

TRANSPORTATION

ABSTRACT

The transportation industry serves to mobilize the U.S. economy and provides critical links to the rest of the world. Transportation has undergone a major transformation, with speed, in-transit visibility, and value-added logistics highlighted as the hallmarks of the revolution. Air carriers have globalized through code sharing, and container shippers have responded by creating their own alliances. The increasingly international nature of the industry has created challenges for the U.S. government, which relies on contractual links to the transportation industry for surge sea and airlift capacity. Transportation is a thriving sector, one in which the United States faces world-class competition. The United States has an edge in many areas, but chronic underfunding in surface infrastructure has dulled the advantage.

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PLACES VISITED

Domestic

Alameda Corridor Transportation Authority, Long Beach, CA
American Airlines, Fort Worth, TX
American Presidents Line, Port of Los Angeles, CA
AMTRAK, Washington, DC
Burlington Northern Santa Fe Railway, Fort Worth, TX
Burlington Northern Santa Fe Railyard, Alliancc, TX
Defense Distribution Center, Chambersburg, PA
Long Beach Port Authority, Long Beach, CA
Maryland Port Authority, Baltimore, MD
Union Pacific Railroad, Long Beach, CA
United Parcel Service, Louisville, KY
U.S. Naval Ship *Antares*, Baltimore, MD
U.S. Naval Ship *Comfort*, Baltimore, MD
USTRANSCOM, Scott Air Force Base, IL

International

Baltic Exchange, London, England
British Airport Authority, Heathrow Airport, England
British Airways, London, England
Caterpillar Logistics Services, Brussels, Belgium
DHL Global Opns & Hub, Brussels, Belgium
European Transport Systems, Moerdijk, The Netherlands
EURO-Tunnel, Folkestone, England/Calais, France
GE/SEACo, London, England
Maersk Lines, London, England
Military Traffic Management Command (USA/MTMC), Rotterdam,
The Netherlands
Ministry of Transportation & Public Works, Barendrecht, The
Netherlands
Rotterdam Port Authority, Rotterdam, The Netherlands
Royal Nedlloyd N.V., Rotterdam, The Netherlands
Sea-Land Delta Terminal, Rotterdam, The Netherlands
U.S. Embassy, London, England
Van der Vlist Special Transportation, Moerdijk, The Netherlands

INTRODUCTION

The transportation industry touches virtually every aspect of daily life. Its tools—jet airplanes, high-speed trains, container ships, buses, and trucks—transit the globe to facilitate the commerce underpinning the U.S. economy. As an integral part of the U.S. economy in its own right, the transportation industry accounts for more than 15 percent of the gross domestic product (GDP). Government recognition of transportation's centrality has been the impetus to regulatory reforms leading to industry consolidation and revitalization. Transportation is central to the economy and to national security.

National security relies on transportation assets. The U.S. military owns an impressive array of air and sealift equipment, including such world-class transportation assets as the C-17 Globemaster aircraft and the purpose-built Large Medium Speed Roll on/Roll off (LMSR) ships. Crucial to U.S. mobility in the event of war is a set of voluntary partnerships with private industry. Civilian air and sea assets are ready for call-up in the event of an emergency through the Civil Reserve Air Fleet (CRAF) program, the Voluntary Intermodal Sealift Agreement (VISA), and the Maritime Security Program (MSP). Though firm commitment to strategic airlift is vital, these agreements with private industry give the United States a unique surge capacity to handle the transportation requirements associated with a major regional conflict.

Beyond moving people and things from point to point, there is the growing field of value-added logistics or supply chain management—that is, moving material from the point of production to the customer. Increasingly, companies are focusing on core competencies and are divesting themselves of support activities, such as transportation, order processing, inventory control, and customer service. The goal is to be more efficient in serving the customer. The Department of Defense (DOD) has also started to re-engineer logistics management—replicating the business world, where immediate service and pinpoint accuracy are routine. This philosophy has far-reaching implications for military logisticians and requires mastery of the best civilian practices.

The transportation industry and the infrastructure supporting it are critical to the continued economic growth and to the mobility that those in the United States have come to expect. The transportation industry, perhaps more than any other, is essential to the U.S. ability to project military power around the world in order to protect and defend U.S. national interests. It is the transportation system—the ability to move things and people—that truly brings together all of the elements of U.S. national power.

THE TRANSPORTATION INDUSTRY DEFINED

Transportation is a system. It deals with moving people and goods from a point of origin to a point of destination. The medium in which transportation takes place influences the type of vehicles to be used. The vehicle, along with its means of locomotion, is the mode. Although vehicles (e.g., trains, ships, planes) are its most visible aspect, thinking of transportation as simply an aggregation of vehicle movements would be to underestimate the complexity of the industry.

The information revolution has transformed the transportation industry and has made possible the growth of just-in-time delivery systems, which are fast becoming the state of the art for U.S. industry. Indeed, the case can be made for redefining the industry, moving away from categorization by vehicle and stressing the intermodal nature of transportation. Intermodalism derives from containerization, whereby standardized steel boxes flow through the system in a seamless circuit. Containers are filled at a factory loading dock, trucked to a railhead, put on a transcontinental freight train, off-loaded at a purpose-built container port, shipped across an ocean . . . and the process continues. All the while, the container is tracked via the latest satellite positioning technology or radio frequency tags.

As the lifeline of U.S. commerce, the transportation system boasts 4 million miles of highways and roads; more than 250,000 miles of rail and rapid transit lines; 190,000 miles of petroleum pipelines; 26,000 miles of navigable waterways; and more than 2,000 commercial airports, seaports, and intermodal terminals. This enormous and diversified transportation system serves 260 million people, 6 million business establishments, and 87,000 governmental units scattered over the 3.7 million square miles of the United States. In 1994, the system carried more than 4.2 trillion passenger-miles of travel and 3.7 trillion ton-miles of freight.¹

Until recently, all ships of a nation, whether for war or for commerce, were considered part of the nation's navy. Because the U.S. commercial fleet is much smaller and much of the U.S.-owned fleet uses foreign registry and crews, the United States now separates the two. The nation continues to rely on transportation by sea for the bulk of its commerce (fully 98 percent of world trade is by sea.) and to rely on its mastery of the sea to protect that commerce. Despite the formal separation between the U.S. Navy and the U.S.-flagged merchant fleet, it is only a partnership between the two that ensures the country's ability to meet the requirements of a national emergency.

Just as public-private cooperation is vital to sealift, so too are partnerships across all modes of transportation. The advent of just-in-time manufacturing has given rise to (and has in turn been facilitated by) the growth of cargo integrators (e.g., FedEx, UPS, DHL). These integrators not only use their own fleets of air cargo planes, but also use other modes (recently Amtrak has turned its scheduled passenger train service to advantage by contracting to carry integrator parcels).

The cargo integrators and a bevy of other firms have gone beyond mere transport service, moving parcels from point to point. Under a system called "value-added logistics," transportation firms will provide customers with a smorgasbord of services to enhance products. Hence, a computer manufacturer may produce components in several countries and award assembly and customer delivery contracts to a cargo integrator. An Asian construction equipment firm may ship sections of massive dump trucks to Rotterdam, where a logistics firm will weld the pieces together and transport the vehicle (by rail, truck, or canal barge) to the customer. Value-added logistics has tended to blur the lines between transportation and the services formerly performed by manufacturers or their agents. Indeed, carried too far, it can mean a company might take on more than it can handle by trying to be all things to all customers.

Pipelines accomplish what transportation is supposed to do—get the goods to the customer. They could be a metaphor for the goal of all transportation modes: fast, efficient, continuous, automated movement of product. The "pipeline" employed by air cargo integrators is nothing other than an attempt to make the delivery process a seamless "flow." Where pipelines do not exist, transportation companies try to mimic the concept. Wherever bulk cargo is involved, be it rail or sea (75 percent of all ocean cargo is of the bulk/tanker variety), the pipeline concept of large volume flow is applicable.

CURRENT CONDITION

The booming U.S. economy has had its effect in the transportation industry. Because transportation is not a purely domestic industry, however, the state of the world economy affects the transportation sector more quickly than it affects other sectors. Phrases such as "before the Asian downturn" permeate briefings by port officials, who see the immediate effects on traffic from fluctuations in imports and exports.

Air Industry

The airline industry is basically a service industry. With its extensive fleets of airplanes, support equipment, and related infrastructure, it is highly capital-intensive. Aviation is a high cash flow industry. Its inherently physical nature makes it labor-intensive as well, with a highly trained (and unionized) workforce. Outside factors (e.g., economic downturns, oil prices, weather) mean operating on thin profit margins.

Airlines in the United States have made progress in restructuring their balance sheets after suffering enormous losses in the early 1990s. The profits of the past 3 years have been applied to reducing capital debt. As a result, total long-term debt decreased from \$17.6 billion in 1994 to \$15.5 billion in 1997. Retained earnings increased from \$2.2 billion to \$12.8 billion, and stockholder equity more than doubled from \$13.2 billion to \$27.8 billion. The airlines have now reduced the percentage of capital generated from debt to 46 percent. While this figure is still higher than the 40 percent average for all U.S. corporations, it is significantly improved from the more than 65 percent level for the airlines in 1993 and 1994.²

The U.S. airline industry is composed of four air carrier categories: (1) the major airlines, such as United, Delta, and American, which have annual revenues of \$1 billion or more; (2) the national airlines, which are scheduled airlines with revenues between \$100 million and \$1 billion; (3) the regional airlines, which have service limited to a single region of the country, but represent the segment of the market that has been the fastest growing and the most profitable; and (4) the cargo carriers, which are divided into combination carriers (i.e., cargo on one level of the aircraft and passengers on the other) and cargo-only carriers (e.g., FedEx, UPS, and DHL).

Significant increases in traffic and continued strong demand for air travel resulted in some overdue airline cost increases. Not only did the airlines add 22,000 new employees, but also average wages increased. The average annual compensation per airline employee, including wages, insurance, and pension benefits, increased from \$62,092 to \$63,223, as compared to a U.S. industry average of \$40,100.³ Labor is the industry's largest single cost, representing 34 percent of total operating expenses for passenger airlines.

A significant portion of labor costs goes to retain the highly trained pilots needed to operate modern aircraft. The U.S. airlines hired a record 12,000 pilots in 1997, which was the fourth year of a hiring boom that could last well into the next decade. The rosy job outlook is taking shape

amid record passenger loads and robust earnings. New hires are needed to operate growing fleets and to replace thousands of pilots who earned their wings in the Vietnam-era military and are nearing retirement. The competition for qualified pilots could mean trouble for small airlines unable to match major airline salaries. Regional airline pilots stay with one carrier an average of 5 years, but if predictions hold, the average stay will be only 2–3 years by 2002; the result will be increased training costs and, possibly, higher salaries.

Jet fuel costs, airlines' second largest expense, decreased from an average price per gallon of 66.4 cents in 1996 to 64.5 cents in 1997. With U.S. airlines requiring 18.5 billion gallons of fuel annually, total cost of fuel reached \$11.9 billion. These costs do not include the 4.3 cents per gallon federal deficit–reduction tax imposed on the airlines since October 1995.⁴ Clearly, increased fuel efficiency is a top priority for the industry. During the past two decades, the airlines have increased fuel efficiency nearly 50 percent by

- lowering cruising speeds
- using computers to determine optimum fuel loads and to select altitudes and routes that minimize fuel burn
- increasing the use of simulators for pilot training
- using only one engine to taxi

Most important, airlines have continued to invest billions in new aircraft and cleaner-burning, fuel-efficient engines.

Railroad Industry

Today's railroads have increased efficiencies, improved infrastructure, and are in the best shape since the mid-1960s. The foundation for this success lies in the mergers permitted by the 1980 Staggers Act, which deregulated railroads. The number of class one railroads has dropped from 25 to 6. Mergers, spin-offs of low-profit rail lines, the selling of regional rail networks, and the abandonment of branch lines significantly increased efficiency and created some very strong class one railroads. Megamergers of railroads significantly reduced shipping costs to customers. After Union Pacific acquired the Chicago Northwestern Railroad (CNW) in a merger acquisition, "through" cars from Los Angeles to Chicago go direct and have to pay only one railroad for moving the load. With competition now setting freight rates, average rail freight costs to railroads between 1988 and 1997 (in constant 1988 dollars) dropped from 2.72 cents to 1.85 cents per ton-mile. These cost reductions helped the railroad business, primarily

from increased coal hauling and intermodal (container and truck trailer) traffic.⁵

To ensure that rail system capacity and customer service capabilities meet these increasing demands, class one railroads have heavily invested in infrastructure—retracking mainlines to double and triple railsets, as well as adding long passing sidings. Railroads are working with two U.S. “motive power” producers in designing, building, and producing more powerful locomotives capable of moving greater loads more efficiently. New diesel locomotive designs have increased the efficiency of fuel consumption between 1980 and 1997 from 235 to 377 revenue ton-miles per gallon of fuel consumed. Another dividend from infrastructure investment is that derailment/accident reductions dropped from 11.4 accidents per million train miles in 1980 to 3.5 accidents per million train miles during 1997.

Maritime Industry

The U.S. shipping industry has had to adapt to the intermodal revolution. Break bulk cargo ships simply cannot compete with large-capacity container ships, which are increasingly integrated into intermodal systems. Though the U.S. commercial shipping industry has lost much of its shipbuilding capacity to foreign flag carriers, shipping remains vital to the U.S. economy. Some 90–95 percent of U.S. import and export volume travels by sea. Seaports are faced with daunting infrastructure modernization requirements to accommodate larger, faster ships. In 1999, the intermodal container traffic saw intense competition between the ports of Baltimore and New York, with the latter retaining the loyalty of the major shippers. Faced with the loss of government subsidies, U.S. shipyards must compete in a market characterized by oversupply. In Europe, economic integration has not eliminated port overcapacity, where Rotterdam must face competition from nearby Antwerp and Bremen. Strategically, shipping is vital to national security; the United States must travel up to 8,700 sea-lane miles in order to protect its interests abroad and respond to international crises. During a major theater war, more than 93 percent of all the equipment and supplies needed to sustain the U.S. military would be carried by sea.⁶

In the aftermath of the Persian Gulf War, Congress ordered a mobility requirements study that led to major improvements in U.S. sealift capacity. The Future Years Defense Plan (FYDP) now contains \$20 billion for 19 LMSRs, 14 smaller Roll-on/Roll-off (RO/RO) ships, and improved ready reserve readiness. The studies have revitalized the

Military Sealift Command (MSC) and moved logistic requirements higher on budget priority lists.

Trucking Industry

Trucking accounts for more than 62 percent of freight transportation tonnage in the United States, and it dominates local and regional freight. The trucking industry is more specialized than the other modes. Trucking companies tend to segregate their services into distinct categories or industries: long distance versus regional/local; private versus for-hire; dry van versus tanker; and general cargo versus specialized cargoes, including hazardous cargo. The trucking industry shipment services are broken down into three segments: truckload (TL), less-than-truckload (LTL), and package express carriers. The TL carrier hauls the goods of only one customer from the point of origin to the final destination. The LTL carrier hauls the goods of many different customers from numerous points of origin to their final destinations. The operating cost of the LTL carrier is usually much higher than that of the TL carrier, partly because the LTL carrier requires facilities to consolidate and distribute the freight before a shipment can reach its final destination. The operating cost of the distribution center (both the original construction and the maintenance) is layered on top of the operating cost of the trucking equipment. The final segment, the package express carrier, has an operating cost similar to that of the LTL carrier because it is servicing numerous customers at numerous locations. This diversity, versatility, and flexibility has enabled the trucking industry to remain highly competitive with other modes of transportation.

In 1996, the number of people employed by the trucking industry increased 26.4 percent to more than 9 million people, and the number of truck drivers increased 23.1 percent. There are 442,695 interstate motor carriers, of which 69 percent operate 6 or fewer trucks and 78 percent operate 20 or fewer trucks. This equates to more than 19 million trucks used for business purposes on U.S. highways. A direct result of the increase in motor carriers was truck tonnage growth, which grew well over 40 percent between January 1994 and December 1998. The estimated \$345 billion spent for truck freight dominated the freight transportation market in 1996 at 82 percent of the nation's freight bill. By 1998, 92 cents of every U.S. transportation dollar was paid to a trucking company.⁷

Mass Transit

Those who live in the United States depend on mass transit. More than 32 million senior citizens are coming to rely on public transportation as their driving ability decreases with age. Nearly 24 million people with disabilities need mass transit to maintain their independence. Almost 37 million people who live below the poverty line and cannot afford a car, rely on mass transit to reach their jobs. Some 56 million children under driving age travel farther to schools than ever before, and they use mass transit. In many metropolitan areas, mass transit continues to grow. Systems such as California's Bay Area Rapid Transit (BART) are including state-of-the-art passenger transport systems and pioneering systems, such as electronic display boards for subway platforms, video monitors, and "talking signs" for the visually impaired. The National Passenger Railroad Corporation (Amtrak) is perhaps the best example of the federal government's involvement in mass transit. Recent performance figures indicate that Amtrak is exceeding ridership revenue and cost reduction projections, lending some hope to Amtrak's plan to be independent of most federal operating support by the year 2002.

OUTLOOK

By its very nature, the transportation industry is confronted daily by worldwide competition. Cross-border alliances are now the norm in the air and maritime sectors. As the new millennium arrives, the momentum for change will only accelerate.

Air. Paperless documentation created online by the shipper is the way of the future. Airfreight will move significantly faster through a combination of improved data sharing, reduced red tape, faster and more efficient aircraft, and partnership agreements linking the complementary strengths of air carriers. The C-17 is a proven national asset, and the program could grow due to documented strategic airlift requirements. The Pentagon is studying development of a heavy-lift airship for long-distance sustainment. In Europe, plans for a pan-European future large aircraft (FLA) for troop transport remain on the drawing board.

Maritime. The 1960s worldwide container revolution has affected all transportation modes. The transportation industry standard by which all conveyance means are measured is the 20-foot equivalent unit (TEU) trailer; today's container ships can carry up to 6,000 TEU trailers. Tomorrow, even larger and faster ships will dominate the high seas, and world ports will have to invest to match their capabilities. The ocean

shipping industry, in an effort to capitalize on this revolution of new technology, introduced container ships and specially designed terminals, cargo-handling cranes, and container trains and tractor-trailers to provide commercial shippers with more expeditious origin-to-destination “intermodal” transportation. Today’s ocean transport industry trend toward containerization has created a shortage of commercial sealift ships with military applications capable of carrying combat equipment, however. The MSC works continuously with private industry to find ways to make commercial resources more compatible with military sealift needs and is identifying areas where the MSC can more efficiently and safely use containerization to transport military cargo, particularly ammunition. Looking ahead, December 1999 will see the final handover of the Panama Canal to the Panamanian government. Now carrying only 14 percent of U.S. maritime trade, the canal has lost much of its significance—thanks to the growth of intermodal port/rail networks across the North American “land bridge.”

Railroads. Tomorrow’s transportation customer will be more demanding and will require specialized service. Evidence of what lies ahead is seen in the recent agreement of Burlington Northern and Santa Fe Railway (BNSF) and Wal-Mart, where BNSF will be Wal-Mart’s primary rail transportation provider. Alliance Yard, BNSF’s \$150 million multimodal transfer hub, is a global commerce center. As the largest transport center in the Southwest—575 acres with 50 miles of railroad track and an adjacent airport—it is a model distribution center for the 21st century.

The search for efficiencies may lead to remote-controlled engines. In Cargill’s fertilizer plant in South Park, Florida, one operator has taken the place of several employees by using remote controls to manage the entire loading operation of hopper cars for shipments. Although this experiment is going well, the Federal Railway Administration ordered the Wisconsin Central to refrain from using remote-controlled equipment in its rail operations, citing concerns over safety.

Recruitment remains problematic. Railroads cut crews due to reduced traffic loads in the 1980s. Unanticipated increases in traffic during the early 1990s put a strain on the availability of qualified personnel. Today, the average age of a train crewman is 50, and many enter the retirement window each year. Railroads scramble for qualified personnel and have had to turn to nontraditional personnel resources, including human resource companies and college training programs.

Trucking. The largest issue for motor carriers is safety. In 1995, commercial trucks logged 369 billion miles. The number of miles traveled by motor carriers has continually increased while the number of

fatalities has decreased drastically, thanks to drug- and alcohol-free drivers. In 1996, only 1.4 percent of commercial truck drivers involved in fatal crashes were intoxicated. Of the nearly 42,000 road fatalities in 1996, trucks were involved in only 12 percent of cases—a remarkable record, given that large trucks accounted for 161 billion miles traveled.⁸ Driver fatigue remains one of the leading causes of accidents, however. The American Trucking Association (ATA) is aggressively working with the Department of Transportation (DOT) to reduce the hours-of-service in a 24-hour period to help alleviate driver fatigue. The Federal Highway Administration (FHWA) is conducting research to evaluate hours-of-service regulations.

The trucking industry will continue to be capable of meeting U.S. economic and defense needs in the 21st century. The most important challenges that it will face will be an aging infrastructure, congested road conditions, adequate supply of truck drivers, new and emerging technologies for intermodalism, identification and development of markets for intermodal freight transport, and compliance with federal and state safety and environmental requirements.

Mass Transit. Emerging technologies are having a positive impact on the nation's mass transit system. For the past 20 years, the Department of Energy (DOE) has been developing alternative fuel technologies in partnership with industry. Though many conventional vehicles using alternative fuels are on the road today—used by the public and in fleet applications—much work is still needed to improve the technologies and reduce the cost. The key to making electric vehicles practical, for example, is the development of batteries that can provide power to operate the vehicle at costs comparable to those of operating conventional vehicles. This would be an improvement over today's limited range lead-acid batteries. Finally, in 1999 Amtrak is on the verge of unveiling a train set service that features state-of-the-art “tilt” technology, which is designed to operate at high speeds and to enhance passenger safety and comfort.

Pipelines. Economic uncertainty in energy markets has caused most companies to trim plans for pipeline construction. The data show that plans for petroleum and natural gas pipeline installation in 1999 will decline by 28 percent. These statistics should be seen as an indication of a cooling down period while the industry reevaluates the domestic and global energy picture. Most companies planned their long-term strategic pipeline projects before they understood the full effects of the weak energy economy. The sagging energy markets have affected the petroleum side of the pipeline industry the most; in fact, the natural gas sector shows some promise of growth. The most extensive development

of new pipeline capacity is primarily the result of growing demand for natural gas as fuel for electricity-generating plants that are replacing their coal- and oil-fired units. Total U.S. natural gas consumption has increased by 17 percent since 1990, marketed production has increased by 6 percent, net imports have nearly doubled, and the interstate pipeline system has increased in size and capability.⁹ Overall growth of the pipeline network has occurred in both its deliverability and usage levels. The Energy Information Administration projects that the natural gas market will grow steadily into the next century, prompting the pipeline industry to plan extensive capacity additions.

Information Technology. Like most other industries, the transportation industry is dependent on the national information infrastructure. The transportation industry in the United States, as in most other industrialized nations, has a sophisticated network of government agencies to protect critical information technology and other infrastructure through safeguards and regulations. The United States has yet to assemble an information technology working group of government and industry specialists to develop a national strategy for coping with information technology intrusion and catastrophe, however.

Peculiar to this year's industry study is the Year 2000 "millenium bug" phenomenon, better known as Y2K. The transportation industry has received considerable attention during discussions of this issue, given its safety and economic considerations. The success of U.S. efforts to minimize or abate the Y2K problem rests with the industry's early acknowledgment of the problem and willingness to dedicate considerable assets to a robust effort to fix it. Generally speaking, industry officials agree that the United States is relatively secure in its efforts to remedy the problem. No one can guarantee with any degree of certainty how the interaction with other countries and their systems will affect the transportation infrastructure. Industry groups believe that they are prepared. The question remains whether the customer base and foreign concerns will be ready.

Efficiency in any industry, achieved primarily by cutting inventory and using the Internet, requires reliable transportation. Just-in-time delivery of parts, a practice yielding efficient inventory management and reducing supply chain costs, is dependent upon electronic data systems. Transportation is the common denominator and link to the integration of the supply chain.

Logistics Management. For the private sector, information about a shipment—where it is and where it is going—is just as critical as its safe delivery. The DOD acknowledged the overarching importance of information and logistics management with *Joint Vision 2010*,¹⁰ which

has far-reaching implications for military logisticians. *Joint Vision 2010* provides a conceptual template for the way in which U.S. armed forces will use technological opportunities to achieve new levels of effectiveness in joint warfighting. A central pillar in this framework is focused logistics.

Focused logistics is best described as minimal inventory, minimal logistics footprint, and minimal response time. It includes total asset visibility, including in-transit visibility. It is intended to yield joint forces that are more mobile and versatile. The idea is to support rapid crisis response; to track and shift assets even while en route; and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical levels of operation. Focused logistics will be the logical extension of industry best practices to the U.S. military.

GOVERNMENT GOALS AND ROLE

Government is a major consumer of transportation services, a supplier of parallel services (largely in the military sphere), and the regulator of the industry. Government at all levels, both domestically and internationally (through membership in specialized international and regional organizations), fundamentally shapes the transportation industry.

Safety and Security. Of all the issues in the transportation industry, safety and security have the potential for catastrophic impact. They affect the public image of the industry and even future transportation modes. Safety is a matter of government regulation and is an especially challenging task in this age of asymmetrical threats by terrorists, rogue states, organized crime, and drug cartels. The United States and other industrialized nations have sophisticated networks of government agencies with transportation safety and security responsibilities. In the United States, the DOT serves as an intermodal umbrella for a number of modal-specific agencies.

On the international level, regulatory organizations tend to follow similar modal lines. The National Transportation Safety Board (NTSB), charged with investigating transportation accidents, is linked to other national transportation investigative agencies through the International Transportation Safety Association (ITSA). The Federal Aviation Administration (FAA) and the Department of State provide U.S. representation and support to the International Civil Aviation Organization (ICAO). The network of international cooperation is vital

to transportation security, as transportation links do not end at a country's border.

Deregulation. As the United States prepares for a new millennium, deregulation and the resulting mergers set the stage for even greater efficiencies and service improvements in the transportation industry. An exception to greater efficiency and improved service has arisen in the rail industry, however. Major disruptions in service, costing customers hundreds of millions of dollars in lost revenues, occurred immediately after the merger of the Union Pacific and Southern Pacific railroads. Fortunately, these service disruptions were relatively short-lived, less than 18 months, and customers should start seeing benefits from this merger in the very near future. Only a deregulated railroad industry allows the flexibility to meet the demands of future customers.

Infrastructure. In 1997, the trucking industry paid \$27 billion in federal and states taxes and an additional \$16 billion in fuel taxes to the government. There is a question, however, as to whether this tax base is adequate to fund the roads, bridges, and highways that are the lifeline of the trucking industry. The American Society of Civil Engineers (ASCE) released a 1998 "Report Card for America's Infrastructure" that gave letter grades for the nation's public infrastructure and environment. The roads in the United States received a grade of D-. More than 50 percent of the roadways are in poor, mediocre, or fair condition, and more than 70 percent of peak-hour road traffic occurs in congested conditions. It will cost \$263 billion to eliminate the backlog of maintenance and repair needs, and another \$94 billion for modest new improvements for a total bill of \$357 billion. Bridges rated a little higher at a C-. Nearly one of every three bridges is rated structurally deficient or functionally obsolete. It will require \$80 billion to eliminate the current backlog of bridge deficiencies and maintain repair levels.¹¹

TEA-21. Congress and the President have moved in the right direction with the passage of the Transportation Equity Act for the 21st Century (TEA-21), which authorizes highway, highway safety, transit, and other surface transportation programs for 6 years (1998–2003). The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) was the last major authorizing legislation for surface transportation, and the TEA-21 builds on its initiatives. Significant infrastructure features of TEA-21 include assurance of a guaranteed level of federal funds for surface transportation through Fiscal Year 2003, strengthening of safety programs across the DOT, continuation of the proven and effective program structure established for highways under the ISTEA legislation, and investing in research and its application to maximize the performance of the transportation system.

In a major change to the federal budget rules, highway programs are now guaranteed a minimum level of spending under TEA-21. Highway guaranteed amounts are keyed to actual Highway Trust Fund (HTF) Highway Account receipts and can be used to support projects eligible under federal highway and highway safety programs. This historic legislation was a major breakthrough for the American Trucking Association and the trucking industry. For the first time, all highway and fuel taxes collected under the HTF are designated for transportation infrastructure expenses. The HTF establishes the floor that may be spent on eligible projects. The DOT estimates that TEA-21 will increase federal spending for highways from \$23.8 billion in Fiscal Year 1998 to almost \$31 billion by Fiscal Year 2003. Total spending for federally funded highways during the 6-year authorization period is \$171 billion, an average of \$28 billion annually.¹²

TEA-21 also includes \$41.4 billion for improvements in public transportation. Specific mass transit earmarks include \$150 million for transit enhancements, such as improved pedestrian access and landscaping, and \$20–\$25 million per year in discretionary grants to metropolitan planning organizations and local governments to research, plan, and integrate strategies. The \$41.4 billion allocated for mass transit is enough only to maintain the current system, however.

Highways for National Defense. By Directive 4510.11, “DOD Transportation Engineering,” the DOD has established the operating responsibilities between U.S. Transportation Command and the military services. Through the Highways for National Defense Program, the Military Traffic Management Command (MTMC) has established continental U.S. (CONUS) highway systems, which represent the minimum networks required to meet DOD surface movement needs in peace and war. The responsibility to administer the highway systems portion of this program has been delegated to the MTMC Transportation Engineering Agency (MTMC TEA), which works closely with the FHWA, states, services, and installations to identify key sections of the highway system that are important to the DOD and to ensure their continued viability to meet the national security needs of the nation.

The most important network defining the DOD’s highway needs is the Strategic Highway Network (STRAHNET), which was developed in the 1970s. STRAHNET is 61,000 miles of highway, plus an additional 2,000 miles of connectors, that link important power projection platform installations and strategic ports. It provides defense access, continuity, and emergency capabilities for movements of personnel, supplies, and equipment in both peace and war. In January 1991 and again in July 1997, STRAHNET was updated to take into account quantifiable DOD

highway requirements. The evaluations addressed the DOD's peacetime, wartime, strategic interest, and oversize/overweight highway demands. The MTMCTEA has been the driving force, emphasizing the need for a timely nationwide highway status reporting system, which is critical to meet future time-sensitive transportation demands and detailed surface deployment planning requirements.¹³

Through efforts with the FHWA, the MTMCTEA was successful in incorporating STRAHNET into the requirements for the National Highway System. In November 1995, the National Highway System legislation became public law—the first time that legislation designated important defense routes. This legislation gave the DOD a platform to ensure the maintenance of the interstate system, and other roads important to the nation's defense and mobility. TEA-21 identifies a separate authorization line item for the National Highway System, with a funding level of \$28.6 billion over 6 years. This level of investment makes it possible to improve bridges to take heavy loads and to have adequate underpass clearance on roads to and from key military installations. The focus will be on connectors to forts, bases, and the deployment ports. Cooperation between the federal and state governments on the DOD's highway needs should give funding priority to STRAHNET to ensure the readiness of these important strategic highways and roads to support the nation's defense deployments well into the 21st century.

Railroads for National Defense. The Strategic Rail Corridor Network (STRACNET) is a system of U.S. rail lines designated by the DOD as important to move military hardware and commercial products critical to national defense in the event of mobilization. Thanks to the 1980 Staggers Act, greater volumes of freight flowed over single rail networks, and railroads started putting money back into the physical plant to increase both speed and capacity. The upgraded infrastructure also improved reliability. The DOD requires track to be maintained at a level allowing freight trains to travel at an average speed of 22 miles per hour across the system.

The recent growth in the railroad industry has been primarily in bulk movement and container traffic. Railroads sought efficiencies for moving this type of cargo in new railroad cars capable of carrying longer truck trailers and double-stacked containers. Although these more efficient railroad cars helped make intermodal traffic profitable, railroads have had little use for general purpose flatcars. Of concern to STRACNET is the ability of the railways to handle oversized military hardware such as M1 tanks, which require flatcars. A flat car inventory study conducted by the MTMC revealed that the fleet of commercial and

government-owned flatcars is capable of meeting military needs until 2002.

CONCLUSION

The U.S. surface transportation infrastructure has been deteriorating after years of Band-Aid solutions. The FHWA has deemed 182,000 bridges (31 percent of the nation's total) functionally obsolete,¹⁴ with many subject to weight limitations. Years of neglect mean that major investments from all levels of government are necessary.

Competitive pressures lead to pushing on the safety envelope, hence the trucking industry's call for longer trailers and younger drivers. Locked in a cost struggle with the rail industry, truckers lobby for bigger trailers and higher weight limits. Despite their rebound over the past several years, the railroads are still suffering from equipment and crew shortages, severe service disruptions, and erosion of customer confidence. Railroads in the United States struggle to achieve a 90 percent on-time rate, which is still not good enough for manufacturers and retail operators. Improved service is a key goal; the future is in intermodal transport of containerized cargo. Progress is being made with the establishment of hubs, alliances, and shared track use. Of note is the Alameda Corridor at Los Angeles/Long Beach, scheduled for completion in 2002. This ambitious project will allow the rapid offload of containers from ships, their immediate placement on railcars, and their rapid transport out of the city to main lines.

A strong economy, coupled with a competitive environment, meant record profits for U.S. airlines in 1997 and 1998. Not only are U.S. carriers continuing to hire thousands, but also they have more than 1,400 new aircraft on order, representing a \$140 billion commitment to the airline industry and, by extension, to national security through CRAF. Profits in the late 1990s have helped reduce the capital debt incurred earlier in the decade, and earnings are being used to fund the newer aircraft. In 1997, the cost to move a passenger or piece of cargo increased by less than 1 percent as compared to a 2.3 percent increase in the consumer price index (CPI).¹⁵ The balance sheet is promising.

Research on the transportation industry suggests that the United States should

- remain committed to strategic lift procurement plans, both in sealift and in airlift
- continue its efforts for regulatory reform, particularly in the maritime sector

- reduce military service-unique standards and adopt commercial standards—especially in the highly developed transportation sphere—where possible

In sum, the transportation industry has effectively reinvented itself to meet the needs of the U.S. military and the economy as a whole. Globalization means sleepy routines cannot survive, and the confluence of best practices across borders means world-class vehicles, systems, and procedures are here to stay. Infrastructure needs constant mending, however. Further, deregulation, while generally positive in instilling the discipline of the market, is not a panacea and will not replace government action in areas where national security is at stake.

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