unique opportunity to rewrite their thinking on the role of air cargo at their facilities. Currently, many smaller airports have outdated and essentially meaningless airport master plan documents that do little to support their present-day operations. AIP sponsor guides facilitating the AIP funding process for candidate facilities note that the "preliminary planning coordination" turns toward the airport master plan to "define the scope" of a project.³¹ In this early process to secure an essential stream of funding for smaller airports, it is logical for facilities to include every facet of their operations to strengthen any future funding applications, including air cargo. With some master plans approaching two decades in age, their intermittent authorship indicates that facilities should be thorough in their composition.

Over \$1.5 million in AIP funds were distributed amongst MAFC airports for activities related to airport master planning in 2011. Two other airports, MHK and SDF have recorded intentions with significant funding to conduct "Miscellaneous" studies. Major progress can be made by smaller airports to advance any air cargo initiatives with this AIP funding for airport master plans.

Recommendations

GA airports can take a three-pronged approach to position them to improve, create, and expand existing and future air cargo operations. Airport coverage and existing service areas are adequate

³⁰ Sperry, R. Benjamin, Jeffrey E. Warner, and Jeffrey D. Borowiec. "Evaluation of the Role and Needs of Air Cargo in Texas." Texas Transportation Institute, Texas A&M University. College Station, TX. March 2008.

³¹ http://www.faa.gov/airports/central/aip/sponsor_guide/media/0100.pdf

and have largely matured within the MAFC. GA airports should minimize initiatives for expensive new infrastructure installations and instead focus on less expensive alternatives utilizing existing facilities and strong policy-making. While efforts should continue to obtain AIP discretionary funding for non-air cargo objectives, the commonplace lack of data supporting air cargo operations at the GA level is a strong indication that any advancement in its operations will arise at the local level. Financial support is difficult to justify without rigorous statistics to support funding requests.

First, the interviews conducted often revealed discrepancies between federal datasets and local anecdotes pertaining to air cargo statistics. Several airports and FBOs expressed surprise upon the research team disclosing information that the GA airport was, in fact, a relatively significant player in small air cargo operations. It can be argued the existing capacity for air cargo operations and its significance within the local economy is currently underappreciated by GA aviation officials. This foundational data conflict on air cargo operations restricts the confidence in any claims potentially made to bolster air cargo operations. A consistent methodology and solid communication between levels of government is a logical first step to insure the accurate flow of air cargo information on a national level.

These records can then be used as evidence to substantiate claims for air cargo development made to local government committees ultimately responsible for airport operations. These government entities are typically at the county level for publicly owned GA airports within the MAFC region. It is not unusual for FBOs to maintain a better sense of air cargo operations than the airports themselves. While it is adequate and acceptable for profit-seeking enterprises to remain knowledgeable about regional air cargo trends, GA airports themselves must consider the benefits of closely following air cargo trends at their facilities.

Air cargo infrastructure investments are costly endeavors regularly surpassing millions of dollars in value. It is unrealistic to expect counties and other local government agencies to invest significant portions of a capital budget into specialized projects like air cargo infrastructure given the current state of government financing. Airport directors and sizeable FBOs cited the desire to increase air cargo activity without having to invest in physical infrastructure. As such, the initiative to increase air cargo activity diverts itself from a question of transportation infrastructure assets to a line of economic development governed away from the runway tarmac. Policy-makers and economic development coordinators become more pertinent to growth than civil engineers and supply chain managers.

A region's economic development largely rests on the laurels of a community's economic policy. These policies become the second prong a GA airport can utilize to develop air cargo operations. Suites of tax incentives or breaks at the state level can lure manufacturers with an interest in utilizing a community's air cargo services. This tactic, however, has historically proven difficult and controversial both in the air sector and elsewhere.

For example, political initiatives in Missouri centered on an immense proposal for international air cargo activity at STL has proven divisive and impossible to approve. Furthermore, a proposal for an "aerotropolis" in Milwaukee rooted within the operations of MKE failed to elevate much farther beyond the confines of the Redevelopment Authority of the City of Milwaukee.³² An official with the city's Redevelopment Authority noted that the proposal was too abstract to obtain funding.³³ These cases show that grant-givers, as well as the general public, require thorough analyses to justify air cargo development investments.

As mentioned previously, better air cargo statistics can aid in the successful obtainment of adequate funding. The bureaucratic model governing airports, with ultimate power and capability of change vested in government-operated airport commissions or authorities, makes this call for economic development a difficult one to implement swiftly. Depending on the funding streams for

³² Misky, David, Redevelopment Authority of the City of Milwaukee, 22 October 2010.

³³ See supra note 32

an airport, it can become a controversial issue ultimately putting taxpayer dollars at risk if miscalculated approaches to economic development are taken.

Lastly, it is also recommended strengthening the involvement of FBOs on the frontlines of air cargo operations for smaller airports. In many cases, FBOs have a stronger knowledge of daily air cargo operations than airport administration. As one FBO stated, they have a direct financial stake in the air cargo operations of an airport. Encouraging collaboration between FBOs and administrative front office would increase communication and could eventually lead to the identification of air cargo opportunities unique to a community. FBOs frequently state they are ready and willing to accommodate increased air cargo activity with existing resources. Interviews with FBOs indicate they have the available labor and facility capacity to assist air cargo operations at a variety of levels.

Figure 17 shows a flow chart outlining a potential path toward the implementation of these recommendations for GA facilities. It is important to note that the flow chart proposes a feedback loop whose central node revolves around solid communication between local governing bodies and the GA aviation facilities they oversee.

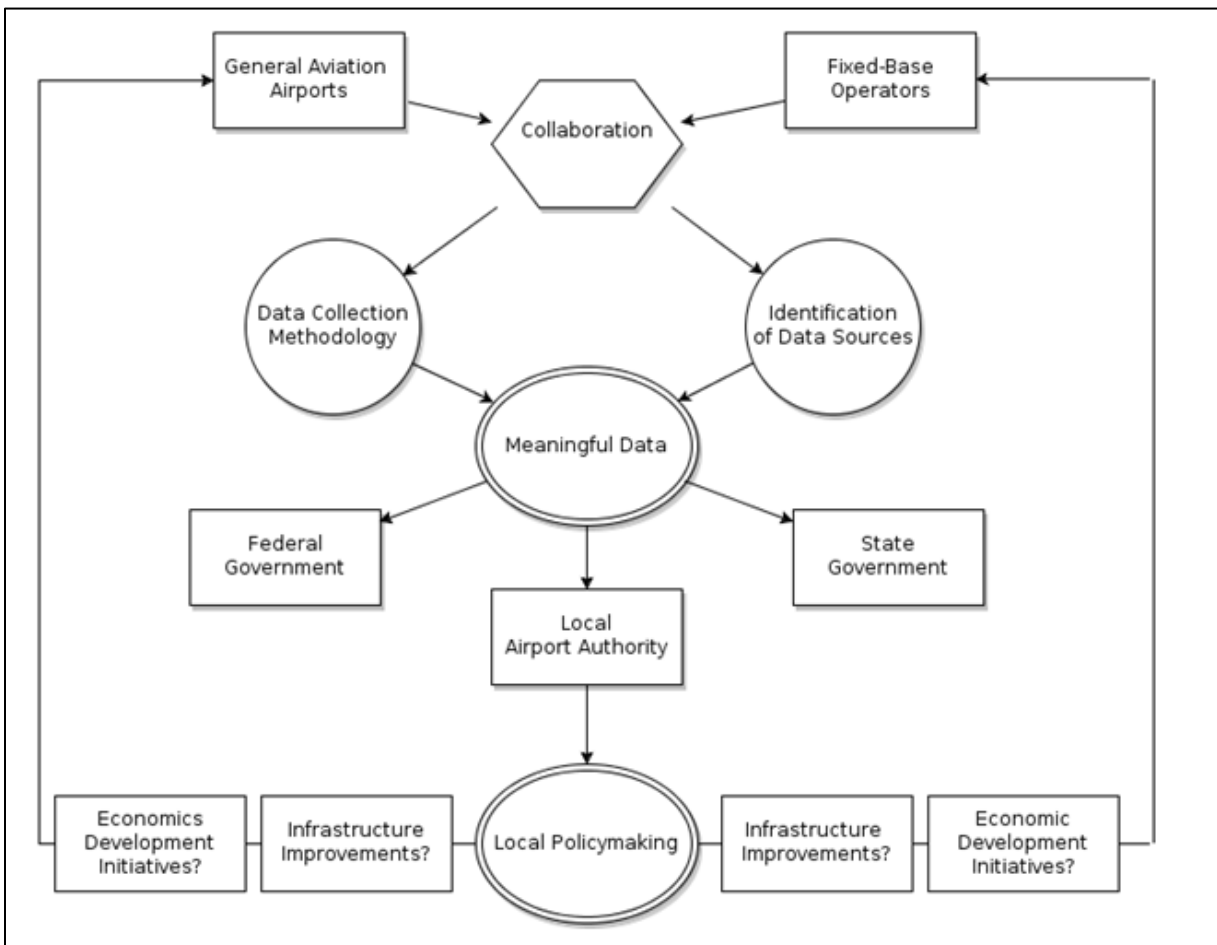


Figure 17: Suggested Path for Implementing Air Cargo Improvements at GA Airports

Chapter 7: Air Cargo Case Studies

This chapter presents five case studies of experience with air cargo at large and small airports throughout the MAFC region. The five case studies are as follows:

- Lambert China Hub Aerotropolis
- Now What?: Facility Reuse and the Aftermath of Carrier Pullout
- Parts and Planes
- Regional Contexts and Considerations
- Airport Twinning

Lambert China Hub Aerotropolis

Key Points

- Air cargo is entwined within greater political and social contexts
- Tax incentives can gain esteem by shifting from the subsidization of physical infrastructure to compensation for real cargo activity
- Air cargo policy needs special attention; the localized and capital-intensive nature of air cargo suggests it is best suited for standalone legislation.
- International gateways cannot simply be created; they develop out of market dynamics in which public entities have limited influence.

Table 46: Summary Facts: Lambert China Hub Case Study

Airport Name	Lambert – St. Louis International Airport
Airport Code	STL
Location	St. Louis, Missouri
Governance	St. Louis Airport Authority
Maximum Runway Length	11,019 Feet
Total Activity, 2010 (Tons)	82,396 Tons (49.9% Enplaned)

Courting Chinese Cargo

While Lambert-St. Louis International Airport was the MAFC's 13th busiest air cargo airport in 2010, it has experienced a significant decline in activity over the past decade. FAF value projections show a decrease in overall MAFC value percentage share in 2040, declining 0.61 percent over 2007 numbers. Only two other FAF regions project larger decreases in value share by 2040. Missouri is the only state to experience marginal growth rates of less than 1 percent over the 20-year period spanning 1990-2010. Data suggests that St. Louis is an epicenter of declining influence in MAFC air cargo activity. Couple this with declining international passenger flights and STL loses the logistics choices more active airports can offer shippers.

In an effort to spark air cargo activity and economic life into the region, St. Louis-area political and business leaders formed the Midwest-China Hub Commission in the late 2000's. With a desirable mid-continent location, representatives from St. Louis and China forged a relationship intending on

bringing a long-term air cargo hub to STL. The Commission maintained a presence in both St. Louis and China, ultimately providing the foundation for proposed legislation intended to launch the hub into existence.

Institutional Bottlenecks

In the China hub legislation's original form, the Missouri General Assembly proposed a complex of array of tax incentives worth approximately \$480 million valid through approximately 2026. After political controversy and public discourse about the merits of a large, localized, and industry-specific multi-national incentive, the bill was eventually whittled down to a much leaner proposition. It became a focal point of the Missouri's news cycle when political indecision forced it to a special legislative session. It is here, in October of 2011, that several critical points about the proposed STL China hub reveal themselves. The legislation ultimately failed to pass the legislation. As a result, it is likely the proposed China hub will not come to fruition.

Strategies to Incentivize: Physical Assets v. Operations-Based

The original version of China hub legislature passed by the Missouri House of Representatives (HB 840) focused on a tri-layer approach to tax incentives designed to accommodate the maximum number of businesses involved in all areas of air freight logistics. This included \$60 million in credits for freight forwarders as well \$420 million to instigate the construction of physical infrastructure required by air cargo activity.

Several parties objected to the heavy subsidization of expensive capital investments. The unpredictability of the industry and the possibility of building maintenance and reutilization falling to the tax payer under potential China hub failure was too great to bear. In response, the legislature largely eliminated the incentives pertaining to physical infrastructure. Instead, both the House and Senate agreed to the \$60 million intended for freight forwarders who redirected international air cargo toward STL. This was a smart redirection in policy, solely emphasizing operations-based subsidies unreliant upon more permanent assets like storage warehouses that formed the crux of earlier proposals. Policies focusing on encouraging business activity rather than their simple presence became a rare point of agreement during the process.

Integration within Political, Social, and Economic Contexts

By the time the China hub legislation reached the special session in October of 2011, it was embedded within a larger proposal reminiscent of federal omnibus bills addressing a hodgepodge of items. Credits intended to foster amateur sporting events within the state, as well as general business development and job-training funds ballooned the legislation's underlying purpose. It is unknown whether items pertaining exclusively to the China hub would have passed without the presence of these other issues. It is important to remember, however, that both the Senate and House agreed to \$60 million in cargo operations tax credits. Regardless, non-cargo related issues contributed to the derailing of what could have been a successful piece of legislation. Potential freight legislation evolves within a complex political landscape. While freight needs must operate within boundaries of any legislative process, air cargo is a specialized economic issue that requires unique policy measures.

Other communities, like Rockford, IL, Wilmington, OH and Denver, CO have been quick to draw China's attention to their air cargo facilities capable of handling significant international traffic. While a Chinese air cargo carrier has locked itself into a 2-year contract with STL for weekly shipments, China is intending to begin much more frequent service. One community's loss is another community's gain. It becomes clearer with each case that air cargo will always be viewed as a crown jewel acquisition for economic development agencies, regardless of the risk they carry.

Now What?: Facility Reuse and the Aftermath of Carrier Pullout

Key Points

- Understand the volatility of the air cargo industry and offer public assistance accordingly
- Develop contingency plans
- Account for regulatory complexity in transitioning to non-aviation facility uses
- Trim expectations of reutilization metrics like employment and economic impact.

Table 47: Summary Facts: Fort Wayne International Airport Case Study

Airport Name	Fort Wayne International Airport
Airport Code	FWA
Location	Fort Wayne, Indiana
Governance	Fort Wayne – Allen County Airport Authority
Maximum Runway Length	12,000 Feet
Total Activity, 2010	25,530 Tons (48.2% Enplaned)

The Lure of Air Cargo

In the world of economic development, air cargo operations are often considered one of the most desirable economic opportunities for a region. Labor intensive and high-value, air cargo can bring hundreds of jobs and local revenue in the form of fees, leases, federal dollars and other taxes to an economy. Once in operation, the external financial stresses for local governments associated with industrial facilities and their accompanying land uses are less costly than their residential or office use counterparts. Costly expenditures and considerations tied closely to residential or office uses, like increased school enrollment or overburdened sewage capacity, make industrial operations like air cargo possess what appears to be a desirable return on investment for local governments.

At the outset, air cargo operations require capital intensive investments. It is common, therefore, for local governments and authorities to consider the utilization of public financing in order to position themselves as a desirable location for airport operations. Local decisions to begin relationships with potential air cargo carriers are often rooted in the promise of public financing to make a project feasible for cargo companies. Fort Wayne International (FWA) and the Fort Wayne-Allen County Airport Authority (FWACAA) began such a relationship in the late 1990's with Kitty Hawk Cargo when the FWACAA issued \$34 million in bonds to cover the costs of an approximately 240,000 square foot building and accompanying ramp. This public assistance and the ensuing facilities helped prompt Kitty Hawk to relocate a large hub to FWA from a previous facility in Terre Haute, IN.³⁴ Kitty Hawk and the FWACAA agreed to a 20-year lease on the facilities. It was therefore believed that 300-400 new jobs and their economic trickle-down effects were in Fort Wayne for the long-haul.

Consequences of Early Departure

Hindsight reveals that Kitty Hawk Cargo operated out of FWA between July of 1999 and October of 2007. While agreements committed Kitty Hawk to FWA for 20 years, the company was unable to recover amidst the economic recession and rising fuel costs. The 300-400 jobs that accompanied

³⁴ Lanka, Benjamin, "Airport approves tax hike," The Journal Gazette, 19 August 2008, Fort Wayne, IN

the Kitty Hawk operations were lost, leaving behind a massive special-purpose abandoned facility and its unpaid financing. The large facility remained vacant until approximately 105,000 square feet was leased by Logistics Insight Corp. in September of 2011. Over half of the facility remains unused, but Logistics Insight is now providing financial relief to taxpayers that have been covering annual payments on bonds since the Kitty Hawk Cargo ceased operations in October of 2007.

Yearly payments by taxpayers, levied by the FWACAA within their annual budget, are not marginal. \$2 million of the FWACAA's 2012 budget is a property tax levy aimed at financing debt left unpaid by Kitty Hawk's early departure.³⁵ Passing the financial burden to taxpayers was frequently cited as a "last resort option" by the FWACAA at the time of Kitty Hawk's bankruptcy. Failed reclamation efforts as well as the inability to quickly sign new tenants necessitated its implementation.

The first tenant, Logistics Insight, is a subsidiary of LINC Logistics Company, a third-party logistics and supply chain management operation. With historical roots in the automotive industry, Logistics Insight is also capable of providing services to major sectors of the air cargo industry: aeronautics, precision instruments, and a multitude of industrial parts and machinery.³⁶ It becomes clear that stand-alone air cargo carriers will not be viable options for air cargo facility reuse. More diverse logistics providers, like Logistics Insight, could play a critical role in reutilizing these functional spaces. For Fort Wayne, an established manufacturing base that includes a General Motors plant, make the Kitty Hawk facility a viable option for entrepreneurial logistics companies.

It is important to note, though, that a multi-tenant approach will likely never arrive at the employment numbers offered by full-scale air cargo carriers. It is estimated Logistics Insight will bring approximately 36 employees to the area, far fewer than the 300-400 employed at the height of Kitty Hawk's operations. Public officials must temper their expectations of economic gain when seeking appropriate reuses for air cargo facilities.

Regulatory Hurdles

Non-aviation reuse of former air cargo facilities is difficult under parameters outlined in the FAA's *Airport Compliance Manual*, also known as Order 5190.6B. The *Manual's* Part VII Chapter 22 titled "Releases from Federal Obligations" highlights the required processes that need to be followed for the consideration of the reclassification or release of aeronautical land for non-aviation purposes. Considering many of the release qualifications and other regulations apply to the entirety of an airport, it becomes difficult to successfully repurpose aviation facilities. It is likely many airports and their governing bodies would seek temporary non-aviation uses for former air cargo facilities to generate revenue streams in the interim while more permanent plans are developed for sites. The FAA makes it clear interim uses are difficult to receive approval. The *Manual* notes that "interim use should not be approved if the proposed use will prevent the land from being recovered on short notice for airport purposes." Additionally, "interim use proposals should be carefully evaluated to ensure that what is being proposed as a temporary arrangement is not really a long-term or permanent change in land use."

³⁵ Sade, Vivian, "Airport Authority's '12 budget remains flat," *The Journal Gazette*, 27 September 2011, Fort Wayne, IN.

³⁶ www.4linc.com/aboutus/industriesserved.aspx

Parts and Planes

(The Importance of Automotive Parts Manufacturing (and Other Industries, Too) for Small-Scale Air Cargo Operations)

Key Points

- Just-in-time requirements for manufacturing needs require air cargo services that general aviation airports can feasibly provide
- The MAFC is well-positioned to consider cargo opportunities as they relate to automotive parts manufacturing facilities
- Local governments and airport authorities must root their thinking in the manufacturing realities of the community. They can distinguish themselves from other rural areas in part through the presence of a GA airport.

The Realities of GA Air Cargo Activity

GA airports often struggle to define themselves in the air cargo industry amidst large metropolitan areas with market radii extending hundreds of miles in width. In a simplified context, the air cargo potential of a given facility is largely dictated by only a handful of indicators: proximity to other air cargo facilities, size of the local and regional consumer base, and the type of industry clusters that help define a facility's area economy. The location of GA airports typically weakens their performance in two of these three aforementioned indicators. Those GA airports sited near major metropolitan areas are intended to augment auxiliary aviation activity not suitable for larger scale commercial operations. Air cargo activity thus becomes regionally centralized at these larger facilities possessing the labor and infrastructure requirements needed for smooth logistics. In addition, the rural or exurban location of many GA facilities results in small population centers that do not have the consumer base justifying demand-oriented air cargo shipments. The arrival of goods via trucks adequately serves these smaller communities. Table 48 outlines characteristics of the 10 GA airports with the most activity in 2010 by tonnage.

Table 48: Top 10 GA Airports in MAFC Region for Air Cargo Activity, 2010

GA Rank	Overall Rank	Airport Name (Code)	Total Activity (Tons)	Percent Enplaned
1	57	Gaylord Regional (GLR)	60	2.8%
2	60	Findlay (FDY)	49	2.7%
3	61	W K Kellogg (BTL)	49	22.4%
4	63	Chandler Field (AZN)	32	95.4%
5	67	Bowling Green-Warren County Regional (BWG)	29	95.5%
6	73	Columbus Municipal (CLU)	20	84.6%
7	80	Tulip City (MI2)	10	100.0%
8	82	Wexford County (CAD)	9	0.0%
9	83	Georgetown Scott County-Marshall Field (DQP)	8	0.0%
10	84	Hopkinsville-Christian County (HVC)	8	92.4%

Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data

GA airports must orient their air cargo perspective on the local industry clusters that help define the regional economy. For many GA airports, it becomes clear that the core of their air cargo activity results from automotive parts manufacturers located within their community. Interviews with directors and staff members of GA airports suggest that the relationship between these businesses and the airports form a crucial component of the rural economy. The option of air cargo services, however minimal or extensive, can help define tiers of logistics capabilities that distinguish rural economies from one another.

The Importance of Automotive Parts Manufacturing

Air cargo is particularly appropriate for certain types of commodities. This is repeatedly documented throughout Chapter 5's analysis of air cargo value data. The FAF commodity group of electronics, motorized vehicles (including parts), and precision instruments comprised over 50 percent of the total value of MAFC air cargo goods, amounting to more than \$78 billion. Interview contacts confirm that automotive parts manufacturing form the crux of air cargo opportunities throughout the smaller population centers and economies throughout the MAFC.

Indeed, evidence of the importance of automotive parts manufacturing in these smaller economies mounts as anecdotes from community leaders accumulate. Gaylord, MI and the surrounding region has several Tier II and Tier III automotive parts manufacturers. GLR is the MAFC's most active cargo airport. A contact familiar with BWG in Bowling Green, KY, the 5th most active GA airport, attributed the vast majority of that airport's cargo activity to the proximity of the Corvette assembly plant located nearby. The presence of the assembly plant has spurred secondary businesses and parts manufacturers related to the automotive industry. In some cases, it is possible GA tonnage is derived from the back-and-forth shipments between business partners related to the correction of physical errors and imperfections in the manufacturing process.

Columbus Municipal Airport in Columbus, IN, the 6th most active air cargo further cements the role of automotive parts manufacturing in small-scale air cargo operations. NTN Driveshaft, Inc. is located less than 13 miles from the CLU tarmac. NTN Driveshaft, Inc. is of the world's leading bearings and constant velocity joints. While they are headquartered in Japan, a major North American outlet is operated out of Columbus, IN. This is in addition to the global headquarters of Cummins Inc., one of the largest engine and machinery companies in the world, ranked 150th in the 2012 Forbes 500.

The automotive parts manufacturing industry is particularly robust in the MAFC. An analysis of the US Census Bureau's County Business Patterns reveals a strong centralization of the industry within the confines of the MAFC. Table 49 presents detailed statistics on automotive parts manufacturing establishments and their employees that are located in the MAFC region. Data represents 2009 figures, the most recent year of data available, and is from the U.S. Census Bureau's County Business Patterns dataset. Automotive parts manufacturing is a critical industry cluster within the MAFC that fosters air cargo service needs. Almost 258,000 of the approximately 424,000 automotive parts manufacturing employees work within the MAFC. This is approximately 61 percent of the total automotive parts manufacturing workforce nationwide. The MAFC captures an even greater share of the country's annual payroll in the industry at over \$12.6 billion dollars, 65 percent of the industry's nationwide total. This indicates the relative robustness of the industry within the MAFC compared to the rest of the country.

It is also important to consider the size of these establishments. While smaller manufacturing companies are less likely to produce goods at a scale that necessitates air cargo services, they do represent potential areas of growth. Over 59 percent of the 2,361 manufacturing establishments in the MAFC employ less than 50 people. Interviews conducted with contacts at smaller airports throughout the region suggest there is a significant presence of Tier II and Tier III small automotive parts manufacturers throughout the MAFC's micropolitan areas. There are 106 establishments with large workforces of over 500 people. The highest concentrations of these large manufacturing

facilities are located in Michigan, Ohio, and Indiana. Indeed the four MAFC states hosting the largest manufacturing facilities employing 1,000 people or more account for over 71 percent of the total large manufacturing facilities in the country. The MAFC is decidedly car country. Interviews conducted suggest that the permeating economic effects of these automotive manufacturing facilities on the MAFC's smaller airport facilities are far-reaching and difficult to quantify. It is important for local officials to consider the characteristics of their local manufacturing industries within the regional contexts outlined in Table 49. Officials and decision-makers need to be aware of the presence of air cargo-generating manufacturing centers. There are many.

Table 49: Automotive Parts Manufacturing Industry Statistics, MAFC States, 2009

State Name	Paid Employees	Annual Payroll	Number of Establishments by Employees					
			Total	Size (1-49)	Size (50-99)	Size (100-499)	Size (500-999)	Size (1000+)
Illinois	19,177	803,399	267	182	37	41	6	1
Indiana	45,337	2,629,312	333	184	46	84	12	7
Iowa	4,722	165,754	55	33	6	15	1	0
Kansas	1,684	55,198	38	27	6	5	0	0
Kentucky	26,035	981,055	155	57	22	65	11	0
Michigan	81,924	4,324,494	709	405	101	166	25	12
Minnesota	2,175	80,807	68	61	0	7	0	0
Missouri	9,380	345,806	141	99	8	31	3	0
Ohio	57,704	2,836,143	466	264	66	109	19	8
Wisconsin	9,809	379,995	129	85	16	27	1	0
Total MAFC	257,947	12,601,963	2,361	1,397	308	550	78	28
Total U.S.	424,294	19,387,710	5,270	3,652	511	940	128	39
Percent MAFC	60.8	65.0	44.8	38.2	60.3	58.5	60.9	71.8

Source: U.S. Census Bureau County Business Patterns Database

It is clear that the location of automotive parts manufacturing facilities is closely tied to the proximity of large scale automobile and truck assembly plants. There are approximately 37 automobile and truck assembly plants operating within the MAFC today. 13 of these are located in Michigan. Five are located in Indiana. Eight are located within Ohio³⁷. It is expected these larger automotive parts manufacturers are serving as Tier I suppliers for nearby automobile and truck assembly plants. The operation of a significant automobile and truck assembly plant instigates industry clusters that require air cargo services. It is here where smaller GA airports can generate meaningful cargo activity related to just-in-time manufacturing.

Limitations of Automotive Parts Manufacturing and Air Cargo Activity

Contacted airports and surrounding businesses cautioned against the intermittent nature of what is otherwise a beneficial automotive parts manufacturing industry to the air cargo sectors. Oftentimes cargo activity at smaller airports are seasonal, aligning with the just-in-time manufacturing requirements and production schedules of automobile and truck assembly plants throughout the

³⁷ Data from *Automotive News*, 2010. From thinkkentucky.com.

region. Particular parts orders can drive activity over the course of a month or two, as is the case at CLU in Columbus, IN. March and April of last year saw heavy activity as NTN Driveshaft, Inc. pushed production to meet temporary demand. LAF in West Lafayette, IN saw similar seasonal activity aligning with the needs of the Subaru plant located nearby.

Car manufacturing facilities are historically fickle enterprises, reflecting the unpredictable nature of the air cargo industry itself. The well-documented experiences of “company towns” souring after significant employers close manufacturing facilities, like Janesville in Wisconsin or Flint in Michigan, are reminders of the bottom-line emphasis private companies are forced to consider in their operations decisions. It is important, therefore, for local and regional officials to recognize that automotive manufacturing and its wide-ranging secondary industries are not panaceas to help fulfill air cargo initiatives. Rather, they are stepping stones in which officials can begin to consider the array of manufacturing industries that require air cargo services.

Every Airport’s Data Have a Story

It is important for local officials, their airports, and surrounding businesses to know the stories behind their community’s air cargo data so they can position themselves to make the most efficient and cost-effective decisions as possible to develop air cargo activities. Air cargo activity at smaller GA airports is not restricted to motor vehicle parts manufacturing. A large part of the story behind FDY’s 49 tons of activity in Findlay, OH involves the proximity of a Whirlpool appliances manufacturing facility nearby, one of the world’s largest. A contact noted that, at times, shipments stream in from Laredo, TX via Mexico to ensure production does not stall at the Findlay manufacturing facility. The shipments of large numbers of circuit boards in a precisely timed manner represent the core role air cargo plays in communities. Manufacturing facilities depend upon the resources and facilities local airports provide to their community.

Battle Creek’s BTL in Michigan registered considerable GA air cargo activity in 2010. An investigation of the airport facilities and local economy in Battle Creek indicates it is likely that Duncan Aviation and WACO Classic Aircraft generate sizeable air cargo activity at the airport. Duncan Aviation identifies itself as one of the largest maintenance, repair, and overhaul companies focused on smaller aircraft, primarily for business needs, in the country. With the Battle Creek facility adjacent to BTL capable of comprehensive aircraft maintenance and support, just-in-time logistics needs are required to ship time-sensitive aircraft parts. A Duncan Aviation contact noted that the company’s Lincoln, NE facility is the optimal location for standard parts shipments. However, considerable activity is generated at Battle Creek for critical time-sensitive needs. Couple BTL’s other classic aircraft manufacturing tenants of WACO Classic Aircraft and their subsidiary Centennial Aircraft Services, BTL has positioned itself to experience consistent shipments for just-in-time needs in the aircraft maintenance and manufacturing industry. In addition, the 10,000’ runway at BTL to service the Air National Guard’s 110th Tactical Air Support Group extends the versatile capabilities of BTL.

Once local officials and decision makers understand the connection between their local economies and the community’s general aviation facilities, they can begin to augment the existing relationship with efficient value-added approaches to air cargo improvements. Local officials must consider the regional contexts in which local GA facilities operate.

Regional Contexts and Considerations

Key Points

- The decisions of one air cargo facility have significant impacts on many others
- The maturation of the industry suggests reinvestments in established centers of activity are more feasible than projects intended to initiate new centers of growth
- Airports and their governing bodies employ strategies of regional separation by offering financial incentives or elements of regional partnerships by attempting airport twinning.

Regional Focus

More so than any other mode of transportation, aviation systems must operate at regional scales whose boundaries stretch hundreds of miles wide. This forces a fundamentally different perspective on the decision-making process that must account for aviation facilities not only in neighboring metropolitan regions but also across multiple states. What should be of concern to Milwaukee is not just itself, but activity in Madison and Chicago. Stretching further, operations in Rockford, Indianapolis, and Rockford should also be taken into account. While these regional contexts are infinitely dynamic, it is crucial to think beyond the tarmac of a home airport.

The air cargo industry is moving toward increasingly concentrated nodes of activity. The market has matured enough where major infrastructure projects at newly proposed cargo hubs are not likely to operate at economically beneficial scales. It is important for local officials and decision-makers to understand their airport facilities and surrounding economies are likely bounded to the fringes of total air cargo activity in the MAFC regardless of proposed cargo improvements. This is not a detriment to air cargo planning. Instead, it is a scoping mechanism that should help set realistic goals and objectives for a community's air cargo planning activities. The following analysis will identify key concepts and examples of the regional context to help local officials and other decision makers consider the strongest and most effective air cargo options available.

Adequate Coverage: Different Ways to Think About Proximity to Other Air Cargo Facilities

Geographic coverage of air cargo facilities is best understood through meaningful filters. Runway length is often used as a proxy for air cargo capabilities. The longer a runway is, the more service capabilities it can provide to a variety of users. For the purposes of this study, parameters established by the Texas Transportation Institute in 2008³⁸ will be used to determine thresholds of runway length and mileage radii that help determine cargo facility capabilities and service areas. TTI uses 8,000' and 10,000' classifications for runway length and 100-mile radii for coverage.

Cargo markets are also linked through their potential to be threaded together by the use of U.S. Customs and Border Protection's (CBP) Foreign Trade Zones (FTZs). The capability of an air cargo facility to be located within a foreign trade zone is typically considered a desirable attribute that can add value to a facility's potential. More discussion of the implications of FTZ for air cargo is found in Chapter 3. The following maps presented display the impressive level of coverage MAFC air cargo facilities achieve throughout the region. Approaches to air cargo improvements must be made with the acknowledgement of these spatial relationships.

³⁸ See supra note 30

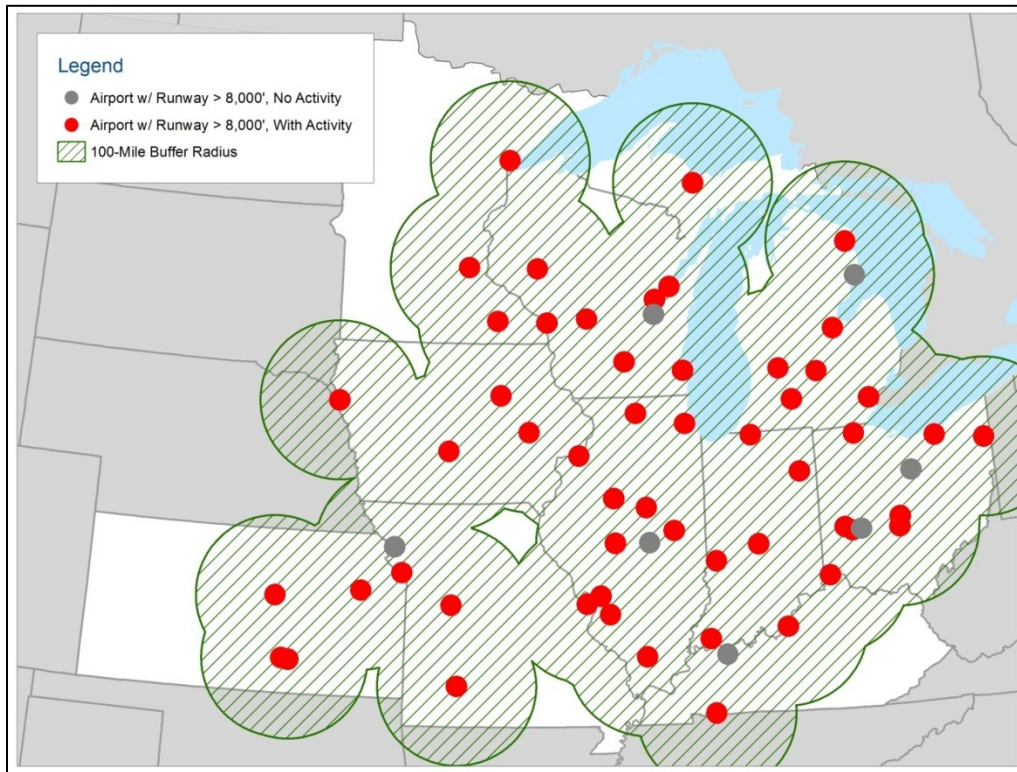


Figure 18: 100-Mile Radius, Airports with Runways Greater than 8,000'

Figure 18 displays 100-mile radii around every MAFC airport with a maximum runway length of more than 8,000'. Of airports located within the MAFC, spatial coverage of runways over 8,000' is comprehensive, with the majority of the region served by adequate cargo facilities. Most areas experience overlapping 100-mile service areas. Portions of western Minnesota, western Kansas, and eastern Kentucky appear to be underserved, but these areas are in proximity to other non-MAFC facilities in places like Grand Forks or Nashville. Coverage of 8,000' runways in the MAFC is not a problematic issue.

Figure 19 displays 100-mile radii around every MAFC airport with a maximum runway length of more than 10,000'. There is significantly less coverage of the MAFC by airports with the most capable air cargo infrastructure. Central Wisconsin, and the majority of Iowa lose coverage provided by MAFC facilities. Air cargo facilities in Minneapolis-St. Paul and Duluth form an isolated service area of 10,000' runways removed from the rest of the MAFC. The eastern half of the MAFC is adequately served by 10,000' runways. The I-70 corridor in Missouri and Kansas form the foundation of the MAFC's western 10,000' runway service area. It is connections like these between aviation facilities and surface transportation infrastructure that local officials should leverage as they move through the air cargo decision-making process.

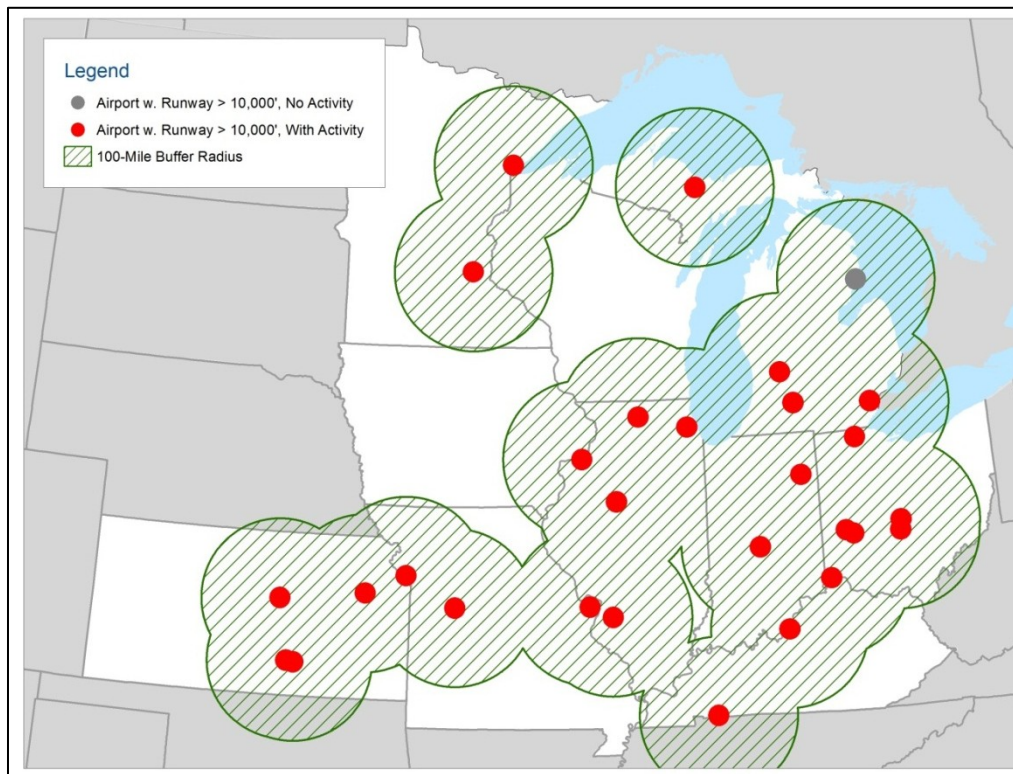


Figure 19: 100-Mile Radius, Airports with Runways Greater than 10,000'

Industry Consolidation and Maturation

The two most active air cargo airports in the MAFC registered more than 55 percent of the region's total tonnage in 2010. The top 10 airports registered over 90 percent of the region's total tonnage in 2010. There were 130 airports with air cargo activity in 2010. 99 percent of the MAFC's total 2010 tonnage occurred at the top 24 airports. The industry is incredibly concentrated within just several critical nodes of activity.

Large FedEx and UPS air cargo carrier hubs have hugely influenced historical MAFC air cargo flows, as demonstrated in Chapter 4. Activity has concentrated itself within major hubs in Louisville, Indianapolis, Toledo, and Rockford. Industry contacts have consistently noted that the focus of major air cargo carriers will not be the construction of new air cargo facilities, but rather the increased efficiency and reinforcement of strong-performing existing air cargo hubs.

This reinforcement of and investment in existing infrastructure is occurring within the MAFC. The best example of reinforcements to an existing major air cargo hub is the announcement of the Chicago O'Hare International Airport Northeast Cargo Center in May of 2012. The Northeast Cargo Center represents a \$200 million investment in and expansion of existing air cargo facilities at the airport. Chicago and Mayor Rahm Emanuel expect the large investment to spur 1,200 construction jobs and 1,200 permanent jobs³⁹. This is in addition to 10,000 jobs created indirectly throughout the region created by the presence of the Northeast Cargo Center. Perhaps more important is the nature of the facility improvements will set up ORD to continue commanding significant air cargo activity to its operations. With the ability to land next-generation jumbo aircraft and the provision of 820,000 square feet of additional cargo buildings, Chicago is capitalizing on what they view to be

³⁹ "Mayor's Press Office. "Mayor Emmanuel Announces Major Cargo Project at O'Hare International Airport." 14 May 2012. http://www.cityofchicago.org/city/en/depts/mayor/press_room/press_releases/2012/may_2012/mayor_emanuel_announcesmajorcargo-project-to-hare-international-airp.html

an opportunity to strengthen its global presence in the air cargo industry. These investment decisions will have impacts on the rest of air cargo industry throughout the MAFC.

Table 50: Cumulative Share of MAFC Top 10 Airports, 2010

Rank	Airport Name	Total Activity (Tons)	Percent Share	Cumulative Share
1	Louisville International	2,391,434	34.2%	34.15%
2	Chicago O'Hare International	1,510,121	21.6%	55.72%
3	Indianapolis International	1,019,760	14.6%	70.28%
4	Cincinnati/Northern KY International	410,485	5.9%	76.14%
5	Minneapolis-St. Paul International	246,297	3.5%	79.66%
6	Detroit Metro Wayne County	204,820	2.9%	82.58%
7	Toledo Express	190,042	2.7%	85.30%
8	Chicago/Rockford International	158,378	2.3%	87.56%
9	Rickenbacker International	106,211	1.5%	89.08%
10	Kansas City International	95,429	1.4%	90.44%

Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data

Louisville International Airport, SDF, is also a good example of how air cargo activity is concentrating itself into a few locations where significant air cargo investments and facility reinforcements are being made. Over \$1 billion was invested by UPS in their global Worldport hub facility since 2006⁴⁰. Expanded services and capabilities widen a facility's service radius, making it difficult for other airports with less-established air cargo activity to carve out a sustainable market. As such, some metropolitan areas are at a disadvantage at the onset of initial air cargo development considerations because of these regional contexts. Other metropolitan areas might experience opportunities to develop air cargo activity because of regional contexts that play in their favor. The following sections below highlight some potential areas of air cargo activity decline and growth when considering the regional dynamics of the air cargo industry.

Area of Potential Decline in Activity Due to Regional Contexts: Milwaukee, WI

Milwaukee and General Mitchell International Airport, MKE, are positioned to experience the negative effects of the regional dynamics of the air cargo industry. The large O'Hare investment in Chicago damages future air cargo potential for MKE. With longer runways, more warehouse space, and a wider variety of air cargo support businesses to supplement logistics operations, ORD is well-positioned to capture the business of companies considering air cargo services.

A strength Milwaukee and MKE could potentially promote to air cargo users is proximity to Chicago and its exurban manufacturing facilities and population centers of consumption. There could potentially be time-savings in the delivery of goods to northern and western portions of Chicagoland compared to O'Hare given the airport's heavy periods of traffic congestion. However, RFD in Rockford has focused its cargo efforts on promoting itself as the premier alternative to traffic and freight congestion surrounding ORD. RFD and MKE are located approximately 73 miles from ORD, almost equidistant. RFD has been implementing air cargo infrastructure to support their claims of performance and standards comparable to those of ORD. Research suggests these efforts are resulting in significant positive benefits to RFD. RFD was the MAFC's 8th busiest air

⁴⁰ UPS Worldport Facts. <http://pressroom.ups.com/Fact+Sheets/UPS+Worldport+Facts>

cargo facility in 2010. It also hosts one of the largest UPS hubs in the country. The projected Milwaukee, WI CSA FAF region average annual growth rate for the value of all shipments is 6.3 percent, 2.1 percent lower than the Remainder of Illinois FAF region's AAGR.

Milwaukee must compete with these high-quality logistics options that have established and larger air cargo operations. It is unlikely Milwaukee would shift significant amounts of air cargo activity to its facilities, regardless of infrastructure improvements. Evidence suggests air cargo markets are well-established. If Milwaukee were to experience positive shifts in air cargo activity, they would likely occur in small amounts, related more to local manufacturing needs than due to fundamental changes in regional air cargo operations.

Area of Potential Increase in Activity Due to Regional Contexts: Twin Cities

Minneapolis-St. Paul and MSP are positioned to experience the positive effects of the regional dynamics of the air cargo industry. The Minneapolis-St. Paul region has several positive regional attributes that indicate the potential for strong and consistent air cargo growth. MSP and the Minneapolis-St. Paul region maintain one of the only available 10,000' runways in the northwest portions of the MAFC. The nearest 10,000' runway is over 160 miles away at DLH in Duluth. The next furthest 10,000' runway is in Rockford, IL, more than 340 miles from MSP. The regional isolation of the Minneapolis-St. Paul region and the lack of competing highly-capable facilities is a significant boon to the area's air cargo industry. It brings stability and reliable business when the area's businesses and manufacturing centers require air cargo services.

According to FAF data analysis, this stability and growth in air cargo activity is projected to continue over the next 30 years. The Minneapolis-St. Paul region is projected to experience 2010-2040 average annual growth rates at or above the MAFC average. More importantly, however, is the projected balance between air cargo imports and exports. Many of the 26 MAFC FAF regions have significant percentage value differences between From and To shipments. 19 of the FAF regions are projected to show between 0.7 and 7.2 more percentage points of To shipment values than From shipment values. The Minneapolis-St. Paul MN-WI CSA (MN Part) FAF region is projected to have the most balanced commodity values between To and From shipments. This potentially makes the Minneapolis-St. Paul region's air cargo industry less vulnerable to large changes in the national and global economies as they relate to import and export shipments. The consumption demand of the region's large population base is the primary generator of air cargo activity, not large manufacturing facilities. This is less likely for those FAF regions with less robust population centers, like Iowa and Remainder of Illinois, that are projected to experience robust growth in To or import air cargo shipments to their air cargo facilities. The significant service area that must rely upon the Minneapolis-St. Paul region's air cargo capabilities because of a lack of options helps ensure the area's air cargo stability.

Strategies to Maintain Relevancy in the Regional Landscape

The mature nature of the air cargo industry within the MAFC forces airports to develop business strategies that offer services and incentives unique to the MAFC and the greater national air cargo industry. Some large airport governing bodies responsible for the oversight of multiple airports are capable of "twinning" nearby aviation facilities to establish a micro-regional approach that centers on the production and consumption centers of major metropolitan cities. Most airports and governing bodies, however, are forced to compete through discounted and incentivized fees. Smaller airports relying upon intermittent and opportunistic cargo activity must continually implement facility improvements through a variety of means to stay in contention for potential business at the regional level. Foreign Trade Zones (FTZs) are becoming another critical tool linking aviation facilities to other infrastructure facilities and centers of trade across metropolitan regions. See Chapter 3.6 for a detailed discussion about FTZs and air cargo in the MAFC.

“Twinning” Airports

Key Points

- The separation of airports into passenger and cargo airports, known as twinning, can bolster the regional appeal of a metropolitan area
- Airport twinning, however, adjusts regional competition to a larger scale rather than eliminating it
- A restructuring of airport governance models to reflect statewide interests could ultimately strengthen the overall aviation system

The mature nature of the air cargo industry within the MAFC forces airports to develop business strategies that offer services and incentives unique to the MAFC and the greater national air cargo industry. Some large airport governing bodies responsible for the oversight of multiple airports are capable of “twinning” nearby aviation facilities to establish a micro-regional approach that centers on the production and consumption centers of major metropolitan cities. Most airports and governing bodies, however, are forced to compete through discounted and incentivized fees. Smaller airports relying upon intermittent and opportunistic cargo activity must continually implement facility improvements through a variety of means to stay in contention for potential business at the regional level.

Detroit, MI and Columbus, OH

Several larger airport authorities have created airport “twins” that establish a partnership between a core passenger facility located near a major central business district and a supplemental airport designated primarily as a cargo facility. The cargo airports are typically located between five and 20 miles away from their larger passenger-based counterparts. Transformative state-level policies could expand the “twinning” concept to a much larger geographic scale than what currently exists. Currently, twinning strategies are limited to airport authorities with jurisdiction over a variety of aviation facilities. Regardless, their strategies are important to review as multi-facility, regionally focused approaches.

One of the most significant twinning efforts in the MAFC links the Detroit region’s Willow Run Airport (YIP) and Detroit Metropolitan Airport (DTW) to offer a complete logistics package to businesses that are prospective air cargo users. The implementation of the public-private Aerotropolis Development Corporation (ADC) and the Detroit Region Aerotropolis by state government and the Wayne County Airport Authority (WCAA) is therefore a demand-side strategy harnessing YIP and DTW as premier tools of economic development. Promotional efforts by the ADC focus on regional aspects like talent depth of the available labor pool, the thriving precision manufacturing research and development cluster, and proximity to international crossings rather than the specifics of the airport facilities themselves.⁴¹ YIP is the MAFC’s most active reliever airport, moving 3,176 tons in 2010. Historic activity at YIP suggests that it carries significant potential as a reliever airport to foster cargo activity. YIP is also well positioned to take advantage of the traditional epicenter of the automotive manufacturing industry that encompasses the Detroit metropolitan area.

The YIP-DTW twinning is also important for the jurisdictional collaboration it has generated within the region, reducing elements of competition between communities to attract economic development. The partnership of seven communities surrounding YIP and DTW, located approximately 15 miles apart, represents a movement toward focusing on the vitality of freight regions instead of specific freight facilities.

⁴¹ Byers, Raymond. “Detroit Region Aerotropolis.” TRB Annual Meeting. 24 January 2012. Presentation.

The Columbus Regional Airport Authority's (CRAA) twinning of Rickenbacker International Airport (LCK) and Port Columbus International Airport (CMH) in Ohio represents a large scale supply-side strategy to attract air cargo business. As an all-cargo airport, LCK was 2010's 9th most active air cargo facility in the MAFC moving over 106,000 tons of goods. The facility is a highly-capable air cargo airport, with two 12,000' runways, far longer than the 7,500' runway YIP maintains. CRAA does not brand the LCK-CMH twinning as heavily as the WCAA. There is no attempt at defining the facilities as an aerotropolis. Communication efforts focus primarily on facilities: warehouse space, long runways, the presence of regional hubs for major cargo carriers, advanced ILS systems, and on-site development opportunities.

Limitations of Twinning Airports

While the DTW-YIP and CMH-LCK twinings represent strategies to foster air cargo growth, they also symbolize the flexibility and resource advantages large airport authorities have over their smaller counterparts. Rural GA airports have no other option to but to continue their gradual implementation of small-scale facility improvements while their metropolitan neighbors invest incredible amounts of money on infrastructure projects.

Airport twins are also restricted to relatively small geographic areas. Genuine regional thinking must occur at larger scales. While aviation assistance programs are administered at the state and federal levels, airport twinning strategies are largely constricted to metropolitan areas. As such, twinning airports continues to spur regional competition, albeit it at a different scale. It becomes not airport versus airport, but metropolitan region versus metropolitan region or airport authority versus airport authority.

Twinning at a Different Scale

The consideration of airport twinning directed at the state level could be a transformational policy tool that streamlines air cargo operations and leverages the regional mindset that defines the industry. It would also require a significant overhaul of airport interactions, forcing a rethinking of the regional role specific aviation facilities play within the greater fabric of available services offered throughout a specified area. This is likely a primary reason why attempts at large-scale regionalism have never been formally attempted at the state level.

Over a decade ago, Minnesota has addressed the concept of inter-metropolitan area twinning in order to bolster the air cargo presence of the state's premier facility, MSP in Minneapolis-St. Paul. In a 2001 study commissioned by the Minneapolis-St. Paul Task Force intended for the Metropolitan Airports Commission (MAC) to consider long-term air cargo strategies, the authors suggested a "mandate" to upgrade "an existing regional airport to be a cargo 'twin' for MSP."⁴² What makes the report's proposal notable is the suggestion to consider an airport facility located in St. Cloud, Duluth, Rochester, or Wilmar.⁴³ Each of these airports has their own respective governing authority. They are all at least 70 miles away from MSP, a significant departure from the twinning distances of less than 20 miles in intra-authority facilities. The report suggests that "governance over these airports should be with one centralized authority to ensure the practical integration of the two operations."⁴⁴ Obtaining the political capital and energy to consider such a structural change in airport governance, however, is extremely difficult.

Recent investments in airports throughout eastern Minnesota indicate the political and economic realities of the greater MAFC aviation system. In 2010 the MAC approved the MSP Long Term

⁴² SITA Logistics Solutions. "Minneapolis-Saint Paul Air Cargo Study." December 2001.

<http://www.dot.state.mn.us/aero/avoffice/pdf/mspaircargostudy.pdf>

⁴³ See supra note 42

⁴⁴ See supra note 42

Comprehensive Plan (LCTP) with over \$2 billion in facility improvements over the next 20 years.⁴⁵ In 2009, St. Cloud Regional Airport, approximately 70 miles away spent \$5 million to construct a new terminal that now experiences little traffic. Hindsight suggests the airports' investments are incompatible and symbolize the inherent difficulties of operating a sustainable aviation system at the regional scale. Indeed, in 2011 momentum was generated to rethink governance structures upward to the state level, potentially transforming the MAC into the Minnesota Airports Commission and developing a statewide aviation strategy.⁴⁶ The Metropolitan Airports Commission maintains authority. It is likely any foundational changes to airport governance structures will be initiated by significant regional disparities in passenger activity, similar to the Minnesota experience.

⁴⁵ Metropolitan Airports Commission. "MSP Long Term Comprehensive Plan Update." June 2010. http://www.msairport.com/about-msp/airport-improvements/ltcp_final_document.aspx

⁴⁶ Doyle, Pat. "St. Cloud airport has everything but flights." Minneapolis Star Tribune. 4 April 2011. <http://www.startribune.com/local/119100799.html>

Chapter 8: Conclusions

This chapter presents the conclusions from this study of air cargo in the 10-state Mid-America Freight Coalition (MAFC) region, including a summary of the key findings, recommendations for airport planning practice, and suggestions for future research.

Summary of Findings

The MAFC region is home to almost 68 million people with a total region GDP of almost \$3 trillion (2010). The location of the MAFC region in the Midwestern U.S. is strategic for all types of freight transportation, including air cargo transportation. The primary benefits of transporting cargo via air are related to the speed of delivery, which benefits both time-sensitive and value-sensitive cargoes. The typical commodity shipped by air is high-value and generally low-weight.

The geographic scope of this analysis included all airports in the 10-state MAFC region which are included in the FAA's *National Plan of Integrated Airport Systems* (NPIAS). A total of 817 airports in the 10 states are included in the NPIAS, of which 80 are classified as commercial, 62 as reliever, and 675 as general aviation airports. Many major air cargo hubs are located within the MAFC region, including Louisville, KY (SDF), Indianapolis, IN (IND); Chicago, IL (ORD); Rockford, IL (RFD); and Cincinnati/Northern Kentucky (CVG). Facilities supporting air cargo in the MAFC region include 9 independent cargo screening facility locations, 81 freight forwarder screening facility locations, and 48 foreign trade zones.

Data from the U.S. DOT Bureau of Transportation Statistics, Office of Airline Information were used to analyze air cargo activity in the MAFC region by weight. A total of 7,002,396 tons of air cargo were enplaned or landed at 130 airports in the MAFC region in 2010. Since 1990, air cargo activity in the MAFC region has increased by 7.3 percent annually, with most of this growth taking place between 2000 and 2004. More than 80 percent of activity by weight was enplaned or landed at airports in Kentucky (40 percent), Illinois (25 percent), and Indiana (15.1 percent). These states are home to the four busiest airports in the MAFC region in terms of air cargo tonnage: Louisville International, Chicago O'Hare International, Indianapolis International, and Cincinnati/Northern Kentucky International. These four airports accounted for more than three-quarters of all air cargo activity by weight in 2010. A vast majority of air cargo is transported on flights that are operating according to a published schedule on aircraft that are operated as "all cargo" type aircraft. Top carriers of air cargo include major express carriers (e.g. UPS/FedEx), passenger airlines (e.g. United/Delta/American), and all-cargo airlines (e.g. ABX Air/Polar Air Cargo).

Data from the Federal Highway Administration Freight Analysis Framework, Version 3.2 were used to analyze air cargo activity by shipment value and commodity type. Total air cargo shipments originating or terminating in the MAFC region were valued at more than \$155 billion in 2010. The top three states by value were Illinois, Kentucky, and Ohio. The top five commodities transported via air to/from the MAFC region in 2010 were electronics (25.6 percent by value), machinery (20.2 percent), precision instruments (13.6 percent), pharmaceuticals (9.5 percent), and transport equipment (8.8 percent). Air cargo between the MAFC and countries in Europe and Eastern Asia accounted for a majority of international activity in 2010. Air cargo activity (by value) in the MAFC region is expected to grow 4.9 percent annually between 2010 and 2040, with the fastest growth projected to be in Iowa (6.9 percent), Minnesota (5.6 percent), and Ohio (5.3 percent).

Case studies of experience with air cargo at large and small airports throughout the MAFC region were also presented. The Lambert China Hub Aerotropolis case study examined the efforts in St. Louis to attract international air cargo from China while the Fort Wayne International Airport case study examined issues related to facility re-use after a carrier pullout. Regional contexts and considerations were also examined, noting the interrelationship between the agendas of individual airports, proximity among airports competing for air cargo traffic, and the complexity of the air

cargo industry. Finally, a case study on a multi-airport collaboration known as airport “twinning” demonstrated how a region could focus passenger investments at one airport and cargo investments at another, yielding positive results for the overall region.

The role of general aviation airports was also examined in this report. A total of 316 tons of air cargo were enplaned or landed at general aviation airports in the MAFC region in 2010, less than one-tenth of one percent of the overall region’s total. The most active general aviation airports in terms of cargo included Gaylord (MI) Regional Airport (GLR, 60 tons); Findlay (OH) Airport (FDY, 49 tons); and Battle Creek (MI) Kellogg Airport (BTL, 49 tons). A case study was presented examining the role of general aviation airports in supporting local automotive parts and other manufacturing sectors. Specifically, air cargo at general aviation airports supports just-in-time manufacturing requirements by allowing access for overnight deliveries that avoid costly downtime on the assembly line. Airports in cities such as Battle Creek and Gaylord, Michigan; Columbus, Indiana; and Bowling Green, Kentucky were noted as examples of locations where local manufacturing has benefitted from the availability of air cargo services. Statistically, general aviation cargo activity forms a relatively small piece to the air cargo profile of the MAFC region. However, it is vitally important to the industries, businesses, medical professionals, and consumers who use it. Air cargo at general aviation airports are critical to the businesses, customers, and families in the towns and region served by these airports.

Recommendations

Based on the analysis and findings presented in this report, the following recommendations are presented for consideration. First, it is recommended that airport planners and decision-makers study this report and understand the basic structure and components of the air cargo industry, including a recognition that the air cargo industry within the MAFC is nearing maturity in such a way that additional localized improvements will yield only marginal gains in air cargo activity in a particular community. This will allow for future investment decisions related to air cargo to be framed in the proper context and help set realistic goals and objectives for a community’s air cargo planning activities. Second, this report analyzed air cargo data from two publicly-available data sets. These data provide valuable insights into air cargo operations for a particular airport. It is recommended that airport planners and decision-makers utilize these data wherever possible in the decision-making process. Finally, it is recommended that, for smaller airports, airport planning should include the airport FBO if it is not already involved – the “front line” insights provided by the FBO may be helpful in the process.

Future Research

This report provided an overview of air cargo in the MAFC region. There are many topics covered in this report that are worthy of more detailed research efforts in the future. The most obvious area of future research is to better-define the role and benefits of air cargo services at general aviation airports. Quantifying the economic impacts of air cargo investments at general aviation airports would be useful for planning, programming, and local decision-making. A more in-depth study with additional emphasis on qualitative interviews of airport personnel and industry representatives would also be helpful. Another potential area of future research is the multi-airport phenomenon in the broader context of the long-haul and local/regional freight distribution systems. The future of air cargo transport appears to be rooted in the inter-continental movement of cargo between the MAFC region and international destinations in Asia and Europe. Future research might focus on understanding how to leverage investments in air cargo to support local and regional economies. Finally, future research should seek a greater understanding of the types of commodities being transported by air in order to provide better information in support of planning and construction of landside facilities and other investments.

Appendix A: State Summaries

This Appendix contains summaries of air cargo for each state in the 10-state MAFC region. Each summary includes contact information, basic data on air cargo operations, and a discussion.

- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Michigan
- Minnesota
- Missouri
- Ohio
- Wisconsin

State Summary: Illinois

Contact Information

Illinois Department of Transportation – Division of Aeronautics
 1 Langhorne Bond Drive
 Capital Airport
 Springfield, IL 62707
 Phone: 217-785-8500 | Fax: 217-785-4533
 Director: Susan Shea

Air Cargo Data

- Commercial Airports: 10
- Reliever Airports: 9
- General Aviation Airports: 66

Top 5 Airports for Air Cargo Activity, Illinois 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	2	ORD	Chicago O'Hare International	664,088	846,033	1,510,121
2	8	RFD	Chicago/Rockford International	88,789	69,588	158,378
3	17	PIA	Greater Peoria Regional	15,076	15,031	30,106
4	19	MDW	Chicago Midway International	13,242	12,928	26,170
5	32	BLV	Scott AFB / Mid-America	680	1,127	1,808

Total Value by FAF Region, Illinois 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Chicago IL-IN-WI CSA (IL Part)	30,919	42.5%	54,580	63.9%	85,499	54.0%
St. Louis MO-IL CSA (IL Part)	277	0.4%	116	0.1%	394	0.2%
Remainder of Illinois	467	0.6%	880	1.0%	1,346	0.9%

Top 5 Most Valuable Commodities, Illinois

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
35 Electronics	6,733	21.3%	18,821	33.9%	25,554	29.3%
34 Machinery	7,794	24.6%	11,181	20.1%	18,975	21.8%
21 Pharmaceuticals	3,167	10.0%	7,959	14.3%	11,126	12.8%
38 Precision instruments	5,228	16.5%	5,684	10.2%	10,912	12.5%
20 Basic chemicals	1,580	5.0%	2,911	5.2%	4,492	5.1%
<i>IL Top 5 Commodities</i>	<i>24,502</i>	<i>77.4%</i>	<i>46,558</i>	<i>83.8%</i>	<i>71,059</i>	<i>81.5%</i>
IL Total	31,663	100%	55,576	100%	87,239	100%

Projected Value Change by FAF Region, Illinois 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Chicago IL-IN-WI CSA (IL Part)	295.0%	4.7%	389.0%	5.4%	355.0%	5.2%
St. Louis MO-IL CSA (IL Part)	-56.7%	-2.8%	155.3%	3.2%	6.0%	0.2%
Remainder of Illinois	153.5%	3.1%	1492.1%	9.7%	1027.9%	8.4%

Summary

Illinois is the 2nd most active state within the MAFC air cargo market by tonnage, capturing approximately 25 percent of the region's total activity. Over 21 percent of the entire region's air cargo activity by tonnage occurs at ORD, the MAFC's 2nd busiest air cargo facility. RFD, located in Rockford approximately 74 miles east of ORD, captures 2.2 percent of the MAFC's total air cargo activity by tonnage. Together, these two airports compile the vast majority of air cargo activity within the state. There are 85 NPIAS-recognized facilities throughout the state. 16 reported air cargo activity in 2010. A total of 5 facilities operate with runways greater than 10,000 feet, the most of any state in the MAFC. Illinois's facility capabilities situate it nicely to continue its dominant air cargo role.

Chicago is the single most important factor for MAFC air cargo operations. Chicagoland's significant population fosters large amounts of consumer demand for products commonly shipped by air. It also contains the manufacturing capacity to produce goods from the area that are then shipped through ORD to rest of the world. Indeed, FAF analysis culled from 2010 data indicates that the Chicago area FAF region moved approximately 54 percent of the region's total goods value worth almost \$85.5 billion. The top commodities being moved represent classic air cargo industry clusters, with the exception of basic chemicals. Chicagoland's movement of basic chemicals is the only FAF region to register the commodity in the top 5 goods being shipped and represents the 6th most valuable commodity movement in the entire MAFC region.

It is important to note, however, the impact Chicagoland region has on surrounding areas. The forces of Chicago echo throughout Illinois and neighboring states. The Remainder of Illinois FAF region is projected to have the largest AAGR within the MAFC at 8.4 percent. In addition, the Remainder of Illinois FAF region seems particularly apt for growth in air cargo imports. With an AAGR of 9.7 percent, it is likely the FAF region will continue to establish itself as an alternative international gateway option competing against the more traditional Chicagoland gateways like ORD and MDW

When coupled with lower annual growth rates for similar FAF regions with large air cargo operations, these statistics suggest that larger air cargo facilities will begin to see slower growth rates of cargo activity over the long-term. As congestion increases, the movement of air cargo goods will not leave important greater metropolitan regions like Chicago, but will instead migrate to more accessible, proximal locations. The role of RFD and their significant investments in air cargo infrastructure throughout the 2000's can be seen as a possible foreshadowing of this outward movement. In general, it is projected Illinois will maintain its significant role in air cargo activity throughout the MAFC. It is possible, however, that the ways in which Illinois will conduct air cargo activity statewide to maintain this share will change significantly.

The industry experiences daily fluctuations, and large air cargo projects can disrupt whatever natural industry trends exist. A good example of a potential industry-changing project is the recent announcement by the City of Chicago to invest \$200 million in a new air cargo facility to increase the movement of international goods and reinforce Chicago's status as an international gateway. Industry implications from the project could be enormous throughout the MAFC.

State Summary: Indiana

Contact Information

Indiana Department of Transportation - Office of Aviation
 100 N. Senate Ave., IGCN 955
 Indianapolis, IN 46204
 Phone: 317-323-1477
 Director: Kevin Rector

Air Cargo Data

- Commercial Airports: 5
- Reliever Airports: 7
- General Aviation Airports: 53

Top 5 Airports for Air Cargo Activity, Indiana 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	3	IND	Indianapolis International	528,308	491,452	1,019,760
2	20	FWA	Fort Wayne International	12,296	13,234	25,530
3	27	SBN	South Bend Regional	5,716	4,891	10,606
4	49	GYG	Gary/Chicago International	17	160	177
5	62	EVV	Evansville Regional	38	4	43

Total Value by FAF Region, Indiana 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Chicago IL-IN-WI CSA (IN Part)	131	0.2%	45	0.1%	176	0.1%
Indianapolis IN CSA	6,318	8.7%	2,527	3.0%	8,845	5.6%
Remainder of Indiana	578	0.8%	775	0.9%	1,353	0.9%

Top 5 Most Valuable Commodities, Indiana

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
35 Electronics	1,886	26.8%	1,233	36.8%	3,119	30.1%
34 Machinery	2,051	29.2%	527	15.7%	2,579	24.9%
38 Precision instruments	1,056	15.0%	362	10.8%	1,418	13.7%
40 Misc. mfg. prods.	424	6.0%	258	7.7%	682	6.6%
37 Transport equip.	332	4.7%	294	8.8%	626	6.0%
<i>IN Top 5 Commodities</i>	<i>5,749</i>	<i>81.8%</i>	<i>2,674</i>	<i>79.9%</i>	<i>8,424</i>	<i>81.2%</i>
IN Total	7,027	100%	3,348	100%	10,374	100%

Projected Value Change by FAF Region, Indiana 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Chicago IL-IN-WI CSA (IN Part)	227.9%	4.0%	394.3%	5.5%	270.4%	4.5%
Indianapolis IN CSA	121.3%	2.7%	346.6%	5.1%	185.7%	3.6%
Remainder of Indiana	1068.3%	8.5%	439.8%	5.8%	708.1%	7.2%

Summary

Indiana is the 3rd most active state according to 2010 tonnage data. Over 15 percent of the MAFC's total tonnage is handled within the state. This amounts to approximately 3.5 percent of total air cargo tonnage throughout the United States. The state contains 65 NPIAS-recognized airports, with 12 showing air cargo activity in 2010.

Over 96 percent of the state's total tonnage is moved through the facilities at Indianapolis's IND. IND is the 3rd busiest air cargo facility in the MAFC. This is largely because of the presence of a FedEx hub operation at the operation, the company's 2nd largest in the world behind their facilities at MEM in Memphis. It is important to note that the influence of this hub operation on the air cargo activity of the state is projected to decrease according to FAF analysis. Percent share of MAFC tonnage within the Indianapolis FAF region is expected to fall to 4.93 percent in 2040 from 5.33 percent in 2007. The corresponding value is projected to endure a starker decrease. FAF analysis projects a decrease in total MAFC cargo value in the region decreasing in the region from 5.94 percent of total MAFC value to 4.42 percent. Meanwhile, the remaining FAF regions in the state, Chicago (IN Part) and Remainder of Indiana are projected to experience moderate value share increases.

FAF commodity data suggests core air cargo industry clusters comprise the bulk of value in air cargo activity. What is not shown in the data, however, is the strength of the pharmaceutical industry cluster in the Indianapolis area. Spearheaded by Eli Lilly and Company, the strength of the pharmaceuticals industry around Indianapolis lends itself well to potential air cargo activity in the region. The low-weight, high-value nature of pharmaceutical products makes them a desirable industry cluster to foster and develop in a region.

The history behind Fort Wayne International Airport (FWA) exemplifies the boom-bust economic path air cargo can lead its investors toward. Kitty Hawk filed for bankruptcy in October of 2007, leaving a 266,000 square foot air cargo facility largely abandoned and over 300 employees out of work. A package of publicly financed incentives became a burden to be paid by taxpayers of Fort Wayne. In December of 2011, over 4 years of non-use, the former Kitty Hawk facilities are slowly being leased to other logistics companies with diverse business plans that stretch beyond the confines of air cargo. Logistics Insight Corporation, leasing 105,000 of the 266,000 square feet, is the first company to utilize former Kitty Hawk facilities.⁴⁷ Airports that utilize air cargo hub-operations of small to moderate size as long-term business solutions are potentially into unreliable revenue streams. It is suggested airport authorities carefully manage hub operation decisions and their financing methods to reduce the likelihood of negative economic outcomes should air cargo carriers decide to close facilities. Thus, the construction of a diverse tenant portfolio for any airport is crucial to their long-term success.

⁴⁷ "Logistics Insight Corporation to Occupy Former Kitty Hawk Facility," The Greater Fort Wayne Chamber of Commerce, 8 September 2011.

State Summary: Iowa

Contact Information

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 800 Lincoln Way
 Ames, IA 50010
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 Director: Michelle McEnany

Air Cargo Data

- Commercial Airports: 8
- Reliever Airports: 1
- General Aviation Airports: 69

Top 5 Airports for Air Cargo Activity, Iowa 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	14	DSM	Des Moines International	43,455	36,252	79,706
2	16	CID	The Eastern Iowa	14,943	16,068	31,011
3	76	DBQ	Dubuque Regional	<1	12	13
4	81	ALO	Waterloo Regional	<1	9	9
5	103	MCW	Mason City Muni	2	<1	2

Total Value by FAF Region, Iowa 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Remainder of Indiana	578	0.8%	775	0.9%	1,353	0.9%
Iowa	589	0.8%	545	0.6%	1,134	0.7%

Top 5 Most Valuable Commodities, Iowa

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
35 Electronics	185	31.3%	133	24.5%	318	28.0%
21 Pharmaceuticals	137	23.2%	46	8.5%	183	16.1%
38 Precision instruments	45	7.7%	124	22.9%	170	15.0%
34 Machinery	94	15.9%	69	12.6%	162	14.3%
37 Transport equip.	31	5.3%	28	5.1%	59	5.2%
<i>IA Top 5 Commodities</i>	<i>491</i>	<i>83.4%</i>	<i>401</i>	<i>73.6%</i>	<i>892</i>	<i>78.7%</i>
IA Total	589	100%	545	100%	1,134	100%

Projected Value Change by FAF Region, Iowa 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Remainder of Indiana	1068.3%	8.5%	439.8%	5.8%	708.1%	7.2%
Iowa	74.1%	1.9%	1246.2%	9.1%	637.0%	6.9%

Summary

Iowa plays a relatively small role within the MAFC air cargo system. The state contains 78 NPIAS airports, with eight of these facilities recording air cargo activity. The vast majority of these airports, 69, are general aviation facilities. Only one of these GA airports recorded air cargo activity in 2010, Fort Dodge Regional Airport, FOD. FOD handled less than a ton of air cargo, ranked 116th out of 130 in total tonnage handled throughout the MAFC. As such, GA airports do not play a role in Iowa's air cargo system. Conversely, in 2010 approximately 72 percent of the 110,742 tons handled by Iowa moved through DSM in Des Moines. This makes DSM the dominant air cargo player within the state. Iowa has realized the significant role DSM can play within the MAFC, as indicated by the airport's expansion of their air cargo aprons in 2003. In addition, Amazon.com harnesses DSM's geographic location and air cargo facilities to centralize their 2-day shipping operations out of the facility. It is likely a significant portion of DSM's tonnage is due to the presence of Amazon.com's large shipping operation.

The reasons for Iowa's minimal role in air cargo reveal themselves intuitively. Few population centers, proximity to other air cargo centers, and sufficient connectivity through roads and highways to these air cargo centers indicates that the state's freight needs are largely served by the trucking industry.

With that being said, FAF data suggests several important trends to consider for the future of Iowa air cargo. There is a projected AAGR increase of over 6.8 percent in air cargo value. This is the 4th highest percentage increase out of the 26 FAF regions in the MAFC. More importantly, the projected AAGR of air cargo value flying into Iowa of approximately 9.1 percent is the 2nd largest in the MAFC. This is an indicator of strength for the state to become a point of entry for air cargo, with products shipped to final destinations via truck. While Iowa's role in MAFC air cargo is likely to remain small relative to other regions, FAF data suggests the total value of air cargo activity will increase at a significant rate.

It is likely DSM will increasingly become the focus of the state's aviation priorities, including air cargo. The presence of UPS and FedEx indicates a vow of confidence by the private sector in the area and its facilities. The transfer of the governance of DSM, subject to approval by the FAA, from the City of Des Moines to the newly created Des Moines Airport Authority only reinforces the notion that Iowa governments are dedicated to the continued development of DSM. This new governance should allow for more independence in airport decisions less restricted by the confines of the municipal structure.

State Summary: Kansas

Contact Information

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 Director: C. Edward Young

Air Cargo Data

- Commercial Airports: 7
- Reliever Airports: 4
- General Aviation Airports: 68

Top 5 Airports for Air Cargo Activity, Kansas 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	18	ICT	Wichita Mid-Continent	10,833	16,576	27,409
2	33	IAB	McConnell AFB	622	447	1,069
3	41	GCK	Garden City Regional	223	261	484
4	65	SLN	Salina Municipal	16	15	31
5	85	HYS	Hays Regional		7	7

Total Value by FAF Region, Kansas 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Kansas City MO-KS CSA (KS Part)	302	0.4%	274	0.3%	577	0.4%
Remainder of Kansas	7,061	9.7%	988	1.2%	8,048	5.1%

Top 5 Most Valuable Commodities, Kansas

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
37 Transport equip.	6,771	92.0%	125	9.9%	6,896	80.0%
35 Electronics	182	2.5%	426	33.8%	608	7.1%
34 Machinery	156	2.1%	147	11.7%	303	3.5%
38 Precision instruments	81	1.1%	180	14.3%	261	3.0%
21 Pharmaceuticals	11	0.1%	225	17.8%	235	2.7%
<i>KS Top 5 Commodities</i>	<i>7,201</i>	<i>97.8%</i>	<i>1,103</i>	<i>87.4%</i>	<i>8,304</i>	<i>96.3%</i>
KS Total	7,363	100%	1,262	100%	8,625	100%

Projected Value Change by FAF Region, Kansas 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Kansas City MO-KS CSA (KS Part)	185.3%	3.6%	482.2%	6.0%	326.6%	5.0%
Remainder of Kansas	220.7%	4.0%	769.8%	7.5%	288.1%	4.6%

Summary

Kansas plays a smaller role in MAFC air cargo. Out of 79 NPIAS airports, 9 reported cargo activity in 2010. There was one military airport, McConnell Air Force Base, that registered 1,069 tons of activity, the 33rd highest total in the MAFC. ICT, located in Wichita, is the state's most active air cargo airport. It is, however, only the 18th busiest air cargo facility in the MAFC. With only about 0.4 percent of the total tonnage moved by the MAFC, air cargo in Kansas is dwarfed by truck traffic. Low population densities, as well as large distances between population centers, make Kansas an intuitively illogical choice for significant air cargo investments.

It is important to note the large difference between projected export and import cargo values. Export values are significantly higher, almost seven times greater, than import shipments. This large gap is somewhat unusual for the MAFC. This indicates Kansas is far more of a producer than a consumer of goods. An analysis of commodities being shipped indicates that transportation equipment accounts for approximately 80 percent of the total value of goods in Kansas. Evidence suggests a large portion of this commodity activity is tied to Wichita's strong history in aircraft manufacturing. Cessna, Hawker Beechcraft, Airbus, Bombardier Learjet and several other aviation companies have significant operations out of Wichita. The closure of the Boeing manufacturing facility in January of 2011 is expected to greatly reduce projected value numbers for the Remainder of Kansas FAF region. Despite this setback, Wichita's strong history in aviation innovation and manufacturing gives it a core industry cluster reliant upon air cargo services. Wichita will continue to be Kansas's homegrown epicenter for air cargo activity.

Several anomalies present themselves within the data that are worthy to note. GA airports with runways over 10,000' are perceived to be ripe for the consideration of air cargo implementation. FOE, located in Topeka, is classified as a GA airport with a maximum runway length of 12,802 feet. Out 130 airports recording air cargo activity in the MAFC, it is the 125th busiest moving a negligible amount of cargo. Considering its proximity to Kansas City and significant runway length, FOE manifests itself as a future air cargo facility candidate. FOE, however, is predominantly a military base and refueling station with limited civilian applications. Should Forbes Field cease operations as a military facility, it is possible its conversion to an air cargo facility could be economically feasible given its facilities and proximity to a significant population center.

In addition, it is important to consider that in a regional context, the FAF statistics for the Kansas portion of the Kansas City FAF region are misleading. MCI, the 10th busiest air cargo airport in the MAFC, is located approximately 10 miles across the state line in Missouri. Missouri's MCI therefore commands much of the cargo business for the region.

State Summary: Kentucky

Contact Information

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 Commissioner: R. Winn Turney

Air Cargo Data

- Commercial Airports: 4
- Reliever Airports: 1
- General Aviation Airports: 50

Top 5 Airports for Air Cargo Activity, Kentucky 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	1	SDF	Louisville International Airport	1,228,786	1,162,648	2,391,434
2	4	CVG	Cincinnati / Northern KY International	203,357	207,128	410,485
3	34	LEX	Blue Grass	479	567	1,045
4	52	HOP	Campbell AAF		102	102
5	67	BWG	Bowling Green-Warren County Regional	28	1	29

Total Value by FAF Region, Kentucky 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Louisville KY-IN CSA (KY Part)	5,983	8.2%	5,138	6.0%	11,121	7.0%
Remainder of Kentucky	4,044	5.6%	1,225	1.4%	5,269	3.3%

Top 5 Most Valuable Commodities, Kentucky

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
34 Machinery	2,709	27.0%	1,536	24.1%	4,245	25.9%
35 Electronics	1,782	17.8%	1,373	21.6%	3,155	19.3%
40 Misc. mfg. prods.	2,149	21.4%	225	3.5%	2,375	14.5%
38 Precision instruments	1,124	11.2%	554	8.7%	1,679	10.2%
37 Transport equip.	340	3.4%	939	14.8%	1,279	7.8%
<i>KY Top 5 Commodities</i>	<i>8,105</i>	<i>80.8%</i>	<i>4,628</i>	<i>72.7%</i>	<i>12,733</i>	<i>77.7%</i>
KY Total	10,026	100%	6,363	100%	16,389	100%

Projected Value Change by FAF Region, Kentucky 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Louisville KY-IN CSA (KY Part)	103.0%	2.4%	226.0%	4.0%	159.9%	3.2%
Remainder of Kentucky	-8.2%	-0.3%	404.1%	5.5%	87.7%	2.1%

Summary

Kentucky's role within MAFC air cargo operations is dominated by the presence of SDF in Louisville. Of 55 NPIAS facilities in the state, 7 show cargo activity. While they comparatively have fewer airports reporting cargo activity in 2010 than other states, facilities that do report activity show significant operations.

The world headquarters for UPS air operations, SDF, moves over 33 percent of the total air cargo tonnage in the MAFC. It is likely the discrepancy between total MAFC tonnage and value percentage shares is due to the hub nature of SDF. Much of the air cargo that is processed at SDF never leaves the confines of the airport facilities but instead is routed to other planes en route to their final destinations around the globe. As such, FAF statistics do not capture the magnitude of value being moved through SDF facilities. It is clear from the financial investment UPS has placed within SDF, over \$2 billion since 2002, that the company intends to remain a dominant presence in the Kentucky economy. The presence of SDF limits the potential for air cargo opportunities elsewhere in the state and region.

CVG, located in the city of Covington across the Ohio River from Cincinnati, also shows the movement of significant air cargo tonnage and value. It is important to note, however, that FAF value data projections through 2040 indicate it is likely the investments made by UPS at SDF will siphon off activity and slow growth surrounding CVG. This is an indication of the increased influence of hub operations on the air cargo industry throughout the MAFC. With adequate infrastructure in place and a mature air cargo market, airports and air cargo carriers will focus on maximizing the efficiency of existing operations.

While Kentucky is buoyed by the presence of SDF, it is important to acknowledge FAF's long-term projected value trends for the region. Both FAF regions in the state have the 2nd and 3rd lowest annual growth rates. Exports in the Remainder of Kentucky FAF region are projected to actually decrease in value by 8.20 percent between 2010 and 2040. Data suggests that Kentucky's cargo operations will trend downward over the next 30 years relative to the rest of the MAFC, especially outside of the Louisville metropolitan area. Considering Kentucky recorded the 2nd highest total value of air cargo at almost \$16.4 billion, or about 10.4 percent of MAFC value, the FAF declines are not a result of low baseline activity. This poses a unique set of challenges for Kentucky to consider as air cargo operations likely continue consolidating toward a handful of facilities throughout the MAFC.

GA airports play a negligible air cargo role within Kentucky. LEX, a small commercial airport registering over 1,000 tons of activity, appears to capture air cargo redirected from SDF. Located approximately 70 miles from SDF, LEX is the closest airport to SDF reporting air cargo activity.

State Summary: Michigan

Contact Information

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 Director: Mike Trout

Air Cargo Data

- Commercial Airports: 16
- Reliever Airports: 9
- General Aviation Airports: 70

Top 5 Airports for Air Cargo Activity, Michigan 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	6	DTW	Detroit Metro Wayne County	87,173	117,647	204,820
2	15	GRR	Gerald Ford International	19,587	20,766	40,353
3	23	LAN	Capital City	9,381	11,160	20,541
4	26	FNT	Bishop International	5,195	5,875	11,070
5	31	YIP	Willow Run	782	3,176	3,958

Total Value by FAF Region, Michigan 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Detroit MI CSA	1,267	1.7%	3,967	4.6%	5,234	3.3%
Grand Rapids MI CSA	1,121	1.5%	338	0.4%	1,460	0.9%
Remainder of Michigan	361	0.5%	490	0.6%	851	0.5%

Top 5 Most Valuable Commodities, Michigan

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
34 Machinery	724	26.3%	838	17.5%	1,562	20.7%
35 Electronics	240	8.7%	1,085	22.6%	1,325	17.6%
38 Precision instruments	247	9.0%	1,002	20.9%	1,248	16.5%
36 Motorized vehicles	366	13.3%	235	4.9%	601	8.0%
24 Plastics/rubber	499	18.2%	74	1.5%	573	7.6%
<i>MI Top 5 Commodities</i>	<i>2,076</i>	<i>75.5%</i>	<i>3,233</i>	<i>67.4%</i>	<i>5,309</i>	<i>70.4%</i>
MI Total	2,749	100%	4,795	100%	7,545	100%

Projected Value Change by FAF Region, Michigan 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Detroit MI CSA	507.6%	6.2%	194.2%	3.7%	270.1%	4.5%
Grand Rapids MI CSA	286.7%	4.6%	115.2%	2.6%	246.9%	4.2%
Remainder of Michigan	465.6%	5.9%	109.4%	2.5%	260.5%	4.4%

Summary

Michigan has an extensive aviation network that consists of 95 NPIAS-recognized facilities. 24 of these airports recorded air cargo activity in 2010, the highest number in the MAFC and eight more than the next highest state, Illinois. A variety of types of air cargo facilities operate within the state. The 6th-busiest air cargo airport in the MAFC, Detroit-area DTW, handles almost 3 percent of the total tonnage in the MAFC. Willow Run, YIP, located between Ann Arbor and Detroit, has developed their own significant air cargo market share by focusing on alternative strategies to capture business that would have traditionally occurred at traditional hubs of activity like DTW or nearby TOL in Toledo.

YIP and DTW are moving forward in collaboration to develop a robust air cargo economy for Michigan's southern region. The establishment of the Aerotropolis Development Corporation officially bundles the infrastructure and logistics capabilities of both YIP and DTW, located approximately 11 miles apart, to better market the Detroit region as a viable option for the location of manufacturing facilities. The structure of the Aerotropolis Development Corporation is unique within the MAFC, establishing a viable regional framework to sustain and grow the air cargo industry. While economic development agencies are commonplace throughout the region, the Detroit Region Aerotropolis is notable for its refined focus on linking aviation facilities at the regional scale to potential air cargo demand-inducing industry clusters. Data suggests the strategy is producing results. Strategies like cheaper landing fees and the marketing of adequate intermodal connections free from the traffic congestion of more centralized facilities have turned YIP into the most active reliever airport in the MAFC and 31st most active overall. In 2010 they handled almost 16 tons of cargo per weekday.

Projected FAF value trend analysis for Michigan reinforces the potential for Michigan to create a manufacturing economy. While total projected 30-year growth rates show all three FAF regions in the state with AAGRs significantly less than the MAFC 5.45 percent median annual rate, the import and export statistical splits tell a more detailed story. Projected growth rates for exports for the Detroit CSA, Remainder of Michigan and Grand Rapids CSA FAF zones are 2nd, 4th, and 9th highest in the MAFC at approximately 8.5 percent, 6 percent, and 4.6 percent per year, respectively. This is evidence for a projected robust manufacturing economy. It is also in stark contrast to projected import values for the state; its FAF regions represent three of the four lowest average growth rates in the entire MAFC. It is likely the future of Michigan air cargo will depend upon the diverse manufacturing capabilities of the DTW-YIP corridor.

State Summary: Minnesota

Contact Information

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 Director: Chris Roy

Air Cargo Data

- Commercial Airports: 9
- Reliever Airports: 7
- General Aviation Airports: 81

Top 5 Airports for Air Cargo Activity, Minnesota 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	5	MSP	Minn-St Paul / Wold-Chamberlain	120,162	126,135	246,297
2	28	RST	Rochester International	4,024	4,058	8,081
3	35	DLH	Duluth International	248	724	972
4	38	BJI	Bemidji Regional	315	314	629
5	55	TVF	Thief River Falls Regional	79	5	84

Total Value by FAF Region, Minnesota 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Minneapolis-St. Paul MN-WI CSA (MN Part)	3,953	5.4%	2,844	3.3%	6,798	4.3%
Remainder of Minnesota	292	0.4%	171	0.2%	463	0.3%

Top 5 Most Valuable Commodities, Minnesota

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
38 Precision instruments	1,890	44.5%	641	21.3%	2,532	34.9%
35 Electronics	1,245	29.3%	674	22.3%	1,918	26.4%
34 Machinery	411	9.7%	365	12.1%	777	10.7%
21 Pharmaceuticals	139	3.3%	160	5.3%	299	4.1%
40 Misc. mfg. prods.	104	2.4%	176	5.8%	279	3.8%
<i>MN Top 5 Commodities</i>	<i>3,789</i>	<i>89.2%</i>	<i>2,016</i>	<i>66.9%</i>	<i>5,805</i>	<i>80.0%</i>
MN Total	4,245	100%	3,015	100%	7,260	100%

Projected Value Change by FAF Region, Minnesota 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Minneapolis-St. Paul MN-WI CSA (MN Part)	428.7%	5.7%	403.6%	5.5%	418.2%	5.6%
Remainder of Minnesota	136.2%	2.9%	664.7%	7.0%	331.3%	5.0%

Summary

Minnesota plays a crucial role in air cargo for the northern reaches of the MAFC. The aviation network for Minnesota is extensive, with 97 NPIAS-designated facilities in operation. However, only 12 of these airports recorded air cargo activity in 2010. Cargo tonnage being moved through Minnesota airports amounts to 3.7 percent of the total MAFC weight, 6th highest of the MAFC. Over 86 percent of the total tonnage in the state, or 246,297 tons, are moved at MSP alone. The majority of the remaining activity by tonnage occurs at RST in Rochester. The nearby Mayo Clinic is likely generating significant air cargo traffic for medical and pharmaceutical shipments. The state has decidedly less diversification of tonnage spread amongst its air cargo facilities. With few large population centers demanding frequent air cargo service and adequate air cargo coverage elsewhere in the MAFC, the state's air cargo needs and opportunities are largely accommodated by the large operation at MSP. Considering a predicted shrinkage in market share elsewhere in Minnesota, it is likely MSP will only increase its importance in Minnesota air cargo.

As such, MSP elevates itself as the 5th busiest air cargo airport in the MAFC serving a large geographic region that stretches into states west of the MAFC borders. Findings and projections show that MSP and the Twin Cities region will continue to play a prominent role in MAFC air cargo, experiencing an AAGR of over 5.6 percent, significantly greater than the MAFC average total AAGR of approximately 4.9 percent. The Twin Cities FAF region is subsequently projected to experience the largest percentage share difference in cargo value from 2007-2040 in the MAFC, at 1.7 percent. As FAF value statistics indicate, the Remainder of Minnesota region will likely see slower growth. Indeed, the Remainder of Minnesota will see their percentage share of total MAFC cargo value actually slightly decrease.

The Twin Cities FAF region is a unique urban center that shows potential to limit value loss to its surrounding, less urban areas. The manufacturing foundation of the state is located within the Twin Cities area, as indicated by the stark contrast of projected import AAGRs between the Twin Cities and Remainder of Minnesota FAF regions, approximately 5.7 percent to 2.9 percent respectively. Data indicates that the core air cargo commodity in the state is precision instruments, comprising almost 35 percent of the state's total air cargo value. Appropriately, Medtronic, the largest medical products and equipment in the country, is headquartered near Minneapolis. The company has eight research and development, manufacturing, or distribution facilities in the Twin Cities area.

State Summary: Missouri

Contact Information

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 Administrator: Joe Pestka

Air Cargo Data

- Commercial Airports: 6
- Reliever Airports: 6
- General Aviation Airports: 63

Top 5 Airports for Air Cargo Activity, Missouri 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	10	MCI	Kansas City International	47,576	47,853	95,429
2	13	STL	Lambert-St Louis International	41,094	41,302	82,396
3	21	SGF	Springfield-Branson National	11,717	12,801	24,518
4	56	MKC	Charles Wheeler Downtown	29	48	77
5	64	SZL	Whiteman AFB	0	31	31

Total Value by FAF Region, Missouri 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Kansas City MO-KS CSA (MO Part)	123	0.2%	227	0.3%	350	0.2%
St. Louis MO-IL CSA (MO Part)	2,205	3.0%	612	0.7%	2,817	1.8%
Remainder of Missouri	106	0.1%	295	0.3%	401	0.3%

Top 5 Most Valuable Commodities, Missouri

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
37 Transport equip.	1,529	62.8%	204	18.0%	1,733	48.6%
21 Pharmaceuticals	401	16.5%	162	14.3%	563	15.8%
35 Electronics	136	5.6%	206	18.2%	342	9.6%
38 Precision instruments	68	2.8%	188	16.6%	257	7.2%
40 Misc. mfg. prods.	77	3.1%	114	10.1%	191	5.3%
<i>MO Top 5 Commodities</i>	<i>2,211</i>	<i>90.8%</i>	<i>875</i>	<i>77.1%</i>	<i>3,086</i>	<i>86.5%</i>
MO Total	2,434	100%	1,135	100%	3,569	100%

Projected Value Change by FAF Region, Missouri 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Kansas City MO-KS CSA (MO Part)	420.2%	5.7%	529.1%	6.3%	490.8%	6.1%
St. Louis MO-IL CSA (MO Part)	153.3%	3.1%	327.8%	5.0%	191.2%	3.6%
Remainder of Missouri	182.2%	3.5%	998.0%	8.3%	782.5%	7.5%

Summary

Missouri is the 7th most active state according to 2010 tonnage data. Approximately 2.9 percent of the MAFC's total tonnage is handled within the state, amounting to 0.67 percent of total nationwide tonnage. Over \$3.5 billion worth of goods were moved through Missouri in 2010, representing approximately 2.3 percent of the total value of MAFC air cargo activity. All of this air cargo activity is concentrated within the nine airports that recorded activity in 2010. There are a total of 75 NPIAS airports in the state. Of the over 200,000 tons of activity in Missouri in 2010, over 87 percent occurred at the two most active airports, MCI and STL, located in Kansas City and St. Louis, respectively. Activity was evenly distributed between MCI and STL, accounting for approximately 47 percent and 41 percent of the state's total cargo activity. Missouri's duality of distributed activity is unique among the MAFC states. Interestingly, Missouri moves the 3rd highest value of pharmaceuticals in the MAFC at an approximate value of \$563 million in 2010. Other popular air cargo commodities are traditional air cargo goods: transport equipment, electronics, and precision instruments.

Analysis of projected 30-year AAGRs suggests that the St. Louis MO-IL CSA (MO Part) FAF region will lag behind strong growth in other areas of the state, including Kansas City. The outlook of the St. Louis metropolitan area worsens when taking a regional approach, as the Illinois portions of the area register some of the lowest AAGRs in the *From/Export*, *To/Import*, and *Total* growth categories. The St. Louis MO-IL CSA (IL Part) and St. Louis MO-IL CSA (MO Part) are projected to have the lowest and 6th lowest Total AAGRs in the MAFC at 0.2 percent and 3.6 percent, respectively. The MAFC average is 4.9 percent. In contrast, the Remainder of Missouri FAF region has projected Total AAGR of approximately 7.5 percent, 2nd highest in the MAFC. The Kansas City MO-KS CSA (MO Part) is projected to have the 6th highest Total AAGR at 6.1 percent. FAF data suggests there is a dichotomy in Missouri's air cargo story. There is stagnation in St. Louis and growth elsewhere.

Missouri policy makers have attempted to act upon the real and projected decline of cargo activity at STL and the St. Louis metropolitan region. The significant efforts of the Midwest China Hub Commission through the late 2000's and early 2010's represent some of the most aggressive state-level attempts at generating interest in developing an air cargo economy. While the attempts at transforming St. Louis into an international air cargo gateway failed, they represent the political, economic, and social importance placed on air cargo throughout recent history.

State Summary: Ohio

Contact Information

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 Administrator: James Bryant

Air Cargo Data

- Commercial Airports: 7
- Reliever Airports: 12
- General Aviation Airports: 81

Top 5 Airports for Air Cargo Activity, Ohio 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	7	TOL	Toledo Express	99,997	90,046	190,042
2	9	LCK	Rickenbacker International	53,936	52,275	106,211
3	12	CLE	Cleveland-Hopkins International	43,204	42,127	85,331
4	29	DAY	James M Cox Dayton International	3,699	3,885	7,584
5	30	CMH	Port Columbus International	1,883	2,906	4,789

Total Value by FAF Region, Ohio 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Cincinnati OH-KY-IN CSA (OH Part)	2,428	3.3%	3,096	3.6%	5,524	3.5%
Cleveland OH CSA	713	1.0%	1,167	1.4%	1,880	1.2%
Columbus OH CSA	262	0.4%	1,627	1.9%	1,889	1.2%
Dayton OH CSA	216	0.3%	573	0.7%	789	0.5%
Remainder of Ohio	1,162	1.6%	1,709	2.0%	2,871	1.8%

Top 5 Most Valuable Commodities, Ohio

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
35 Electronics	1,055	22.1%	2,116	25.9%	3,171	24.5%
34 Machinery	1,530	32.0%	1,208	14.8%	2,738	21.1%
38 Precision instruments	756	15.8%	1,629	19.9%	2,385	18.4%
37 Transport equip.	385	8.1%	711	8.7%	1,097	8.5%
21 Pharmaceuticals	92	1.9%	580	7.1%	672	5.2%
<i>OH Top 5 Commodities</i>	<i>3,818</i>	<i>79.9%</i>	<i>6,244</i>	<i>76.4%</i>	<i>10,062</i>	<i>77.7%</i>
OH Total	4,781	100%	8,171	100%	12,952	100%

Projected Value Change by FAF Region, Ohio 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Cincinnati OH-KY-IN CSA (OH Part)	426.4%	5.7%	301.3%	4.7%	356.3%	5.2%
Cleveland OH CSA	494.6%	6.1%	321.7%	4.9%	387.2%	5.4%
Columbus OH CSA	51.3%	1.4%	351.2%	5.2%	309.6%	4.8%
Dayton OH CSA	180.7%	3.5%	319.6%	4.9%	281.6%	4.6%
Remainder of Ohio	165.2%	3.3%	676.4%	7.1%	469.4%	6.0%

Summary

Ohio plays a significant role within the MAFC air cargo system. The state maintains the most intensive aviation system in the region, operating 100 airports. 13 of these airports recorded air cargo activity. TOL and LCK were the 7th and 9th busiest air cargo airports in the MAFC in 2010. More importantly, however, is the diversity of air cargo operations throughout the state.

The state emphasizes the notion that air cargo activity can be generated through a variety of business and management approaches. CLE, 12th most active air cargo airport by tonnage in 2010, is a prime example of a passenger airport that integrates a high level of air cargo activity within its daily operations. LCK serves as an alternative approach to successfully generate air cargo activity as an international gateway. Predominantly an all-cargo airport, LCK has utilized their 12,012' runway and centralized location to draw a plethora of large and small air cargo carriers that operate out of their facilities. LCK is the MAFC's 9th-busiest air cargo airport in 2010. This diverse portfolio of tenants positions LCK to sustain historically volatile swings in the industry. Shifting passenger operations to the neighboring CMH allows LCK to focus exclusively on maximizing cargo efficiency.

An antithetical air cargo approach is exemplified in the operations of TOL, the 7th-busiest air cargo airport in 2010. After experiencing a decline in passenger service since the early 2000's, TOL was steadfastly relying upon the significant business generated by the DB Schenker/BAX Global Inc. air cargo hub. In July of 2011, the company announced the closing of the Toledo operation, subsequently resulting in the projected loss of approximately 1.2 million tons of annual cargo and a major impact on Toledo's local economy.⁴⁸ It is expected air cargo tonnage statistics for 2011 will show significant reductions in cargo activity for TOL. In addition, remainder of Ohio FAF region values will likely drop accordingly. Hub operation facilities, while providing an economic boon when operating, can have an equally negative effect on local economies when the nature of the air cargo industry forces their closure.

According to FAF data, the percentage difference in the overall Ohio share of MAFC cargo value is projected to largely stay the same from 2007-2040. This is an indicator of overall projected long-term stability within the region. A macro-level analysis suggests that the variety of air cargo facilities in all regions of the state will continue to form an economic pillar for the state.

⁴⁸ <http://www.toledoblade.com/local/2011/07/24/Air-cargo-was-seen-as-Toledo-Express-bedrock-business.html>

State Summary: Wisconsin

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Air Cargo Data

- Commercial Airports: 8
- Reliever Airports: 6
- General Aviation Airports: 74

Top 5 Airports for Air Cargo Activity, Wisconsin 2010

State Rank	MAFC Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	11	MKE	Gen Mitchell International	45,035	45,241	90,276
2	24	MSN	Dane County Regional-Truax Field	6,365	6,678	13,043
3	25	ATW	Outagamie County Regional	5,396	6,150	11,546
4	39	RHI	Rhinelanders-Oneida County	366	248	614
5	45	CWA	Central Wisconsin	102	161	263

Total Value by FAF Region, Wisconsin 2010 (Millions)

FAF Zone	From		To		Total	
	Value	% Value	Value	% Value	Value	% Value
Milwaukee WI CSA	290	0.4%	465	0.5%	755	0.5%
Remainder of Wisconsin	1,569	2.2%	799	0.9%	2,367	1.5%

Top 5 Most Valuable Commodities, Wisconsin

Commodities	From		To		Total Value	
	Value	% Value	Value	% Value	Value	% Value
35 Electronics	676	36.4%	372	29.5%	1,048	33.6%
21 Pharmaceuticals	408	21.9%	167	13.2%	575	18.4%
38 Precision instruments	171	9.2%	255	20.2%	426	13.6%
34 Machinery	202	10.9%	70	5.5%	272	8.7%
40 Misc. mfg. prods.	38	2.0%	119	9.4%	157	5.0%
<i>WI Top 5 Commodities</i>	<i>1,495</i>	<i>80.4%</i>	<i>983</i>	<i>77.8%</i>	<i>2,478</i>	<i>79.4%</i>
WI Total	1,859	100%	1,264	100%	3,123	100%

Projected Value Change by FAF Region, Wisconsin 2010-2040

FAF Zone	From		To		Total	
	% Change	AAGR	% Change	AAGR	% Change	AAGR
Milwaukee WI CSA	98.6%	2.3%	802.6%	7.6%	532.0%	6.3%
Remainder of Wisconsin	68.6%	1.8%	376.9%	5.3%	172.6%	3.4%

Summary

Wisconsin is the 8th most active state within the MAFC air cargo market by tonnage, capturing approximately 1.7 percent of the region's total activity. The state has 88 NPIAS airports, with 12 recording cargo activity in 2010. MKE recorded almost 78 percent of the state's total tonnage activity. MSN recorded an additional 11.2 percent with ATW contributing another 10 percent. Data suggests significant and valuable activity occurs outside the confines of the Milwaukee metropolitan area.

The presence of Chicago 90 miles to the south of Milwaukee likely has profound impacts on the role and function of air cargo in the state's most populated area. Chicago's presence changes the landscape in which air cargo carriers can operate a financially successful business. It is likely Milwaukee will always be predominantly served by the air cargo services provided out of the Chicagoland region, regardless of the relatively high AAGRs generated for the Milwaukee WI CSA FAF region. Accordingly, it is interesting to note that over 75 percent of the total value of air cargo goods are moving outside of the Milwaukee metropolitan region, valued at over \$2.3 billion. It is likely a significant portion of this activity is generated at MSN and ATW. The AAGRs for all *From/Export, To/Imports, and Total* shipments are below the MAFC average, suggesting a slower pace of growth in Wisconsin relative to the rest of the MAFC. In addition to ORD in Illinois, Minnesota's MSP is the 5th most active air cargo airport by tonnage and located less than 30 miles from the Wisconsin border. There is significant regional competition Wisconsin must face when considering the development of an air cargo economy. Many of the major metropolitan centers are adequately served by large operations in the Minneapolis and Chicago metropolitan areas. These external air cargo service capabilities are only expected to expand with the eventual implementation of the \$200 million air cargo developments at Chicago's ORD.

Considering the importance of integrating cargo operations into the belly of passenger planes, it is critical to note the fluctuating state of passenger operations at Milwaukee's MKE. In the spring of 2012, Frontier Airlines reduced the number of daily flights out of MKE from 86 to seven⁴⁹. Other airlines operating out of MKE are trimming service, reducing the number of cities reachable by direct flight to less than 40 cities. While the expected decline in passenger numbers is obvious, it is likely there will also be reductions in the accompanying air cargo activity occurring in the belly of these passenger planes.

⁴⁹ <http://www.jsonline.com/business/frontier-to-cut-11-flights-from-milwaukee-furlough-125-workers-fd57qe8-149563185.html>

Appendix B: Air Cargo Activity by Airport

Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
1	SDF	Louisville International Airport	1,228,786	1,162,648	2,391,434
2	ORD	Chicago O'Hare International	664,088	846,033	1,510,121
3	IND	Indianapolis International	528,308	491,452	1,019,760
4	CVG	Cincinnati / Northern KY International	203,357	207,128	410,485
5	MSP	Minn-St Paul / Wold-Chamberlain	120,162	126,135	246,297
6	DTW	Detroit Metro Wayne County	87,173	117,647	204,820
7	TOL	Toledo Express	99,997	90,046	190,042
8	RFD	Chicago/Rockford International	88,789	69,588	158,378
9	LCK	Rickenbacker International	53,936	52,275	106,211
10	MCI	Kansas City International	47,576	47,853	95,429
11	MKE	Gen Mitchell International	45,035	45,241	90,276
12	CLE	Cleveland-Hopkins International	43,204	42,127	85,331
13	STL	Lambert-St Louis International	41,094	41,302	82,396
14	DSM	Des Moines International	43,455	36,252	79,706
15	GRR	Gerald Ford International	19,587	20,766	40,353
16	CID	The Eastern Iowa	14,943	16,068	31,011
17	PIA	Greater Peoria Regional	15,076	15,031	30,106
18	ICT	Wichita Mid-Continent	10,833	16,576	27,409
19	MDW	Chicago Midway International	13,242	12,928	26,170
20	FWA	Fort Wayne International	12,296	13,234	25,530
21	SGF	Springfield-Branson National	11,717	12,801	24,518
22	CHI	Chicago All Airports	9,610	13,209	22,819
23	LAN	Capital City	9,381	11,160	20,541
24	MSN	Dane County Regional-Truax Field	6,365	6,678	13,043
25	ATW	Outagamie County Regional	5,396	6,150	11,546
26	FNT	Bishop International	5,195	5,875	11,070
27	SBN	South Bend Regional	5,716	4,891	10,606
28	RST	Rochester International	4,024	4,058	8,081
29	DAY	James M Cox Dayton International	3,699	3,885	7,584
30	CMH	Port Columbus International	1,883	2,906	4,789
31	YIP	Willow Run	782	3,176	3,958
32	BLV	Scott AFB / Mid-America	680	1,127	1,808
33	IAB	McConnell AFB	622	447	1,069
34	LEX	Blue Grass	479	567	1,045
35	DLH	Duluth International	248	724	972
36	PTK	Oakland County	116	784	901
37	TVC	Cherry Capital	479	257	736
38	BJI	Bemidji Regional	315	314	629

Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
39	RHI	Rhineland-Oneida County	366	248	614
40	MQT	Sawyer International	220	310	531
41	GCK	Garden City Regional	223	261	484
42	PLN	Pellston Regional of Emmet County	104	264	367
43	DTT	Detroit All Airports	177	171	347
44	APN	Alpena County Regional	125	216	341
45	CWA	Central Wisconsin	102	161	263
46	IMT	Ford	83	160	242
47	CIU	Chippewa County International	121	117	238
48	FFO	Wright-Patterson AFB	211	0	211
49	GYG	Gary/Chicago International	17	160	177
50	CMX	Houghton County Memorial	42	122	164
51	ESC	Delta County	65	86	152
52	HOP	Campbell AAF	0	102	102
53	YNG	Youngstown-Warren Regional	79	20	99
54	CAK	Akron-Canton Regional	60	33	93
55	TVF	Thief River Falls Regional	79	5	84
56	MKC	Charles Wheeler Downtown	29	48	77
57	GLR	Gaylord Regional*	2	59	60
58	DPA	Dupage	20	31	52
59	GRB	Austin Straubel International	26	25	51
60	FDY	Findlay*	1	48	49
61	BTL	W K Kellogg*	11	38	49
62	EVV	Evansville Regional	38	4	43
63	AXN	Chandler Field*	31	1	32
64	SZL	Whiteman AFB	0	31	31
65	SLN	Salina Municipal	16	15	31
66	CMI	University of Illinois-Willard	23	8	31
67	BWG	Bowling Green-Warren County Regional*	28	1	29
68	AZO	Kalamazoo / Battle Creek International	3	26	29
69	LUK	Cincinnati Muni Lunken Field	8	18	26
70	BKL	Burke Lakefront	10	15	25
71	MBS	MBS International	18	7	25
72	MLI	Quad City International	8	15	23
73	CLU	Columbus Municipal*	17	3	20
74	ENW	Kenosha Regional	0	15	15
75	BMI	Central IL/Bloomington-Normal	10	2	13
76	DBQ	Dubuque Regional	0	12	13
77	BRD	Brainerd Lakes Regional	0	12	12
78	EAU	Chippewa Valley Regional	7	4	11
79	SUS	Spirit of St Louis	10	1	11

Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
80	MI2	Tulip City*	10	0	10
81	ALO	Waterloo Regional	0	9	9
82	CAD	Wexford County*	0	9	9
83	DQP	Georgetown Scott County - Marshall Field*	0	8	8
84	HVC	Hopkinsville-Christian County*	7	1	8
85	HYS	Hays Regional	0	7	7
86	COU	Columbia Regional	5	1	6
87	DDC	Dodge City Regional	4	2	6
88	VOK	Volk Field ANGB	0	6	6
89	HUF	Terre Haute International-Hulman Field*	6	0	6
90	BMG	Monroe County*	3	2	5
91	PWK	Palwaukee Municipal	5	0	5
92	MWA	Williamson County Regional	5	0	5
93	DNV	Vermilion Regional*	4	0	4
94	MKG	Muskegon County	4	0	4
95	AOH	Lima Allen County*	0	4	4
96	ALN	St. Louis Regional	4	0	4
97	CGI	Cape Girardeau Regional*	4	0	4
98	STP	St Paul Downtown Holman Field	0	3	3
99	TDZ	Metcalf Field	2	1	3
100	MHK	Manhattan Regional	1	1	3
101	MDF	Taylor County*	3	0	3
102	SBM	Sheboygan County Memorial*	0	3	3
103	MCW	Mason City Muni	2	0	2
104	MIE	Delaware County - Johnson Field*	2	0	2
105	LAF	Purdue University*	2	0	2
106	LSE	La Crosse Muni	1	1	2
107	SPI	Abraham Lincoln Capital	0	1	2
108	HLM	Park Township Airport	2	0	2
109	HIB	Range Regional	2	0	2
110	MNM	Menominee-Marinette Twin County*	1	0	1
111	JEF	Jefferson City Memorial*	1	0	1
112	CEV	Mettel Field*	0	1	1
113	ILN	Clinton Field*	1	0	1
114	LWV	Lawrenceville-Vincennes International*	0	1	1
115	RSL	Russell Municipal*	0	1	1
116	FOD	Ft Dodge Regional	0	1	1
117	II2	Lewis University	0	1	1
118	LOZ	London-Corbin Airport-Magee Field*	1	0	1
119	MQJ	Mount Comfort	0	0	0
120	LBL	Liberal Mid-America	0	0	0

Rank	Code	Airport Name	Enplaned (Tons)	Landed (Tons)	Total Activity (Tons)
121	IRS	Kirsch Municipal*	0	0	0
122	STE	Stevens Point Municipal*	0	0	0
123	SKY	Griffing Sandusky Airport	0	0	0
124	AUZ	Aurora Muni	0	0	0
125	FOE	Forbes Field	0	0	0
126	PHN	St Clair County International	0	0	0
127	FFM	Fergus Falls Municipal-Einar Mickelson Field*	0	0	0
128	SUX	Sioux Gateway / Day Field	0	0	0
129	IA1	Shenandoah Municipal*	0	0	0
130	PAH	Barkley Regional	0	0	0
Total All MAFC Airports			3,450,118	3,552,279	7,002,396
*Denotes airport classified as General Aviation (GA) airport.					
Source: Bureau of Transportation Statistics, Office of Airline Information T-100 Market Data					



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