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## **ABSTRACT**

Today, more than ever, the global economy depends on the efficient movement of people and cargo. The ability of the global transportation industry to rapidly move passengers and products from one corner of the globe to another continues to amaze even those wise to the dynamics of such operations. As globalization spreads and the demand for quicker, more robust transportation services increases, economies worldwide hang in the balance. This is largely because the economic prosperity of every nation is inextricably connected to the successful transportation of products from their point of origin to their point of consumption. As the global economy flourishes, more and more stress is placed on a transportation infrastructure that is unprepared to accommodate such extensive growth. Today, costly infrastructure expansion requirements affect all sectors of the transportation industry.

As if the capacity issues were not enough, security of property and goods has now risen to the top of every transporter's priority list. The threat of continued terrorist attacks have forced security professionals in the industry to evolve their procedures from simple theft and contraband reduction to a counter-terrorism focus across the entire transportation network.

This study will briefly define the transportation industry, give a snapshot of each mode's performance and outlook, and then examine three cross-cutting issues prevalent throughout the transportation industry: capacity and congestion, security, and government involvement/participation.

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## Introduction

The transportation sector of the US, by far one of the world's largest industries, ranges in scope from taxis and planes to barges and trains. The sector relies on an extensive and complex transportation network. Four million miles of roads and highways connect the nation's cities while railroads add over 140,000 miles of valuable conduit. With over 1.5 million miles of pipeline, the natural gas and petroleum industry transports its valuable cargo through a network that can best be described as our country's energy "spine." Over 19,000 airports, 5,100 inland waterway facilities, and nearly 1,000 ports round out a transportation infrastructure that is critical to our nation's economic prosperity.

In 2006 the US transportation industry generated \$1.6 trillion of revenue across all sectors (Plunkett, 2007, p. 1). According to the US Department of Transportation Bureau of Transportation Statistics (USDOT BTS), the transportation of goods and services alone consistently accounts for over 11% of the US Gross Domestic Product (GDP) and directly employs over 4.5 million workers (Plunkett, 2007, p. 1). Today, businesses depend more and more on an efficient, interconnected transportation network to move passengers and goods. As a result, the demands on the industry to be more responsive, reliable, and cost effective continue to increase as global economies continue to grow. While transportation of people contributes greatly to the above figures, the movement of freight cargo comprises the major demand on transportation services.

Efficient, safe and reliable freight transportation helps form the foundation of our nation's economic strength. Since 2002, when over 19 billion tons of freight moved throughout the country, the amount of tonnage moved in the United States has steadily increased (Bureau, 2007, p. 1). This, in large part, is due to the ability of the transportation industry to become more productive and efficient as the demand for transportation services increases.

Improvements in freight productivity have been instrumental in increasing the economic competitive advantage the US holds throughout the world. Deregulation in the early 1980s allowed the freight rail industry to divest unproductive infrastructure, reduce labor costs and consolidate duplicative services. Additionally, the use of intermodal containers (containerized freight that can be easily transferred from ship to rail to truck without repacking) has allowed the transportation industry as a whole to realize great efficiency and productivity gains. The cost of moving freight dropped from 16.1% of GDP in 1980 to approximately 10.0% in 2000 (FHWA, 2007, p. 8). Stated in other terms, the ratio of ton-miles of freight shipped in the US per dollar of GDP declined by a remarkable 35.3% from 1970 to 2002 (Plunkett, 2007, p. 1).

To date, the transportation industry has gone to great lengths to improve freight transportation efficiency and productivity; however, productivity gains realized from deregulation and logistic improvements may now have reached their limits. If so, the transportation industry will need to adopt innovative strategies to maintain the ability to absorb the increasing demand on transportation services.

## Modal Analysis and Outlook

*Trucking:* Among the different modes of transportation, trucking remains a popular choice for businesses and continues to experience an increase in market share. In 2005, the trucking industry handled 10 billion tons of freight, the most of any transportation mode (Vault, 2007, p. 1). Over 650,000 trucking companies employ over 3 million truck drivers, a number expected to increase by as much as 17% over the next several years (Vault, 2007, p. 1). Long haul truckers are in especially high demand as this segment of the sector continues to expand. According to a 2005 report by the American Trucking Association, the current long-haul driver shortage exceeds 20,000; moreover, this number is likely to increase to over 100,000 by 2014. As a result of these challenges and due to the increase in intermodal freight traffic, a customer/client relationship has developed between the railroad and trucking industries.

*Railroads:* Today's seven Class I freight railroad systems move 42% of the nation's intercity freight on over 140,000 miles of track (AAR, 2007). This percentage equates to over 2 billion tons of freight per year, which in 2006 included 12.3 million intermodal trailers. This figure is a significant increase from the 3 million trailers transported in 1980. Most estimates predict that domestic freight volumes will double in the next twenty years and that freight rail could see as much as a 67% increase by 2020. Unfortunately, the downsizing associated with railroad deregulation has created a situation where freight rail today has little if any excess capacity. As positive economic conditions lead to greater demands on freight transportation, the nation's rail network will be hard pressed to increase capacity fast enough.

*Shipping:* The ocean carrier industry has undergone major changes in the past few decades. These include refining routes, abandoning less efficient ports and contracting with motor and rail carriers to improve efficiency and increase productivity through feeder and inland distribution services. The enormous increase of imports from Asian markets into the US has forced this industry to build internal alliances and tailor services so that carriers can more efficiently use larger container ships. The future remains bright for this industry since the demand for foreign goods does not appear to be waning, and US port facilities continue to grow and advance technologically.

*Ports:* More than 95% of the nation's international trade moves through the 299 deep-draft (defined as greater than fourteen feet) ports of the US. Of these, 14 are designated as Department of Defense (DOD) strategic ports. Additionally, the port sector contains 627 shallow-draft ports. Over 2.5 billion tons of cargo transited these ports in 2004. North American port volumes have increased an average of 7% per year since 1990. The Port of Los Angeles is the largest US container port and one of the world's top ten. Opinions differ on how best to generate maximum terminal productivity and port capacity. Labor unions and spokesmen insist that fully-automated terminals cannot keep pace with semi-automated terminals that rely on human labor. Conversely, advocates for automated ports suggest that such operations result in more cargo moves per hour over traditional or semi-automated terminals. The issue lacks specificity with regard to projected maintenance and replacement costs of automated operation. This issue requires further data collection and analysis before recommendations can be proposed. For a more detailed discussion on the economics of port operations, see appendix C.

*Aviation:* While the tonnage of air cargo remains a small and specialized segment of the freight transportation industry, air freight and airborne express delivery continue to experience an impressive level of growth. Despite the challenges of complex security requirements, higher fuel costs and aging aircraft, the worldwide demand for air freight is projected to increase by 50% domestically and 110% internationally by 2016 (CRS, 2007). United Parcel Service (UPS), FedEx, and DHL currently control the package delivery market. While UPS has roughly 400

fewer aircraft than FedEx, its massive fleet of over 120,000 delivery vehicles makes it the sector leader with a 47% market share and revenue exceeding \$42 billion in 2005 (Vault, 2007, p. 1).

Growth in the US economy combined with increases in domestic and global wholesale and retail trade will continue to affect the level of US shipments and the demand for transportation services. According to a US DOT estimate, US freight volumes are expected to increase by 70% between 1998 and 2020. In addition, most analysts predict that the amount of freight moved through ports of entry will more than double during the same period (Plunkett, 2007, p. 1). The need to manage freight flows as well as the demand placed on the overall transportation network will be critical as the industry continues further into the 21<sup>st</sup> Century. As the demand for freight service grows, addressing congestion, security, and system capacity will be critical to the economic well being of the US.

### **Capacity and Congestion**

Limited transportation capacity and related congestion are reaching near-crisis proportions in the US while the forces of globalization continue to heighten the stakes. In the 2007 National Strategy to Reduce Congestion on America's Transportation Network, Secretary of Transportation Mary Peters stated, "congestion across all of our transportation modes continues to limit predictable, reliable movement of people and goods, and poses a serious threat to continued economic growth" (Peters, 2007, p. 1). Beyond congestion's obvious economic costs for American businesses, there are ripple effects throughout the economy and society as a whole that include lost productivity, damage to the environment, and negative effects on the American quality of life. Policymakers will have to address the need for an overarching national transportation strategy that optimizes the investment in, and use of, resources across all transportation modes.

**Aviation.** Air congestion is a rapidly worsening problem. The Federal Aviation Administration (FAA) estimates that the air transportation system currently handles 750 million passengers per year. The percentage of on-time arrivals at the nation's busiest airports has steadily declined in recent years to an all-time low of 75% in 2006 (FAA Fact Sheet, 2007). Future passenger volumes may bring further delays as long-term forecasts project a 200-300% passenger traffic increase from today's levels through 2025. Unless the current Air Traffic System (ATS), built with 1960s technology, is upgraded, FAA expects complete gridlock as early as 2015. While airlines are purchasing new aircraft and adding new routes, a commensurate investment is not being made in air traffic control equipment, terminals, and runways. Following deregulation in 1978, carriers reorganized routes around hub-and-spoke operations in several major cities to maximize their markets at minimum cost. An estimated 40 to 50% of US air traffic now connects at such hubs. As a result, many hub or primary airports are operating at or near peak capacity, and future development is hampered by increasingly strict environmental regulations. The result is inefficiency, congestion, and delay.

The Bush Administration's proposed Next Generation Air Transport System Financing Reform Act is intended to address some of these concerns through a revolutionary approach to air traffic control, using satellite-based navigation, networking, and surveillance while requiring all users of these services to pay for them. FAA believes this new system will be able to handle three times today's traffic levels. Moving more air traffic to secondary or regional airports is another way of reducing airport congestion. An increasing number of low-cost carriers are now attempting to compete on major city pairs and dominate in underserved markets. In order to provide adequate service these airlines need parking slots, aircraft stands, terminals, and handling capacity. Because primary airports are no longer able to adequately provide such

services, secondary airports offer a viable alternative. In an effort to preserve service to non-hub communities located away from larger airports, Congress authorized DOT to subsidize airlines that could not otherwise earn a profit on such flights. DOT is also empowered to fund aviation projects that enhance non-hub air services. Continued federal funding may alleviate congestion at larger hub airports.

**Trucking.** The trucking industry accounts for the majority of freight moved throughout the United States, making highway congestion a critical problem. Traffic bottlenecks can cause severe system-wide congestion and degradation of traffic flow. The growth in international trade exacerbates these bottlenecks by concentrating freight traffic at a small number of nodes at certain ports and border crossings. Continued trade expansion and US population growth will only serve to heighten this problem. Congestion imposes additional external costs on American businesses and others that extend beyond lost time and fuel expenses. Among these external costs are the loss of productive delivery cycles, unreliability, the need to maintain larger inventories, and the cost of congestion-related emissions (Peters, 2007).

There are numerous initiatives and proposals for reducing highway congestion, but none of them are inexpensive, easy to achieve politically, or without controversy among various elements of the trucking industry and others. Among the measures for policymakers to consider is raising the fuel tax to fund highway maintenance, build new highway capacity, and expand public transit. Intelligent transportation systems encompassing a broad range of wireless and wire-based information and electronic technologies provide other means of relieving congestion, improving safety, and enhancing productivity for the trucking industry and others. Truck-only lanes and truck toll lanes are another potential tool for combating road congestion, enhancing safety, and reducing pavement damage. Congestion pricing, a toll for the use of congested roads during peak hours, is a tool that has been successfully employed in London to reduce congestion and observed by this industry study during its travels. It is currently being considered for use in lower Manhattan by the mayor of New York and being proposed for Virginia's I-95 corridor (The Economist, 2007). Highway congestion policy measures that are part of an inter-modal transportation policy are needed now and well into the future to prevent congestion from crippling the trucking industry and hindering the free flow of commerce.

**Rail.** Congestion is one of the most serious challenges facing the freight rail industry today. Following deregulation of the industry in the 1980s, railroads reduced excess capacity by pulling up parallel tracks and spinning off unprofitable lines to local railroads. In recent years, however, the railroads have been caught with insufficient capacity to meet growing demand due primarily to globalization, the rise in intermodal traffic, and increased trade with Asia. Some estimates project that freight rail volumes will more than double over the next 20 years. Aligning capacity with business needs is a difficult and risky calculation for railroads. Unlike other modes of transportation, railroads pay for building and maintaining their own infrastructure and bear a substantial financial risk in making decisions about infrastructure needs and investments that must last 30 to 50 years. The projected investment needs for new rail capacity are enormous. According to the American Society of Civil Engineering, the rail industry needs to invest \$175-\$195 billion over the next 20 years to meet projected demand.

Several options exist to tackle freight rail's capacity crisis in the near-term, including closer coordination with port facilities, new technology and more efficient asset and equipment utilization, and better collaboration among railroads themselves. There are also a number of federal loan programs and other individual rail infrastructure initiatives including public-private partnerships (PPPs) among railroads, government agencies, and other stakeholders. None of these initiatives are likely to result in capacity enhancement on an order of magnitude sufficient to meet projected levels of demand. The major freight railroads will have to employ innovative

strategies and creative financing methods to come up with the necessary funds. For a more detailed discussion of rail capacity issues, see appendix A.

**Shipping.** Ninety percent of world trade is transported via maritime means, and world seaborne trade has reached record proportions in recent years. Despite this, the maritime shipping industry does not suffer from the same degree of congestion found in most other modes of transportation. In fact, the overall industry has excess capacity in available tonnage. The foreign corporations that dominate the maritime shipping industry have made sufficient investment in ships, infrastructure, and cargo tracking technology to handle the tremendous growth in the container shipping industry. In response to that growth, larger container ships with greater capacity are becoming more common.

Vessels with larger capacity demand adequate handling infrastructure and capability by ports and other land-based logistics to move cargo efficiently, so additional investments in infrastructure and technology are required. Three trends are likely: significant capital investments to improve commercial operations to retain and attract shipping lines; advances in technology to better track, trace and monitor potential tampering of containers transported; and, investments in technology to declare goods electronically and in advance of entering port.

**Ports.** While sufficient maritime shipping capacity exists, the same cannot be said for the infrastructure required to unload and transfer the cargo, once ships have reached port. Increased global trade has severely strained port capacity, and some observers expect container throughput at West Coast terminals alone to at least double over the next two decades. As noted, a maritime shipping industry trend of building larger vessels in order to carry more freight at one time has further complicated port operations. Such vessels require longer berth time for unloading, more yard space for temporary storage, and more vehicles to move cargo off port. Some US ports are currently unable to accept these larger vessels due primarily to insufficient channel depth and berthing lengths.

Most seaports today have seen cities grow up around them and have become victims of their own location and success; consequently, there is little space available to expand. Thus, most ports will be required to make more efficient use of their existing facilities. Some improvements that would allow for more speed of transit through the port include extended gate hours, congestion pricing, trucker appointment systems, off-dock container yards, fast rail shuttles, automated yard marshalling and inventory control, high-speed gates, and multi-pick cranes (Port Congestion, n.d.) Enhanced links to other transportation modes are essential. For example, dedicated ramps provide access to major road networks for trucks, and upgraded or newly constructed rail spurs provide better integrated maritime and rail movement. Dredging operations that deepen ports to handle larger ships with greater drafts and upgraded dockside operations for larger ships are needed as well. These endeavors require significant capital investment to be funded by private port operators or through municipal or state bond issuances.

## **Homeland and National Security**

In recent years, enormous effort and expense has been devoted to strengthening homeland security efforts in the US transportation arena. The key challenge facing policymakers and the industry is to develop security policies and approaches that balance cost, performance, profit, and timeliness with a level of security that factors in the potential costs of a terrorist attack, including loss of life and property and related economic impacts. Because transportation is such a vital and inextricable element of US economic health, this is a difficult balancing act. Adding to the complexity is the fact that the transportation industry is also a vital component of

US national defense capabilities and plays a pivotal role in the nation's ability to project power across the globe.

**Aviation.** Since 9/11, aviation security measures have been significantly enhanced. The Aviation and Transportation Security Act (ATSA) of 2001 created a number of provisions for airline safety primarily focusing on passenger operations. However, the emphasis on passenger security has left the air cargo system a more vulnerable and likely target for terrorists. It is estimated that air cargo shipments will increase from current levels by 50% domestically and over 110% internationally by 2016 (CRS, 2007). The Implementing the 9/11 Commission Recommendations Act of 2007 contains a provision that would require physical inspection of 100% of cargo placed on passenger aircraft by the end of FY2009, but this is a contentious issue. The air cargo industry stakeholders have largely opposed this approach because of the costs and potential delays involved, arguing instead for a risk-based approach to cargo screening that is currently articulated in the Transportation Security Administration (TSA) strategic plan. This approach is already in use by Dutch Customs in cooperation with US Customs and Border Protection (CBP).

The airline industry's prominence in the homeland security debate often overshadows its essential role in national security. The Civil Reserve Air Fleet (CRAF) program enables US carriers to voluntarily provide a percentage of their fleet for logistics movements of Armed Services personnel and equipment. Activated during the Persian Gulf War, and more recently for Operation IRAQI FREEDOM (OIF), over two-thirds of US forces and a quarter of their equipment were transported on US airlines (Graham, 2003, p. S-1). With the March 2007 Open Skies tentative agreement between the European Union (EU) and the US, greater access to US domestic air markets may be granted to EU airlines. Some observers are concerned that easing foreign ownership/operations restrictions within the US could negatively impact the CRAF program. The agreement could lead to a reduction in the number of US-owned airlines and ultimately reduce the number of participants in CRAF. As recent history shows, this nation has grown to rely on CRAF as a strategic capability.

**Trucking.** Trucking safety and security is managed through a variety of regulatory means. For example, the Commercial Motor Vehicles Safety Act and the Commercial Driver's License process limits tractor-trailer licenses to individuals who can pass physical and written examinations and who do not have criminal records and driving violations. Homeland security measures intersect significantly with the trucking industry at seaports and border crossings. For example, truck drivers who transport goods to and from ports will soon be required to hold a Transportation Worker Identification Credential (TWIC). The TWIC initiative will require a security threat assessment and the receipt of a biometric credential for such drivers. It is slated to be in place by 1 July 2007 for ten of the highest risk US ports. However, this initiative is currently behind schedule, and port operators express doubt about DHS's ability to efficiently implement the program.

Other homeland security efforts are focused on truck cargo transiting through air and sea ports. US ports use radiological and X-ray screening of trucked containers transiting through their facilities. The voluntary Customs-Trade Partnership Against Terrorism (C-TPAT) is intended to bolster security with certain US trading partners through Homeland Security teams that assess supply chain security risks associated with goods moving through those ports. Other proposed solutions being developed include the use of intelligent seals that transmit satellite messages when broken and other intelligent transportation systems.

**Rail.** In the post 9/11 environment, homeland security concerns have taken on greater importance for railroads. Radio Frequency Identification (RFID) devices provide a means of tracking railcars throughout the country. Passive RFID devices that can be tracked as they pass

scanners along rail tracks have gained widespread use in the US but less so in the EU as was observed by this industry study. Active RFID devices that transmit their real-time location are currently not widely used in the United States or elsewhere. The Rail and Public Transportation Security Act that is currently pending in Congress requires DHS and DOT to work together in defining a strategic vision for the homeland security aspects of rail. This act also authorizes funding of rail security exercises, security research and development, and an increase in the number of security inspectors (H.R. 1401 & S. 184, 2007). The rail industry has some ideas for modifying the legislation, particularly in the hazardous materials area. However, some observers suggest that the industry's proposals lean too heavily toward protecting their financial bottom line than they do toward strengthening security (Hamberger, 2007).

Railroads play a critically important role in national security. They move bulk and mass quantity shipments across country in amounts that other transportation modes are unable to match. Likewise, rail is the safest and most effective means of moving hazardous materials that are vital to a functioning economy. Railways are also used to transport large quantities of military equipment both in peacetime and in time of war. For example, railroad companies are the biggest transporter of large military aircraft parts and are a key mode for transporting other weaponry and equipment. Given the rail network's critical role in defense logistics, there is concern that there is little or no surge capability within the current infrastructure. During wartime, the military is competing with commercial traffic for already-stretched rail capacity. A specific example of this occurred when the 101<sup>st</sup> Airborne Division (Air Assault) experienced major rail shipping delays as the unit deployed in support of OIF. It is important that policymakers take this concern into account as part of their deliberations on the need for enhanced funding and better coordination of transportation infrastructure projects.

**Shipping.** Globalization and the growing importance of shipping to the nation's economy make the continued increase in imports arriving by containers an important security challenge. Finding an appropriate balance between container security and maintaining the free flow of goods from overseas is the core concern. The industry must find an effective way of layering security measures to minimize vulnerabilities. Measures such as the C-TPAT and the Container Security Initiative (CSI) are examples of initiatives taken by DHS geared at closing gaps in security of the ocean-going container shipping threat. The US continues to press the nations with which it trades to enact more stringent security measures, in cooperation with the International Maritime Organization, World Trade Organization, and other institutions.

The maritime shipping industry is a critical component of the nation's ability to project power across the globe. The US has reduced the number of troops stationed abroad over the past decade and is currently engaged in extensive military operations overseas. The privately owned US merchant fleet has decreased by half over the past 10 years and has caused a similar decline in qualified mariners able to man our Ready Reserve Force. This could increase the nation's dependence on foreign-flagged ships to carry US military equipment during national emergencies. The decline in organic ship capacity has negative implications for critical US strategic sealift capability. The Maritime Security Program and the Voluntary Intermodal Sealift Agreement are two ways the government provides annual funding to private operators in exchange for emergency sealift and related services. More attention and funding will be needed to maintain an adequate fleet to fulfill our global sealift needs in the future.

**Ports.** The challenge of securing ports is daunting. Annually, about 11 million containers arrive by sea, and US CBP officials closely inspect fewer than 10% of them. However, since 9/11, there have been improvements. For example, CBP has created an automated targeting program that checks the manifests of shipments headed to the US for anomalies and tags suspect shipment as high risk. One security initiative being debated is a US proposal for 100% inspection

of US-bound sea cargo. European and other governments are cautiously supportive of this initiative. However, port operators, retail shippers, and other stakeholders are not universally convinced that this approach is operationally feasible or technically reliable. They are concerned that unacceptably high costs and disruptions to the nation's international commerce could occur.

Among other security proposals, the Maritime Security Transportation Act (MSTA) was created to provide preventative security measures and includes regulatory procedures addressing passengers, vehicle and baggage screening, security controls, the establishment of restricted areas, personnel identification, access control, and installation of surveillance equipment. The International Ship and Port Security initiative, an IMO program, is the first multilateral and international ship and port security standard designed to compliment MSTA by helping other nations evaluate port security measures. CSI addresses one of the most vulnerable aspects of shipping, which is container security. It calls for establishing a specialized set of standards for inspecting and storing cargo aboard ships. The Secure Seas, Open Ports Initiative is designed to better monitor and secure containers in the overseas, in transit, and in US waters phases of their journey. Finally, America's Maritime Shield is a long-range effort among 58 worldwide agencies designed to achieve real-time tracking and surveillance of vessels in transit.

### **Government Participation in the Transportation Sector**

Historically, government involvement in the freight transportation industry has consisted of safety and economic regulatory controls along with loan programs designed to help offset the expense of capital projects. The historic wave of deregulation measures that have swept through the transportation industry resulted in massive sector restructuring through mergers and consolidations, greater levels of labor and equipment efficiency, and increased competition with lower costs for shippers. In contrast to this economic deregulation, social regulation in all transportation sectors has increased over the last decade. Safety and environmental regulations in particular have negatively affected the profit margins of most sectors. Additionally, the sharp own/operate divide that has existed between the public and private sectors has given way to collaborative action aimed at leveraging private expertise and investment. PPPs are emerging, promising opportunities that can easily achieve benefits for both sectors.

**Aviation.** Until the late-1970s, the DOT maintained tight control of the airline industry in the US by dictating routes, operating locations, and fares. After deregulation, air travel grew, and a new age in aviation emerged. The 1978 Airline Deregulation Act became landmark legislation that abolished the Civil Aeronautics Board and allowed significant reductions in passenger fares. The Act essentially shifted the government authorities of setting fares and rates, establishing airline routes, and regulating mergers, to the industry's market sector (FAA Chronology, 2007, p.203). In the years prior to the Airline Deregulation Act, nearly 243 million passengers flew on US airlines. Twenty years after the Act was implemented, that number skyrocketed to over 600 million (Slater, 1998, p. 1). Though success of deregulation was especially beneficial for airline passengers, there were negative consequences for the airlines. Seeking higher profits, airlines reduced or stopped service to smaller airports. Additionally, many new low-cost carriers entered the industry which drove down fares. Eventually, several airlines filed for bankruptcy protection (Siddiqi, 2007, p. 4). By 1991, only three of the six major airlines that operated before deregulation remained viable.

The economic success of deregulation inspired the US to seek an Open Skies initiative with European counterparts. Under this concept, US DOT pursued agreements that would allow fare setting flexibility and the unrestricted right to operate from any US airport to points within individual European countries (FAA Chronology, 1992, p. 278). Due to cabotage laws, which

deal with the carriage of air traffic that originates and terminates within the boundaries of a given country, foreign carriers were prevented from transporting cargo or passengers within the US. Other laws capped foreign ownership of US airlines at 25% (Tatelman, 2004, p. 5).

As US airline operations within Europe flourished, the EU brought legal action against member states that had individual agreements with the US. In 2002, the European Court ruled in the EU's favor causing the EU and US to commence negotiations in 2003. In March 2007, the US and EU finalized an Open Skies agreement. The agreement recognizes the EU as a single community and allows European airlines to depart from any country within the EU to US destinations. Industry experts now forecast US-EU flights will increase by 50% over the next five years and predict greatly reduced passenger fares (EurActiv, 2007, p. 2). For a more detailed discussion of airline deregulation and the Open Skies agreement, see appendix B.

**Trucking.** Through regulation, the US government is heavily involved in many aspects of the trucking industry. Current regulations at the federal and state levels prescribe acceptable behavior in safety, environment, truck dimensions, and security but not routes, rates or market entry. At a time when intense competition has already made trucking a low margin business, new regulations are regularly added that weaken the sector's slim profit line. While many regulations have merit, their composition needlessly entangles the trucking companies with added problems. Employing positive mechanisms for compliance such as tax credits, engaging safety advocates with sincere negotiation methods, and the use of enabling technology to monitor compliance can satisfy the spirit of regulation while fostering the long term health of the industry.

The primary safety regulation that has affected the trucking industry over the past several years is the hours-of-service (HOS) reform. The HOS is meant to limit the amount of hours that a driver can spend behind the wheel. Under the new rule, drivers are authorized 11 hours on the road or 14 hours with loading, unloading and breaks and 10 hours of rest. The government hopes that HOS will mitigate truck accidents.

In recent years the trucking industry has been particularly affected by a series of environmental regulations. These regulations have been heavily targeted at truck engines and the diesel fuel that powers them. The immediate effect on the industry will be a surge in truck engine costs because of the required emission control technologies for new engines. The Environmental Protection Agency estimates the cost savings for society at \$13 for each dollar spent on reducing exhaust emissions.

The latest set of regulations addresses security fears that a terrorist attack could come from trucks transporting weapons of mass destruction. A strict background check is now required for driver employment. Drivers with certain criminal convictions are automatically disqualified. A more complicated requirement involves hazardous material (Hazmat) credentialing. Prior to 9/11, all truck drivers were required to receive Hazmat training. Following the attacks, drivers must now receive a complex Hazmat endorsement. This has had a significant impact on the less-than-truckload drivers who have to handle Hazmat on a daily basis.

**Rail.** Deregulation has been particularly important in the railroad industry. Starting in the 1950s, the impact of regulation combined with the loss of passenger and freight traffic to the highways created a crisis in the railroad industry. With the passage of the Staggers Rail Act of 1980, regulatory restraints were largely removed. The industry quickly lowered costs by shedding redundant and light density lines while variable-pricing policies attracted more business from shippers and increased revenues. More than 20 years after Staggers, the productivity of the freight rail industry has increased dramatically. This increased productivity has led to greater freight volume and revenue; however, the increasing demand for freight transportation has created enormous pressure on the railroads to expand.

Several federal loan programs exist to help fund freight rail capital projects. However, in an attempt to mitigate the reliance on federal loans and the resulting debt levels, Class I carriers are increasingly exploring PPPs to leverage public funds for their infrastructure expansion needs. The federal Transportation Infrastructure Finance and Innovation Act (TIFIA) provides funds to the public sector once a PPP is established with a railroad. A recent example, the Alameda Corridor project in California, utilized TIFIA funds to cover 17% of the \$2.4 billion project (Alameda, 2007, p. 1). In the Heartland Corridor PPP, Norfolk Southern leveraged over \$100 million in public funds to create a direct rail route to Midwest markets from the port of Norfolk, Virginia. Future utilization of PPPs will allow the freight rail industry to realize the benefits of expansion without enormous capital outlays and increased debt.

Without question, the US is woefully lacking in the productivity of its passenger train sector. Since the advent of the automobile, the passenger-train sector has been in steep decline. In the early 1970s, Amtrak took over the majority of long distance passenger train traffic, but they have yet to post a profit (and never will). In fact, Amtrak remains heavily subsidized, taking in \$29 billion in government subsidies through 2006 (Vault, 2007, p. 2). The reason is simple. Amtrak has been unable to compete with the speed of air travel or the low fares of bus companies in most passenger markets. One answer to this dearth of efficient, cost effective US passenger train capacity is high-speed rail (HSR).

HSR is flourishing in Europe and Asia. Europe possesses 800 sets of HSR rolling stock while Asia has 300. The US has 20 sets if one considers Amtrak's Acela as high-speed rail. While several HSR corridors have been planned for congested US markets, project approval and federal funding commitments have yet to occur. Multiple foreign governments have invested billions in HSR technology. Their commitment has revealed the following benefits of HSR:

- Offers a significant increase in passenger capacity - up to 300,000 passengers per day on HSR routes in Europe.
- Provides a dramatic decrease in motor vehicle congestion. As an example, the Paris to Brussels HSR has decreased motor vehicle traffic by 25%.
- Requires 1/3 less land than a comparable highway system.
- Maximizes energy efficiency by utilizing 1/10<sup>th</sup> the energy consumed by commercial aircraft and a 1/4<sup>th</sup> the energy of automobiles. In Spain, the Madrid to Seville HSR has reduced the number of air passengers by over 50%.
- Provides logical territory structure, i.e., it manages city congestion and urban development.

Directly and indirectly, HSR can mitigate all of the transportation problems addressed in this report. The US government needs to acknowledge the benefits of this technology, redirect the \$1 billion per year subsidization of Amtrak to HSR investment (Barron, 2007).

**Shipping.** With continued growth and increasing importance to the global economy, the shipping industry continues to wrestle with government intervention. The world's maritime industry "has seen an escalation in political involvement" ranging from market entry restrictions to regulations on safety, pollution, crew requirements, and security (Stopford, 1997, p. 7). Maritime countries also apply cabotage laws. These laws were mainly intended to protect an individual nation's trade and shipping industry from foreign competition.

The US Maritime Administration (MARAD) cabotage study in 1987 found that out of 54 countries 40 indicate strong cabotage restrictions: 17 provide some sort of direct domestic subsidy, 13 provide indirect subsidies, 43 possess crewing restrictions, 37 have ownership provisions, six have domestic construction requirements, and 15 have reporting reflagging restrictions (MARAD, 1987). This industry operates in a "complicated world pattern of

agreements between shipping companies, and policies of governments” (Stopford, 1997, p. 7) and yet is still one of the most efficient and cost effective means of transportation in the world.

While no one would argue that safety, environmental protection, and security regulations make this and many other industries better overall, there are some regulations that could be removed to create a large and positive economic impact. The US International Trade Commission (ITC) estimated in 1991 and 1995 that the US cabotage law, called the Jones Act, alone cost the US economy between \$2.8 and \$9.8 billion per year (GAO, 1998, pp. 1-2). Further, the ITC study stated that removal of all US import restraints could raise the US economy by \$19.6 billion in imports and \$13.5 billion in exports (ITC, 2007, p. 103). While the ITCs report does not specifically target all maritime laws it does point out that there is an economic cost to government intervention into the marketplace. This would suggest that the world economies of all nations engaged in the maritime industry as well as those related industries could benefit from a reduction in government involvement within the industry.

## **Conclusions and Recommendations**

Perhaps no other industry is interwoven so completely into the fabric of the economy and society as transportation. It is enmeshed just as deeply into the inner workings of the national security apparatus. The ability to move people, goods, and equipment to their destinations in a secure, timely, and cost-effective manner is critical to our nation’s ability to compete in the global marketplace and to protect its citizens from those who would do them harm.

Given the importance of effective transportation networks to our prosperity and security, transportation capacity and congestion are of major concern. Nearly every transportation mode is at or near maximum capacity and is experiencing serious congestion. Without robust and sustained action, the nation will confront multiple congestion crises in most transportation modes in the near future with cascading effects on the economy and national security. This industry study recommends that policymakers work to build broad public support for dramatically enhanced public funding of transportation infrastructure at all levels of government and that they square with the public on the fiscal implications and tradeoffs involved.

There are a number of specific capacity-enhancement approaches that merit consideration by policymakers. One is private-public partnerships among industry, government, and other stakeholders to leverage private-sector efficiencies and expertise in the construction and operation of transportation infrastructure. We recommend making substantial additional public investment in American high-speed passenger rail networks to help mitigate many of the congestion problems addressed in this report. Raising the fuel tax to enhance the funding of highway maintenance, build new highway capacity, and enhance public transit should also be considered. Expanded use of toll lanes and congestion pricing for peak usage of roads are also worthy of consideration.

Because our transportation networks act as portals into our open society, the industry will continue to come under intense public scrutiny with respect to the threat of terrorism and other security issues. The potential for terrorists to smuggle weapons of mass destruction into our country via container ships, trucks crossing the southern or northern borders, or with time-sensitive cargo on planes is of particular concern. The smuggling of drugs, illegal immigrants, and other harmful contraband through such networks is a worry as well.

It is important to recognize that 100% safeguarding against such threats is an unattainable goal in an open society that depends on global trade for its economic prosperity. However, the federal government, in cooperation with state, local, and foreign governments, can help mitigate these threats through effective risk management. We recommend that the Administration

continue to press foreign governments to establish consistent standards for cargo inspection and continue to reassess the effectiveness of such programs on a periodic basis. We also believe that the United States should insist on the use of advanced technology to detect unauthorized cargo for any country that desires to trade with us. We recognize that our government may need to help subsidize the purchase of such equipment for poorer nations. We also recommend that DOT and DHS provide technical assistance to other countries to help them develop risk-based approaches to detecting suspect cargo, without impeding the free flow of trade.

We do not believe, however, that well-intended infrastructure, capacity, and security policies and programs alone are sufficient to address these challenges. In our judgment, whatever the specific transportation policy measures and funding mechanisms chosen, they should be integrated pieces of an overall strategic approach to the problem. Fragmented efforts based upon the parochial interests of individual transportation sub-sectors and their stakeholders will only lead to more waste, duplication, and continuing congestion.

If the public is to support greater investment in transportation, there must be a reasonable degree of confidence that their investments are being optimized. We recommend that greater public investment in transportation capacity and security be made only as part of a systematic and comprehensive national transportation plan that effectively balances the complex trade-offs among all modes. We recognize that, to be effective, such an effort may require a reorganization of the Department of Transportation, doing away with its current “stovepipe” management of individual modes in favor of an inter-modal approach. It may also require a parallel reorganization of congressional oversight and funding.

The problems we have highlighted, if ignored, will have negative consequences on our nation’s future economic well being, quality-of-life, and security. There are no easy solutions. Pursuing the recommendations outlined in this report will no doubt require strong leadership from policymakers and a degree of sacrifice on the part of the American people.

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## APPENDIX A: CLASS I FREIGHT RAILROAD CAPACITY

Today's seven Class I Freight Railroad Systems<sup>1</sup> move 42% of the nation's intercity freight on over 142,000 miles of track. This percentage equates to over 2 billion tons of freight per year and includes the transportation of 70% of new automobiles sold in America. What's more impressive is that Class I carriers comprise just 1% of freight railroads yet bring in 93% of all freight revenue (AAR, 2007, p. 1). The future will easily see an increase in these figures based on the rising demand for freight transportation.

Most estimates predict that domestic freight volumes will double in the next twenty years and that freight rail could see as much as a 67% increase by 2020. Unfortunately, freight rail today has little, if any, excess capacity. As an example, traffic and congestion on rail lines has led to an average reduction in train speeds of 20% resulting in a deterioration of service reliability (Peters, 2007, p. 3). Due to the enormous amount of capital required to expand, the Class I carriers will have to employ innovative strategies and creative financing methods to handle the increased level of demand predicted for this industry.

### ***“Staggers” and the Revival of an Industry***

Thanks in large part to the Staggers Rail Act of 1980, the freight rail industry finds itself in a position to address future growth. Prior to Staggers implementation, economic regulation prevented any flexibility in pricing that would allow rail to compete with other transportation modes. Regulation also prohibited restructuring of routes and services which precluded carriers from controlling their costs. In short, the industry was plagued with excess capacity and few railroads could generate meaningful revenue. Low profits and return on investment hindered the ability of carriers to raise capital and forced several into bankruptcy.

With the passage of the Staggers Act, many regulatory restraints were removed. The industry lowered costs by shedding redundant and light density lines while differential pricing policies increased service and revenues. More than 20 years after Staggers, the freight rail industry's financial health has markedly improved. While Staggers has led to enormous gains in productivity and volume, the industry's uniquely high level of capital expenditure requirements has slowed expansion and prevented appreciable increases in revenue.

### **The Cost of Capital**

Unlike the other modes of freight transportation, railroads have the significant burden of paying for and maintaining their own infrastructure. From 1980 through 2006, Class I railroads spent over \$370 billion – more than 40 cents out of every revenue dollar – on capital expenditures and maintenance expenses related to infrastructure and equipment (AAR, 2007, p. 2). It's important to note that reported capital expenditure data may exclude new long-term operating leases and therefore may understate overall spending when it comes to new equipment. As an example, in 2005 Class I carriers spent \$8.8 billion on infrastructure and *another* \$7.9 billion on locomotives, freight cars and other equipment (AAR, 2006, p. 7).

In a valiant effort to increase capacity and satisfy demand, the freight rail industry has double tracked high-density corridors, expanded industrial facilities along rail lines, and started

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<sup>1</sup> Class I carriers are railroads that have operating revenues of over \$319.2 million (2005)

track renewal and upgrade projects – all at a tremendous cost. The obvious question is how long can the freight rail industry shoulder this burden alone? While capital expenditures continue to increase, the delta between expenditures and operating income has steadily grown. In 2005, the capital expenditures for the seven Class I carriers exceeded net operating income by over \$370 million (AAR, 2006, p. 69). Union Pacific (UP) and BNSF Railway each had capital expenditures that exceeded net operating income by \$880 million and \$150 million, respectively. As expansion efforts struggle to keep up with industry growth, shippers have begun to realize freight rail's capacity limitations.

### **Rate Hikes on the Horizon**

The freight rail industry must act quickly to address the large capital expenditures associated with needed expansion. If they don't, the industry risks losing market share they worked so hard to obtain post Staggers. Due primarily to the surge of intermodal traffic, demand continues to increase for freight rail as capacity gets further stressed. Rail intermodal has quadrupled in the last 25 years, rising from 3.1 million trailers in 1980 to 12.3 in 2006 (AAR, 2007, p. 3). As rail capacity reaches its limits, service to the shipper has deteriorated. For the rail industry, the short-term solution to fund further expansion seems to be a simple matter of increasing shipping rates. However, increasing rates to fund expansion is extremely problematic. Shippers and the freight rail industry currently have a heated disagreement over the high fuel surcharges imposed on the shippers by the railroads. Shippers have complained that the current fuel surcharges are rate-based, not mileage-based and therefore do not reflect the railroad's true costs (Logistics, 2007, p. 1). This combined with increased rail transit times and the specter of rate hikes will likely cause shippers to start exploring other modes of freight transportation, e.g., the trucking industry.

Despite increasing levels of highway congestion, the trucking industry has plenty of capacity. Shippers thus have a viable alternative if the rail industry doesn't address the fact that increased costs and rail transit times will result in unacceptable volume reductions for shippers. Additionally, shippers argue that rail has prioritized international intermodal traffic over domestic, which will likely leave them no other choice but to utilize the trucking industry to cover the domestic intermodal market.

### **Expanding Freight Capacity**

Several options exist to tackle freight rail's capacity crisis in the near term. Collaboration with ports to smooth out volume peaks through better shipping schedules will help reduce congestion and rail delay times. Better asset utilization, e.g., increasing double stack container shipments via rail, will greatly improve efficiency and productivity. Increasing staging tracks at busier distribution centers precludes lengthy delay times for loading freight. Innovative productivity developments like on-dock rail will allow containers to be dropped directly onto railcars by extending rail alongside shipping berths. An even simpler option to expand capacity involves collaboration between Class I carriers on routes and service.

Many Class I carriers have realized that collaboration is cheaper than infrastructure development. Recently CSX Transportation (CSXT) signed a long-term agreement with Canadian National (CN) to haul CSXT freight from Ontario to Toledo. The use of CN lines significantly decreases the transit time of CSXT cargo originating in Canada. In the US, UP and

NS agreed to collaborate on intermodal train service that will increase capacity and expand service from Los Angeles to Southeast cities. This agreement will include significant investment by both parties but will result in the shortest and most efficient rail route between California and the Southeast (PR, 2007, p. 1). In the near-term, more efficient use of existing capacity offers some ability to control current demand; however, the projected doubling of freight traffic in the next twenty years will challenge the Class I carriers to find the means to increase infrastructure and satisfy the future freight transportation needs of the nation.

### **Show Me The Money!**

When it comes to financing large-scale capital expenditure projects, a number of Federal loan programs exist to help freight rail. Fiscal year 2002 marked the first time Congress included funding in the Department of Transportation's annual appropriations for specific highway, transit and rail projects. Known as "Section 330" appropriations, these funds exceeded \$670 million dollars for 353 projects in 2005. Rail, however, hasn't received a very big slice of Section 330 appropriations since only \$24 million were allocated to the Federal Railroad Administration (FRA) for eight rail projects in 2002. A more significant program, The Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) provided federal dollars for transportation initiatives at the state and local levels. Although it expired in 2003, TEA-21 established two critical sub-programs for the freight rail industry: the Railroad Rehabilitation and Improvement Financing (RRIF) program and the Transportation Infrastructure Finance and Innovation (TIFIA) program.

Under the RRIF program, the FRA administers up to \$35 billion for direct loans and loan guarantees. These loans can fund up to 100% of a railroad project with low interest rates and repayment periods of up to 25 years (FRA, 2006, p. 1). While RRIF does make funding more available, participants are hesitant to borrow large amounts and incur significant debt. Less than 20% of RRIF loans since 2002 have been over \$50 million (FRA, 2006, p. 1). Additionally, large loan requests are highly scrutinized by the FRA and must satisfy strict statutory requirements.

TIFIA provides direct loans, loan guarantees and lines of credit to states, local governments and State Infrastructure Banks to finance surface transportation projects. The relevance and importance of TIFIA for freight rail is that in 2005, TEA-21 became the "Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU allows public-private partnerships (PPPs) undertaking eligible projects to receive TIFIA funding. Eligible projects under TIFIA now include public freight rail facilities, private freight rail facilities providing public benefit, intermodal freight transfer facilities, and any project that provides access to any of these rail/intermodal networks.

### **PPPs: Sharing the Burden**

Strictly defined, PPPs refer to contractual agreements between public agencies and a private sector entity that allows for greater private sector participation in the delivery of transportation projects (FHWA, 2007, p. 1). Traditionally, this has meant private sector insertion into established public sector functions, e.g., highway construction and operation. For the freight rail industry, PPPs mean capital expenditure projects that benefit the public sector can now be offset with public funding; moreover, TIFIA provides those funds to the public sector once a PPP is established. In return, the public sector benefits greatly from PPPs since state and local economies are strengthened by increases in freight transportation capacity. SAFETEA-LU not

only ensures broader finance options via TIFIA privileges, but also provides the private sector significant flexibility in establishing PPP contracts by lessening Environmental Protection Agency restrictions and reducing floor limits on contracts (Hedlund, 2005, p. 3). While still in its infancy, PPPs in the rail industry have already shown enormous benefits to both freight carriers and the various state and local governments that participate.

**CREATE.** The Chicago Region Environmental and Transportation Project (CREATE) exists as the largest PPP to date for the rail industry. The \$1.5 billion Chicago area project is not only a model for financial cooperation between the private rail industry and public government, but also an example of operational cooperation and asset sharing between competing railroads (FRA, 2005, p. 1). The six Class I carriers involved have pledged \$212 million to the project which includes the creation of four dedicated freight rail corridors. One hundred million dollars of SAFETEA-LU funding has been earmarked for the project with the rest of the funding coming from federal, state and local sources.

**Heartland Corridor.** NS's rail network from the Port of Virginia to the Midwest markets in Columbus and Chicago consists of five separate intermodal projects that will create a direct rail route to Midwest markets through Virginia, West Virginia and Kentucky. Designed to increase mobility and increase freight capacity, the route will facilitate double-stack container trains and reduce transit distances by up to 200 miles (FHWA, 2007, p. 1). NS's pledge of \$44 million to the project has leveraged over \$105 million in public funding including a \$90 million earmark from SAFETEA-LU. No doubt NS will benefit greatly from this increased rail capacity, but so will the public sector. A direct route to the Midwest will go a long way to increase the competitiveness of ports in the Tidewater region of Virginia.

### **The Rail Ahead**

PPPs are not new; The Federal Highway Administration has been aggressively pursuing PPP agreements for years. For rail, PPPs are emerging, promising opportunities that can easily achieve benefits for both the public and private sector. While the railroads pay far less than they normally would for infrastructure expansion, the city, state and federal government pay for and receive vast public benefits through improved freight transportation and economic stimulation. Short-term projects, menial Federal grants and debt financing won't solve freight rail's long-term capacity issues. CREATE and the Heartland Corridor PPPs represent significant landmarks in private-public cooperation and should be used as a model for future rail expansion. Through the use of PPPs, the freight rail industry will be able to realize the benefits of expansion without the enormous outlays and increased debt normally associated with capital projects. Class I railroads will then be able to more robustly support the nation's future transportation needs as part of a larger national transportation network.

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## **APPENDIX B: THE ROAD TO OPEN SKIES**

It took off from Germany weighing nearly one million pounds, with a wingspan over 260 feet, and carrying more than 400 passengers, technicians, and aircrew. It was Airbus' newest aircraft, the A380, and it arrived at New York City's JFK Airport a little after noon on 22 March 2007 (Popular Mechanics, 2007, p. 1). The trip was the first of what Airbus, and the European Union (EU), hopes is many more non-stop flights destined for America. For on that very same day, EU Transportation Ministers were busy approving a comprehensive "Open Skies" agreement with the United States (US).

### **From a Modest Beginning...**

For years issues regarding domestic and international aviation operations have challenged regulators striving to balance customer needs against those necessary to promote a viable and cost-effective airline industry. To understand the complexities airline industry managers confront, it is prudent to review the evolution of governance pertaining to the industry.

The development of international regulations stem from the formation of the Provisional International Civil Aviation Organization (PICAO) in 1944, an entity developed in affiliation with the United Nations. In April of 1947, twenty-six countries ratified an agreement that formally created the International Civil Aviation Organization (ICAO) to succeed PICAO (FAA Chronology, 2007, p. 43). Collectively, ICAO members established policies that created, and recognized, sovereignty of a country's airspace. Almost a decade later, legislators within the US attempted to protect commerce within its own 'sovereign airspace' and founded laws known as "cabotage."

The Department of Transportation (DOT) characterizes cabotage as, "the carriage of air traffic that originates and terminates within the boundaries of a given country by an air carrier of another country. Rights to such traffic are usually entirely denied or severely restricted" (DOT, 2007). Under extreme circumstances a foreign-owned carrier may be authorized to conduct commercial traffic between US points when it is "required in the public interest; that because of an emergency created by unusual circumstances not arising in the normal course of business the traffic cannot be accommodated by US carriers" (DOT, 2007). Instituted by the 1958 Federal Aviation Act, cabotage laws prohibited foreign-owned carriers from providing domestic services in the US and capped foreign ownership of US airlines at 25% (Tatelman, 2004. p. 5).

During the era of aviation that spanned the 1950s through 1970s the amount of air traffic increased and so did the number of mid-air collisions. In an effort to better manage US air space and improve safety, Congress strengthened the responsibilities of existing government organizations and merged them into the newly formed Federal Aviation Agency. The charge of this new agency was to further develop the air traffic system and integrate civil-military air operations. Approved by Congress at the end of 1966, DOT began full operations in April 1967 and the Federal Aviation Agency was moved under its administrative structure and renamed the Federal Aviation Administration (FAA). The National Transportation Safety Board was also created at that time as an independent accident investigation body.

### **Opening the Flood Gates...**

The 1978 Airline Deregulation Act became landmark legislation that shifted the government's regulating role, through the Civil Aeronautics Board (CAB), of setting fares, establishing airline routes, and regulating mergers to the market place (FAA Chronology, 2007,

p. 203). As the Deregulation Act moved closer to passage, industry representatives were eager to devise cost-effective operations. In a little over two months, 248 of their new airline route requests were approved by the CAB (FAA Chronology, 2007, p. 203). In essence, the Airline Deregulation Act allowed market forces to determine price structure and optimal routes, not government regulators. By 1985, the CAB ceased to exist and its residual functions were transferred to the Office of the Assistant Secretary for Aviation and International Affairs in DOT.

The impact of deregulation was immediate and dramatic. By deregulating the industry President Carter intended to spur economic growth through lower airfares and higher consumer demand. In the year prior to the Airline Deregulation Act nearly 243 million passengers flew on US airlines. Twenty years later fares dropped by 1/3 and in 2006 airlines reported that more than 725 million passengers flew that year (Slater, 1998, pp. 1-2).

### **Where Did They Go?**

Though success of deregulation was especially beneficial for airline passengers, there were negative consequences. Major airlines and industry unions opposed deregulation fearing increased competition for routes they presently operated, smaller revenues as competitors drove down fares, and the potential of non-union labor entering the market.

Rural routes also suffered. Seeking more profitable markets, airlines often reduced or stopped service to and from smaller airports. Instead, airlines found it more economical to establish a “hub and spoke” system using one airport as their main operating base (hub) with services to other cities from that hub via connecting flights (spokes).

Though deregulation spurred record profits in the initial years of implementation, many airlines struggled to adapt to the new market. By 1981 airlines reported a net operating loss of \$421 million (Siddiqi, 2007, p. 3) in part due to rising fuel and labor costs in addition to deregulation.

Other factors including the entry of many low-cost carriers, like Braniff and People’s Express, into the industry drove down fares. That new competition reduced or eliminated profit margins for over-extended major airlines. Pan Am, Continental, Eastern, Trans-World, and United Airlines declared bankruptcy during the turbulent years that followed deregulation (Siddiqi, 2007, p. 4). By the end of 1991, only three of the six major airlines that operated before deregulation were still in existence. However, over time new entrants into the market were able to provide economical service to smaller cities while the major carriers divested themselves of less-than-profitable routes.

### **The Future’s so Bright, I Have to Wear Shades...**

The initial negative effects of airline deregulation eventually dissipated. More passengers were flying than ever before and industry experts anticipated a robust increase in air travel. DOT analysts forecast that the number of passengers on US airlines will exceed one billion by 2015 (Peters, 2007, p. 1).

Across the Atlantic Ocean, European governments noticed the success of deregulation in the United States. Europe’s Transportation Ministers began to collaborate on ways to reduce government regulation over their airline industry and preliminary deregulation policies were adopted in 1987. In 1993, comprehensive reforms modeled after those in the US were implemented and soon thereafter cabotage restrictions within the EU were repealed. The impact of these reforms resulted in a 6.1% growth in air travel in 2002 (GAO Report, 2004, p. 8).

## **Here Come the Yanks**

The economic successes of deregulation inspired the US to seek Open Skies initiatives with European counterparts. Prior to the notion of Open Skies, US airlines had only limited access to European markets under a small number of agreements. In 1992, DOT sought to broaden venues that would grant US airlines greater access to global markets. Under the Open Skies concept, DOT envisioned agreements with European countries that would; “open entry points on all routes, allow fare setting flexibility and code-sharing opportunities, an ability for US carriers to enter commercial transactions with their flight operations, and the unrestricted right to operate from any US airport to any point within the European country” (FAA Chronology, 1992, p. 278).

There were draw backs. Open Skies agreements were executive branch actions and were unable to address congressionally mandated legislation like cabotage. In addition to cabotage laws, a “nationality clause” was also written into these agreements. These clauses prevented European flights bound for the US to originate in any other country except the one in which that airline was licensed. For example, Air France flights bound to the US could not depart from a third country, say Germany. Instead, all Air France flights to US cities had to originate from France.

The first of the Open Skies treaties was signed between the Netherlands and the US in October of 1992 and by 2004 fifteen were in place. Wording of these agreements included willingness, “to permit US carriers essentially free access to their markets” (Tatelman, 2004, p. 2). In essence, although US carriers were subject to European cabotage laws, these Open Skies agreements enabled them to create hub and spoke networks in Europe. Although not permitted to fly between two cities in one country, US airlines developed a quasi-cabotage system by establishing hubs in major European cities like Frankfurt, and then fly connecting flights to other European cities outside of that country (Tatelman, 2004. p. 3).

## **Protecting an Industry**

Domestically, foreign carriers were still unable to transport cargo or passengers within two points in the US. As US airline operations within Europe flourished, the EU brought legal action against member states that had individual Open Skies agreements with the Americans. In 2002, the European Court found that the nationality clauses, “illegally discriminated against other airlines from other EU nations because it excluded them from the transatlantic aviation market between the two agreeing countries” (GAO Report, 2004, p. 2). European Union member states that had individual agreements with the US were now considered in violation of EU law.

After the Court’s findings, the EU and US commenced new rounds of negotiations in 2003. The EU sought a broader agreement and was intent on eliminating nationality clauses while gaining greater access to US markets. US cabotage limitations and associated airline ownership issues were purposefully not addressed in previous Open Skies agreements. Recognizing that only Congress had the authority to alter existing cabotage regulations, the executive branch had previously deferred them.

At the beginning of this new century, The Vision-100 Century of Aviation Authorization Act slightly modified previous US cabotage laws. One notable change was that it permitted foreign-owned carriers to transfer cargo in Alaska from one airline to another, even if both are foreign-owned, and be transported to a location within the continental US (Tatelman, 2004, p. 7). Although regarded by the EU as a step forward, they still sought greater access to US markets.

## Let's Make A Deal

On 2 March 2007 Secretary of Transportation, Mary Peters, announced the tentative agreement of an Open Skies deal between the EU and US that was pending approval by the EU's Transportation Ministers. The agreement recognizes the European Union as a 'community' and allows their airlines to depart from any country within the EU to the US. European-owned airlines would also be permitted to base operations in a third EU country but still unresolved is which nation's safety, employment, and legal regulations apply. The United Kingdom (UK) has been the only country that had voiced opposition to the agreement contending that the US did not make adequate concessions regarding limits to foreign-ownership of US airlines.

Other EU nations supported the deal in hope that it would provide more opportunity to perform operations in the largely profitable Heathrow routes to/from the US. Presently only four airlines, United, American, Virgin, and British Airways, are authorized use of Heathrow's transatlantic routes. However, even with a relaxation of the nationality clauses, many analysts concede that it will be difficult to obtain landing rights and gate usage presently controlled by those four airlines (UK Wins Delay, 2007, p. 2).

On 22 March 2007, the same day that the Airbus A380 made its maiden flight from Europe to the US, EU's Transportation Ministers approved the new Open Skies treaty. But they only did so after agreeing to the United Kingdom's demand for a five-month implementation delay in order to finish building greater terminal capacity at Heathrow Airport (UK Wins Delay, 2007, p. 1).

The economic benefits of the agreement appear to be promising. Some industry experts forecast US-EU flights to increase by 50% over five years while adding an additional 80,000 jobs and reducing passenger fares (EU-US Edge Closer, 2007, p. 2). Although American negotiators refused to grant a greater percentage of foreign ownership of US airlines, they did offer the opportunity for foreign investors to own up to 100% of non-voting shares. Negotiators also hinted at the possibility of easing restrictions for operations within the US. Conversely, the new agreement now caps American ownership of EU airlines at 25% (EU-US Edge Closer, 2007, p. 2).

Included in the new agreement is a clause allowing suspension of US airline benefits if there are no concessions regarding foreign ownership and cabotage restrictions within the United States by 2010 (EU Backs US Pact, 2007, p. 1). In the meantime, the UK is exploring ways to protect the 60% dominance British Airways presently enjoys in the lucrative Heathrow to US market. It is one more government attempt to balance the economic desires of customers against protectionist elements of the industry.

## And Yet...

There is still cause for concern under this new agreement. Granting greater access to US domestic markets will prove to be even more contentious than nationality clause issues. One of the more significant items associated with easing foreign ownership and operations within the US is the potential impact on the Civil Reserve Air Fleet (CRAF) program. CRAF enables US carriers to voluntarily provide a percentage of their fleet for logistics movements of Armed Services personnel and equipment when deemed necessary by the Department of Defense (DoD).

Activated during the Persian Gulf War, and more recently for Operation IRAQI FREEDOM, over 2/3 of US forces and 1/4 of DoD equipment was transported via US-owned airlines (Graham, 2003, p. S-1). Adjustments to existing laws may lead to a reduction in the

number of US-owned airlines and ultimately reduce the number of CRAF participants. As recent history shows, this nation has grown to rely on CRAF as a strategic capability. To render it obsolete in future agreements would jeopardize the military's ability to operate globally.

There is a compelling argument that airline passenger fares would decrease if foreign-owned airlines are permitted to provide competitive services within the US. However, such an arrangement must be prudent in implementation and safeguard the strategic-lift capabilities provided by CRAF. Only Congress has the ability to relax cabotage laws, but should they elect to do so, that legislation must mandate participation in the CRAF program in exchange for operations within US domestic markets.

### **Conclusion**

Since the dawn of flight, a robust aviation industry has emerged. Governments had tried to regulate development but more often hindered potential economic growth of the airline industry. In the US, the 1978 Airline Deregulation Act became landmark legislation that empowered airlines to operate more efficiently while reducing consumer costs. As the turbulent years of deregulation's aftermath subsided, new levels of airline industry growth began and most forecasts predict a dramatic increase of air travel in the decades ahead. To spur development beyond US domestic routes, negotiations for a new Open Skies agreement with the EU finally lead to its approval in March of 2007. But there are still unresolved challenges ahead as cabotage laws restrict access to domestic markets. Efforts to protect US-owned airlines while creating opportunities for lower air fares and better service, will continue to confront law-makers in the years ahead.

Submitted by: CAPT Kenneth Seliga, U.S. Navy

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## **APPENDIX C: MARKET IMPERFECTIONS AND GOVERNMENT INTERVENTION IN PORT OPERATIONS**

Port operations are subject to market conditions and demand consideration and influence from elected officials, special interest groups and a concerned business and consumer community. Ports produce a number of goods – both public and private. Public goods are non-rivalrous in that consumption by one customer does not prevent consumption by another. These public goods are non-excludable where any customer or user cannot be excluded from its use. They are difficult to measure in terms of value, but essential to the proper function of markets. Goods like public safety, security, and environmental health and coastal protection all support port operations. Private goods are generally consumable and more clearly divisible in terms of cost and pricing that is measurable and understood in the free market (World Bank, 2006).

Unlike manufactured goods, the calculation of marginal cost does not fit most public goods. It is equally difficult to apportion charges or fees to users as these benefits are often indivisible as to how they are consumed. The nature of public goods is expensive and the marginal cost to provide the service or good exceeds the likely marginal benefit any one user or port customer might gain if they were to provide them out of pocket. Despite this lack of clarity, recognizing the need for public goods and their importance to sustaining any port operation is critical to understanding the real costs involved in operating a port activity and why taxes or fees should be considered necessary in many port environments (World Bank, 2006).

### **Government Intervention and Market Imperfections**

Political influence, regulations and legislation intent on encouraging commercial expansion and developing port capacity must be designed to allow free competition and prevent intervention from benefiting one port or terminal operator or operation over another. Too often policies intent on assuring fairness have unintended consequences that inhibit fair markets practices and competition. The desire to enhance the commerce through a home port must be balanced against the rights of domestic and global trading partners. Adhering to the laws and treaties that govern such activities becomes paramount to preserving free and open trade. The impact of globalization elevates this issue to great importance requiring full consideration by governments that seek to maximize growth while maintaining a fair marketplace.

### **The Role of the Port Authority (PA)**

Port operations fall between two broad categories: tenant enterprises that lease port facilities and privately owned and operated terminals that own every aspect of the operation from dockside to access to transport networks for rail and roadway. For each end of the spectrum there exists a place for the PA to act as an advocate for both the community it represents (local, state, national or regional) and the terminal operators. The intent of the PA is to effectively manage port access and properties ensuring adequate public goods are present and to facilitate trade while generating expanded port capacity and a reasonable return on the investment.

PAs serve the interests of all parties by encouraging the establishment of value added services resident in the harbor close to port operations. They attract businesses that extend logistical chains providing specialized capabilities to add value to cargoes stored and handled at the port. These services may include ship repair, container maintenance, marine appraisals, insurance claims inspections, and banking (World Bank, 2006). Cluster development, places industrial or manufacturing operations are developed along side ports where they can benefit

from easy access to shipping. These efforts spawn added growth by increasing efficiencies and making the port more attractive to shippers and port operators alike.

### **Private and Public Partnership**

It is becoming more difficult to define what share of the cost to keep the public goods available should be paid for by the port and terminal operators. This balance demands a fresh look at what is at stake and who stands to achieve substantial gains from the pending growth in trade projected over the next 30 years.

The Maryland Port Administration oversees the port authority, all port operations and falls under the Maryland Transportation Authority (MTA). The MTA falls under the Maryland Department of Transportation which operates all rapid transit for the harbor, rail, public transit, toll roads and airports, for the city. They operate rapid transit (subway, buses and light rail) at a 50% target for cost recovery. In 2006, the operating costs were 299 million with 84 million in operating revenue representing a net loss of \$215 million (MTA, 2006).

The burden of funding public transit – an economically challenged enterprise known for higher cost than revenue generated – combined with the demand to fund improved port infrastructure and maintenance must be measured against basic economic principles. The PAs must strive to recover all or most of the public funds invested to improve the port environment for trade and commerce. Without such rigor, the tendency would be to over spend and pass the additional cost on to the community or government whose interests are represented by the PA.

The escalating cost of water front property, capital improvements and maintenance of port infrastructure deserves frank and open discussion between the public and private partners. Globalization, especially the explosion in trade with the Far East presents substantial opportunities for port and terminal operators in the US and around the globe. The need for added capacity lends credibility to the argument for added contribution by private industry.

### **Capital Improvements and Funding Sources**

Given the huge costs required to maintain and expand port capacity, additional funding sources need to be developed. To encourage investment in port maintenance and capital improvement; matching funds from public and private entities must be achieved. Such contributions, coupled with tax breaks for the contributors shift added responsibility to those most likely to maximize the potential gains from projected increases in trade.

Tax rates can impact business success in almost every market. The tax must generate perceived benefit to those paying the tax or those protected by the tax. In an attempt to fund harbor maintenance congress enacted the Harbor Maintenance Tax (HMT) in 1986 (Bryant, 1999). Although described as a tax, it is seen by both port operators and port authorities as a user fee. The tax was originally imposed at a rate of 0.04% of the value of the commercial cargo shipped. The rate was tripled to 0.125% in 1990, around the same time the US Supreme Court ruled it unconstitutional to apply this tax to foreign cargo (Critchlow, 1999). Despite the increased rate and a growing surplus in the HMT trust fund (projected to be \$3.7 billion by FY 2008), legislators continually under appropriated funds (ASCE, 2007).

PAs, terminal operators and the Army Society of Civil Engineers (ASCE) – all agree the fund is ineffective at addressing port maintenance needs. They believe that the HMT trust fund "should be taken "off-budget", in the same way that the Highway Trust Fund is administered (Ditmeyer & CBO, 1993)". Right now the HMT trust fund is on-budget, and the Congress sets spending limits each year.

### **Summary: Recommended Policy Changes to Enhance Port Operations**

The impact of government decisions is mixed in terms of benefit to increase commerce and encourage the rapid and efficient movement of goods to and from foreign and domestic markets. Based on issues and policies described above the following changes in governmental intervention in port operations are recommended:

Port authorities should recover all or most of the cost of administrating and improving the harbor environment they support. A cost conscious approach better aligns itself with efficient use of available capital, reducing losses and generating positive cash flows. Rents and fees should match the raising fair market value. Large capital expenditures are necessary to fund skyrocketing real estate development and harbor maintenance costs. Although port authorities maintain their role as economic engines for there areas and often receive funds from taxes or government grants, these costs need to be shared fairly by the businesses that have the most to gain from the expanding trade.

The HMT and HMT trust fund need to be reviewed for adequacy and effectiveness in meeting harbor maintenance needs. HMT and the HMT trust fund must be taken "off-budget" to improve responsiveness and bypass spending limits that keep needed funds from viable port maintenance projects. Getting funds into the hands of the Army Corps of Engineers and producing positive results would enhance the trust and confidence PA leaders and port operators have in government efforts to improve port operations in this country.

Finally, increased tax breaks, cost sharing programs, and other incentives for private investment that encourage private business to contribute funds matched by bond issues or other government funding sources need to be explored. The requisite expansion of port capacity demands an equitable contribution from private enterprise.

Submitted by LTC Stephen Burns, U.S. Army

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