AIR CARGO LEAKAGE:
ASSESSING OPPORTUNITIES FOR THE LOCAL AIR CARGO MARKET

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ABSTRACT: Air cargo planning and development are becoming increasingly important to the strategic direction of airports. To adequately plan for air cargo facilities and infrastructure means that airports must understand their local air cargo market. Strategic marketing plans that assess air cargo leakage can arm airport authorities with the information necessary to improve their competitiveness. Airports that ignore leakage will have more difficulty in effectively planning for air cargo growth.

1.0 INTRODUCTION

Worldwide air cargo growth exceeds the growth in passenger traffic. For airports, the development of cargo facilities and infrastructure is a component of air cargo growth. Planning for the right types of cargo facilities, buildings, apron space and service means that airports must understand their local air cargo market. They must understand not only the volumes of air cargo flows, but the underlying characteristics of those flows.

Air cargo volumes – even those collected directly by airports – do not address the issue of diverted air cargo, or air cargo leakage. In 1999, a Leakage Study was undertaken by the Winnipeg Airports Authority (WAA) to assess air cargo traffic flows that bypass Winnipeg International Airport (YWG).

This paper identifies air cargo being moved via other airports to and from Winnipeg. Specifically, it outlines the methodology of the study and presents diverted air cargo by: volumes, commodities, regions of origin-destination and airports used. Reasons that drive freight forwarder air cargo routing decisions are also discussed. The paper examines WAA’s route development strategies aimed at enhancing Winnipeg’s local air cargo market and service opportunities that link airports along the Mid-Continent International Trade Corridor (MCITC).

2.0 THE WORLD AIR CARGO INDUSTRY

Air cargo is expected to grow at a faster rate than the world economy. Boeing forecasts an average annual growth rate of 6.4 percent for air cargo over the next twenty years, while predicting an annual growth rate of 2.9 percent for global GDP through 2017. Similarly, MergeGlobal predicts a 6.2 percent average annual growth rate for air cargo and a 3 percent growth rate for world GDP over the next five years. The most significant factors that drive the continued growth of air cargo are:

- economic growth
- global economic integration
- re-engineering of supply chains
- time-based competition
- declining real air freight rates

1 The authors were a part of Winnipeg Airports Authority’s Air Cargo Development Team and co-authored its 1999 Air Cargo Marketing Plan.
3 See MergeGlobal Forecasts, www.mergeglobal.com
Air cargo demand is growing because expanding logistics systems emphasize higher processing speeds, greater efficiency, enhanced customer service, and activity-based costing. Individual firms are focused on reducing order-cycle times including all of their integrated logistics strategies — just-in-time (JIT), make-to-order, quick response, etc. — as a source of competitive advantage. On the supply side, increased competition has forced carriers to become more efficient. Holding fuel prices constant, efficiency gains could translate into declining freight rates that induce shippers to use more air freight. The air cargo industry is offering more complete services and the lines between freight forwarders and integrators continue to blur. Freight forwarders and consolidators are following the example of the integrators by providing comprehensive door-to-door logistics services. Through mergers and acquisitions, freight-forwarding companies are expected to continue to decrease in number but increase in size and market share. The integrators, meanwhile, are expected to continue to be the fastest growing sector of the industry. In addition, integrators are showing an increased interest in acquiring freight forwarders to expand their own business.\(^4\)

3.0. AIR CARGO RESEARCH

3.1 AIR CARGO DATA GAPS AT YWG

Data gaps prohibit an accurate measure of cargo volumes moving through YWG. Statistics Canada data is incomplete since it reports information only for major scheduled and charter carriers at Canadian airports. No cargo data are collected from the integrators, regional/local carriers and smaller airlines at YWG. Publication of Statistics Canada data is also untimely. Passenger and cargo data generally are unavailable until several months after the end of each year. Cargo information that is incomplete and dated is of little use for airport planning.

As part of a new air cargo research initiative, WAA has begun the process of collecting timely cargo volumes from all carriers moving freight via Winnipeg International Airport.

3.2 AIR CARGO VOLUMES

The WAA Air Cargo Development Team was established in January 1999 in conjunction with the Transport Institute (TI) at the University of Manitoba. TI commenced data collection of cargo volumes from firms moving air cargo through YWG. Carriers report monthly cargo volumes directly to WAA. Data can be updated within two weeks at the end of each reporting month.

Initial data collection reveals that published statistics of inbound and outbound cargo under-estimate the true volumes at Winnipeg. Statistics Canada figures appear to represent less than 15 percent of the total cargo moving through YWG, including in-transit and connecting cargo. The 1999 estimated total air cargo throughput for YWG is between 90,000-100,000 metric tonnes, while Statistics Canada will likely report volumes in the neighborhood of 15,000 metric tonnes.

4.0 AIR CARGO LEAKAGE STUDY

A "leakage" study was undertaken to assess air cargo traffic flows that bypass the airport. The leakage study identifies air cargo being moved via other airports to and from Winnipeg. For example, a significant amount of air cargo that originates in Winnipeg is carried by truck to other airports before subsequent airlift. Similarly, air cargo destined for Winnipeg lands at other airports, before being trucked to Winnipeg.

4.1 LEAKAGE IN OTHER AIRPORT JURISDICTIONS:

- CASE OF MINNEAPOLIS-ST.PAUL (MSP)

\(^4\) For example, at the time of this writing, FDX, the parent company of Federal Express, was in negotiations to purchase GeoLogistics.
Minneapolis -St.Paul is often referred to as America’s “North Coast Gateway”, a gateway that exists in the shadow of Chicago. While the production of airborne exports in the region has experienced growth, what remains unclear, is the how much leakage from Minneapolis -St.Paul’s catchment area occurs due to insufficient international cargo service at MSP. Although there is widespread agreement among local airport officials, shippers and forwarders that a high percentage of local products are trucked to Chicago or other substantial cargo gateways for export, leakage flows from MSP have not been documented in a manner that is likely to help the airport draw additional cargo service into the area. Local leaders must convince prospective carriers that the Twin Cities can generate sufficient demand for inbound international air cargo traffic to fill flights returning from much needed outbound trips.

Transport companies need either to make enough money on one-way traffic so that they can afford to operate return trips without additional revenue, or to have enough traffic in both directions to support the outbound and inbound service. This backhaul issue is one reason why the supply of air cargo service does not seem to keep up with the demand for service at Minneapolis. A growing share of air cargo traffic in the Minneapolis region is trucked out of state and airlines are reluctant to launch new all-cargo service. However, Air Cargo World noted that there is not much competition at MSP on a cargo basis, not because of Northwest’s control of the market, but because forwarders control the market and the vast majority are trucking it out.

- **CASE OF EDMONTON (YEG)**

The Edmonton Regional Airports Authority conducted a study similar to the WAA Leakage Study. Although the full findings of the study were never made public, ERAA has disclosed that approximately 40 percent of its air cargo is diverted by truck to other airports.

For Edmonton, the vast majority of this cargo utilizes Calgary International Airport, just three hours away by truck. Calgary’s airport has more wide-body service than Edmonton, and also has more transborder and international routes. To the shippers and forwarders, trucking cargo between Calgary and Edmonton allowed for more efficient air routing.

Some of these same routing issues apply to Winnipeg in Section 5.0.

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5 An equally important factor in cargo service’s constrained growth at MSP is Northwest Airline’s dominance within the local market. The dominant hub operations of Northwest make it a difficult market for new entrants on both the passenger and cargo sides. The lack of competition has given Northwest little reason to improve its service at its captive home market.

6 See B. Sobie “Squeezing the Heartland”, Air Cargo World, August, 1999.
4.2 Why Conduct a Leakage Study?

In 1998, WAA learned that a significant volume of air cargo – approximately 2 truckloads per week – was being trucked from Winnipeg to Ottawa and then flown to Iqaluit, Nunavut (then Northwest Territories) by First Air. WAA encouraged First Air to expand its northern passenger and re-supply routes out of YWG. In doing so, First Air has captured a portion of the local cargo leakage by flying a 727-combi aircraft between Winnipeg and Iqaluit. WAA’s instincts were that there was likely a significant volume of air cargo still being diverted that could be captured.

The leakage study was undertaken to assess both existing and potential air cargo service levels at YWG. Understanding the diversion of air cargo from YWG’s catchment area assists future cargo marketing and planning requirements. It also assists the airport in supplementing passenger route development, as carriers are becoming more aware of the incremental revenue flow opportunities represented by air cargo. As part of WAA’s passenger route development activity with scheduled carriers, the leakage information could be used to assess the viability of attracting wide-body service capacity to Winnipeg. Leakage information also identified better opportunities to meet the needs of Winnipeg’s freight forwarding community. Freight forwarders are key players in the air cargo industry because they consolidate freight and arrange for it to move in the bellies of passenger aircraft.

Leakage information for 1998 was obtained through a survey of freight forwarders who focused on factors that influence their routing decisions. These factors include:

- Availability of Air Service
- Compatibility of Aircraft Capacity
- Economies of Consolidation
- Time, Cost and Efficiency
- Service Market Information

Information was requested on total cargo volumes, the percentage of cargo diverted via other airports, air-eligible commodity types and by regional origins/destinations.

The study appealed to the freight forwarders because it represented an opportunity to improve the cargo service level at YWG, and make Winnipeg more of an air cargo gateway. Increased and improved cargo services translates into higher volumes and better margins for freight forwarders.

5.0 Study Results

The results of the Leakage Study could convey to forwarders the competitive advantages of utilizing YWG for air cargo services, while at the same time addressing key issues driving forwarder routing decisions. Figure 1, Tables 1-2 and Leakage Maps 1-4 illustrate the results of the study by tonnage, commodity, airport and region. Figure 1 shows that a significant amount of inbound and outbound air cargo is diverted via other airports. For 1998, participating freight forwarders diverted approximately one-quarter of the total inbound/outbound volume.

Figure 1 Total Air Cargo to/from YWG, 1998

![Figure 1 Total Air Cargo to/from YWG, 1998](image)
Winnipeg’s total air cargo market includes the actual air cargo that moves through YWG plus all diverted air cargo that is trucked between Winnipeg and other airports. If 25 percent of the total air cargo market is diverted, then the actual volumes moving through YWG account for the remaining 75 percent. The estimated total cargo flow through YWG in 1999 is in the range of 90-100,000 metric tonnes. An estimate of the total diverted cargo would equal one-third of the actual recorded volumes, or 30-33,000 metric tonnes. The true size of the local air cargo market – or the actual volumes plus the diverted volumes – is between 120-133,000 metric tonnes. This includes diverted air cargo of freight forwarders, integrated carriers and passenger carriers, assuming each diverts approximately one-quarter of their cargo. In terms of belly space, this estimate may support new service of 3-4 flights per day using a 767 wide-body aircraft.

While the percentages of diverted inbound and outbound volumes were roughly equal, the types of commodities diverted differed. Table 1 presents total diverted inbound and outbound commodities. Inbound, the two largest proportions of diverted inbound commodities were textiles (37.1 percent), and furniture and collectibles (12.4 percent). Other notable diverted inbound commodities were industrial/machinery products, construction machinery and electronic components.

Outbound, the most significant of diverted commodities from Winnipeg consisted of aircraft engines and parts (27.2 percent) and printed matter (20.9 percent). Electronic components, general cargo (e.g., building supplies), agricultural product and industrial machinery also have sizeable volumes of diverted outbound commodities.

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<th>Table 1 Diverted Commodities</th>
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Leakage Maps 1 and 2 present a regional perspective of air cargo leakage. The majority of the leakage originates in Western Europe. Inbound, the United Kingdom (UK) accounted for 12.7 percent of diverted cargo, while other Western European countries accounted for 46.5 percent. Nearly one-quarter of the diverted inbound cargo originated within Canada. The Asia-Pacific region accounted for 15.1 percent. Outbound, the most significant cargo lanes are Western Europe, Asia-Pacific and the U.K. Outbound diverted cargo destined to Western European countries – excluding the UK – accounted for 31 percent of the total. Asia-Pacific and the UK accounted for 26.5 percent and 22.7 percent respectively.

Leakage Maps 3 and 4 depict leakage by airport. The majority of cargo leakage was diverted via Toronto (YYZ) or Calgary (YYC) International Airports. Combined, these airports accounted for approximately three-quarters of both the inbound and the outbound totals. Vancouver International Airport (YVR) accounted for 14.4 percent inbound leakage.

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*Winnipeg has a very healthy aircraft manufacturing and aerospace sector (i.e., Boeing, Bristol Aerospace and Standard Aero). The majority of this sector’s manufactured goods are transported via truck.*
and 9.3 percent outbound. Air cargo leakage via Minneapolis-St. Paul (MSP) accounted for 13.3 percent of the total outbound share from YWG, while the inbound leakage was negligible.

Leakage Map 1: Diverted Cargo by Origin – Inbound, 1998

Leakage Map 2: Diverted Cargo to Destination – Outbound, 1998

Source: WAA Leakage Study
Leakage Map 3: Diverted Cargo by Airport (Trucked) – Inbound, 1998

YVR (14.4%)
YYC (34.8%)
YYZ (41.4%)
JFK (5.2%)
ORD (1.4%)
MSP (0.2%)
YUL/YMX (2.7%)

Source: WAA
Leakage Study

Leakage Map 4: Diverted Cargo by Airport (Trucked) – Outbound, 1998

YYC (33.1%)
YYZ (40.3%)
JFK (0.9%)
ORD (2.0%)
MSP (13.3%)
LAX (0.6%)
YUL/YMX (0.6%)
YVR (9.3%)

Source: WAA
Leakage Study
5.1 Air Cargo Routing Decisions

As part of the survey, forwarders were requested to identify reasons that drive air cargo routing decisions. Figures 3 and 4 illustrate forwarder issues by level of importance. The evaluation factors allow for presentation of mean scores and rankings based on those mean scores. The level of importance ranged from “1” (not important) to “5” (most important). On both inbound and outbound sides, the lack of air cargo service (i.e., Origin-YWG; YWG-Destination) and the inability to accommodate large shipments were the two most important problems facing forwarders. Winnipeg’s freight forwarding community indicated that the lack of wide-body aircraft serving YWG has resulted in a significant amount of oversize cargo – too large to load on narrow-body aircraft – to be shipped via other locations. Insufficient frequency levels of scheduled passenger (belly capacity) and the lack of all-cargo service were also important reasons for diverting air-eligible commodities, both inbound and outbound. Considering that there is no all-cargo service – a part from integrated express carriers – it was not surprising forwarders would indicate the lack of all-cargo service as a reason for routing traffic via other airports. Forwarders indicated that issues related to inadequate storage facilities, loading/unloading equipment, poor arrival/departure times, cargo loss/damage and transport costs through Winnipeg were of relatively lower importance, but still areas to be addressed.

6.0 Passenger Route Development

Now that we gathered all of this leakage information, we had to ask ourselves: “What are we going to do with the information?”, and “What opportunities can be explored?”. The results of the study indicated the freight forwarding community’s specific set of needs: “improved wide-body service to key markets”.

Freight forwarders expressed the opinion that air freight volumes could increase if direct service were available. Knowledge of diverted volumes combined with the identification of Western Europe and the UK as key markets should encourage WAA to market passenger service between Winnipeg and London or Frankfurt using larger gauge aircraft – such as a Boeing 767. Filling aircraft serving such routes with belly cargo, which is presently being diverted, would improve the viability of Winnipeg-Europe service.

Winnipeg’s air cargo market can not support regular all-cargo flights, with the notable exception of the integrators. To improve air cargo service offered through Winnipeg, WAA should regularly address cargo in its passenger marketing efforts to attract wide-body service. Large shippers and freight

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Footnotes:

8. The largest aircraft used by main line scheduled are narrow-body aircraft.

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forwarders would be better served by four or five wide-body passenger flights per week than a single weekly all-cargo flight.

6.1 Wide-Body Service to Key Markets

- **Winnipeg–Toronto (YWG/YYZ)**
- **Winnipeg–Calgary (YWG/YYC)**

A Canadian passenger carrier would be a natural fit for improved passenger service at YWG. Increasing the gauge of aircraft on YWG-YYZ or YWG-YYC or YWG-YVR flights would provide forwarders with the belly capacity required to send palletized air cargo. However, Air Canada, Canadian Airlines and Canada 3000 have to date been unwilling or unable to make such a commitment. Therefore WAA’s attention must also include other international airlines, two of which have expressed an interest in increasing belly capacity at YWG through improved passenger service.

- **Winnipeg–Minneapolis (YWG/MSP)**

One-stop wide-body service could be provided from Winnipeg to Europe by Northwest Airlines through its Minneapolis-St. Paul (MSP) hub. By converting one of its current flights between YWG and MSP (five flights per week) from a DC-9 to a DC-10, and routing the same plane service to a European destination (i.e., Amsterdam, London-Gatwick, Oslo), Northwest could resolve the three most important issues identified by Winnipeg’s freight forwarders in the Leakage Study. Furthermore, passengers flying Northwest would also benefit from increased aircraft size serving this busy route. Northwest also offers direct flights serving Asia (i.e., Tokyo, Osaka, and Singapore) from MSP that could accommodate some of the diverted cargo between YWG and the Pacific Rim.\(^{10}\) However, cargo pre-clearance\(^ {11}\) would be a necessity as cargo would be originating in Canada, stopping in the United States and destined for Europe or Asia. If cargo pre-clearance could be negotiated in upcoming bilateral discussions between Canada and the United States, the possibility of Northwest capturing YWG’s air cargo leakage would increase. Without cargo pre-clearance, the economic advantages of shipping international cargo through MSP would be diminished.

- **Winnipeg–Reykjavik (KEF)**

Alternatively, Icelandair could provide service between YWG and Keflavik International Airport (KEF) in Reykjavik, Iceland utilizing Boeing 757s. Currently, the airline flies directly between KEF and Halifax (YHZ), but could add YWG to its route network during upcoming bilateral discussions between Canada and Iceland. Most major European markets are served non-stop from KEF so Winnipeg shippers and forwarders would have one-stop service to almost anywhere in Europe. However, the majority of Icelandair’s flights are on 757s, which are narrow-body aircraft. The current problems associated with shipping palletized cargo would not be resolved. Also, flying to KEF still necessitates changing aircraft before continuing on to other European destinations. Shippers and forwarders prefer to have same plane service rather than having to change aircraft.

- **Other Charter/Start-Up Carriers**

WAA should be prepared to accommodate new cargo charter operations or the expansion of existing operations that may utilize wide-body aircraft in Winnipeg. This could include airlines such as Winnport, Evergreen, HeavyLift-....

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\(^{10}\) In fact, Northwest added several weekly frequencies –and an additional B747-freighter – after the latest US-China bilateral agreement, though not exclusively from MSP (Putzger 1999).

\(^{11}\) The inability to pre-clear cargo adds further transaction costs (time, service), which impairs the cargo system and reduces the competitiveness of cargo shippers, forwarders and airlines. Allowing for cargo pre-clearance would reduce the dwell time cargo shipments would be held in bond. See Shurvell, S.J. Crockatt, M.A., “Open Skies For Passengers, But What About Cargo? Re-Evaluating Canada-U.S. Air Cargo Regulations”, CTRF, 2000.
VolgaDnepr, or other possible start-up carriers. WAA should be ready to take advantage of any new cargo opportunities that arise.

7.0 TRI-LATERAL AIR CARGO WORKING GROUP

Another opportunity for increased level of air cargo service is through the work of a recently formed Tri-Lateral Air Cargo Working Group. In the summer of 1999, the Working Group was established to examine the feasibility of air cargo service opportunities along the MCITC. The Working Group consists of two key airports along the corridor – Winnipeg Airports Authority (WAA) and the Kansas City Aviation Department (KCAD) – and a number of organizations in Winnipeg, the mid-continent US, and Mexico. The first meeting of the Working Group took place in July 1999 in Kansas City, MO. At that time, preliminary data was presented and a further work plan was discussed. WAA’s 1999 Air Cargo Marketing Plan encouraged the continued development of cargo partnership opportunities with Kansas City International Airport and the exploration of new alliance opportunities as they present themselves along the MCITC.

In recent years, there has been a shift in transportation and trade patterns in North America. The rate of growth of north-south trade is greater than that of traditional east-west trade. There is a need to facilitate these changing trade patterns. Conventional wisdom dictates that cargo moving through the U.S. travels east or west. But, the Working Group hopes to send traffic in other directions. While truck and rail traffic head up and down the Interstate 29 corridor and eventually into Mexico, the members of the Working Group believe a similar north-south air service could be well received.

While truck and rail modal service opportunities have greatly increased along the MCITC, the level of air cargo service has not. Shippers in Kansas City must send air freight to either Chicago, or Dallas for transshipment to Mexico. Similarly, no direct air cargo service exists between Winnipeg and Kansas City, even in the belly of passenger aircraft. Important first steps in attracting air cargo service involves assessing the local cargo market, including the value and weight of commodities already moving along the corridor and identifying transferable commodities that could be moved by air from alternative modes (i.e. by truck) along the same route.

The Air Cargo Working Group is proceeding with quantifying trade-flow potentials via dedicated resources in both Kansas City and Winnipeg. The primary objective of the Working Group's efforts is to present a compelling business case to an air cargo carrier to begin the provision of air cargo service along the corridor. The separate leakage studies conducted for Winnipeg and Kansas City help to pinpoint the demand for a charter service linking the two cities and destinations in Mexico. The service would be combined to complement north-south services offered by the Kansas City Southern Railway through its intermodal hub in Kansas City.

The Working Group is also endeavouring to identify air cargo leakage between the Winnipeg International Airport catchment area, the eight-state catchment area for Kansas City International Airport (these include Arkansas, Colorado, Iowa, Kansas, Minnesota, Missouri, Nebraska and Oklahoma) and three key Mexican regions: Monterrey, Guadalajara and Mexico City.

7.1 METHODOLOGICAL ISSUES

More information could have been derived from the Leakage Study if freight forwarder information was supplemented with direct information from passenger airlines and integrators. A longer, more detailed survey was also considered. The longer version would have enabled further disaggregation of the leakage data to analyze the connections between commodities, airports used, and origin or destination region. For instance, results from a longer survey could have indicated the proportion of cargo trucked to Toronto that goes to each destination region.

7.2 “WALK-BEFORE-YOU-RUN” STRATEGY

WAA’s “walk-before-you-run” air cargo development plan establishes an on-going framework for the collection of cargo data and provides for an understanding of cargo leakage. The information gathered is necessary if WAA is to make informed investment and development decisions that could encourage continued air cargo growth at YWG.
8.0 CONCLUSION

The continued growth of air cargo worldwide means that air cargo can no longer be dismissed as a side issue at airports. In Canada, cargo information is hard to address because of significant data gaps. Although airport authorities have recently begun to fill those gaps, they still do not address air cargo leakage. At Winnipeg, ¼ of total air cargo volume was diverted. If cargo service levels improved, leakage could be reduced.

Leakage Studies not only arm airports with information pertaining to diverted air cargo flow characteristics, but also identify underlying issues and impediments that force forwarders to consider alternative cargo routings. Resolving issues and impediments raised by forwarders could enable airports to improve their competitiveness with other airports and recover leakage. Every tonne of diverted cargo are lost revenue opportunities for an airport. Other airports subsequently gain this revenue loss. For this reason, every airport should consider a leakage study to improve its competitive position. While the leakage study for Winnipeg (YWG) found that improved air cargo service should be blended in its passenger route development and marketing, this need not be the case for every airport. If airports can successfully address issues that restrict their air cargo growth, the benefits extend not only to airports, but also to freight forwarders, carriers and shippers.

Airports do not have to fight the leakage battle single-handed. Strategic partnerships and alliances (i.e., Air Cargo Working Group) enable airports to address specific leakage components and stimulate trade between each market’s catchment area.

NOTES

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The authors take full responsibility for any errors or omissions.

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