Capitalizing on Potential

Air Cargo Development at Washington Dulles International Airport

A PRACTICAL POLICY ANALYSIS

Prepared for: Washington Airports Task Force

George Mason University
School of Public Policy
Transportation Policy, Operations, & Logistics
Spring Practicum 2006
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Executive Summary

Over the past several months, participants of the George Mason University School of Public Policy’s Transportation Policy, Operations, and Logistics program (TPOL) have diligently researched and analyzed future possibilities for increasing air cargo flow at Washington Dulles International Airport (IAD). Commissioned in February of 2006 by the Washington Airports Task Force (WATF), Master’s candidates in TPOL’s capstone practicum course were challenged with deciding whether or not an operational synergy exists between the Virginia Inland Port (VIP) and IAD.

To gain a deeper understanding of the air cargo industry and fully evaluate this scenario, the group utilized Eugene Bardach’s *A Practical Guide for Policy Analysis; The Eightfold Path to More Effective Problems Solving*. Using this analytic framework, the team devised a problem statement, focused on increasing air cargo flow, and initiated research related to three distinct areas of the air cargo industry: operations, marketing, and regional studies. Interviews with industry experts, a survey of the IAD freight forwarder community, and multiple field visits to IAD and VIP bolstered the team’s academic research. Based on identification of critical factors that drive air cargo transport decisions, the team developed possible alternatives and weighed them against criteria constructed around initial guidance from the WATF. Working within this structured process, the team then formulated recommendations to present to the task force.

While this analysis has not identified any immediate opportunities for an operational relationship between IAD and VIP, the team has uncovered the potential for development of a marketing synergy between them. Despite the prospects for development of an operational relationship with VIP, the team has identified alternatives that may be viable strategies for air cargo development at IAD. The team recommends that the Metropolitan Washington Airports Authority’s (MWAA’s) efforts to capture additional eligible air cargo should focus on a mix of the following alternatives:

- Build a relationship of mutual understanding and operations with regional freight forwarders;
- Develop the resources and environment necessary to encourage a new major airfreight customer to relocate to the region;
- Facilitate growth of a niche market centered on movement of Household Goods and Personal Effects; and
- Continue efforts to attract the operation of a freighter service at IAD.

Analysis of the experiences of other airports in the U.S. and abroad suggests that there is no single “silver bullet” for increasing the flow of cargo to IAD. However, pursuing several of these identified complementary strategies will help the Metropolitan Washington Airports Authority (MWAA) capitalize on IAD’s potential in the future.

*Spring Practicum 2006*
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Introduction

The Washington Dulles International Airport (IAD) is a successful passenger airport, ranking 21st in passenger enplanements out of 399 surveyed U.S. passenger airports in 2004. Within the air passenger service industry, IAD ranks in close proximity with New York's John F. Kennedy International Airport, Los Angeles International Airport, Chicago O'Hare International Airport, and Hartsfield-Jackson Atlanta International Airport. In the air cargo industry, however, IAD fails to rank among the top 50 freight gateways. Recognizing this deficiency, the Metropolitan Washington Airports Authority (MWAA) is pursuing development of the air cargo sector, which will enhance the airport's reputation as a world-class, full service operation.

Transportation Secretary Norman Mineta has stated that, “Cargo is one of the fastest growing segments of the U.S. economy.” Airfreight alone more than doubled from 1993 to 2002. Intercontinental air cargo volume is expected to grow 6.1% through 2009. IAD, similar to more than 600 other commercial airports worldwide, is vying for a portion of that cargo growth to increase revenue while balancing its operational portfolio. IAD has several advantages over other airports, including ongoing runway expansion and expanding passenger service. IAD's location is also advantageous as it positioned within the Washington Metropolitan Region—ranked first in the 15 largest U.S. job markets for job gains for the period of November 2004 – November 2005. IAD is also located within sixty miles of a growing inland port—the Virginia Inland Port (VIP). The geographic proximity and VIP's focus on cargo movement suggests a possible relationship, or “synergy,” between IAD and VIP.

At the request of the Washington Airports Task Force (WATF), a team of students from the Transportation Policy, Operations, and Logistics (TPOL) Master's Practicum course at George Mason University's School of Public Policy set out to evaluate the potential for an operational relationship with VIP. However, the team expanded the study beyond the VIP, to tackle the fundamental problem of identifying a viable air cargo development strategy that will capture sufficient air cargo business to utilize IAD’s current and projected operational capability. Research focused on the air cargo market, political and economic conditions, commodity flows, and cargo operations of IAD and airports in several other select regions. Evaluating the research results, the team developed a list of nine possible alternatives for development of IAD’s air cargo sector and selected criteria to assess the feasibility, sustainability, and costs and benefits of the alternatives. Through this analytic process, the team identified the most attractive, viable options for IAD and formulated cargo development recommendations for the WATF.

Through the research process, the team identified several key factors that drive decisions about air cargo movement. The characteristics of cargo, such as value, time-sensitivity, and size, determine selection of transport mode. To identify opportunities for development of an operational relationship with VIP, the team studied the development and operations of inland ports, learning that inland ports are strategically located to integrate elements of the supply chain, thus offering customers cost savings and operational efficiencies. Perhaps most striking in the research was the central role of freight forwarders in the air cargo industry and how post September 11, 2001 security initiatives, specifically the Known Shipper regulations, affect transport options at IAD. Lastly, the team identified the potential prominence of the Household Goods and Personal Effects (HHG/PE) market in cargo development in the Washington Metropolitan Region. These findings influenced the selection of several strategic recommendations for further air cargo development at IAD.

Key Findings

- The value and characteristics of cargo determine modal selection.
- Inland ports are specifically positioned to integrate supply chain components.
- Freight forwarders are key decision-makers in air cargo transportation.
- Known Shipper regulations constrain air cargo lift options.
- The Washington Metropolitan area household goods and personal effects market is a potential cargo growth opportunity.

The alternatives ranged from a continuation of IAD’s current focus on expanding passenger operations to building an airfreight consolidation facility to attract major freight forwarders to IAD. However, based on IAD’s current operational environment and market, air cargo industry trends, and cargo development strategies employed at other airports, the team identified the top four alternatives:

- Attract freighter service;
• Entice a new customer, such as a major manufacturer or freight forwarder;
• Develop household goods and personal effects (HHG/PE) as a niche market; and
• Conduct an in-depth study of the freight forwarders at IAD.

While the results of this analysis did not identify any immediate opportunity for an operational relationship between IAD and VIP, the team uncovered the potential for development of a marketing synergy between them. There is no single “silver bullet” for increasing the flow of cargo to IAD; however, the team determined that the Metropolitan Washington Airports Authority (MWAA) should consider pursuing a mix of these complementary strategies for development of IAD’s air cargo sector in the future.

Project Development & Methodology

The methodology that guided the team’s examination and policy analysis of increasing air cargo at IAD and determination of a possible operational relationship with VIP was Eugene Bardach’s Eightfold Path to More Effective Problem Solving. This process entails eight distinct steps: problem definition, evidence assembly, construction of alternatives, selection of criteria, projection of outcomes, confrontation of trade-offs, deciding upon a preferred alternative(s) and finally “telling one’s story.”

Bardach’s Eightfold Path

• Define the Problem
• Assemble Some Evidence
• Construct the Alternatives
• Select the Criteria
• Project the Outcomes
• Confront the Trade-offs
• Decide on Preferred Alternative(s)
• Tell Your Story

Problem definition was essential to focusing the team’s research and framed the development of the project. The objective was to craft a problem statement that was clear and concise, without building a solution into the problem statement. An iterative examination of the issue resulted in development of the following problem statement: The Washington Dulles International Airport does not currently capture air cargo business that sufficiently utilizes its current and projected operational capacity.

In order to ensure the gathering of adequate information pertaining to a wide array of relevant issues, the team divided into three groups: a Regional Studies Group; a Market Studies Group; and an Operations Group (Appendix I, II, III). In addition to studying operations at IAD, the Operations Group examined air cargo operations at prominent airports worldwide to gain a basic understanding of what components are important to the successful implementation of airport cargo operations. The group compared IAD to other domestic and international airports to identify deficiencies or any area that could be improved upon to attract more cargo (Appendix III). The Regional Studies Group examined transportation, politics, land use, commodity flows and infrastructure within the Northern Virginia/Dulles Region. The Market Studies Group focused on economic development, current customer base, fees, freight costs and cargo flows. These groups researched a variety of academic and trade publications, conducted an electronic survey of the freight forwarder community at IAD, and interviewed multiple sources, including a well-known air cargo consultant, a senior VIP representative, area business managers, Transportation Security Administration (TSA) cargo specialists, IAD air carrier cargo managers, and freight forwarder representatives. Key findings of this research are discussed in this report.

In the third step of constructing alternatives, the team developed a comprehensive set of potential strategies. After selecting a set of criteria, the team analyzed those alternatives and projected plausible outcomes using evidence for each alternative, which is the fifth step in this policy analysis process. The alternatives were then measured against the criteria and compiled into a master matrix. During steps six and seven, the team further refined the list of alternatives and determined recommendations for the client, which is the seventh step in the policy analysis process. In the final step of “telling the story,” the team published this report and presented its recommendations to the Washington Airports Task Force.
Critical Factors Driving Freight Transport Decisions

The team’s research revealed several key factors that shape freight transport choices available to IAD. These findings highlighted the key components influencing freight movement and significantly influenced both the development of alternatives and criteria, and the selection of feasible recommendations for the WATF.

MODAL CHOICE AND “VALUE PROPOSITIONS”

Transportation modes are generally categorized as either “fast”—air and truck transport—or “slow”—rail and maritime transport. Modal choice for movement of cargo is based on analysis of several factors: speed, value, weight, and type of cargo. Time-sensitive, high-value, light, or perishable items—such as pharmaceutical items or electronics—are most likely to be shipped via air or truck, depending on distance. Conversely, staple, inexpensive, heavy, or bulk items—like lumber and automotive parts—are usually moved via ship or rail.

Most cargo transport—and all air cargo transport—is multi-modal when one considers door-to-door shipment. According to MergeGlobal air cargo consultant David Hoppin, modal match-up is based on speed: slow with slow (ocean and rail) and fast with fast (air and truck). The fundamentally different “value propositions” of the transported cargo makes the mix of fast and slow modes less attractive to shippers. Hoppin is skeptical of the value in bringing multi-modal transfer points together at one facility, because customers recognize that “buying” various modal pieces separately is more cost-effective and will be regionally dependent. Therefore, a strategy for increasing transport of air cargo must focus on attracting time-sensitive, high-value, or perishable commodities.

DEVELOPMENT OF INLAND PORTS

Increasing congestion around port facilities has become a bottleneck and is driving shippers to increase their use of inland ports as a way to get their containers out of the port and through customs and other inspection points more quickly. Industry experts suggest four key criteria are necessary to develop a successful inland port: sufficient demand for intermodal freight transportation; local supply of competitive motor carrier service; successful community relationships; and an adequate supply of public/private-sector capital to fund development. Many companies are choosing to locate in close proximity to inland ports, because one of the critical aims of an inland port is to integrate all supply chain components to create a highly efficient system, which, if leveraged properly, can result in a competitive advantage over companies that do not use such supply-chain tactics. Industry leaders believe that inland ports are capable of creating local employment, enhancing corridor efficiencies, and reducing both public and private costs. For this reason, local governments often woo inland ports with tax breaks and other incentives.

Virginia Inland Port (VIP) commenced operations in 1989 to create time and financial savings for shippers and container lines using the Ports of Virginia. Located in Front Royal, Virginia, 220 miles inland from the Port of Hampton Roads and 40 miles west of Dulles, VIP brings key markets in West Virginia, the Ohio Valley region, Pennsylvania, Maryland, Washington, D.C., and Northern Shenandoah Valley, closer to marine terminals. Developers of VIP positioned the facility to capture container traffic being trucked to other competing East Coast ports. VIP controls more than 160 acres—only 45 of which are currently developed. The facility contains on-site rail operated by Norfolk Southern Railroad five-days-a-week between the marine terminals at Hampton Roads and VIP.

FREIGHT FORWARDERS: POWERHOUSES OF THE AIR CARGO INDUSTRY

Freight forwarders, commonly referred to as “travel agents for freight,” operate as brokers between shippers and carriers. Their profit is a function of two variables: consolidation of cargo from a variety of shippers; and negotiation of reduced shipping prices with carriers based on cargo vol-

Critical Factors Driving Freight Transport Decisions

- Modal Choice and Value Propositions
- Development of Inland Ports
- Central Role of Air Freight Forwarders
- Known Shipper Regulations
- Household Goods and Personal Effects Market
Freight forwarders produce volume discounts and profit from the margins they create. The consolidated cargo volume allows the carrier to maximize utilization of lift capacity, passing along some of the price reduction to the shipper and thereby increasing customer benefits.

Research suggests the relationships between the shipper, the freight forwarder, and the carrier differ in the air and ocean cargo sectors. In the maritime freight industry, freight forwarders are known as non-vessel operating common carriers (NVOCCs). They book space on ocean vessels in large quantities at lower rates and sell space to shippers in smaller amounts. NVOCCs also consolidate small shipments into container-loads that move under one bill of lading and pass the favorable rates on to the shipper.

According to cargo consultant David Hoppin, many ocean freight forwarders are owned and operated by ocean carriers that have purchased the NVOCCs in an effort to expand their businesses to compensate for declining profit in port-to-port vessel operations. Therefore, ocean carriers have retained their access to shippers. Air carriers, on the other hand, surrendered their relationship with shippers a long time ago. Thus, air freight forwarders have been able to maintain their status as brokers between shippers and carriers. To maintain their prized position as intermediaries, air freight forwarders have employed heavy-handed tactics when an air carrier has sought to supplant them.

In the air cargo industry, it is a cardinal “rule” that air carriers never attempt to directly solicit shippers. In the mid-1990s, Dutch air carrier KLM mounted a campaign to “cut out” small and medium freight forwarders by attempting to directly capture shipper business. According to several air cargo managers, freight forwarders “blacklisted” KLM for nine months, i.e. did not send any cargo to KLM, until the carrier finally relented. Although he did not provide additional details, a KLM cargo expert admitted that the freight forwarders’ backlash contributed to the carrier’s decision to end its program of marketing logistic services directly to shippers.

Dependent on cargo volume to negotiate lower carrier prices, freight forwarders have developed “hub and spoke” or “gateway” systems to support the consolidation of cargo at specific airports. These airports offer the largest variety of lift capabilities, destinations, and flight frequencies. Freight forwarders often ship cargo via truck from multiple locations to the designated “hub” airport to ensure the availability and volume of cargo necessary to negotiate low carrier prices or to maintain efficient operational practices. Airports, such as New York’s John F. Kennedy International Airport, Los Angeles International Airport, and Miami International Airport, serve as major U.S. air cargo hubs. According to Metropolitan Washington Airports Authority (MWAA) Air Cargo Development Manager Richard Norris, freight forwarders can transport cargo from Dulles to New York or Miami via truck in one day and still fly it out cheaply due to consolidation of cargo volume. Therefore, an increase in cargo coming into a freight forwarders’ “spoke” location, such as IAD, does not necessarily result in an increase in the amount of cargo flown out of the spoke airport; the additional cargo may be trucked away from IAD to the freight forwarder’s hub airport.

Air Freight Forwarders’ Influence

Air Freight Forwarders make every decision in the air freight cargo flow process from the beginning of the shipment with the Customer until it is delivered to the consignee. Decisions include: which Truck Transport Carrier to pickup the shipment; what Consolidation Center to use or whether to make delivery directly to Air Carrier; which Airport and Air Carrier offers the best service; and which Deconsolidation Center to use versus making delivery directly to the Consignee.

The impact of the gateway system was highlighted in a discussion with airline cargo managers at IAD. One manager suggested that it is not only the consolidation of freight volume that yields purchasing power for the freight forwarder but also the mix of freight that gets them better prices. In addition, they noted that freight forwarders have long-term contracts to lease infrastructure at their hub airports. Some have invested in additional equipment and developed unique service capabilities at these facilities. Therefore, they need the volume coming through these facilities to justify and fund the expense.
Freight forwarders provide at least 80% of the cargo volume moved by commercial air carriers. Their relationships with air carriers, although not bound by contract, are based on assurances of quality and reliability developed through many years of interaction. Many freight forwarders are risk averse and appear resistant to change, which gives existing air cargo hubs a distinct advantage. These relationships often create a complex tapestry of pricing and cargo volume negotiations that interweaves operations across multiple airports, regions, and markets. A change or disruption in price or volume at one location may impact relationships across their entire network—regionally or even globally. Therefore, the freight forwarder assumes tremendous risk in shifting gateway locations or changing cargo volume flows. As a result, freight forwarders use a multifaceted calculation of risks and benefits that is rarely based on the operational costs or infrastructure at one specific airport.

Although the freight forwarder-air carrier relationship may seem to be a symbiotic partnership, the balance of power between them can vary based on the available cargo volumes and lift capacity. On the East Coast of the United States, for example, freight forwarders are able to command better prices from air carriers due to the excess air carrier lift capacity and low-growth in cargo traffic in the North Atlantic market due partially to the international trade imbalance. Therefore, there is little competition for space. The booming Asian market, however, gives air carriers far greater advantage, which is reflected in the higher cost of air cargo shipment from the West Coast.

In 2004, the global air trade network generated 159 billion freight tonne-kilometers (FTKs). Approximately 28.4 FTKs originated in the Asia/Pacific region bound for North America while only 15.3 FTKs originated in North America for transport to Asia; the air cargo traffic is forecasted to increase 6.3% annually over the next three years. The air cargo traffic between North America and Europe was significantly less, with 13 FTKs originating in Europe and 10.4 in North America. Air cargo in the North America/European network is expected to increase by 3.9% annually.

Survey of the IAD Freight Forwarder Community

The team designed an informal survey to gain a greater understanding of IAD’s freight forwarders’ operations and culture. Surveys were disseminated to 44 air freight forwarders at IAD. The team received 18 completed surveys and conducted several follow-up interviews that provided valuable insight into freight forwarders’ perspectives on IAD cargo operations. Although the team charted some of the data to

What are the three or four major types of commodities your organization ships out of your primary location?

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<thead>
<tr>
<th>Category</th>
<th>Number of Respondents</th>
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<tr>
<td>Computers/Technology/Electronics</td>
<td>14</td>
</tr>
<tr>
<td>Government/Diplomatic/Military</td>
<td>8</td>
</tr>
<tr>
<td>Perishables/Pharmaceuticals</td>
<td>7</td>
</tr>
<tr>
<td>Household Goods/Personal Effects</td>
<td>7</td>
</tr>
<tr>
<td>Machinery/Parts</td>
<td>5</td>
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</tbody>
</table>

(16 Dulles Area Freight Forwarders Responded)

If your organization does not ship commodities out of IAD, why not?

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Respondents</th>
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<tbody>
<tr>
<td>Schedules</td>
<td>13</td>
</tr>
<tr>
<td>Route Diversity</td>
<td>12</td>
</tr>
<tr>
<td>Lack of Capacity</td>
<td>12</td>
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<tr>
<td>Costs/Rates</td>
<td>4</td>
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<td>Convenience</td>
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(16 Dulles Area Freight Forwarders Responded)
highlight potentially noteworthy findings, some of the questions were open-ended and did not permit a more formal quantitative evaluation (Appendix IV).

The seven-question survey focused on determining what type of cargo is coming to IAD, whether the freight forwarders are using IAD lift capacity to move that cargo, and what might be done to increase cargo flow to and, more importantly, off the runways of IAD. The results highlighted some of the institutionalized processes that impact how freight is routed and are significant obstacles to drawing additional air cargo to IAD, which may be potentially significant to development of a successful cargo growth strategy.

Almost 60% of the respondents do not use IAD as a gateway, and JFK was most often cited as the freight forwarders’ hub of choice. When asked to select from a list of reasons they do not ship cargo out of IAD, the most frequent responses were a lack of capacity, schedules, and routing. The freight forwarder respondents see a number of obstacles to increasing air cargo flow at IAD including: the lack of freighter service; increased traffic problems compounded by an inadequate transportation network around the airport; low-value cargo; the continued low cost of trucking; and proximity to JFK.

Freight forwarders did offer some possible options and necessary conditions for increasing cargo movement out of IAD. One freight forwarder identified the shipment of household goods and personal effects as a “golden opportunity” for increasing IAD’s cargo flow through freighter service. Respondents recommended efforts to attract companies/distributors with cargo to Virginia or large freight forwarders to the airport, as possible strategies. The issue is not simply drawing more cargo to IAD but also addressing those processes that compel freight forwarders located at IAD to truck cargo to other major regional gateways in New York or Atlanta. Concerns about traffic congestion, delays, and future zoning around the airport trouble many of the forwarders and elevate the risk associated with expanding and/or relocating operations to IAD. None of the respondents mentioned use of VIP.

These survey responses provided insight into the factors that influence freight forwarders’ decisions on moving air cargo. However, they represent only a small sampling of the community, and thus, verbatim survey responses were not included in this report. The team recommended a more in-depth study that canvases the entire freight forwarder community at IAD.

**KNOWN SHIPPER REGULATION: CONSTRAINTS ON BELLY CARGO**

The Transportation Security Administration (TSA) Known Shipper Program requires that only cargo from “known shippers” — i.e. businesses with whom carriers or freight forwarders have a shipping history and have undergone background checks and/or vetting — may be transported as belly freight, i.e. freight transported in the cargo hold of a commercial aircraft carrying passengers. Any cargo accepted by a forwarder from a third party and/or unknown shipper cannot fly as belly cargo on passenger aircraft. Therefore, in the absence of non-integrator all-cargo aircraft at IAD, unknown shipper cargo cannot be flown out of IAD except when flown by the express all-cargo carriers.

These regulations are a direct result of the use of passenger aircrafts as weapons of mass destruction during the attacks of September 11, 2001, and while necessary to minimize the potential for introducing dangerous materials, they exclude many shipments from being transported on passenger aircraft. Regulatory issues weigh heavily in freight forwarders’ decision-making. The continued strengthening of Known Shipper requirements, coupled with IAD’s current reliance on belly lift, leave open the possibility that all IAD lift capacity could be eliminated through a drastic regulatory change prohibiting all cargo from flying on passenger aircraft due to political pressure or in response to an act of terrorism. However, TSA claims it is committed to working with stakeholders to ensure that security regulation minimizes the negative impact on efficient movement of passengers and goods.

**HOUSEHOLD GOODS AND PERSONAL EFFECTS MARKET**

The Washington Metropolitan Region, as the seat of the U.S. Federal Government, is home to 660,000 U.S. federal employees, as well as U.S. military members and thousands of employees of foreign government diplomatic missions, multinational corporations, international governmental and non-organizations and special interest groups. This population and employment composition creates constant turnover of the working population in the
region. The frequent relocation of employees and their and families into and out of the region requires transport of their household and personal items. Thus, the rotation of human capital creates a unique commodity of “change,” which presents a potential distinctive air cargo market opportunity for IAD. Commonly referred to as Household Goods (HHG) and Personal Effects (PE), these shipments generate considerable freight volume on an annual basis.28

**World Bank Personal Effects Shipments**

- The World Bank contracts its personal effects shipments through Security International.
- Air shipments of personal effects allow for one D-category container not to exceed 500 lbs gross (which includes the weight of the container). This shipment is meant for personal effects only that will be needed until the main shipment arrives.
- Of these PE shipments, 90 percent fly out of New York airports and 10 percent from IAD.
- All other effects go via ship with 75 percent leaving via Norfolk, and the remainder divided between Baltimore and New York.
- In fiscal Year 2005 (July 2004-June 2005), there were 347 international air shipments and 630 sea shipments.29

HHG and PE shipments, unlike most commodities, are often comprised of items that vary in weight, time-sensitivity, and value, thus requiring segmentation and transport by a variety of modes—both fast and slow—to their points of destination. For example, an employee’s clothes and work-related equipment require a fast mode of transport in order to arrive before or with the traveler for immediate use. PE shipments are small—500 pounds or less—and are generally shipped as airfreight. Household items, such as furniture or appliances, become necessary when the employee secures housing at a new destination; this “slow” segment of the shipment comprises the bulk of the HG move and permits use of a slower, less costly transportation method, such as ocean transport. HHG and PE shipments for employees of the U.S. Department of State, the U.S. Department of Defense, and the World Bank are among those upon which IAD may be able to capitalize.

Development of Decision Criteria and Proposed Alternatives

After gathering information and developing key findings, the team crafted proposed alternatives and selected nine criteria to determine if these alternatives addressed the problem statement. For analytic purposes, the team divided the criteria into three broad categories: feasibility, cost and benefit, and sustainability. The criteria assisted in evaluating the possible strategies and guided determination of the final recommendations offered to the WATF for increasing air cargo volume at IAD.

**CRITERIA**

- **Feasibility:** Political feasibility, broadly defined as the likelihood that a proposed alternative is “acceptable” to a majority of the stakeholders, is crucial to successful implementation of any air cargo development strategy. A politically feasible alternative, considered by local, state, and/or federal authorities, would not encounter widespread objection. In addition, the team viewed the feasibility of an alternative as directly related to the timeframe required for implementation. We chose five years as a benchmark to give the WATF an idea of the length of time that may be required before return on investment (ROI) would be realized.

- **Cost and Benefit:** The proposed alternatives should be reasonably expected to increase freight volume at IAD, which is the primary goal of the WATF in pursuing an air cargo development strategy. However, cost effectiveness is also an important measurement of any policy alternative.

In the initial meeting, the WATF indicated that cost might negatively impact implementation of recommendations without the assurance of increasing freight. The team decided each proposed alternative should be evaluated against required capital expenditures. If a solution could increase freight without a large expenditure, the risk was lowered, making the alternative more attractive. If
any capital expenditure is required for a proposed alternative, it should provide an acceptable ROI. While a formal cost-benefit analysis was not conducted, the team weighed its finding against the assumption that any new expenditure of funds must generate some quantifiable benefit.  

• **Sustainability**: The proposed strategies should be sustainable into the future. Spending time and money on short-term solutions is not wise resource expenditure.

Investments that generate growth and potential over the long term should be favored. Any improvement to the current situation should contribute and be adaptable to future industry needs. Given the critical role of freight forwarders in the air cargo industry, the team evaluated whether each alternative would reasonably garner support from this important stakeholder community, which is also critical to the sustainability of a cargo development initiative. Creating a successful airfreight gateway also requires freight flow in both directions, i.e. into and out of the Washington, D.C. market, to attract necessary lift capacity, such as freighter service.

**PROPOSED ALTERNATIVES**

After identifying important air cargo industry trends influencing freight operations, analyzing the local operating environment at IAD, and evaluating the experiences of other airports and freight operations in attracting freight, the research team developed a number of alternatives for potential air cargo development strategies at IAD. This section briefly describes the alternatives the team initially considered and specifies the reasons for elimination of some from serious consideration as recommendations.

**Current Operations**

By maintaining its focus on increasing passenger operations, IAD will automatically gain additional belly lift on which it can potentially capitalize. Since flight routing and frequency are two factors freight forwarders identified as important to their cargo movement decisions, an increase in the number of passenger flights and destinations will likely result in additional cargo being flown in the belly of passenger aircraft. Fifty percent of international airfreight moves as belly cargo nationwide.  

Seventy percent of international air freight in the North Atlantic market is dependent on belly lift, with some Boeing 747’s carrying as much as 35 tons of cargo along with their passenger loads and the new Airbus A380 carrying even more. Although this alternative ranks highly in political and implementation feasibility, cost-effectiveness—since it does not require specific expenditure—and return on investment, this alternative only addresses half of the problem—additional lift, which is the supply side of the equation—and does not address attracting additional freight to IAD. In addition as previously discussed, belly cargo is constrained by TSA security requirements and physical size limitations of configurations of the lower decks of passenger aircraft. Its sustainability in the long term is subject to potential changes in security regulations that could further curtail or, if an incident involving air cargo occurred, prohibit belly cargo altogether. Ultimately, the team chose not to devote additional analysis to this alternative, because it would not provide additional options for the client and does help to diversify IAD’s air cargo sector development.

**“Milk Run”**

This alternative entails contracting a pick-up/delivery service for airfreight customers in the region to IAD. The trucking service would travel a regularly scheduled route between IAD and a number of air cargo customers in a particular region, such as VIP. This “milk run” concept originated from surveys of VIP and surrounding businesses, speculating that consolidation of the small air cargo shipments currently in the VIP area could create a critical mass that made such a delivery service viable. Four of the six businesses surveyed around VIP currently use IAD air cargo services but only intermittently when time-sensitive air cargo service through an express carrier is required. The team eliminated this alternative for multiple reasons, including a lack of consistent cargo volume; traffic congestion on the roadways serving IAD (e.g., I-66, Route 28); and direct competition from express carriers, such as FedEx, UPS, and DHL, which already provide this service.

**Build Airfreight Consolidation Facility**

The team also looked at the possibility of building an airfreight consolidation facility either near IAD or VIP. This alternative requires the construction of air cargo staging space for short-term warehousing and consolidation activities for air cargo pallets. The goal is attraction of freight forwarders to use the facility for hub operations. IAD’s current freight facilities are 93-95% occupied; MWAA is adding 29,000 square feet of new warehouse space onto Cargo Building 6 and has considered building a seventh cargo terminal building on newly acquired property. However, this alternative may be costly and is not guaranteed to attract tenants, particularly if the cargo demand is not developed to support a hub operation.
Although the cost of space and labor is far lower in Front Royal, as discussed in the “milk run” alternative, individual shippers in the area do not currently generate enough air cargo to justify investment in an air cargo consolidation facility near VIP. While it is possible that such a facility could capture some of the air cargo moving along the I-81 corridor to JFK, given IAD’s current operational constraints, it is not clear what benefit shippers or freight forwarders would gain from consolidating in Front Royal and trucking it to IAD.

The experience of Denver International Airport (DIA) offers a cautionary tale on facility expansion in the absence of demonstrated cargo demand. Planned during the economic boom of the 1990s, WorldPort at DIA was hailed as a way to make DIA a more prominent player in the $200 billion global air-logistics market. However, only two of the seven air-freight facilities were built due to a dearth of tenant demand, and one of those buildings was empty for almost 18 months after its completion. The airport, which partnered with private firms, issued $54 million in tax-exempt bonds for the venture in April 2000. In addition to the impact of the September 11, 2001 terrorist attacks on the aviation industry, DIA also suffered from competition with trucking companies, offering cheaper rates and improved on-time delivery services to existing air cargo facilities on the West Coast—a parallel with IAD, which is sandwiched between JFK and MIA to which trucks can travel in one day. Another problem faced by DIA is the lack of manufacturing in Colorado, which is also an obstacle for IAD.

The potential costs include land, labor, and planning for a facility that may be underutilized at first while the business is being marketed. Thompson of Interchange Co., commenting that demand for a brand new freight service is not created overnight, noted that VIP was underutilized for 8 to 10 years before demand increased. Even Huntsville Airport, which has been called a “shipper’s dream,” moves relatively modest freight volume when compared to the main U.S. cargo hubs. The team determined this alternative would not provide a reasonable return on investment.

**Cost Incentives**

The Cost Incentives alternative focused on expansion of the customer base by offering cost incentives to committed customers who use IAD as a freight hub. These incentives may be in the form of contracts with companies and air freight forwarders that include: tax incentives on property tax reductions; fuel incentives for air and truck carriers; and revenue rebates from landing fees, cargo handling fees, apron fees, etc. For example, in 2002, the New York City Industrial Development Agency (IDA) issued approximately $161 million in Special Airport Facility Bonds for Ariis Corporation to develop two air cargo facilities at John F. Kennedy International Airport. The development included a 435,000 square-foot state-of-the-art air cargo complex. Previous tax incentive packages at JFK from the IDA have included approximately $12.4 million in mortgage recording tax waivers and sales tax exemptions for JFK.

IAD is already offering low landing fees and other incentive packages that have yet to attract a cargo customer base or all-cargo service. Beyond that, this alternative would have MWAA to lobby local government officials to support initiatives for tax incentive packages or issuance of bonds. The team did not pursue analysis of this alternative, since MWAA already offering some financial incentives; however, this type of strategy complements other alternatives, such as attraction of new customer and pursuit of freighter service.

**Develop VIP-IAD Relationship**

WATF expressed specific interest in research and evaluation of the possibility of developing a synergy between IAD and VIP, which the client views as a possible strategic partner in expanding airfreight at IAD. To determine the feasibility of developing that operational partnership, the team researched VIP’s operation and conducted a market study that included multiple interviews with representatives from VIP and logistics companies in the Front Royal area. Given VIP’s focus on containerized freight and bulk commodities suited for rail and maritime transport, the team could not identify an immediate opportunity for development of an operational relationship. However, a joint marketing campaign with VIP and the Warren...
County Economic Development Agency may hold promise for long-term development of additional air cargo for IAD. *Since this alternative is specifically related to the WATF’s initial interest in VIP, the team conducted additional analysis to address in greater detail the reasons for the lack of potential for an operational relationship in the near term and prospects for a long term marketing synergy.*

The following alternatives are the most promising options for implementation at IAD. These cargo development strategies are discussed in greater depth in subsequent sections of this report.

**Freighter Service**

Attracting freighter service back to IAD is already a primary element of the airport’s cargo development strategy. Responses to the team’s survey, interviews, and research illustrate the importance of all-cargo service to freight forwarders and their use of IAD. Freighter service would minimize the constraints of the Known Shipper program and open up opportunities for IAD to capitalize on the HHG/PE market. However, all-cargo carrier service will not address all of the freight forwarders’ concerns, as some may continue to consolidate volume at their gateway airports where flight routing and frequency will still outpace that at IAD. In addition, the freighter service will only be as useful as its connections into the worldwide network of air cargo hubs and will only be sustained if the cargo volume is available for both incoming and outgoing flights. *Thus, the team viewed freighter service as a complement to other alternatives, such as niche market development.*

**New Customer**

While the pursuit of freighter service addresses the need for all-cargo lift capability, this alternative focuses on attracting additional air cargo demand. Two IAD air cargo managers indicated that cargo volume drives decisions on flight service. If IAD had guaranteed cargo demand, then attracting freighter service would not be a challenge. Luring a major manufacturer of high-value, time-sensitive, or perishable items could significantly increase cargo volume at IAD. Likewise, enticing a major freight forwarder or integrator to locate a gateway operation at IAD would also bolster demand for all-cargo service. Successful implementation of this strategy at other airports, such as those in Louisville, Kentucky and Huntsville, Alabama, suggests promise for IAD.

**Niche Market**

Research suggests household goods and personal effects (HHG/PE) market may present an opportunity for IAD’s air cargo sector. The continuous rotation of military personnel, U.S. Government workers, and employees of international organizations and businesses creates a sustainable market. Although several barriers exist, such as the lack of freighter service, constraints of the Known Shipper program, the team has identified several potential sub-options for development of this market at IAD. Each has its challenges, but we believe the sustainability of this market may be worth the long-term investment in time and capital.

**IAD Freight Forwarder Study**

The air freight forwarder community is complex with a variety of business models and institutional processes influencing air cargo routing decisions. These airport stakeholders are critical to a successful air cargo operation, and thus an in-depth study of IAD freight forwarders would benefit WATF. Understanding the freight forwarders’ business models, culture, and risk calculus will highlight ways to support and attract their use of IAD for moving cargo. It will also help WATF understand how the advantages of the airport, e.g., the road network, are actually viewed as disadvantages by freight forwarders. The first step is to understand what is attractive to freight forwarders, and the second step is to market those components. The team also views this alternative as complementary to pursuit of other strategies, such as development of a new customer or building of an air consolidation facility, in which attraction of a large freight forwarder’s gateway operation is identified as a possible strategy for increasing air cargo volume at IAD.
CRITERIA-ALTERNATIVE MATRIX

The team members voted on the perceived importance of each criterion using a binary voting system, which was used to limit subjectivity and obtain efficient results in a limited time period. Voting tallies were placed into a matrix and added to develop totals for each criterion. In order to provide a scientific measurement that compensates for a limited number of voters and the binary system, the results were weighted on a 33.3% scale. A scale of 1 to 3 was used with 1 being the least relevant for the primary goals of the client and 3 being the most relevant. The total number for each criterion was then multiplied by the weighting factor. The mean of the total weighted votes and number of criterion was derived to provide the final score for each criterion. This difference in the non-weighted and weighted criterion is shown in the graph. There were some changes of rank after weighting was applied. Most significantly were the increase in ranking of “Cost Effectiveness” and the decrease in “Increases Inbound and Outbound”.

The new weighted criteria were used as a variable in ranking the order of alternatives. A cross-matrix method was applied using the weighted criteria matrix and the predetermined alternative matrix, which was developed with the same methodology as the criteria. After the cross-matrix was applied, the results were tallied and averaged similar to the criteria matrix. The results of the weighted alternatives were the same as originally developed. The primary difference as viewed in the graph is the skew between each alternative therefore showing the scientific relevance of each alternative. The relevance can be applied to determine probability of success of each alternative given the client’s needs.

Analysis

DEVELOP VIP-IAD RELATIONSHIP

At the request of the WATF, the team researched the market and operations at VIP to evaluate the potential for development of an operational relationship between IAD and VIP. Cargo movements at the inland port are steadily increasing, with about 14,000 moves in 2003, some 28,000 in 2004, and 35,000 moves in 2005.38 Much of this increase is due to distribution centers moving into the area.39 The majority of the merchandise being shipped are imports (household goods, textiles) headed to these distribution warehouses or regional distribution centers (RDC). Mass retailers, such as Wal-Mart, the Home Depot, Target, and the Dollar Tree, now account for over two-fifths of the containerized imports at the Virginia Inland Port. VIP’s ratio of imports to exports is approximately 2:1, a reversal of the previous trend attributed to Home Depot’s arrival. Exports include large bulk commodities, such as lumber, plastic, iron, steel, and machinery.40 These goods transit VIP on their way to the marine terminals in Hampton Roads for ocean transport.
Chris Thompson, Business Development Manager of Interchange—a third-party logistics (3PL) company near VIP—emphasized that VIP’s objective is container freight. The inland port transfers containers between the rail line and trucks and is not currently interested in consolidating or deconsolidating freight. VIP handles bulk goods, such as wood and machine parts, which are not time sensitive and, therefore, travel slowly—by rail and/or ship. Shippers have little incentive to pay the cost of expedited shipping associated with air cargo movement. In addition, the road connection between VIP and IAD is congested and unpredictable, which makes time-sensitive air service even more unattractive. Although there are many warehouse and distribution centers in the VIP area, almost all exclusively use truck, rail, and/or ship modes for freight distribution. They only use air cargo service for small, individual shipments. Thus, there appears to be little, if any, opportunity for IAD to capitalize on VIP cargo flow at this time. Although specific objections to formulating a working relationship were not evident based on discussions with VIP representatives and associated businesses, none of the stakeholders appeared to see much opportunity for an operational relationship at this time. Likewise, the respondents to the team’s IAD freight forwarder survey did not currently have any interaction with VIP.

An examination of the FHWA Freight Analysis Framework Database reinforced the absence of commonalities between goods flowing through IAD by air and goods flowing through VIP, primarily via truck and rail. The key goods moved through the Dulles region via air include, electronics, miscellaneous manufactured products, pharmaceuticals, precision instruments printed products, transport equipment and textiles/leather. The primary goods moved through VIP are not generally subject to expedited shipping schedules and include bulk commodities, machinery, furniture and automobile parts. For example, the amount of machinery moved into the Dulles region via air in 2002—$117 million—is relatively small when compared with the $3 billion in machinery moved through VIP in the same year. Other goods exhibit even greater disparities with the value of furniture moving through VIP exceeding by more than 1000 times that transiting the Dulles Region via air. Electronics are one of the primary products moved through the Dulles region via air.

While there is no operational nexus, VIP’s Davis thinks there is definitely a marketing relationship to be developed between VIP and IAD. Warren County, working with VIP, has successfully marketed truck, rail, and ocean freight transport opportunities provided in the area, but air cargo transport is not included. If IAD helped the Warren County Economic Development Agency (WCEDA) market air cargo opportunities at IAD, perhaps large hi-tech, bio-tech, pharmaceutical, or similar types of businesses might consider investing in facilities in the Warren County area, which could bring air cargo demand to IAD’s doorstep. Davis thinks IAD needs to be more active in working with VIP and WCEDA to present a complete freight logistics package to prospective companies looking to build manufacturing or distribution facilities in the Front Royal area.

Shippers could also take advantage of the Foreign Trade Zone (FTZ) at VIP, whereby goods are moved “in bond” and not subject to tariffs or duties. FTZs provide significant benefits and are most often utilized by manufacturers, such as automotive, electronic, and pharmaceutical companies. Although these types of businesses heavily rely on air freight to ship their products, they are not currently present in the Front Royal area. The marketing and promotion of FTZ could attract such industry, thus presenting more air cargo opportunities. Currently, the FTZ is not activated due to a perception that doing so involves a lot of administrative paperwork. Each FTZ is subject to a lapse provision requiring activation within five years. The inactivation of FTZ suggests the loss of potential air cargo opportunities.

The strengths and opportunities of the Front Royal–Warren County area do not currently benefit IAD cargo operations, but a joint marketing campaign may be beneficial to development of additional air cargo in the long term.

Still, the obstacles presented by the current transportation network would need to be overcome to make any operational link viable in the future. Alternatives are currently being examined for a long-term highway widening plan that will encompass I-81; however, the construction timeframe is 12-15 years, and no final decision has been made. Therefore, high levels of truck traffic on this roadway will likely remain an issue for some time. The Virginia Department of Transportation’s current six-year

Of the 35,000 movements at VIP in 2005, 10,000 came from Home Depot, with its Regional Distribution Center (RDC) located just 8 miles north of VIP. Their volume has increased significantly the past few years with other new distribution centers for DuPont Plastics, Family Dollar, Sysco, and Lenox moving into the area. VIP has the capacity to move approximately 100,000 containers per year given its current configuration and expects to move 40,000 containers in 2006.

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plan (FY2007-FY2012) does not include any roadway improvement projects that will add significant capacity, reduce congestion, and improve travel time between VIP and IAD.54

**FREIGHTER SERVICE**

Two-thirds of the IAD freight forwarders that responded to the team’s survey identified the lack of lift capacity as a reason they do not ship freight out of IAD.54 Indeed, promotion of IAD to all-cargo operators is the current focus of MWAA’s Air Cargo Development program, which markets IAD in various industry publications, as well as pitches the benefits of IAD to various all-cargo and freighter carriers. IAD offers all-cargo carrier operators lower airport, landing, and cargo handling fees than the major air cargo hubs on the East Coast and is working on a financial incentive program but is still struggling to capture freighter service.

The amount of cargo transported by all-cargo carriers has increased significantly in the last ten years. All-cargo carriers moved 80.8% of the percent of domestic cargo traffic in 2005, measured in revenue-ton-kilometers, as compared to 62.5% in 1995. The growth has been a bit slower for international cargo, but the all-cargo carriers’ slice of the 2005 market has still increased to 63.8%, up from 49.3% in 1995.55 A variety of factors influence this change, including post-9/11 cargo security regulations, the economic impact on domestic passenger air carriers, and the boom in Asian trade.

Freighter operations offer several key capabilities to shippers. First, all-cargo aircraft permit movement of air cargo of larger dimensions and configurations than that which can be transported as belly cargo on passenger flights. Secondly, cargo shipped on all-cargo aircraft is not competing with passengers for space on flights. Since airfare for passengers offers a higher margin of profit for the air carrier, it will always “bump” cargo to make room for additional passengers onboard a commercial flight. Given the often time-sensitive nature of airfreight movement, this delay may not be acceptable and forces the freight forwarder or air carrier to truck the freight to another airport where a flight is available. Lastly, cargo moving on all-cargo aircraft is not subject to the TSA Known Shipper regulations—another oft mentioned constraint associated with current IAD cargo operations. If all-cargo service commenced at IAD, freight forwarders could fly cargo from unknown shippers out of IAD, which would support the development of the HHG/PE niche market which is discussed later in this report.

New Italian all-cargo operator Ocean Airlines, which operates B-747 freighters, is reportedly pursuing approval from the U.S. Department of Transportation to fly into the U.S. and has expressed interest in beginning service between Milan and IAD in 2006. Initiation of Ocean Airlines freighter service is a positive step; however, at least one freight forwarder pointed out that any freighter service must offer connectivity to major world air cargo hubs to be beneficial to them.56

Although the mark of a growing cargo airport is the ability to capture freighter service, luring a freighter to IAD may be pointless if the market does not generate the enough volume to sustain its operation in the long term.57 Unlike passenger flights, which generate pure profit from belly cargo operations, the revenue generated by cargo carried on all-cargo flights must first cover the entire cost of operating the flight before any profit is accrued to the carrier. Therefore, sufficient cargo volume must be guaranteed both into and out of IAD. Matching up those flows may be a challenge given the import/export imbalance in the region.

Similar to belly lift, freighter service addresses the supply side of the equation, not the demand side of cargo volume. Again, IAD must convince freight forwarders to utilize the freighter service or identify one large customer with sufficient cargo volume to sustain the freighter service over the long term.

Air France had freighter service at IAD ten years ago due to demand from a specific customer. Once that demand disappeared, so did the freighter service. Although Air France cargo manager Gilles Rebour said their hub system, as well as their geographical service plan, no longer makes IAD attractive, he also said demand determines service.58

**NEW CUSTOMER**

Attraction of freighter service, as mentioned, may depend upon attraction of one or several customers with enough air cargo volume to sustain all-cargo service over the long term. The expense of luring a major manufacturer or freight consolidator may be a good investment that could be shared by several government entities and interest groups, such as MWAA, Loudon County, WCEDA, and/or VIP. If an electronics or pharmaceuticals manufacturer could be convinced to build a production facility in the Dulles or Warren County areas, the expense of a marketing venture would likely be quickly recaptured and lead to an increase in air freight for IAD. The increase in jobs, tax revenue, and business for all of the stakeholders makes this a cost effective strategy.
As previously discussed, Warren County has a shared interest with IAD in attracting high paying jobs come into the area, such as hi-tech companies, bio-tech companies, pharmaceutical companies, etc. These types of manufacturers ship their high-value, time sensitive products by air. Thus, IAD would benefit by working with Warren County’s business associations to encourage these types of companies to relocate to the area.

Another option for generating significant cargo volume is attraction of a large freight forwarder or express carrier/integrator, such as FedEx, UPS, or DHL, to IAD to establish a gateway or hub operation at the airport. Attraction of a major integrator or freight forwarder could play an important role in attracting relocation of companies that rely on shipment of high-value or time-sensitive goods.

The Louisville International Airport offers an example of the benefit of an integrator’s hub operation and may be instructive for IAD. Louisville’s future was changed when UPS began a new overnight-delivery hub operation in 1981. By 2004, Louisville International Airport was ranked tenth in the world and fifth in the United States in the total amount of cargo handled. At IAD, FedEx established a collection and sorting facility at the airport that is critical to the movement of packages to its hub in Memphis, Tennessee. While FedEx’s operation at IAD is not nearly as large as that in Memphis or UPS’ operation in Louisville, the expansion of another third-party logistics (3PL) giant at IAD would likely significantly increase freight traffic.

Air freight forwarders are reluctant to make changes that disrupt the balance of power in their relationships with air carriers. The team’s research suggests that these complex relationships contribute to institutional inertia, which is an additional challenge to enticing freight forwarders to alter their current operations and utilize seemingly beneficial opportunities, such as a new cost-effective airport. Air cargo consultant David Hoppin said the challenge for IAD is to persuade one or two large freight forwarders that they can get enough cargo traffic through IAD to maintain necessary volume at their current gateways, e.g. JFK, while increasing flow out of IAD, which may attract more lift capability.

Huntsville International Airport: Capturing a Major Freight Forwarder

Part of a growing inland port complex that includes an intermodal center and large industrial park, Huntsville International Airport (HSV) got a major boost to its air cargo business in 1991 when it persuaded international freight forwarder Panalpina to locate its North American air cargo gateway at HSV. As an added benefit, Panalpina began chartering freighters out of HSV. The airport’s cargo volume increased 557% between 1989 and 1998.

Port authorities also waive some fees and offer short term leases; “we try to make it easy for people to give us a try,” said Rick Tucker, Executive Director of the Port of Huntsville. The Port authorities use a variety of cargo development strategies to increase freight volume at the airport. Despite their world-class intermodal facilities, however, HSV’s cargo volume is still modest when compared to that moving through traditional U.S. air cargo hubs.

DEVELOP NICHE MARKET

Development of a niche freight market is another promising alternative for increasing air cargo flow at IAD. The transport of household goods and personal effects (HHG/PE) belonging to personnel of the U.S. Government, other national governments, and international organizations and businesses may be a market on which IAD could capitalize. According to responses to the team’s freight forwarder survey, a conservative estimate suggests the Washington Metropolitan area’s volume of international HHG/PE shipments is approximately 11,000 to 13,000 movements annually.

While not every shipment includes an air cargo segment, a significant number do. Currently, few air shipments can depart the region via IAD, due to Known Shipper regulations that do not permit the transport of unaccompanied personal effects on commercial passenger aircraft. In developing this alternative, the team identified several potential strategies that may enable IAD to pursue the HHG/PE niche market. These strategies include: initiation of freighter service; approval for a TSA Known Shipper waiver program; and pursuit of known shipper status for certain classes of civilian and military U.S. Government employees.

All-cargo service would obviate the constraints of the Known Shipper program and enable the shipments of the “fast” segments of HHG/PE to fly out of IAD. Since the merits of attracting freighter service to IAD have been discussed in a previous section, we will not address this option again. However, in the absence of freighter service, IAD authorities could pursue options that work within the current confines of belly lift and seek development of a pilot program and waiver of the Known Shipper regulation. Through a partnership with the freight forwarder commu
nity, IAD would design a prototype screening and inspection process by which HHG/PE shipments could be cleared for transportation on passenger aircraft. IAD would have to submit the process to TSA for approval of a waiver to screen, inspect, and transport these shipments as belly cargo.

Establishment of such a process would require a significant investment of money and resources and is likely to encounter substantial political opposition, since cargo screening remains a political hot button issue. However, a well planned lobby effort aimed at distinguishing threat from vulnerability, as well as a detailed economic analysis, could provide a strong platform from which to generate support for such a project. TSA does certify waiver programs (i.e. alternate methods for meeting security requirements), but this lengthy process requires design of a proposal and TSA approval. Estimation of the implementation timeline is difficult and will likely depend on the political opposition and amount of stakeholder support that can be garnered.

Heavy Political Opposition Likely

Political opposition to a known shipper waiver program is likely to be heavy. The current screening measures for belly cargo are already under fire. Representative Ed Markey (D-MA), a senior member of the Homeland Security Committee, and several colleagues introduced two bills (H.R. 2004 and H.R. 2649) in May 2005 to increase air cargo screening. In addition to other aviation security measures, the legislation requires 100% inspection of all cargo before it is transported on passenger aircraft. Markey supports a three-year phased plan in which 35% of cargo must be inspected by the end of Fiscal Year 2006, 65% of cargo by the end of Fiscal Year 2007, and 100% of cargo by the end of Fiscal Year 2008. These lawmakers also unsuccessfully attempted to insert these provisions as amendments to the Department of Homeland Security’s 2006 authorization bill.66

According to Representative Markey, “Failure to inspect all of the cargo that is transported on passenger planes provides terrorists with an opportunity to carry out another 9/11-style attack, and we must take action now to close this dangerous loophole.” It may be possible to frame this waiver program as supporting Representative Markey’s position, since the screening equipment and procedures will be a movement toward the type of screening Markey is advocating. A smart lobbying campaign could align this program with supporters of more aggressive screening, instead of highlighting it as an attempt to sidestep federal security regulations. “Securing all cargo carried aboard commercial airlines is a very achievable goal. The technology exists right now to screen this cargo. These systems provide an accurate picture of ‘what is in the box’ and do not impede the flow of commerce,” said Paul Onorato, Vice-President of the Coalition of Airline Pilots Associations.67

This waiver program could include the possibility of packing and repacking the cargo for this cargo subset, or, more practically, involve investment of screening equipment. Screening equipment would also have to be tested and approved by TSA. If approved, the equipment could be purchased by the airport for use by freight forwarders for a fee, provided the freight flies out of IAD. The user fees could generate revenue to offset the initial capital expenditure. Alternatively, interested freight forwarders, such as Security Storage, could partner with IAD to acquire the equipment, provided other freight forwarders were permitted to utilize it. Security Storage Company has considered funding the purchase of this equipment, since this type of freight makes up 60% of its business.

The final option within the niche market alternative is pursuit of known shipper status for a segment of military and civilian U.S. Government employees. For example, State Department employees going overseas could be designated as known shippers by virtue of their employment. Presumably, these individuals have been subject to background checks prior to employment and could be viewed as a class with low security risk. IAD could also lobby the State Department to undersign the liability on shipment of its employee’s household goods/personal effects, so that they become qualified as known shippers and, thus, their goods could be shipped aboard commercial passenger aircraft. Likewise, military officers or civilians above a specified pay-grade could also be designated as known shippers under the guise of their federal employment. This type of status designation would also require submission of a proposal for TSA approval. It is also possible that TSA would require use of certified screening equipment like that involved in the aforementioned waiver program.

There may be restrictions on the ability of federal agencies to assume liability for their employees. State Department’s acceptance of liability for its employees household goods/personal effects may be constrained by federal regulations. Additionally, identifying the correct office to solicit will require time and effort.

Ascribing known shipper status to all government employee HHG/PE shipments for transport on commercial aircraft may present a potential security risk and is not advo-
cated. However, identification of low risk classes of ship-
ners within this population could facilitate implementa-
tion of alternate screening requirements that minimize
impact on the flow of commerce while maintaining rigor-
ous regulations for cargo from potentially higher threat
shippers.

The challenges of pursuing this alternative are numerous,
requiring investment in time, and capital, particularly with
outreach to TSA stakeholder and air cargo security pro-
gram offices. Garnering political support, or more impor-
tantly battling political opposition, will also be difficult.
However, the team believes the benefits overweight the
potential difficulties this alternative may pose.
Approaching TSA with a specifically designed protocol for
the vetting and inspection of HHG/PE shipments for a
select group of employees presents the possibility of estab-
lishing a specialized niche for IAD within the air cargo
transportation industry. Since the heavy household goods
portion of these shipments, i.e. the “slow” segment, moves
via ship, it is possible that this could be the basis of an
operational link with VIP; however, currently, the low
trucking rates keeps many freight forwarders moving this
cargo on highways to the coastal ports.

FREIGHT FORWARDER STUDY

The last alternative the team considered was continued
research and focus on the freight forwarder community at
IAD. MWAA has not conducted a formal survey of its air
freight forwarder community in recent years. Based on
research and the IAD freight forwarder survey results,
WATF would benefit greatly from conducting an in-depth
study of its freight forwarder community. Air cargo expert
David Hoppin stressed the importance of studying the
industry: “the first step is to understand the cargo industry
and the market segments in which an airport can realisti-
cally compete. Who are the decision-makers that the air-
port should seek to influence?” Freight Forwarders are
clearly among those decision-makers.

This focus on freight forwarders also supports the discus-
sion of the “New Customer” alternative in which attrac-
tion of a large freight forwarder’s gateway operation is
identified as a possible strategy for increasing air cargo vol-
ume at IAD. A study of the current IAD freight forwarder
community would assist WATF in understanding what
attributes are necessary to entice a freight forwarder to
shift their operations to another airport. In the team’s lim-
ited survey, IAD determined that variety of destinations
and frequency of flights are important factors freight for-
warders consider when routing air cargo. Freight for-
warders operate within a global network and a move from
their current locations to IAD may cause disruptions in
their global alliances. The study should strive to provide
WATF with a thorough understanding of what the risks
are for the freight forwarders to make the move to using
IAD, how much cargo would need to come through IAD
to justify a move to IAD, and what frequency of service
freight forwarders require to make this a successful part-
nership.

“Airports must build personal relationships with the decision-
makers at forwarders and carriers.”
–David Hoppin, Air Cargo Consultant, MergeGlobal

Another helpful step may be the establishment of an IAD
Cargo Development Council. Based on its mission state-
ment, the Washington Air Cargo Association (WACA)
would appear to be an appropriate venue for IAD to
develop its relationship with tenant freight forwarders.
However, our research suggests, while it is a good forum
for discussions of best practices, it has no role in formulat-
ing cargo development initiatives or policies. JFK has a
similar association which also appears to be more social in
nature; however, the Kennedy Airports Airlines
Management Council (KAAMCO) has a Cargo
Operations Committee that meets monthly with the goal of
bringing JFK cargo entities (operators, regulators, and inspec-
tors) together to discuss problems, solutions, and ideas.

Recommendations and Moving Forward

Analyzing the team’s detailed research, results of the freight
forwarder survey, and interviews with air cargo industry
leaders led to identification of critical factors affecting air-
freight movement regionally, nationally, and internation-
ally. Based on this analysis, the team recommends MWAA
consider four potential strategies for capturing additional
air cargo flow at IAD.
• Build a relationship of mutual understanding and opera-
tions with regional freight forwarders;
• Develop the resources and environment necessary to
encourage a new major airfreight customer to relocate to
the region;
• Facilitate growth of a niche market centered on move-
ment of Household Goods and Personal Effects; and
• Continue efforts to attract the operation of a freighter
service at IAD.
While these recommendations are defined and evaluated as discrete initiatives, they are not mutually exclusive. In fact, the team’s research and findings suggest that the successful implementation of one strategy might benefit or benefit from pursuit of another one of the four approaches, or they may need to be pursued in tandem to address both sides of the air cargo equation—supply (lift capacity) and demand (cargo volume). Alternately, these recommended strategies could be pursued in a phased timeline with one strategy, such as freighter service, laying the foundation for another, such as development of the niche market of household goods and personal effects.

Although the team did not find an opportunity for developing an operational relationship with VIP, at least two of these recommendations—development of a new manufacturing customer and niche market—may benefit from MWAA’s involvement in Warren County’s promotion of a complete transportation logistics package.

Based on its research and the analysis, the team recognizes the freight forwarder’s critical role in air cargo movement worldwide. It is essential that MWAA and the WATF understand to a greater degree the business models, culture, and risk-benefit calculus of this industry. A continuation of the work begun in this project will result in development of closer relationships with local members of the freight forwarder community at IAD and will provide insight into what freight forwarders want and need from airport cargo operations. After all they are not just airport tenants, they are airport customers. One freight forwarder commented that “the airport has not opened its arms to the freight community.” The WATF cannot succeed in developing its air cargo sector without the support of the freight forwarder community.

By developing the necessary environment to accommodate the operations of a major manufacturer high-value, time-sensitive goods, such as electronics or pharmaceuticals, IAD may be able to generate new air cargo flow.

Exploration of a joint marketing campaign with VIP may help attract a new manufacturer to the region. The new customer could also be a major freight forwarder that decides to locate its gateway operation at IAD given its ongoing growth of operational capacity through runway expansion, air traffic control upgrades, and property development.

The team’s research highlights the potential opportunity for IAD to capitalize on the booming Household Goods and Personal Effects market in the Washington Metropolitan area, despite the current constraints associated with moving these items as belly cargo. IAD should focus its efforts on attracting and maximizing the many opportunities it has regionally to move these goods. This recommendation, perhaps more than any other might also have the potential for developing a synergy with Virginia Inland Port. As discussed in detail above, the Household Goods and Personal Effects market requires the shipment of high-value cargo via air and heavy, lower-valued segments via ship.

Development of air cargo demand, as discussed in the aforementioned recommendations, will assist in the pursuit of all-cargo and/or freighter service beyond that offered by the integrators, such as FedEx, UPS, and DHL. Freighter service that connects to the world’s major cargo hubs might advance IAD toward the top of regional air cargo operations.

There is no “silver bullet” for increasing air cargo flow at IAD. However, the team has highlighted several critical factors that drive freight transportation choices and recommended four strategies for influencing those choices to capture a greater portion of the available freight flow. Air cargo sector development also does not happen overnight; it requires analysis, focus, and, above all, patience. Formulation of a comprehensive air cargo development plan that includes pursuing several of these recommendations in tandem or in a phases will move IAD toward capitalizing on its potential.

**Appendix I**

**MARKET STUDIES**

The market study team was tasked with gathering data relevant to the demographics, economic development, and transportation and freight facilities within six markets. The six defined markets were:

- Front Royal-Warren County, Virginia, home to the Virginia Inland Port (VIP),
- Dulles, Virginia, home to Dulles International Airport (IAD),
- New York/New Jersey, home to the three airports of JFK, LaGuardia, and Newark International and the Ports of New York/New Jersey,
- Baltimore, Maryland, home to Baltimore Washington International Airport (BWI) and the Port Of Baltimore,
• Hampton Roads, Virginia, home to the Virginia International Terminals, and
• Columbus, Ohio, home to Rickenbacker International Airport, an ideal air freight regional hub.

It was determined that such a broad market study would lend clarification and understanding as the team attempted to address the problem at hand. In order to structure and manage the data collection process during this phase, the market study team divided itself into groups, with each group responsible for gathering the data relevant to a specific market. Much of the data gathered by the team was the result of academic research and investigation; in several instances, however, relevant information was collected through interviews, both via the telephone and in person, as well as through the distribution of surveys.

Below are summaries of the specific market studies conducted by the group. These studies assisted the team in formulating its recommended solutions. In addition, the studies enabled the team to develop appropriate criteria, which was used in determining the integrity of the overall problem solution and alternatives.

### Front Royal - Warren County Market

The Front Royal - Warren County area, located 70 miles due west of Washington, D.C., is part of the Washington-Arlington-Alexandria Metropolitan Statistical Area (MSA). Warren County is home to the VIP, a modern truck and train intermodal terminal with international traffic that moves between Virginia Ports and the Inland Port through an extensive rail system. Specifically, the VIP moves freight goods between Norfolk International Ports and the Inland Port for further distribution throughout the region and the country. Norfolk-Southern Railway offers freight and intermodal service seven days a week in both directions from the Inland Port to the Marine Terminals. The VIP provides an interface between truck and rail for the transport of ocean-going containers to and from The Port of Virginia. Through this unique location, the VIP is able to offer the northern Appalachian Region (Ohio, Pennsylvania, western Maryland, West Virginia and the northern Shenandoah Valley) excellent seaport access. Containers are transported by truck to the VIP for immediate loading upon a rail car or for short-term storage prior to loading. Containers arriving from Hampton Roads terminals are unloaded from the train and dispatched by truck to inland destinations. Located within one mile of Interstate 66 and within 5 miles of Interstate 81, this ideal location provides excellent roads to and from markets within Pennsylvania, Northern Virginia, West Virginia, Maryland, Washington, D.C. and Eastern Ohio.

The VIP has attracted some 24 warehousing and distribution centers to the area, with over 6 million square feet of combined space and over 7,000 workers. VIP has steadily increased its pace of movements in recent years. It had about 14,000 moves in 2003, some 28,000 in 2004, and 35,000 moves in 2005 with much of this attributed to the new distribution centers moving into the area, according to James Davis, the Mid-Atlantic Regional Manager for the Inland Port. Although the flow of imports through VIP has increased significantly over the last several years, poultry, logs, and lumber still represent a major part of the facility’s freight.

Of the 35,000 moves in 2005, 10,000 came from Home Depot alone, with its Regional Distribution Center located just 8 miles north. VIP expects to move 40,000 containers this year (2006) with a capacity of approximately 100,000 containers per year, given its current configuration. VIP’s biggest customers are Home Depot, Dupont Plastics, Family Dollar, and Lenox. Sysco has recently built a Re-Distribution center next door to the VIP. On a daily basis, between 50 and 150 containers come inbound to the VIP from Norfolk (imports). VIP’s ratio of imports to exports is roughly 2:1. This ratio used to be the reverse (2:1 exports to imports), but the arrival of Home Depot’s Regional Distribution Center increased the import traffic to what it is today.

VIP owns 160 acres and currently uses 52 acres. Its effective radius is roughly 100 miles. Shippers and distribution centers to the northeast will truck to Baltimore or New York. Shippers to the south will truck directly to Norfolk or ports south (e.g., Charleston). VIP fills this void in a 100-mile radius. Workers at VIP are employed by Virginia International Terminals (VIT), a non-profit corporation and are non-unionized.

**Strengths and Opportunities**
The VIP not only effectively brings the marine terminals of Norfolk, Newport News, and Hampton Roads 220 miles inland; it also is included in Foreign Trade Zone (FTZ) #20, which is operated by the VA Port Authority. Although not yet utilized at VIP, the FTZ would enable potential customers to pay customs duties and taxes only after they transfer merchandise from the FTZ to U.S. Customs territory for domestic consumption. Thus, if a manufacturer imports parts or raw materials to a facility in
the zone and then sells the finished product in the U.S., they can choose whether to pay the tariff on the raw materials or the finished product, potentially saving thousands in tariff costs. In addition, goods may be exported from a FTZ free of duty or taxes. Merchandise may be stored indefinitely within the FTZ, and the U.S. Customs Service provides security at the site, resulting in lower insurance costs for those using the facility.81

The area has several business associations that desire to create and maintain a business climate that creates jobs. They include the Warren County Economic Development Authority (WCEDA), the Front Royal Chamber of Commerce, and the Downtown Front Royal Business Association. The WCEDA administers several business programs, including the Enterprise Zone Program, which is designed to stimulate investment and employment opportunity by offering various fee and tax credits, grants, incentives, etc… Another program administered by WCEDA is the Rural Business Enterprise Loan Program, a USDA grant program available to all Warren County businesses that is used to provide financial incentives for the expansion of existing local industries or commercial business ventures and for the attraction of new industries or commercial business venture to Warren County.82 In addition, the Front Royal area has been designated an HUB Zone, or Historically Underutilized Business Zone, by the Small Business Administration.83 Therefore, those businesses choosing to locate in the area have access to an excellent program designed to help small businesses located in distressed areas.

Additionally, the market offers extensive retail, commercial, and residential land and facilities for sale or lease. It also has a large local labor market, with 2005 unemployment figures at 3.1 percent. Additionally, 50 percent of WC residents commute to jobs outside of the area. According to a 2003 survey, 78 percent of commuters would consider employment within Warren County for comparable jobs.84

According to Mr. James Davis, having lower land costs, lower taxes and a lower cost of living are sales points for the area. “Companies can get away from the high costs of doing business along the coast,” he says, “but there is still easy access to international markets via the Inland Port.”85

Weaknesses and Threats
Given the time-sensitive nature of air cargo and the fact that VIP operations generally service heavy and slow moving cargo by train, direct and obvious synergies between VIP and IAD may not exist at this time. For one, the road connections between VIP and IAD are often congested during peak times, which can lead to unpredictability, an undesirable quality for typical customers shipping cargo via the air. Although there are many warehouse and distribution centers in the Warren County – Front Royal market, almost all exclusively use truck, rail, and/or ship modes for freight distribution. Most do not currently use or need air cargo, except for perhaps small, individual shipments, for which they generally utilize one of the Express Carriers such as UPS, or DHL, according to surveys of businesses adjacent to VIP.

Conclusion
The study of this market assisted the team in determining whether, as the client proposed, a synergy exists between IAD and the Virginia Inland Port (VIP). The team interviewed many current customers and conducted a tour and meeting with the regional director. The Front Royal – Warren County market area offers many strengths and opportunities, but these strengths and opportunities may not generate additional air cargo volume and/or revenues in the immediate future for IAD. While the Inland Port has increased its pace of movements in recent years, with about 14,000 moves in 2003, some 28,000 in 2004, and 35,000 moves in 2005, much of this is due to distribution centers moving heavy bulk commodities which are not time-sensitive into the area. Of the 35,000 moves in 2005, 10,000 of those moves came from Home Depot importing goods for its Regional Distribution Center, located just 8 miles away. And while their volume has increased significantly over the past few years with other new distribution centers such as Dupont Plastics, Family Dollar, Sysco, and Lenox moving into the area, this has merely increased their import traffic, with between 50 and 150 containers coming inbound to the VIP from Norfolk every day. Their ratio of imports to exports is roughly 2:1. This ratio used to be the reverse (2:1 exports to imports), but Home Depot’s arrival along with the other warehouse and distribution centers has reversed this trend to what it is today. So although import flows continue to grow for VIP, the majority of the imported merchandise is household goods and textiles heading to warehouses or distribution centers for localized consumption. And the majority of its export goods are items such as poultry, logs and lumber, commodities not suited to air cargo, but ideal for ocean-going transport. And although a foreign trade zone is located at VIP, nobody has activated it.86
**Dulles/Washington Metro Market**

The greater Washington DC Metropolitan region, which includes Northern Virginia and parts of suburban Maryland, is a dynamic and growing region with a population of approximately 4.2 million according to the 2000 census. Approximately 2.5 million people are employed in the Washington area, with roughly three-quarters working in white-collar jobs. The region also has the largest percentage of executive, administrative, managerial, professional and technical workers among the nation’s largest metropolitan areas. The proportion of scientists, technicians and Ph.D.s working in Metro D.C. is among the highest in the nation, and nearly one in seven employees works in computer and/or telecommunications related industries. The Washington Metro region is also well positioned for continued and sustained growth over the next two decades, as the shift from federal to private-sector employment continues. Job growth is also expected to continue at significant rates, with the vast majority in highly skilled occupations, including business, healthcare, law, and education.

The structure of the greater Washington economy relies heavily on the federal government sector, with approximately 660,000 individuals being employed by the federal government, and approximately the same number employed in the trade, transportation and utilities sector (Nov. 2005).

**Strengths and Opportunities**

Of the 15 largest job markets in the United States, the Washington DC Metro Region ranked #1 in job gains for the period of Nov. 2004 – Nov. 2005, with a net gain of 86,900 jobs. For that same period, the highest number of job gains could be found in the professional and business services industry, with 24,200, followed by the leisure and hospitality industry, with 11,300. Education and health services, with 10,400 new jobs, and state and local government, with 10,200 new jobs, round out the top four job growth segments for the region.

Among the 15 largest U.S. job markets, the Washington DC Metro Region also ranked #1 in terms of the lowest unemployment rate with 3.8% for November of 2005. While this demonstrates the region’s economic strength, it could also be seen as a weakness in that it has a diminished pool of qualified employees.

In terms of market development, the Dulles International Airport (IAD) recently completed the purchase of 835 acres, which the airport will develop over the next 15 years. The new land acquisition will be used to build a new runway, which has already been approved by the airport. Currently, the airport’s on-site warehouse capacity is 535,000 square feet, with a utilization capacity of 85-90 percent. To this the airport is adding 29,000 square feet in the near term via an addition to Cargo Building Number 6, and hopes to break ground on a seventh cargo warehouse shortly thereafter. This new facility could be built on the newly acquired acreage, depending on the approval process. In addition, IAD recently received an FAA grant of some $200 million to be disbursed over the next 10 years for the building of a fourth and fifth runway. Currently IAD has three runways and hopes to complete the fourth by 2008.

One significant opportunity for IAD cargo growth is that of personal effects and household goods shipments. This is due to the presence of a number of multi-national organizations, such as the World Bank, International Monetary Fund, and many others. Additionally, the United States Government, along with other governments from around the world, also supplies many of these types of shipments as a result of diplomatic traffic to and from the region. And landing fees are much less at IAD than they are, for example, at JFK. Based on a per 1,000 pound rate, IAD charges $1.99, compared to $5.25 per 1,000 pounds at JFK. Additionally, JFK charges the take-off weight, whereas IAD charges on the landing weight. Due to security regulations that are now in place, however, in particular the Known/Unknown Shipper Program, none of these types of shipments are allowed to travel in the “belly” of passenger jets. Such cargo may only be transported via air on cargo-only flights, which IAD does not currently offer.

**Weaknesses and Threats**

The Washington DC Metropolitan Region does not support a large industrial manufacturing base. A majority of the goods and commodities entering and leaving the region via air at IAD are service-oriented. Furthermore, according to information garnered from a survey of forwarders at IAD, as well as meetings with the heads of air cargo for United Air Lines and Air France, a significant volume of cargo cannot depart from IAD due to the more stringent security regulations implemented after the terrorist attacks of 2001. Another concern is the region’s increasing traffic volume and the associated congestion. Such congestion clearly leads to an increased need for manpower and workhours, and increased transportation costs, as well. In addition, as previously mentioned, the Washington DC Metropolitan Region has one of the low-
In 2003, the New York cargo market share was 20.41 percent of the total market, or roughly more than a fifth of the entire US total. While the figures vary year-to-year, New York typically handles one-fifth to one-quarter of all U.S. imports annually, including over 45 percent of all U.S. apparel imports. While its overall share of the market has declined in recent years, the market itself continues to grow. In 2004, PANYNJ expected exports to grow by 14.6 percent, led by shipments Asian markets, primarily Japan and China. Air-cargo imports and exports in the New York area grew 3.7 percent in January and February of 2004, compared to the same period in 2003. With regard to imports, China is the top source (measured in 1,000 metric tons) into the New York market followed by Italy, the United Kingdom, Germany, and Japan. Woven apparel, machinery, knit apparel, vegetables, fish, and footwear were among the major products imported. With regard to exports, Japan led the way as the destination of exports from New York, followed by the United Kingdom, Germany, France, and China. The major products being exported were machinery, plastics, medical instruments, paper, and books. The amount of exports was only half the total for imports, measured by weight.
The size of the air cargo industry in the New York area is due to a number of factors, including a large manufacturing base in the region as well as a long history as a major hub of international trade and air travel. Together these factors and others helped cement New York as a vital air cargo center with considerable competitive advantages due to its early and sustained growth in infrastructure to accommodate air cargo and the high levels of convenience this infrastructure provides to shippers of time-sensitive products.

JFK has more than one million square feet of office and warehouse space dedicated to broker, freight forwarder, and container freight station operators who do business within the NY/NJ region. Newark is the overnight small package center for the entire metropolitan area and offers a full range of short-, medium- and long-haul services to domestic and international destinations.

**Strengths and Opportunities**

New York has benefited from decades of experience as a dominant player in the air cargo market. In addition, decades as a major air cargo gateway have helped shipping agents, customers, and officials develop strong relationships based on assurances about quality and reliability of service. Most transport logistics decisions are made based on prior relationships and experiences as well as heuristics. Many in the industry are resistant to change and are risk-adverse. In addition, most air cargo customers are more interested in speed and reliability than the price of service. Based on these long-standing relationships, New York should continue to be a major player in the air cargo market for the foreseeable future.

While New York’s market share has stagnated in recent years, increased capacity at the region’s airports may provide significant opportunities to capture part of the growth in international air cargo volumes as well as adjustments in the intra-North American market.

The MergeGlobal Forecast made the following assessments about international air cargo prospects:

**North America-Europe**

Due to the continued weakness in the dollar, the eastbound airfreight market will grow at 3.8 percent between 2004 and 2009, despite sluggish economic growth in Europe. As for westbound traffic, the continuing expansion in the US business sector will support a westbound airfreight market growth of 4.0 percent over the next five years.

**North America-Asia**

U.S. consumer spending, rising technology spending from corporations, port congestion on the West Coast, and the fact that the Chinese Yuan is fixed to the dollar will help fuel robust growth in the eastbound trans-Pacific air freight market. The total trans-Pacific market will average 6.3 percent growth over the next five years. The ongoing expansion of the US business sector and the removal of apparel and textile quotas will support eastbound airfreight market growth of 6.3 percent between 2004 and 2009. Production material and the continued build-out of China manufacturing capacity will drive westbound traffic growth of 6.4 percent during the forecast period.

**North America- Latin America**

The total North America - Latin America market will grow at a compound annual growth rate of 5.8 percent in the forecast period. Economic growth combined with a weak dollar will support southbound airfreight market growth of 4.7 percent in the next five years. The northbound perishable market is expected to continue supplying US grocery chains at a growth rate of 6.4 percent in the forecast period.

In the case of all three markets, New York has an advantage. Due to its location, it has always been a major gateway for goods to and from Europe. Congestion on the West Coast makes New York a good alternative on the East Coast. In the case of both Asia and Latin America, New York is already a major gateway for traded products including clothing and perishable food. With increased capacity and some relief from traffic congestion, New York could add to its market share.

**Weaknesses and Threats**

While JFK has extensive cargo handling facilities and a large number of flights to a vast array of destinations, the congested infrastructure connecting JFK to the rest of the nation’s surface transportation system has reduced the airport’s competitive edge, especially with regard to time-sensitive products. In addition, as more and more airports nationwide provide international connections, JFK faces increased competition.

JFK is the main driver behind robust growth forecasts for passenger traffic at the three New York-area airports this year, but it also bears part of the blame for increasing highway traffic that is negatively affecting cargo levels in the region. For example, traffic congestion caused Nippon Cargo airlines to shift part of its business to Chicago. Traffic tie-ups around JFK have also caused much of the overnight express package business for the region to relo-
cate to Newark. Other airports such as Memphis have become the major national hubs for express package companies such as Federal Express. Competition from trucking is also weakening New York’s market dominance. Shippers’ are shifting their spending on domestic cargo away from short and medium haul air legs to cheaper truck capacity. PANYNY officials have noticed that the cargo airlines are switching second-day service to trucks rather than aircraft.

As congestion grows around JFK, many air cargo shippers may opt for other facilities that provide similar access to the U.S. and faster on-ground delivery to local domestic markets, especially the fast growing localities in the South and West. Facilities in other fast-growing markets are also generally characterized as less densely developed, offering cheaper land for expansion and suffering less congestion, which makes them more attractive. As evidenced by the experiences of Dallas and Denver, however, many factors contribute to success or failure in the air cargo market.

Conclusion
As the international air cargo market grows, New York will continue to be a dominant player with its long established reputation as an air cargo gateway, existing relationships with customers, and significant and expanding infrastructure. Its market share will most likely decline over time, however, as competition from other air hubs intensifies. Most likely its core businesses such as apparel (New York is a major center for the fashion industry) will remain strong. However, niche or new projects such as high tech equipment may move to other markets. New York’s other major challenge will be improving its congested infrastructure which may be difficult to overcome in such a densely populated and built-up area. Express package delivery will mature at Newark, but other domestic air cargo is less likely to be a significant source of future growth in the New York area or other air cargo hubs.

Hampton Roads Market
Hampton Roads is the name of both a body of water and the land areas which surround it in southeastern Virginia in the United States. The water area known as Hampton Roads is one of the world’s greatest natural harbors and incorporates the mouths of the Elizabeth River and James River with several smaller rivers. The harbor itself empties into the Chesapeake Bay near its mouth and leads to the Atlantic Ocean. The land area includes most of the counties, cities and towns in the southeastern corner of Virginia, as well as parts of northeastern North Carolina.

For statistical purposes, Hampton Roads is officially known as the Virginia Beach-Norfolk-Newport News, VA-NC Metropolitan Statistical Area. The area has a population of about 1.6 million and is the fourth largest metropolitan area in the southeastern United States and the largest between Washington, D.C. and Atlanta. The port of Hampton Roads is among the largest ports in US, based on tonnage, and it ranks as the third largest port in the country behind the ports of New Orleans/South Louisiana and Houston.

In 1996, Hampton Roads was ranked ninth among major U.S. ports in vessel port calls with approximately 2,700. By tonnage it ranks 10th in the country and 33rd in the world, beating out such ports as London and Amsterdam. It has been a major anchorage point since colonial times and has extensive harbor facilities and shipyards. Newport News and Hampton are on the north shore, and Norfolk and Portsmouth on the south.

Hampton Roads specializes in containerized and breakbulk cargo. Its three biggest customers are Wal-Mart, Sysco, and Dollar Tree. Hampton Roads’ market audience are firms specializing in light manufacturing and product distribution. Wood pulp and ore are the largest items of import, while coal and scrap iron are the largest items of export. The latter reflects the current trend toward international rearmament. Key exports include grain, tobacco and tobacco products, lumber and logs, cotton and textiles. Seventy-five percent of containers shipped through Hampton Roads arrive via trucks. About 1.8 million 20-foot equivalents -- the industry measure for container traffic -- passed through Hampton Roads in 2004. That compares to 4.48 million handled by New York-New Jersey and 1.86 million for Charleston, according to the American Association of Port Authorities.

Hampton Roads is served by 2 major commercial airports: Norfolk International Airport and Newport News/Williamsburg International Airport. Norfolk International Airport is the main air passenger and cargo transport hub in the region.

Strengths and Opportunities
Since 1989, Hampton Roads has been the mid-Atlantic leader in U.S. waterborne foreign commerce and is ranked second nationally behind the Port of South Louisiana based on export tonnage. Hampton Roads has become known as the “world’s greatest natural harbor”, located only 18 miles from open ocean on one of the world’s
deepest, natural ice-free harbors. When import and export tonnage are combined, the port of Hampton Roads ranks as the third largest port in the country following the ports of New Orleans/South Louisiana and Houston. Hampton Roads is located near Pocahontas coalfield in West Virginia, which has helped make the port the U.S. leader in coal exports. The coal loading facilities in the Port of Hampton Roads are able to load in excess of 65 million tons annually, giving the port the largest and most efficient and modern coal loading facilities in the world. The Hampton Roads area has an extensive network of Interstate Highways, including Interstate 64, the major east-west route to and from the area, and its spurs and bypasses of I-264, I-464, I-564, and I-664. The port of Hampton Roads is the deepest port on the East Coast; therefore it can accept most ships that are rejected by other ports.109

Hampton Roads is also the world’s largest Navel base. The Navy owns 36,000 acres and more than 6,750 buildings in the area. There are some 108,000 Navy and Marine Corps personnel stationed in the area. The Navy employs more than 41,000 civilians. The total Hampton Roads Navy community numbers some 318,000 people. This economic generator pumps over $11 billion into the local economy annually.110

Weaknesses and Threats
Total tonnage at Hampton Roads peaked in 1991, and it has seen its total volume of bulk cargo steadily declining. In addition, general cargo, which is more labor intensive, has been increasing. Maersk and Orient Overseas are producing ships that require deeper waters than what Hampton Roads currently has to offer. Other East Coast ports are trying to attract container traffic. Savannah, for example, is spending $100 million to add cranes and berths for ships. Savannah also wants to dredge its channels to 48 feet from their current 42-foot depth. The port of New York-New Jersey has begun dredging its channels to 50 feet, a $2.25 billion project. In South Carolina, the state’s port authority will develop a $545 million terminal on the site of the former Charleston Naval Base.111 Lastly it is important to note that highway congestion in the Hampton Roads area is increasing and causing delays in cargo movement.

Conclusion
Hampton Roads is currently undergoing significant expansion. A $450 million container terminal under construction in Portsmouth will increase the port’s capacity when it opens in 2007. The Virginia Port Authority, which already has terminals in Norfolk, Newport News and Portsmouth, is also expanding the container-handling capacity of its Norfolk International Terminal, and is getting ready to construct a giant container terminal at Craney Island in Portsmouth — a project with a $1.76 billion price tag. The Authority expects the first stage of its Craney Island facility to open in 11 years. Given the current expansion projects, it is likely that Hampton Roads could eventually become the East Coast’s biggest port for ocean-container traffic, taking the top ranking from the port of New York-New Jersey.112

Port of Baltimore/BWI
The Port of Baltimore is the closest port to the Midwest. Strategically located in the mid-Atlantic region of the U.S. east coast, the Port sits in the center of the enormous Washington/Baltimore Common Market. This inland location makes it the closest Atlantic port to major Midwestern population and manufacturing centers and a day’s reach to 1/3 of U.S. households. The port provides immediate access to the 6.8 million people in the thriving Washington/Baltimore region, the nation’s fourth largest and one of the wealthiest consumer markets in the U.S.113

The Baltimore/Washington International (BWI) Airport is centrally located on the east coast of the U.S. It is surrounded by excellent transportation infrastructure that provides BWI with premiere access for air cargo distribution throughout the mid-Atlantic, mid-West and north-east regions of the U.S. BWI is linked to five major interstate highways for easy, rapid access to the mid-Atlantic region. It is within minutes of rail service and just 15 minutes from the Port of Baltimore. Its location enables cargo shipped through BWI to be transported, warehoused and distributed cost-effectively.114

The overnight market has the advantage of the Port of Baltimore’s outstanding highway access; trucks can reach 35% of America’s manufacturing base overnight and 32% of its population.115 Customers such as steel manufacturers in Pittsburgh, furniture makers in North Carolina and consumers in Boston can all be served within 24 hours from the Port of Baltimore.

The BWI Airport has cold storage facilities that are capable of handling time-sensitive air cargo with 24-hour-a-day cold storage. BWI is equipped to provide on-airport services to ensure that the product (i.e. seafood, produce, flowers, pharmaceuticals, etc.) is temperature-controlled immediately upon unloading or prior to the loading of the
aircraft. The cold storage facilities are also equipped with direct ramp access.116

The BWI Airport has a facility designated for Foreign Trade Zone (FTZ) use that allows both foreign and domestic merchandise to be stored, manipulated and re-exported to avoid the usual form of customs entry procedures and payment of duties/taxes. FTZ #73, where BWI is located, offers both warehouse and office facilities available to BWI cargo customers for immediate occupancy.

Strengths and Opportunities
BWI Airport handles nearly 50 percent of the U.S. East Coast market’s share of roll-on roll-off (RO/RO) cargo annually, which is more than double the next largest port. BWI prides itself on one of the lowest cargo damage rates in the country. Year after year its employees deliver on their promise to have the lowest damage rate on RO/RO cargo.117 BWI smoothly and efficiently handles more RO/RO cargo than any other port in the U.S. with the only Quality Cargo Handling Action Team (QCHAT) for RO/RO.118 This team is comprised of labor and management that meets monthly to assess performance, identify problems and take corrective action. As part of its strategy, the Port of Baltimore’s “RO/RO Rodeo” rounds up manufacturers to teach labor the unique handling and operational requirements for each type of vehicle.119

Moreover, Baltimore has a distinct geographic advantage with its strategic inland location. The Port of Baltimore is within an overnight drive of one-third of the nation’s households and closer to the Midwest than any other U.S. East Coast Port.120 The arrival of a new container service with CMA-CGM and China Shipping into the Port of Baltimore is a confirmation of the growth of both its port and its international reputation. To reaffirm its position as the top U.S. RO/RO port, Baltimore recently signed a 20-year agreement to serve as the East Coast hub for the largest RO/RO carrier in the world.121 The port’s facilities handle more and more RO/RO cargo every year. Nearly 150 acres for autos at the Fairfield Marine Terminal, and 200 acres of pavement at Dundalk Marine Terminal keep them ready to store more RO/RO equipment than competing ports.122

Baltimore’s proximity to the Midwest’s major farm and construction equipment manufacturers has helped the port become the leading U.S. port for combines, tractors and hay balers and in importing excavators and backhoes. Both CMA-CGM and China Shipping are ranked in the top-ten of container shipping services worldwide, with CMA-CGM ranked third and China Shipping ranked sixth.123

Weaknesses and Threats
Port of Baltimore is not designed for direct air cargo traffic, although BWI is within minutes of rail service and just 15 minutes from the Port of Baltimore. To control cost, the cargo must be shipped through BWI to be transported, warehoused and distributed. Its air cargo only accommodates up to 24 aircrafts.124

Also, the Port of Baltimore lacks specialized training in seaport policing and security. The Maritime Transportation Security Act (MTSA) and the resulting Coast Guard regulations (33 CFR Part 105) mandate increased training for port authority employees. POB lacks this skilled work force. To combat this weakness, Baltimore’s International Longshoremen’s Association and Steamship Trades Association have formed a progressive partnership that enhances Baltimore’s competitive position and the skills of its workers.125

Reportedly, there has been delivery of dangerous and hazardous cargo into the terminals in the Port of Baltimore. International trade policies, procedures and documents are required to be in place. For governmental purpose, importers and exporters are required to prepare numerous and varied documents. The preparation of these documents is costly to the shippers, the consignees and the vessels.126

Conclusion
The Port of Baltimore and Baltimore Washington International Airport have a positive, strong business partnership. The Port of Baltimore has experienced increases in all of its top commodities. This is a dynamic port with a fully engaged port community. At the same time, BWI is strategically located, has overseas offices, and trade specialists. It has U.S. Department of Agriculture inspectors on premises and Customs Service available 24-hours a day. BWI’s all-cargo airlines include: Airborne Express, DHL Worldwide, Emery Worldwide, FedEx, Menlo Worldwide, UPS Air Cargo, and Kitty Hawk.128 As the gateway to Maryland and the National Capital Region, BWI is a strategic asset to the State.129 The airport is critical to the region’s continued economic development. BWI has grown in recent years and has brought more jobs, development, and services to the entire region. The current improvement and expansion program has strengthened the local economy and helped to secure BWI’s place as a leader in aviation.130
Columbus, Ohio/Rickenbacker Market

Rickenbacker is a reliever airport in Columbus, Ohio. It is dedicated to cargo and distribution operations and has two parallel 12,000-foot runways capable of landing any size aircraft 24 hours a day.131 Rickenbacker has international airfreight, multi-modal transportation and a high-speed logistics gateway designed to accommodate the movement of goods with complementary services and support facilities.

Strengths and Opportunities

Rickenbacker International Airport has unparalleled advantages. First, it is well located to be a distribution center for the Midwest. It is located within a 1-day truck drive or a 90-minute flight to 58% of the United States population, 50% of Canada’s population, and 61% of the manufacturing capabilities of the United States. Second, its internal industrial market is enormous.132 Ohio itself is the second largest manufacturing state, leading in the production of steel, plastics, trucks and industrial machinery.133 Third, Rickenbacker is well located on national highway, rail and air transportation networks. Four interstates provide access to Columbus: Interstates 70, 71, 75, and 77. Fourteen major air carriers, 140 motor carriers and thirty-eight freight forwarders are located in the region. There are also three rail lines servicing the area, with Conrail, Norfolk Southern and CSX with three intermodal terminals.134 Fourth, the Columbus area has less traffic congestion and offers more combined intermodal linkages. Meanwhile, costs of transportation, warehousing, legal and financial support are less than in many “traditional” shipping centers. Finally, Rickenbacker is specifically a cargo airport and the FTZ supports its core activity. More than 70 companies are located in the FTZ at Rickenbacker, including many listed in the Fortune 500. Businesses located in the FTZ generate an additional $951 million for the regional economy and support almost 10,500 jobs.135

On the other hand, some factors bring new opportunities to Rickenbacker International Airport. Namely, they are: the continuing growth of air freight, a variety of marketing and business relationships with other ports, the development of inter-modal facilities and the broad international market in Columbus area. One of most exciting is that Rickenbacker area’s potential has not been fully realized. Less than half of the land suitable for industrial buildings is currently in use or slated for development. There are approximately 7,500 acres land in this area can still be further developed, 800 acres for aviation uses at the Rickenbacker International Airport included.136

Weaknesses and Threats

The movement of goods to and from the Columbus area is hampered by existing infrastructure limitations, especially on the rail side of the operations. Although Columbus is well-served by railroads, it is not located on main lines crossing the United States. Furthermore, Columbus area requires more backhaul shipments.137 Aggregating backhaul shipments out of Columbus would provide direct outbound service to more destinations and would help to reduce air shipment costs, because planes would be carrying cargo inbound and outbound, rather than just inbound.

With the continuing development of Rickenbacker International Airport, more issues need to be carefully considered, such as the noise issues, the upsurge in smaller warehouse/distribution and trucking business, competition from other communities, the federal trade policy changes and land use incompatibility.

Conclusion

In sum, Rickenbacker provides a good model for IAD. The Greater Columbus Inland Port Concept has helped Rickenbacker become an economic success after 1990.138 Relying on this concept, Rickenbacker’s new marketing strategy was developed. It identified the airport as part of a larger, comprehensive regional transportation system that recognized Central Ohio’s strategic location midway between New York and Chicago, and the immediate area’s exceptional highway and railroad access.139 Rickenbacker international airport, located in a 2,000-acre Foreign-Trade Zone, is the pivotal point of the Greater Columbus Inland Port. The Inland Port combines Rickenbacker International Airport with exceptional highway and railroad access, combining all the necessary elements to offer a complete transportation package and a very efficient, cost-effective alternative to the increasingly costly, congested, and inefficient traditional gateway ports.

Appendix II

REGIONAL STUDIES

Several tasks were undertaken within the Regional Studies group, including the determination of commodity flows, traffic volumes, land values, political climate, regional port data and the overall movement of goods into and out of the Northern Virginia (NOVA) area. In order to determine the traffic volumes and upcoming construction projects along key roadways, a number of tools were used. To
complete an initial analysis of projects in the NOVA area, the VDOT Project Cost Estimating System (PCES) and the GIS Integrator were examined, which allowed for a determination of the most likely routes connecting VIP and IAD. The key roads connecting IAD and VIP include: I-66, Route 28, Route 15, Route 255, and Route 50. A number of these roadways encompass several VDOT projects, as discussed below. However, the timeframes associated with such endeavors is quite expansive. Additionally, the pace at which growth occurs in the NOVA region outpaces the rate at which road projects are developed. Further traffic data was collected, expanding on the concept that traffic volumes will continue to grow markedly over the next decade. Traffic appears to be one of the essential concerns in the NOVA region, and this may be one of the key barriers to further expansion of air cargo in the NOVA region.

Commodity flows were another area reviewed within the NOVA region. One of the primary tools used in conjunction with the commodity flow determination task was the Freight Analysis Framework Database provided by FHWA. A number of queries were created pertaining to the origins and destinations of various commodities. The types of commodities moving throughout the network were also examined. Queries were then used to develop a series of reports detailing information pertaining to all modes of transportation. Commodities moving into and out of Washington via air, air and truck, truck, rail and other modes of transportation were examined. The flow of commodities into and out of the U.S. was also examined. Some of the preliminary conclusions obtained from this analysis process include: little to no overlap exists between commodities traveling via rail and commodities traveling via air, air and truck. A substantial amount of overlap exists between commodities flowing via air, air and truck, and via truck.

After the initial analysis and report compilation, a refined set of queries and reports was created relating explicitly to the air and air and truck flows and the commodity correlations experienced across the various modes of transportation. Correlation across various modes of travel, or lack thereof, relates to the concept of modal disconnects between fast and slow transport modes. Goods that travel via air are generally higher cost or time-sensitive commodities. Thus, movement of such goods must transpire in an expeditious manner. Goods moved via slower modes such as rail or sea are generally larger items, or instances where time is not the most essential factor with respect to transport.

The commodities that appear to be moving into and out of Washington via air in the greatest volumes include: electronics, miscellaneous manufactured products, pharmaceuticals, precision instruments printed products, transport equipment and textiles/leather. Electronics is by far the most valuable commodity moved into and out of Washington. The volume and value of electronics moved out of Washington is only 50 percent of that traveling to Washington. Other commodities exhibited greater disparity between goods moving into versus out of Washington. The positive factor associated with this analysis: there appears to be a large quantity of goods moving via truck that could perhaps be converted to air cargo in the right circumstances. However, determining the exact manner in which greater air cargo movement can be expanded is a key determination we would like to further pursue.

In looking at the regional port data, the Virginia Port Authority manages the three marine terminals in Hampton Roads at Portsmouth, Norfolk and Newport News and the Authority manages the Virginia Inland Port (VIP) in Warren County. The Port of Hampton Roads is the second busiest general cargo port on the East Coast, trailing only behind the port of New York/New Jersey. The Port of Hampton Roads is a distribution hub for the Southeast and Midwest United States. In 2004, 14.8 million tons of merchandise moved through the Port of Virginia. Mass retailers such as Walmart, the Home Depot, Target and the Dollar Tree ship through the Port of Virginia. The volume of cargo moving through the port is expected to double over the next 15 years. The Port of Virginia is served by the deepest ice-free channels on the East Coast. Currently the shipping channels are being dredged to the depth of 50 feet. Once complete, Norfolk will become the first East Coast port to accommodate a fully loaded 8,000 twenty-foot equivalent unit (TEU) ship. Other current improvement projects at the Port include the addition of 13 million square feet of warehousing, and the throughput capacity at Norfolk International will be increased by 30 percent. With the completion of the improvement work, the Norfolk International Terminal Port will be home to eight of the largest cranes in the world and it will have a state-of-the-art Wharf facility capable of handling the heaviest cargo in the world. The Maersk-Sealand Terminal is situated on
250 acres of Port Authority property. When completed, this terminal will be the first major privately developed terminal in the United States. Due to delays experienced at the ports on the west coast shippers from China are looking at shipping their goods through the ports on the East Coast.

The VIP is operated as an intermodal container facility providing an interface between truck and rail for the transport of ocean-going containers to and from the Port of Virginia and from the VIP to inland destinations. Containers are brought to the VIP from the Port of Virginia by rail or by truck. The VIP is less than 40 miles from IAD. The VIP is within one mile of I-66 and five miles of I-81; two roadways that provide direct connections to the markets in Pennsylvania, Northern and Western Virginia, West Virginia, Maryland, Washington DC and Ohio. Rail service between the VIP and the ports of Hampton Roads allows direct access to the trade routes of 75 international shipping lanes.

In 2003, Eastern Loudoun County, Virginia had a large amount of land (12,858 acres) zoned for office and industrial use. Based on zoning density, and not accounting for redevelopment potential, the maximum amount of total office and industrial space that could be realized in Loudoun County is 173.4 million square feet, including the 24.2 million square feet of already developed space. Approximately 149.2 million square feet remain to be developed at the derived density of 0.39. Furthermore, the Metropolitan Washington Airports Authority (MWAA) has acquired “830 acres of land immediately west of Dulles Airport from Eugenia Investments, Inc. and Emmanuel Holdings, Inc.” This $56 million acquisition will enable the construction of an additional north-south runway (9,000-foot runway to handle wide-body aircraft for air freight) as well as provide for future development such as cargo facilities, or maintenance facilities.

Land values across the region vary significantly. With the projected population growth, land values as well as housing values will continue to rise. The corridor population is expected to see significant population growth in the next 25 years – an expected growth rate of 56 percent between 2000 and 2025. Population growth, coupled with the inability of the housing industry to keep up with demand has led to continued housing shortages. This has also led to increased costs associated with purchasing and renting available housing. A good example of this is that the average single family home in Loudon County increased by 20 percent in 2004. In terms of housing prices, the price in Loudon County has jumped to over $400,000 on average while the regions average is fast approaching $500,000 per home.

VDOT has several on-going spot improvement projects for I-66 to install additional lane capacity in certain areas on westbound lanes only. In addition, several studies are looking into the feasibility of adding high-occupancy toll (HOT) lanes to I-95, I-395 and I-495. A HOT facility enacts tolls on single-occupant vehicles who wish to use lanes or entire roads that are designated for the use of high-occupancy vehicles (HOVs, also known as carpools). The other interstate, (I-81), is currently undergoing a “Corridor Improvement Study” to assess various roadway improvement alternatives.

A few other initiatives planned for the Commonwealth should help the region capture some air cargo business. One such project is the “Heartland Corridor Initiative.” The project is a rail project that will effectively link The Port of Virginia with the Midwest United States distribution markets. This corridor was designed to create a seamless, efficient intermodal rail route traveling from Norfolk, Virginia to Columbus, Ohio. When the project is completed, it will be the most direct route for Double-stack container trains from Norfolk to Columbus and Chicago. Another project is the “Interstate 95 Rail Corridor Study.” This study involves five states that are evaluating capacity of the rail system in the I-95 corridor and assessing ways to make the rail corridor viable option for future freight. In addition to the I-95 study, the Commonwealth’s Rail Plan is constructing a third track, from Richmond to Washington, D.C., to improve operations and reliability and facilitate increase freight movement.

Appendix III

OPERATIONS ANALYSIS

The purpose of the operations analysis was to derive and compare statistics of domestic and international airports to IAD. The original intent was to develop a model that IAD could use to recognize deficiencies and successes in their current operations compared to the other airports. Air Cargo World’s airport directory details data for components common to passenger/cargo and cargo only airports. These components consisted of the total number of airlines servicing the airport, total number of air cargo carriers, the amount of cargo space in square feet, the amount
of warehouse space in square feet, and the percentage of occupancy of the warehouse space. The availability of foreign trade zones, customs, an agricultural inspector, the number of freight forwarders, total cargo traffic measured in metric tons were included in the statistics. Finally the distance to the closest rails, the distance to the closest ship port, distance to the closest highway, distance to the nearest trucking terminal, distance to the closest intermodal terminal, finally the distance to the closest inland waterway all measured in miles, were also included.

The analysis originally focused on the statistics of the top five airports in eight international regions and ranked according to cargo traffic measured by metric tons. The regions were Europe, Africa, the Pacific Rim, West Coast, Midwest, and East coast of the United States, Canada, and South America. This produced approximately 40 airports detailing statistics from the components previously described. In order to increase the statistical population all domestic airports listed in the Air Cargo World directory was added to the data.

Once the entire dataset was derived, multiple regressions were run to develop a standardized model. The number of freight forwarders at an airport was used as the dependant variable in the first analysis and the amount of traffic measured in metric tons was the dependant variable for the second analysis. After the analysis was complete, it showed relatively little correlation between the components and the dependant variables. The lack of correlation negated the ability to develop a standardized model for IAD. The lack of definitive correlation can be attributed to the numerous and different variables that define individual airports. Each airport must face numerous regional factors as well as the ever changing factors of the aviation industry.

In the absence of the model, the analysis turned descriptive in order to compare how IAD operates within the above components to the other airports. Below are the derived data spreadsheets of the top international and national airports listed by AirCargoWorld.com. Included in the spreadsheet are the top international airports, all national airports listed by Air World Cargo, and their statistics. Where statistics were missing, the smoothed average was calculated and used. For binary data, 1 was used for yes and 0 was used for no.

A chart of the descriptive statistics of the analysis is available to compare all airports in the dataset vs. IAD. Although the regression analysis showed little overall correlation, greater correlation was found between certain components. The information was not surprising, however may be of use for further statistical analysis in the future. Due to this a correlation pyramid chart of component vs. component is included.

The operations descriptive and comparative analysis is concurrent with the recommendations of this report. It is obvious that one or two individual components will make little difference with overall operations, however the cross utilization of all available components will greatly increase the probability of growth and success.
## Descriptive Statistics vs. IAD

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# Correlation Graph of Component vs. Component

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Appendix IV

REVIEW & ANALYSIS OF THE SURVEY CONDUCTED OF THE AIR FORWARDERS AND INDIRECT AIR CARRIERS AT DULLES INTERNATIONAL AIRPORT (IAD)

In considering and developing a research strategy, the market study team concluded that surveying the key participants in the air cargo delivery and transportation chain would be of benefit to the overall scope of the project. Those participants, the air forwarders and indirect air carriers at IAD, play a vital role in where, why, and how air cargo moves throughout the global transportation & logistics chain.

The data and information garnered from this survey came as the result of email survey solicitation, a luncheon of the Washington Air Cargo Association on March 28, 2006, as well as personal and telephone conversations with various forwarders. The physical and/or paper survey generated a total of 17 completed surveys, out of a theoretical total of 42 air forwarders as they are listed on the Dulles Cargo web page.

While the survey certainly produced some expected answers, some of the issues that may have been considered minor showed to be more significant than initially anticipated. In following up on these concerns in personal interviews, the magnitude of their impact on the IAD forwarding community and the airport’s future growth and expansion could be significant.

The survey consisted of a total of 7 questions, some requiring yes/no answers, while others asked more probing questions. The replies to the survey broke down as follows:

**Question 1:**
Is Dulles International Airport (IAD) your organization's primary gateway?

- YES - 6 Survey Responses
- NO - 10 Survey Responses

**Question 2:**
What are the three or four major types of goods/commodities your organization ships out of your primary location/hub?

According to the completed surveys, the goods/commodities most commonly handled by forwarders at Dulles International Airport are: (In order of frequency the commodity appeared on a completed survey)
1. Computers / Telecommunication / Electronics
2. Government / Diplomatic
3. Perishables
4. Machinery / Parts
5. Household Goods/Personal Effects
6. Tobacco, Pharmaceuticals, Humanitarian Supplies, Chemicals

**Question 3:**
If IAD is not your organization's primary hub, do you ship any of these same goods/commodities out of IAD?

- YES - 11 Survey Responses
- NO - 3 Survey Responses

**Question 4:**
If your organization does not ship goods/commodities out of IAD, why does your organization not utilize IAD? (Please check all that apply)

- Lack of Capacity
- Convenience Factor
- Schedules
- Routes
- Costs/Rates
- IAD is not company gateway / ship via road to other gateway
- Other:

Of the above choices provided to the survey taker, the top three reasons indicated on almost every survey were:

- Lack of Capacity
- Schedules
- Route Diversity

If no, where is your organization's primary gateway?

For those survey takers that responded no to the above question, JFK was by far the predominant answer.
Question 5: 
Do you see any obstacles to increasing air cargo flow at IAD?

This question of the survey provided some very interesting answers which I later expanded on in some of my one-on-one discussions. Below is a selection of replies to the above question:
• The Price of trucking is too low.
• Really need all cargo service. (multiply indicated)
• JFK is too close.
• Traffic is getting worse. (mentioned three times)
• Distribution Hub / Local Distribution
• Money & Politics
• We have a lot of personal effect & baggage shipments out of DC, we have to truck all of them to New York because IAD has no freigher service.
• Yes, Dulles is not a traditional freight forwarder’s consolidation gateway, as are JFK, ATL, and MIA.
• Lower cost cargo. (mentioned twice)
• No – other than whatever arrangement shippers are using currently – even if a shipper undercuts current pricing – the JFK cargo terminals seem to acquire the goods for shipment.
• Inadequate transportation network. Traffic is so bad at certain times of the day on the 28/50/606 corridors that it is sometimes difficult to meet time requirements on perishable shipments or to get delivery/courier companies to service our needs. This has been exacerbated in my opinion by allowing increasingly larger numbers of residential developments right next to the airport and immediately adjacent to industrial/business zones.

Question 6: 
In your view, what collaborative actions and/or relationships could IAD establish and/or strengthen in its efforts to draw more cargo volume to the airport?

• I feel that government and Personal Effects volumes alone offer carriers a golden opportunity as all PE are being trucked to other airports as IAD has no lift.
• The road situation in Northern Virginia and specifically around Dulles Airport will soon become a major block as if it is not bad enough now. We are off 606 and this is hell!!!
• An increase in volume at our IAD location will not automatically translate into more cargo flying out of here, we are still required to support our hub.
• Pricing
• Freighter Service to fly directly into and out of IAD (mentioned 7 times)
• Increase of more companies/distribution services and cargo in the IAD–Virginia Region that will spur more lift and possible freigher service.
• Create incentives for the largest freight forwarding firms (DHL, Kuehne & Nagel, Excel, etc.) to consolidate and ship to Europe from Dulles. This has been the stumbling point in past.
• Major sort area and aircraft parking.
• Must beat the inland transportation cost to truck to the other hubs vs. departure out of IAD.

Question 7: 
Are you using the Virginia Inland Port (VIP) at Front Royal for ocean shipments?

_ YES _ NO

This question did not appear on the original survey emailed to the forwarders during the beginning of March. This question was added to the survey handed out at the Washington Air Cargo Association luncheon on March 28th, 2006. The question was added via a suggestion from Anita Kayser from WATF. Since the question did not appear on the original survey, all the individuals who had answered the initial email survey received a follow up email from me with the above question. Out of the 17 total responses, not a single survey participant indicated that they are using the Virginia Inland Port (VIP) in any capacity.

Review:

What is significant to note here is that as a result of the above outlined survey, as well as information collected in formal and informal interviews and/or discussions, a main obstacle and something that might be considered a business development weakness on the part of IAD is the institutionalized processes employed by the forwarders and/or indirect air carriers in how freight is routed. The issue is not simply drawing more cargo to IAD, but addressing the issues that requires forwarders located at IAD to truck cargo to other major regional gateways in New York or Atlanta. Since price, convenience and open market economic forces seem to have only marginal impact on the decision making process of these operators, attracting more cargo to IAD may initially only cause those operators located at IAD to truck the increase in cargo to the aforementioned gateways.

There also appears to be a divergence on how an aspect of the transportation infrastructure around Dulles International Airport is viewed. While the airport and its associated entities, i.e. the Washington Airports Task Force
(WATF) and Metropolitan Washington Airports Authority (MWAA) use the road infrastructure around IAD as a “selling” point to attract an all cargo freighter, a significant number of the forwarders view the situation very differently. As the above indicated responses illustrate, concerns about traffic congestion, delays, and future zoning around the airport trouble many of the forwarders. Some see the possibility of job losses, slowing growth, and missed opportunities for new business. Clearly with considerations like these in the back of their minds, think about expanding and/or relocating operations to IAD would at a minimum have to be considered with an increased element of caution on the part of the forwarders.

The issue of transportation security and the associated political and regulatory issues also weigh heavily on the forwarders minds. The fact that the Transportation Security Administration (TSA) and the Department of Homeland Security (DHS) has continuously tightened the requirements for the known shipper program, coupled with the fact that IAD has only belly cargo at this time, leaves the looming possibility that through a drastic regulatory change or an act of terrorism, all capacity currently available at IAD could be wiped out in the event that regulatory, political or public pressure bars all cargo from flying on passenger aircraft.
Appendix V

INTERVIEWS AND CONTACTS

Bob Fruchterman and George Zane (Security Storage), tour of Dulles International Airport Security Storage facility by Angela Stubblefield, April 25, 2006.

Carl Griffin (Family Dollar Stores), telephone interview by James Colyar, March 10, 2006.

Charlene Miller (UTI Air Freight Forwarder), personal interview by Angela Stubblefield, April 25, 2006.


David Hoppin (MergeGlobal Transportation and Logistics Consulting Firm), telephone interview by Christie Dawson, Matthew Lesh, and Angela Stubblefield, March 28, 2006.

Dulles International Airport Freight Forwarder Community, email survey by Boris Populoh, March 13 to 21, 2006.


Flavio Renfer (United Airlines Cargo) and Gilles Rebour (Air France Cargo), personal interview by George Mason University PUPB 722 students, March 15, 2006.

Ignacio Alcalde (World Bank), telephone interview by Nick Bowden, April 6, 2006.

James Davis (Virginia Port Authority), personal interview by James Colyar, Scott Faulk, and Matthew Lesh, March 22, 2006.

James Davis (Virginia Port Authority), telephone interview by James Colyar, April 11, 2006.

Jeff Moller (Association of American Railroads), telephone interview by Nick Bowden, February 1, 2006.

John Beckius and David Walby (Transportation Security Administration), personal interview by Angela Stubblefield, March 3, 2006.

John Schott (Tartan Textile Services), email interview by James Colyar, March 10, 2006.


Michele Siano (Cavalier Logistics Freight Forwarder), personal interview by Angela Stubblefield, April 26, 2006.

Randy Jackson (Quick International Courier) and Kim Minis (Sterling Courier), personal interview by Angela Stubblefield, April 25, 2006.

Richard Norris (Dulles International Airport), personal interview by Boris Populoh and Angela Stubblefield, March 2, 2006.
ENDNOTES


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32. James Davis and Chris Thompson, Personal Interview, April 11, 2006.
33. Bernie Patchan, e-mail message to author(s), March 17, 2006; Richard Norris, Personal Interview, March 2, 2006.
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42. Chris Thompson, Personal Interview, March 10, 2006.
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51. James Davis, Personal Interview, April 11, 2006; Michele Siano, Personal Interview, April 26, 2006.
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68. Richard Norris, e-mail message to author(s), April 24, 2006.
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149. Ibid.
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Practicum Participants

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