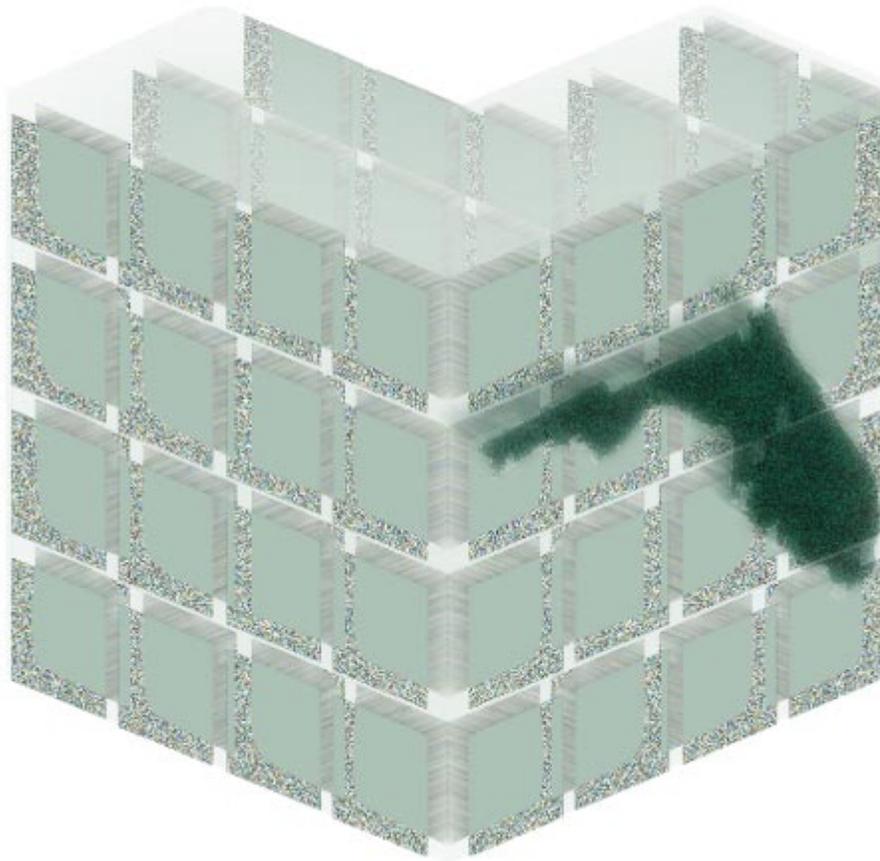


Transportation Cornerstone Florida

Moving Florida's Economy into the 21st Century



FLORIDA CHAMBER
Foundation

ABOUT THE FLORIDA CHAMBER FOUNDATION

The Florida Chamber of Commerce Foundation is a research organization and problem-solver, working in partnership with state business leaders to advance and fund activities in public policy research in order to promote a healthy Florida economy. Founded 30 years ago by the Florida Chamber of Commerce, the Chamber Foundation has been a critical voice for improved public education and a pro-business, pro-Florida business climate that allows Florida to grow and prosper.

The Foundation takes pride in a record of important studies that have provided an intellectual framework for state policy:

- ◆ *International Cornerstone Florida: Building a Crossroads Economy* (1997)
- ◆ *No More Excuses: What Business Must Do to Help Improve Florida's Schools* (1994)
- ◆ *Crossroads: Designing Florida's Tax Structure* (1990)
- ◆ *Cornerstone: Foundations for Economic Leadership* (1989)
- ◆ *Enterprise Florida: Growing the Future* (1989)
- ◆ *The Role of Privatization in Florida's Growth* (1986)

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Transportation Cornerstone Florida

Moving Florida's Economy into the 21st Century

Florida Chamber of Commerce Foundation, Inc.
A Division of the Florida Chamber of Commerce

Research by

Cambridge Systematics, Inc.

with

Economic Development Research Group
Economic Competitiveness Group



Tallahassee, Florida
Copyright 1999

January 1999

Dear Colleagues:

The Florida Chamber Foundation commissioned Cambridge Systematics, Inc., to prepare a goods-to-market study focusing on the impact transportation has on Florida's businesses within three economic clusters: trade, tourism, and high technology. This project was created to provide a credible, pro-active business strategy for future transportation investments. We hope the *Transportation Cornerstone* recommendations will serve as a catalyst for providing solutions for Florida's businesses.

We believe this report offers strategies for businesses and state decision-makers to make sound investments in the transportation infrastructure to meet the needs of the 21st century economy.

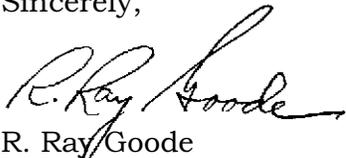
The strategies recommended include:

- Focus on trade corridors and international gateways;
- Link transportation and technology;
- Link transportation planning to economic development priorities; and
- Develop an action plan for statewide transportation investment.

As Chairs of the Transportation Task Force and the Research Committee, we cannot say enough about the participation of our fellow task force members and the commitment of the Cambridge Systematics project team. We take this opportunity to express our appreciation to the Transportation Task Force members and to the many others who contributed their time, ideas, and expertise to this effort.

We present the *Transportation Cornerstone* report to Florida's business leadership, to key public policy-makers, and to all of Florida's decision-makers. We encourage you to consider and respond to our belief that a key to Florida's economic competitiveness is an efficient, intermodal transportation system.

Sincerely,



R. Ray Goode
Chair, Transportation Task Force



Pamela Jo Davis
Chair, Research Committee

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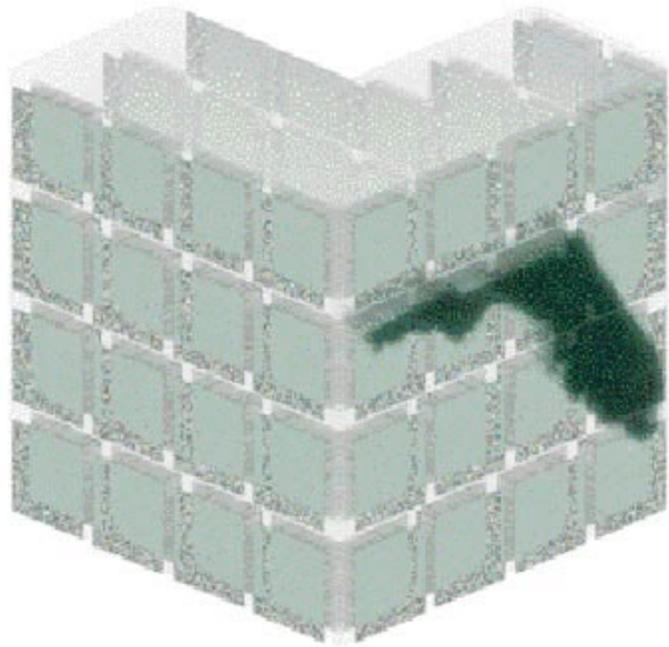
The Florida Chamber Foundation deeply appreciates the assistance of the Center for Urban Transportation Research (CUTR) at the University of South Florida, the Florida Transportation Commission, and Floridians for Better Transportation. The quality of their input contributed significantly to the analysis of the data and to the recommendations contained in the report. We take this opportunity to express our appreciation. Thank you.

Acknowledgments

The Florida Chamber Foundation is pleased to acknowledge and thank the investors in the *Transportation Cornerstone*. Gifts and grants from corporations, private foundations, public agencies, and individual contributions support the Foundation's programs, research, publications, and operations. This partnership on behalf of a strong Florida economy gives us every reason to be proud!

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Introduction

Throughout its history, Florida's economy and population have been living testimony to the power of a dynamic, forward-looking transportation system. Part of the economy's underlying strength, this transportation system has evolved over the centuries, adapting to new modes (from water to rail, highway, air, and space), new markets (Europe, Latin America, and Asia), and new technologies (containerized cargo, next-generation vehicles, and electronic data interchange). Indeed, the high level of transportation service has been part of the "fountain of youth" that has enabled Florida's economy to grow and thrive.

The magnitude of transportation's role is staggering. In 1997, Florida's highways, rail lines, seaport, airports, and spaceport moved:

- Over 120 billion miles of travel by cars, trucks, buses, and other vehicles, or more than 9,000 miles for each resident of the state;
- Over 350 million tons of freight to other parts of the United States, or nearly 27 tons for every resident of the state;
- Nearly \$64 billion in exports and imports to and from other nations, more than half of which were neither produced nor consumed in Florida;
- About 47 million out-of-state tourists, with more than half arriving via air; and
- A total of 32 commercial, NASA, and military launch missions costing upwards of \$3 billion.

Florida businesses depend more than ever on seamless, efficient, multimodal transportation; but they must rely on a system that shows signs of falling behind the pace of economic growth and change.

Accommodating this flow of people and goods requires a massive transportation system:

- More than 110,000 miles of roadway, including a substantial network of Interstate highways and other expressways;
- About 2,900 miles of rail lines, including 25 major terminals;
- 14 seaports, including three of the world's busiest cruise ports and four of the nation's largest freight ports;
- 19 commercial airports, including the nation's second largest international air cargo hub; and
- The nation's busiest and most capable commercial spaceport.

As the 21st century draws near, Florida's economy is changing again – from family vacation spot to international tourist destination; from haven for retirees fleeing the cold Northern states to bustling international gateway for emerging Latin American and Caribbean economies; from resource-rich producer of citrus products and phosphates to technology-rich producer of microelectronics, medical equipment, and aerospace products. With these changes, Florida businesses depend more than ever on seamless, efficient, multimodal transportation; but they must rely on a system that shows signs of falling behind the pace of economic growth and change. Recent evidence suggests that the transportation "fountain of youth" may finally be running dry:

- More than 65 percent of all urban Interstate lane-miles in Florida are moderately or highly congested during peak periods, according to the Federal Highway Administration (FHWA);

- More than 37 percent of all highway bridges in Florida are structurally or functionally deficient, according to the Florida Department of Transportation (DOT);
- About 60 percent of all airports in Florida are at or near threshold capacity, according to the Florida DOT; and
- Virtually every major seaport and airport in Florida is grappling with inefficient highway, rail, and transit access for both goods and people.

The University of South Florida's Center for Urban Transportation Research (CUTR) estimates that merely maintaining existing transportation levels of service in Florida will cost \$112 billion (in constant 1992 dollars) over the next 20 years – compared to \$89 billion in revenue from existing sources.¹ The opportunities are great, but so are the risks. Can Florida's transportation system adapt to meet these new challenges and support the continued growth of the state's economy? If not, what is the impact on economic growth and competitiveness? Finally, what steps are necessary to ensure that transportation remains a driver of, not a barrier to, economic growth?

Study Objectives

The Florida Chamber of Commerce Foundation, with support from private businesses and public agencies from across the state, set out to answer these questions through the *Transportation Cornerstone* study. The study builds upon a series of previous initiatives by the Foundation. In 1989, the groundbreaking study, *Cornerstone: Foundations for Economic Leadership*, defined a blueprint for Florida's economic growth and recommended a series of policy initiatives whose impact continues to resound, notably through the transfer of the state's economic development functions to Enterprise Florida, Inc., an innovative public-private partnership. In 1996, a follow-on study, *International Cornerstone*, developed strategies that will allow Florida to maximize international economic opportunities and position itself in the global marketplace.

Both the original *Cornerstone* and *International Cornerstone* identified transportation as a pressing issue that must be part of the state's economic development strategy and vision. To this end, the Foundation commissioned *Transportation Cornerstone*, with the following objectives:

- Assess the linkages between infrastructure, business logistics, and economic competitiveness in Florida's key industry clusters;
- Define the critical factors of a statewide infrastructure investment strategy that maximizes Florida's economic and transportation goals; and
- Build support among businesses and government in Florida for strategic infrastructure investment.

Study Approach

The Foundation contracted with Cambridge Systematics, Inc., and subconsultants Economic Development Research Group and the Economic Competitiveness Group, to conduct the study during the summer and fall of 1998. Additional technical support was provided by CUTR.

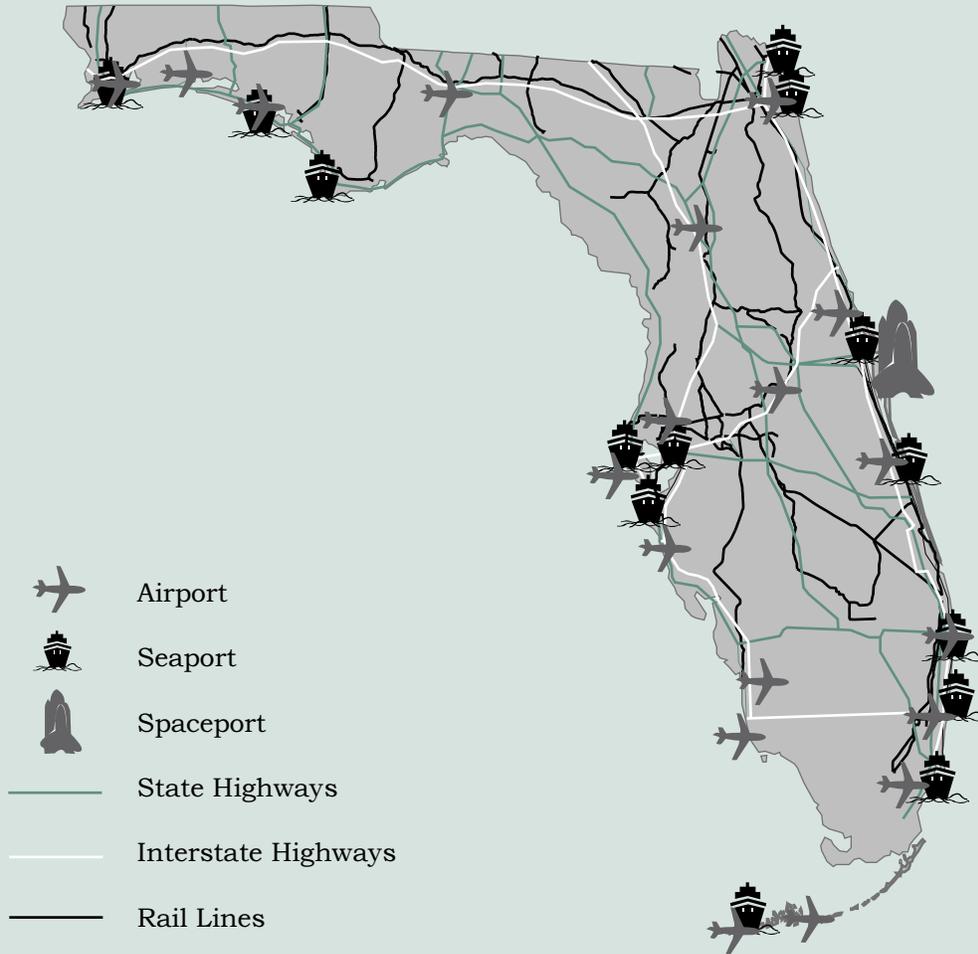
¹ University of South Florida, Center for Urban Transportation Research, *Statewide Transportation Needs and Funding Strategy*, May 1995.

The project was designed with the following principles in mind:

- Be inclusive geographically – examine transportation needs in many different regions of the state, but look for the common threads that can form the basis of a statewide strategy.
- Take a systems approach that examines Florida’s transportation infrastructure and traffic flows in the context of the state’s economic structure, industry logistics patterns, and public policy.
- Focus on three clusters of interrelated industries, but extrapolate from these clusters to general conclusions about the overall economy. The clusters that were targeted for this research were trade and distribution, high-technology, and tourism – all areas that are growing rapidly and have significant transportation requirements.
- Collect information through surveys and case studies of bellwether companies in each industry cluster, with a goal of understanding the market perspective on the supply and demand for transportation that is not available through most public data sources.
- Develop pragmatic solutions that reflect the institutional and policy context for transportation planning in Florida and could be implemented by the state’s transportation community.
- Work toward implementation of these solutions by laying the groundwork for improved cooperation and coordination between business and government.

Over a period of four months, the study team traversed the Sunshine State, gathering data and talking to businesses as well as transportation agencies to gain their perspective on the state’s transportation problems. In this effort the team:

- Surveyed more than 30 major businesses in the three major industry clusters – trade, high-tech, and tourism;
- Conducted detailed personal interviews with representatives of 30 major companies in the three clusters;
- Conducted background interviews with approximately 40 representatives of state and local transportation agencies, seaport, airport, and spaceport authorities, trade associations, educational institutions, and other stakeholder groups;
- Organized focus group meetings with public and private sector transportation stakeholders in four cities – Miami, Orlando, Pensacola, and Tallahassee – involving more than 40 people;
- Reviewed and incorporated the results of previous transportation and economic studies at the state, regional, and local levels;
- Analyzed the strengths and weaknesses of Florida’s transportation system, and the implications for Florida business;
- Compared Florida’s transportation system to two groups of peer states – competing Southern states such as Georgia, North Carolina, and Texas; and other national business centers such as California, Illinois, and New York;
- Identified “best practices” from both Florida and other states or nations that may serve as examples to Florida communities; and
- Collaborated with a task force of business executives and public officials, who provided expert review of and guidance for the study.



Florida's Transportation System

Florida's transportation system includes highways, rail lines, rail terminals, seaports, intracoastal waterways, airports, and the spaceport – an impressive collection of resources that has served the state well in the past. In surveys and interviews, businesses repeatedly noted the significance of transportation, particularly highways, to their operations. They also raised concern about the adequacy of the existing infrastructure to meet their needs (see Table 1). This research provides a high level perspective of the strengths and weaknesses of Florida's transportation system – the “supply” of transportation to Florida businesses and other consumers.

Table 1 Business Perspective on Florida's Transportation Infrastructure

	“Very Important” or “Important”			“Very Adequate” or “Adequate”		
	Trade	High-Tech	Tourism	Trade	High-Tech	Tourism
Highways	100%	100%	100%	38%	38%	75%
Rail	67%	50%	0%	33%	29%	0%
Seaports	73%	50%	25%	40%	17%	50%
Airports	27%	75%	100%	46%	88%	100%
Truck/Rail Facilities	36%	25%	NA	22%	0%	NA
Spaceports	0%	13%	NA	0%	0%	NA
Transit	NA	NA	25%	NA	NA	25%

Highways

Florida's highway system includes over 110,000 miles of roadway and almost 11,000 bridges. Although extensive, the system is not as developed as in other states. Florida maintained 8.1 miles of roadway per 1,000 residents in 1994 – about half the per capita rate of Texas and Georgia. Each mile of Florida highway carried about 1.1 million vehicle-miles traveled (VMT) in 1995, a rate more than 50 percent higher than Texas, Illinois, or Arizona.

The centerpiece of the network is the Florida Intrastate Highway System (FIHS), which was established in 1990 to connect the major commercial centers in the state. Once fully completed, the FIHS will comprise 4,118 miles of roadway, including the Interstates, Florida Turnpike and other toll facilities, urban expressways, and major arterials. The FIHS represents approximately 3 percent of all Florida public roads, but carries approximately 31 percent of all traffic and 70 percent of truck traffic on the state system. In its most recent adopted five-year work program, the Florida DOT has allocated approximately \$3.7 billion for capacity improvements on the FIHS.

The FIHS provides good connectivity among markets within Florida and between Florida and other states. Interstates 95 and 75 are the major corridors for freight movement from the north, while Interstate 10 carries significant truck traffic from Louisiana, Texas, and California (see Figure 1). However, west of I-75 there is no major limited access highway from the Pan-

Source: Transportation Cornerstone study of Florida firms, October 1998.

Case Studies

Transportation Facilities

Jacksonville Port Authority

In the early 1900s, futurists predicted that Jacksonville would emerge as the leading transportation center in the southeast United States. Today, that prediction is much closer to reality. With its growing collection of three airports, three seaports, and pending control of a naval air station, Jaxport is Florida's only bimodal transportation authority and one of the region's economic drivers. The seaports handle a diverse mix of containers, break-bulk (automobiles), dry bulk (lime rock), and liquid bulk (oil). As the only major port in the state with access to three major railroads (CSX, Norfolk Southern, and Florida East Coast Railway), Jaxport has grown rapidly in the past few years. Today the seaport accounts for nearly one-quarter of the value of all Florida imports and is the nation's second largest port for automobile imports. Because of its location, Jacksonville competes with the out-of-state ports located further up the Atlantic coast. Future expansion plans rely heavily on improvements to highway and rail access to seaport facilities. The Jacksonville International Airport is the fastest growing airport in Florida and the fourth fastest growing in the nation; however, better nationwide connections will move it across the threshold from large regional airport to national air center.

Miami International Airport

Miami International Airport is the primary gateway to Latin America and the Caribbean, currently handling nearly 35 million passengers and 2 million tons of cargo per year. Measured by value, MIA handles more international trade than any port of entry in the state. This economic engine is approaching airfield capacity and showing signs of overuse during peak periods. Flight operations now experience average delays of 10 minutes, which could grow to 75 minutes by 2008 without the planned construction of a fourth runway scheduled for completion in 2003. The airport is undergoing a major Capital Improvement Program valued at \$4.7 billion and expected to be completed in 2006. In that timeframe, the airport will double the size of terminal cargo and retail facilities. Ambitious plans to address longstanding ground access problems include participation with FDOT in the development of a major multimodal facility off-airport with a transit connection between the airport and the seaport. Long-range aviation system and strategic planning studies indicate that even with all of these projects moving forward, continued growth in travel demand over the long-term planning horizon beyond 2010 may require a new supplemental commercial air carrier facility in southeast Florida.

Orlando International Airport

Orlando could not have emerged as one of the world's leading tourist destinations without a bustling airport. OIA now handles more than 1,000 flight operations per day. Its 28 million enplaned passengers are projected to reach 40 million within the next decade, and plans already are on the drawing board to accommodate up to 70 million passengers per year. The secrets of OIA's success include a forward-thinking master plan, ample room for expansion, and an extremely competitive cost per enplaned passenger. Despite major investments in specialized facilities for cut flowers and other cargo, OIA is still dwarfed by Miami in terms of air cargo. Although space for future runways and terminals is plentiful, the bottleneck on future growth is likely to be groundside highway access to both downtown Orlando and the theme parks to the south of the airport.

Port Everglades

Located in Fort Lauderdale, Hollywood, and Dania, Port Everglades has the deepest harbor south of Norfolk, Virginia. Historically a major center for petroleum shipments, Port Everglades now ranks among the busiest container ports in the nation. It also is the second busiest cruise port in the world, with

expectations of accommodating 3 million passengers by the year 2000. A key driver of the port's growth has been its direct access to I-595 and its proximity to the Florida East Coast rail line and the Fort Lauderdale-Hollywood International Airport. Major terminal and road access projects are underway and on schedule. The Port also is planning a new intermodal rail facility within the Port area.

Port of Miami

The Port of Miami is the world's largest cruise port and the largest container port in Florida, handling more than one-third of all U.S. trade with Latin America and the Caribbean. With operations already at capacity, the port has developed an ambitious master plan for expansion of cruise and cargo facilities. Projected growth will place future pressure on the landside access to the seaport, which is located on two islands in Biscayne Bay. Incoming passenger car and truck traffic must follow a circuitous route over congested city streets, passing by the site of the soon-to-open American Airlines Arena. Despite a rail spur to the port, the majority of rail movements are handled from the Florida East Coast Railway's intermodal facility in Hialeah, a 12-mile drive that can take up to one hour of truck travel time.

Port of Pensacola

The Port of Pensacola has rebounded strongly from the early 1990s, when it faced declines in federal aid for "bagged goods" grain exports to developing nations, the port's major commodity. Today, the seaport has been successful in many areas: diversifying its cargo to include frozen food, turbines, collapsed rail cars, steel pipe, and paper; reducing operating expenses by changing its management structure from an operational port to a landlord-tenant arrangement; and undertaking a major refurbishment project to meet customers' needs. This diversification depends on an efficient intermodal transportation system. Highway access follows local streets through the city's historic district, although access improvements are in the planning stage. The seaport's on-dock rail access has helped build momentum.

Port of Tampa

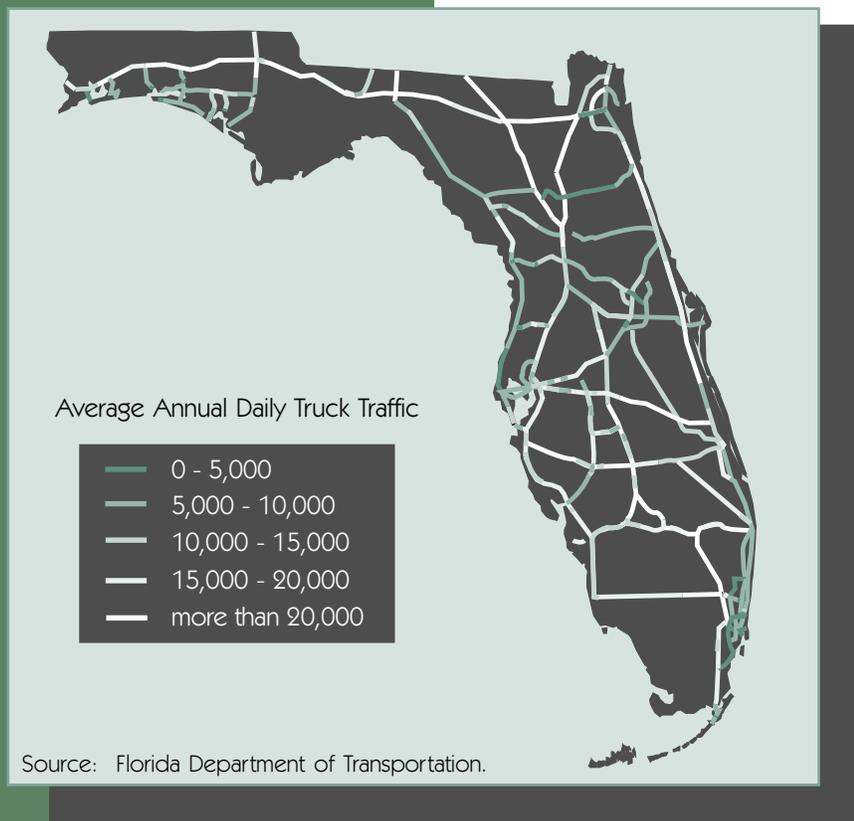
Handling more than 51 million tons of cargo per year, the Port of Tampa is Florida's largest port by tonnage. The Port, which includes 3 cruise terminals and 58 cargo terminals at several sites in the Tampa area, imports bulk commodities including oil, coal, and concrete and exports phosphates and citrus products, supporting many sectors of Florida's economy. With the exception of the phosphate trains and petroleum pipelines, most imports and exports move via truck on city streets through the historic district to Interstate 4. Landside highway access will become a more significant time and cost problem over the next several years. On the heels of its first large passenger vessel berthing in December, Tampa's cruise operations are projected to grow from 200,000 passengers in 1998 to 1 million by 2001, placing further strain on the city streets. If relations with Cuba are restored, Tampa could become even busier.

Spaceport Florida

Florida's spaceport handles more than just the Space Shuttle and NASA satellites; 80 percent of its launches are commercial, placing Florida at the cutting edge of the 21st century's emerging transportation mode. The space industry already is a targeted sector, but its continued development relies on cost-effective, routine access to space from Cape Canaveral. Despite Cape Canaveral's historic role, the Florida Spaceport has had difficulty maintaining its global market share since the 1986 Challenger explosion. The Spaceport handles about 30 launches per year, most of them commercial. The launch industry's strong growth is hampered by insufficient infrastructure capacity, outdated technologies, and a complex federal/state/military management structure.

handle to the north, corridors that could move freight and tourists as well as provide emergency evacuation routes during Gulf hurricanes. Likewise, south of I-10 the only major east-west routes are I-4 and I-75 (the “Alligator Alley”).

Figure 1 Highway Truck Volumes in Florida



The Florida DOT accords highest funding priority to preservation of existing highways, bridges, and other transportation facilities. Investment in highway capacity improvements has not kept pace with the state’s growth.

Between 1980 and 1995, total vehicle-miles traveled (VMT) increased 83 percent, but highway lane-miles rose only 18 percent. This trend is expected to continue – between 1995 and 2005, VMT is expected to rise 57 percent, nearly six times as rapidly as lane miles. The result of this growing imbalance between supply and demand is congestion, which has become an everyday occurrence in urban areas across the state. Over 65 percent of all urban freeway miles are moderately or severely congested, according to the Florida DOT. Highway congestion costs are rising in most cities. Indeed, the Texas Transportation Institute recently reported that Miami is the fifth most congested urban area in the nation. Moreover, congestion is a problem on both the Interstates and expressways and the feeder roads in both urban and rural areas in the state. Because there is no program comparable to the FIHS, the expansion and development of these local roads often lags that of the major expressways and arterials that they feed.

Figure 2 Major Rail Lines in Florida



Rail

Florida is served by nearly 2,900 miles of railroad trackage. A total of 13 line-haul railroads and four terminal or switching companies operate in the state. The freight rail system connects most major markets in the state, and provides access to the northern and western states (see Figure 2). The rail network includes 10 container or trailer transfer facilities and 15 bulk transfer facilities.

With the exception of 81 miles of track in south Florida, Florida’s rail system is owned, operated, and financed by private businesses. Jacksonville-based CSX Transportation is the major Class I railroad, with ownership over 56 percent of the statewide rail system. Norfolk Southern Railway (NS) is the other Class I railroad in Florida, with operations in the Jacksonville area. With the acquisition of Conrail, the major Northeast railroad, by CSX and NS, north-south service between Florida and New York and Boston is expected to expand. Both CSX and NS are investing in significant systemwide capital improvements, which should address some of the longstanding concerns about the quality of rail service along the Eastern coast of the United States.

The Florida East Coast Railway (FEC), a Class II regional carrier, is the state’s second largest railroad, with 442 miles of track between Jacksonville and Miami. FEC offers expedited

rail service between south Florida and Jacksonville, providing seamless interchange of traffic with CSX and NS to major points beyond Florida.

Passenger rail service is limited in Florida today. Amtrak operates three routes using tracks owned by CSX and the State: between Jacksonville and Tampa, between Jacksonville and Miami, and from Jacksonville to the western United States. In south Florida, the Tri-County Commuter Rail provides service among Dade, Broward, and Palm Beach counties. This 81-mile corridor, which is owned by the state, handles as many as 36 passenger trains each day.

Passenger rail service may expand in the future, with several proposed rail systems being explored. Most notably, the DOT is exploring the potential of a high-speed rail system operated by Florida Overland eXpress (FOX), a private consortium. Under current plans, the high-speed rail system initially would include two corridors – Miami to Orlando and Tampa to Orlando – and later would expand to include Orlando to Jacksonville.

Transit and Intercity Bus

Nineteen public transit agencies receive financial support from the state. Except for the Tri-County Commuter Rail Authority, all of these transit agencies provide fixed route bus service. The transit agencies in Miami, Jacksonville, and Tampa also operate automated guideway service.

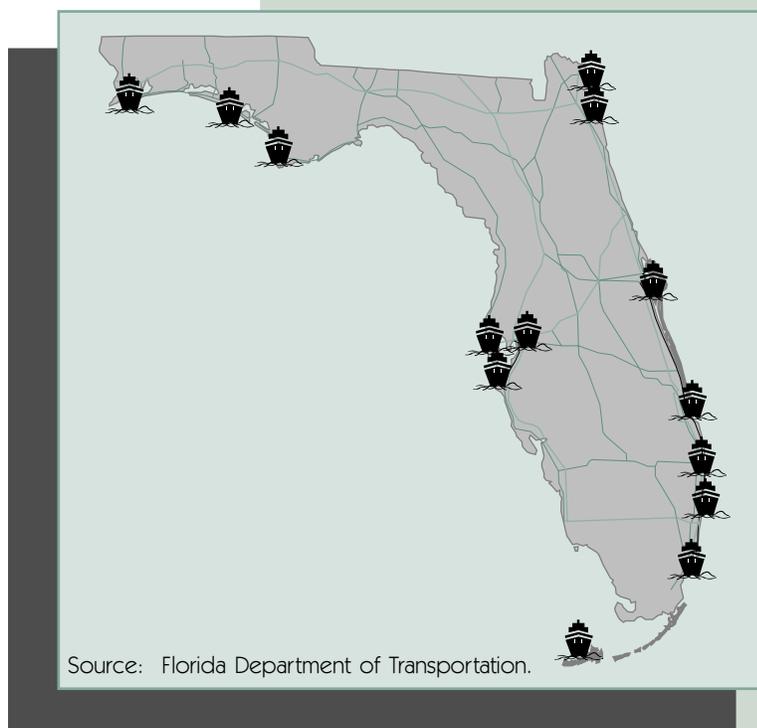
Currently, just about 1 percent of the passenger trips in Florida use public transit (including commuter rail), according to CUTR. In many urban areas, investment in transit service has not reached the point where the transit system's extent or convenience can compete effectively with the highway system. CUTR estimates that doubling the share of all trips handled by transit and commuter rail would require an investment of \$32.5 billion (in 1992 dollars) over the next 20 years.

Seaports

Florida is blessed with a long coastline and 14 seaports, which have enabled the state to serve international markets (see Figure 3). In 1997, the Florida seaports handled 8.1 million passengers and 108 million tons of cargo, including 2.4 million containers. The Florida Seaport Transportation and Economic Development Council (FSTED) projects a doubling in cruise passengers and a 33 percent increase in container movements over the next five years, which will strain capacity at many of the seaports. The FSTED estimates that accommodating this growth will require \$1.3 billion in investment over the next five years. Because these needs outstrip currently available funds, there is a risk of diluted efforts if the limited resources are not allocated in a rational manner.

Each seaport makes its own contribution to the Florida economy by facilitating the movement of goods and people through the state. Four of the state's seaports – Tampa, Port Everglades in Fort Lauderdale, Jacksonville (Jaxport), and Miami – are among the busiest freight seaports in the United States. Tampa, which is a major bulk port for the import of fuel and building materials, is the state's largest seaport in the state when ranked by weight; Miami, which handles no bulk cargo, is one of the nation's busiest container ports and the largest seaport when

Figure 3 Seaports in Florida



Source: Florida Department of Transportation.

ranked by value. Port Everglades and Jaxport handle a combination of container and bulk cargo, with particular specialties such as automobiles in Jacksonville and oil in Port Everglades. The remaining seaports serve particular market niches, such as citrus in Port Manatee and paper in many of the ports along the Panhandle.

Several Florida seaports also support extensive cruise industry operations. The Port of Miami and Port Everglades are the two busiest cruise ship ports in the world. Port Canaveral, with its link to Disney and other theme parks in the Orlando area, is expanding rapidly as a cruise port and is expected to rival Miami in number of passenger trips by 2002. Growth in passenger movements through the seaports will increase competition with freight movement for limited seaport and land capacity.

Indeed, for most seaports the most pressing deficiencies occur primarily in the landside connections, particularly the congested urban streets and arterials over which trucks must move freight between the seaport and Interstate highways, industrial parks, warehouses, and rail yards. Direct rail or transit access to most seaports is limited. The FSTED's *Landside Access* study estimated that \$441 million should be spent over the next five years to improve road and rail access to the seaports. Long-term concerns include the ability of Florida's seaports to accommodate growth in the number and size of ships calling at these facilities.

Airports

Florida has 19 commercial passenger service airports, as well as 20 reliever airports and 60 general aviation facilities (see Figure 4). In 1997, the state's 13 largest airports handled 2.5 million aircraft operations (total of takeoffs and landings) involving 105 million passenger enplanements and 2.4 million metric tons of freight. CUTR projects that the number of air passengers in Florida will increase 128 percent between 1990 and 2010, while international air cargo will double.

Like the seaports, Florida's airports vary widely in terms of their size and role. Miami International Airport is the busiest commercial passenger airport, serving 35 million passengers in 1997. Orlando International Airport moves the second largest number of passengers, followed by Fort Lauderdale and Tampa. The Jacksonville International Airport and Southwest Florida International Airport are among the fastest growing in the United States.

Miami is the unchallenged leader in terms of air freight, handling 73 percent of all Florida air cargo and 98 percent of international air cargo. On Miami's strength, Florida is one of the busiest states in terms of air cargo. Florida's airports move an average of 1.4 tons of cargo per flight, more than 40 percent more than Texas' rate and more than twice Georgia's.

Also like the seaports, Florida's airports are struggling with issues of capacity and access. The DOT's Florida Aviation System Plan estimates that 60 percent of all airports in the state are at or near threshold capacity. In particular, Miami must add a fourth runway to prevent average flight delays from increasing from 10 to 75 minutes per operation. After this expansion the airport will be close to maximum use of its available space. Orlando, with an

Figure 4 Airports and Spaceports in Florida



ambitious expansion program underway, is projected to overtake Miami as the state's largest airport for passenger operations within the next few decades. But both airports, as well as the next group of facilities such as Fort Lauderdale and Tampa, also must contend with congestion on key highway access routes and a lack of fixed-guideway transit facilities. The DOT's Aviation System Plan estimates that the total cost of needed improvements to airport capacity, terminals, parking, and access over the next 10 years is \$6 billion.

Florida's regional airports, meanwhile, are an untapped resource. Airports in cities such as Pensacola, Gainesville, Melbourne, and, most notably, Tallahassee, serve a limited number of markets with direct service, and often with high fares. The introduction of regional jet service offers an opportunity to improve air service to some of these markets.

Spaceport

Florida's Spaceport is a unique facility that is becoming an increasingly important part of the state's transportation system. The Florida Spaceport Authority is a statewide transportation authority that focuses, in part, on serving the infrastructure and development needs of the commercial launch industry. The Spaceport handles about 30 launches per year, about 80 percent of which are commercial. This figure is expected to increase to 50 launches per year by 2005. Although it is the primary commercial spaceport in the United States, the spaceport has been losing market share to domestic and foreign competitors since the Challenger explosion in 1986. The Spaceport Authority attributes this decline to insufficient capacity, outdated technologies, and the complexities of its federal-state-military management structure.

Summary

All told, the gap between Florida's existing transportation capacity and the needs of its burgeoning economy and population is large and growing (see Table 2). Every recent estimate of the unfunded transportation need in the state has been in excess of \$20 billion. Unless available revenues increase significantly, these needs must be prioritized by factors including potential economic return.

Trade and Distribution Cluster

To understand the impact of some of these transportation assets and deficiencies on Florida businesses, the study team examined the "demand" for transportation among three of the state's leading industry clusters – trade and distribution, high-technology, and tourism. A cluster is a group of interrelated industries that are characterized by common supplier or buyer relationships and common competitive requirements. Successful clusters worldwide – such as Silicon Valley in northern California or the automotive industry in Detroit – locate in those areas where they can effectively reach their suppliers and consumers, and where they have access to the human, financial, technological, and infrastructure resources that will meet the needs of their core businesses. The three clusters selected for this analysis were chosen because they are growing rapidly and because transportation plays an important role in their competitiveness.

Every recent estimate of the unfunded transportation need in the state has been in excess of \$20 billion. Unless available revenues increase significantly, these needs must be prioritized by factors including potential economic return.

Table 2. Strengths and Weaknesses of Florida’s Transportation System

	<i>Strengths</i>	<i>Weaknesses</i>
Highway	<ul style="list-style-type: none"> · Extensive system · FHHS program targets major intercity connectors 	<ul style="list-style-type: none"> · Capacity growth does not keep pace with traffic growth · “Gaps” in the system (e.g., poor east-west connectivity in central and southern Florida) · Deteriorating bridge conditions
Rail	<ul style="list-style-type: none"> · Extensive system with multiple intermodal transfer facilities · High-speed rail initiative under review 	<ul style="list-style-type: none"> · Limited passenger rail service today
Transit	<ul style="list-style-type: none"> · Commuter rail service in south Florida · Expanded programs planned for major metropolitan areas 	<ul style="list-style-type: none"> · Difficulty competing with public preference for single-occupancy vehicles
Seaports	<ul style="list-style-type: none"> · 14 seaports, including some of the world’s largest facilities 	<ul style="list-style-type: none"> · Competition among seaports for limited funds · Capacity constraints · Inefficient landside truck and rail access
Airports	<ul style="list-style-type: none"> · 19 commercial airports, including major facilities at Miami and Orlando · Strong air cargo capabilities 	<ul style="list-style-type: none"> · Competition among airports for limited funds · Capacity constraints · Inefficient landside highway access · Limited landside transit access
Spaceport	<ul style="list-style-type: none"> · World’s largest and most capable commercial spaceport 	<ul style="list-style-type: none"> · Outdated infrastructure and limited capacity · Complex federal-state-military management structure

Economic and Logistics Trends

The trade and distribution cluster is not a cluster in the traditional sense of the word, but a cross-cutting function that is important to a wide range of businesses. Transportation and distribution activities – narrowly defined to include for-hire transportation and warehousing – accounted for 160,000 jobs in 1995. Including in-house private fleets, distribution centers, and logistics support activities, the total jobs involved in trade and distribution statewide is several times this figure. Regionally, the pattern of trade and distribution employment tends to match the pattern of the state’s domestic and international gateways, with major concentrations in Jacksonville, Tampa, Miami, and Orlando (see Figure 5).

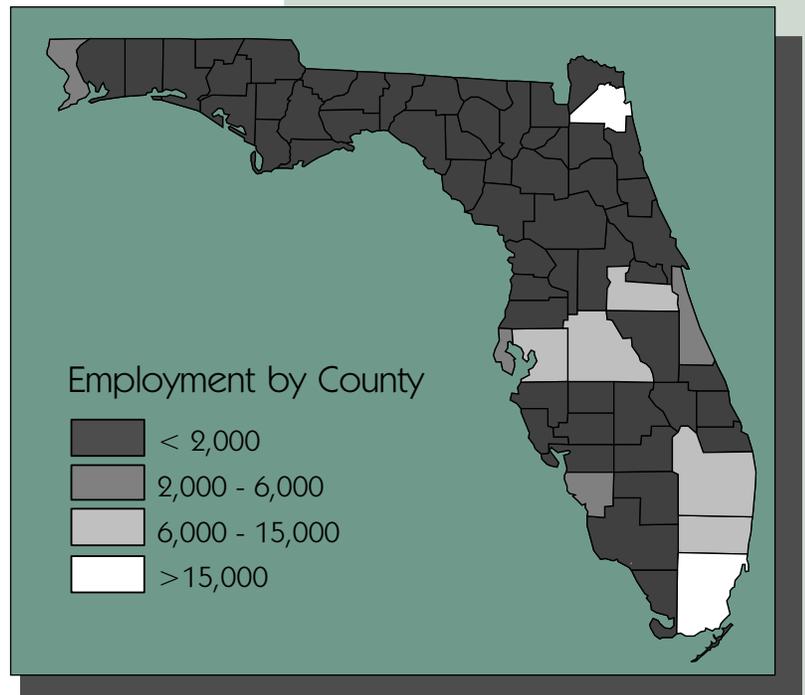
Trade and distribution is of critical importance to the Florida economy because of its fast-growing consumer population and its strategic location as a “crossroads” between the United States and Latin America and the Caribbean. Florida is important as an origin and destination for both domestic and international freight. Domestically, a total of 346 million tons of goods,

valued at \$172 billion, originated in Florida in 1993, according to the U.S. Commodity Flow Survey. International trade through the state doubled during the 1990s to \$64 billion in 1997, and is expected to double again by 2005.

This growth affects an industry that is already redefining itself to meet the demands of a global economy and a cost-competitive environment. Distribution businesses increasingly are:

- Increasing the length and frequency of shipments to accommodate the longer supply chains of customers who are outsourcing and dispersing operations across wide geographic distances;
- Struggling to reduce travel times and improve the reliability of delivery times to meet the windows of customers operating just-in-time and quick-response manufacturing and retail systems;
- Consolidating in search of cost savings and increased market share, as seen in the mega-rail mergers, development of “superports” such as Freeport in the Bahamas, and the construction of next-generation vessels that can carry more than 6,000 containers; and
- Shifting from paper to electronic transactions to meet business and regulatory burdens that require as many as 20 exchanges of information to facilitate a single intermodal freight flow.

Figure 5 Trade and Distribution Employment, 1995



Source: U.S. Bureau of the Census, County Business Patterns.

Transportation Requirements

Florida’s transportation system must prepare now to accommodate this growth and these new demands. A vital trade and distribution industry requires broad-based strength in all modes:

- Highways, because trucks are the dominant form of goods movement in Florida, accounting for 78 percent of shipments by value;
- Rail, because freight trains carry important bulk shipments of coal, chemicals, citrus, and phosphates;
- Seaports, because the majority of international shipments move via water;
- Airports, because the highest-value shipments move via air; and
- Spaceports, because space transportation represents a strategically important industry that will grow and mature well into the next century.

Equally important is the efficiency of the connections among these modes, particularly at the seaports, airports, and truck/rail terminals. These intermodal connections are highlighted by four major types of trips in the state:

- **Truck movement from Midwest or Southeast U.S. to central Florida.** As a major consumption state, Florida “imports” major quantities of consumer goods and energy from other states. The major out-of-state movements enter from Chicago or Atlanta via I-75, from the west via I-10, or from the northeast via I-95. An increasing share of these shipments terminate at distribution centers and truck terminals along the I-4 corridor, particularly in Orlando and Polk County, from which they are distributed throughout the rest of the state. It is estimated that half or more of these trucks return to the north or the west empty.

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Case Studies

Trade and Distribution Cluster

Beall's Department Stores

Behind every successful retailer is a strong distribution network. Beall's distribution function is centered at its Bradenton hub where it performs receiving, processing, and storage activities and where outbound shipping originates. Retail goods sourced from thousands of domestic and international vendors are shipped by truck from consolidation points in New Jersey, California, and North Carolina to Bradenton, where they are inspected, sorted, priced, and shipped via Beall's private fleet to over 240 stores in Florida and the southern United States. Outbound shipments alone will near 700 trucks per week during the peak holiday shipping season, and with Beall's revenues growing 15 to 20 percent per year, the number of trucks moving Beall's goods will only increase. The state has improved access points to Interstate 75, but local feeder roads to Beall's facility remain congested. Moreover, the lack of major east-west routes across Florida make it increasingly difficult for Beall's to meet quick-response delivery needs on the east coast of the state.

Cargill Fertilizer, Inc.

One of Florida's top exports is phosphates, an industry dominated by the rich resources of Bone Valley and long-established companies like Cargill. Cargill moves nearly 20 million tons of inbound and outbound shipments each year, serving export markets in Canada, Mexico, Central America, South America, and Asia. Phosphates are a bulk commodity where as much as one-quarter of the final delivery cost is due to transportation. All of the shipments are time-sensitive: two full trains of phosphates are shipped each day, and if one is missed, the entire operation can lose production because of minimal inventory on hand. Substantial congestion on SR 60 between Lakeland and the Tampa area ports at times is a major bottleneck in the company's operations.

Comcar Industries

Florida's distribution hub is moving to the I-4 corridor, as typified by the growth of Comcar Industries. Comcar operates three trucking companies from the Auburndale area: Commercial Carriers, which hauls bulk products such as building materials and food products to and from 17 terminals in Florida; CTL Distribution, which specializes in short hauls of phosphates from Polk County to the Port of Tampa; and MD Transport, which carries citrus, beer, and other food products between Florida and other states. Although investments in I-75 and I-95 have helped, congestion on local access routes to these facilities, as well as on I-4, remains a problem. In the past few decades, Florida has shifted from being one of the least congested states in Comcar's operation to one of the most congested.

CSX Transportation

Fresh off its acquisition of much of Conrail, Jacksonville-based CSX is one of the two major national railroad systems serving the eastern United States. CSX provides direct rail service to most of Florida, and indirect service to the east coast of Florida via its connection to the Florida East Coast Railway. Florida is an important market for CSX, but a high-cost market due to the large proportion of empty backhauls. CSX is making major investments in its Jacksonville facilities, which it sees as having the best potential for future expansion. However, several unmet needs for rail access to the seaport will require a public sector contribution. From CSX's systemwide perspective, Florida seaports may be losing ground to their competitors in Savannah and Charleston, where state resources are more focused.

Florida East Coast Railway

FEC is the historic line that paved the way for the growth of southern Florida as a business and tourist destination. As a regional carrier, FEC now focuses on providing expedited service between Jacksonville and Miami and coordinates seamless intermodal service with NS and CSX between major business hubs and east coast Florida seaports. Although FEC has transitioned from primarily a carload to an intermodal carrier, it offers a full range of rail services. FEC will continue to expand with the rapid growth in international commerce over south Florida seaports.

Fritz Logistics Co.

A poster child for the global logistics revolution, Fritz provides integrated logistics services including the nation's largest customs house brokerage, freight forwarding, warehousing and distribution, and insurance and other support services. Fritz is expanding rapidly in Florida due to the state's growing volume of international trade. Operating costs are increasing due to the need to pay overtime for drivers who are delayed on local access routes to Florida seaports or in lines at customs clearance. For example, SR 836 between the Miami airports and seaports is backed up nearly continuously, with as much as an hour of delay in each direction for truck shipments. Cargo security also is becoming a major problem.

Great Western Meats

An independent food distributor serving restaurants in the burgeoning greater Orlando area, Great Western Meats daily faces the challenge of delivering perishable commodities in a narrow window on variable routes to multiple customers in an urban environment. In 1981, the standard for company drivers was to make 3 deliveries per hour; today, urban highway congestion has reduced the average to 1.3 to 1.6 deliveries per hour. Total delivery costs have increased 300 percent over the past two decades, as the company hired more drivers to make the same number of deliveries. Even when the traffic flows, deliveries are complicated by narrow turning radii and a dearth of loading zones in downtown Orlando.

Maersk Inc.

One of the world's largest container shipping lines, Maersk (individually and through its partnership with Sealand) makes up to 21 vessels calls per week to the Port of Miami, Port Everglades, and Jaxport. The development of the new "superport" at Freeport, Bahamas, as well as the next generation of container ships that can carry more than 6,000 containers per load, are forcing Maersk and other major carriers to reevaluate ports of call. Florida seaports may have difficulty competing for foreign-to-foreign shipments due to limited channel depths, high cost structures, and regulatory requirements. Moreover, capacity constraints and landside access are becoming more problematic at both the Port of Miami and Port Everglades. What happens, Maersk staff ask, when the new American Airlines Arena opens in early 2000 at the mouth of the access road from the seaport to I-195?

Seaboard Marine

Seaboard Marine handles more than one-third of all container traffic through the Port of Miami, the state's largest container port. The company carries a variety of cargo to, from, and within the Caribbean, Central America, and South America, frequently working with local drayage and trucking companies to provide door-to-door service. Miami is the longtime focus of Seaboard Marine's operations due to its southern location and extensive cultural ties to Latin America and the Caribbean. However, landside access problems may impinge on Miami's future growth – the nearest rail transfer facility, operated by Florida East Coast Railway, is more than 12 miles from the port, a journey that could take two to three hours under congested conditions.

Tropicana

With 40 percent of the national fresh orange juice market, Tropicana uses virtually every mode possible to move its product to grocery shelves across the world. The company has managed its growth through a series of steps to cut costs and improve service. To ensure quality long-distance rail transportation to important markets in the Northeast and Midwest, Tropicana purchased its own fleet of 350 refrigerated rail cars that form six unit trains per week on CSX lines to New Jersey and Cincinnati. To accommodate for the limited seaport facilities near its Fort Pierce processing center, Tropicana has used port facilities in West Palm Beach and Manatee to handle European shipments. Trucking remains critical for hundreds of shipments from Bradenton to Atlanta and other Southeast markets, as well as for substantial in-state flows between the orange groves, Fort Pierce, and Bradenton. The lack of major east-west highways forces hundreds of tank and fruit trucks each day onto increasingly congested two-lane roads including State Routes 72, 70, 64, and 60. On both road and rail, congestion and uneven levels of service add costs and introduce uncertainty into an operation struggling to balance time-sensitive delivery needs with driver out-of-service requirements.

About half of the international shipments through Florida neither originate nor terminate in the state. Florida has an opportunity to add value to these shipments by shifting from merely moving goods to other services such as consolidation, packaging, labeling, and final assembly.

- **Exports of Florida goods to Latin America and the Caribbean.** More than 70 percent of Florida’s exports are destined for Latin America and the Caribbean. The major commodities of Florida-origin exports include citrus, phosphates, and high-tech goods, which tend to be produced in the central part of the state and move via trucks – often on congested two-lane roads such as State Route 60 – to seaports. Air is growing in importance: by value the share of exports moving via air has surged from 25 percent to 36 percent over the past decade, with virtually all of this amount moving through the Miami International Airport.
- **Imports of Latin American or Caribbean goods.** The major flows of imports include consumer goods from Latin America or the Caribbean to consumer markets, particularly in South Florida; and bulk products such as oil and cement from Latin America, primarily through the Port of Tampa. These imports are then shipped to warehouses and distribution centers via truck or pipeline.
- **Transshipments.** About half of the international shipments through Florida neither originate nor terminate in the state. These include Asian automobiles imported through Jacksonville for sale nationwide; Midwest capital goods exported through Miami to developing nations in Latin America; and foreign-to-foreign movements of goods from Europe to Latin America that use Florida seaports only as points for the transfer of containers between ships. The emergence of the “superport” in Freeport, Bahamas appears to be reducing the foreign-to-foreign movement through Florida seaports. However, Florida seaports and airports still have opportunities to move goods between other states and the growing Latin American and Caribbean markets. Moreover, Florida has an opportunity to add value to these shipments by shifting from merely moving goods to other services such as consolidation, packaging, labeling, and final assembly.

Transportation Deficiencies

Less than half of the distribution companies surveyed for this research indicated that the transportation system is adequate for their needs, with particularly low marks for rail and truck/rail facilities. The core issues are:

- **Highway congestion along both the FIHS and local feeder routes.** Too many of Florida’s truck routes are clogged with congestion. Congestion adds to the costs of the motor carriers and other businesses shipping goods on Florida’s highway system (see sidebar). Companies also accrue additional costs because they must keep larger inventories to guard against unexpected delays, or because they must hire more drivers or purchase more vehicles to make the same number of deliveries in a single day. Motor carriers have trouble escaping congestion because of the limited number of limited-access truck routes in the state; many carriers note that despite lower volumes on I-75 or the Florida Turnpike in south Florida, they still use congested I-95 because it gets them closer to their customers. The impact of these congestion costs is higher delivery costs for Florida exports and transshipments, and higher consumer prices throughout the state.
- **Inefficient landside highway and rail access to seaports and airports.** Florida’s international gateways are being stopped up by bottlenecks at their own gates. At seaports both large (Tampa) and small (Pensacola), the primary truck access is through downtown business centers or historic districts. Rail access to many seaports requires a final movement in a truck through local traffic; in Miami, the 12-mile drive from the nearest rail terminal to the seaport can take as much as 2 hours during congested conditions. In Miami and Fort Lauderdale, truck traffic must share seaport access roads with large flows of cruise

passengers. Across the state, the connections between modes at these critical gateways are bottlenecks that impede the movement of international freight. These costs will only increase as container and cargo traffic through Florida ports grows. For many long-haul marine movements, terminal operations and landside transportation account for close to half of total delivery costs. The seaports and airports that do not reduce these costs will lose market share, particularly for the transshipments that could easily be handled by facilities in other states or nations. These landside improvements must include not only the access routes or rail lines to the seaports and airports, but more generally improvements to the major corridors through which freight flows to these facilities.

How Much Does One Minute of Delay Cost?

Traffic congestion is the source of untold frustration and lost time for all types of trips – commuting, recreational, social, and business-related. For business trips, particularly those involving freight movement via truck, congestion also means higher costs and reduced competitiveness.

A rule-of-thumb operating cost for a heavy truck is about \$60 per hour, most of which reflects drivers' wages. A single minute of highway delay, therefore, costs the motor carrier (and indirectly, its customer) about \$1. This amount, while small, can add up quickly:

- Based on trip generation rates developed by the U.S. DOT, a manufacturing plant or distribution center with 1,000 employees (typical of the larger companies interviewed for this study) would generate about 1,200 commercial vehicle trips per day, including 900 four-tire vehicles, 200 single-unit trucks, and 100 tractor-trailer combinations.
- Depending on the operating patterns of the company and the length of the peak period, half to all of the trucks serving the distribution center may experience congestion during a given day. Based on the \$60 per hour operating cost for the combination trucks, and lower costs of \$50 and \$40 per hour for the other classes of trucks, the total direct cost of a single minute of delay on an access road to the distribution center is between \$400 and \$800 per day – or \$112,000 to \$225,000 per year assuming operation five days per week.

Given Florida's industry mix and national inter-industry purchasing patterns, it is estimated that about one-third of the congestion costs experienced by trucks is borne directly by for-hire motor carriers; one-third by retailers that operate their own private fleets; and the remainder by manufacturers, wholesalers, and other businesses with private trucking fleets. With the number of vehicle-hours of delay experienced by trucks in Florida increasing steadily, highway congestion on truck routes is a pressing problem that must be addressed.

- **Capacity constraints at seaports, airports, and spaceport.** Some of the larger seaports (particularly Miami and Port Everglades) also are facing constraints in terms of berths, cranes, or gate operations. The Port of Miami is close to full capacity, while Port Everglades has limited room for expansion. None of Florida's seaports can provide the 50-foot draft necessary for today's largest vessels – making seaports that once were “deepwater” somewhat shallow by today's standards (see sidebar). Miami International Airport – which single-handedly accounts for more than one-third of the dollar value of Florida's international trade – needs a fourth runway to stave off major delays in flight operations, and even then is likely to run out of capacity by 2020. At other seaports and airports, the availability of U.S. Customs and other support services is a concern. At Cape Canaveral, the launch pads, processing facilities, and launch range technologies are nearing their limits, causing satellite customers to look overseas for access to space. If these capacity constraints are not addressed, Florida's key gateways will not be able to maintain their historic growth rates.
- **Quality of rail service.** Shippers frustrated by highway congestion are looking to rail to pick up more of the slack, which creates pressures for CSX, NS, and the FEC to continue to upgrade their facilities and networks. The FEC run from Jacksonville to Miami, for example, takes about 11 ½ hours, well above an 8-hour goal. Demand for rail/truck facilities, an often overlooked link in the intermodal chain, is growing.

Megaships and Superports: Can Florida's Seaports Compete?

For many years, Florida's seaports have benefited from the state's location and cultural ties to growing Latin American and Caribbean markets. In today's competitive maritime industry, however, these assets may not be sufficient to ensure future growth.

The U.S. DOT estimates that by 2010, 90 percent of all oceanborne freight will be shipped by container. Four of Florida's container ports ranked among the top 20 in the nation in 1997: the Port of Miami, Port Everglades in Fort Lauderdale, Jaxport in Jacksonville, and the Port of Palm Beach. The number of containers handled by these facilities could easily double by the year 2005, given consensus projections for growth in international trade.

Driven by burgeoning international trade and continued pressures to reduce costs and delivery times, steamship lines are investing in next-generation vehicles including the "megaships." Megaships can carry 4,500 or more twenty-foot equivalent (TEU) container units. These ships account for less than 1 percent of the worldwide fleet today, but represent 8 percent of all orders and are expected to carry as much as 40 percent of all container shipments by 2010. The megaships offer substantial economies of scale on the waterside in terms of reduced transit costs and vessel needs, but also create new challenges for seaports. For example:

- Megaship operation generally requires a minimum draft of 50 feet for channels, berths, and turning basins – a measure by which all of Florida's major seaports currently fall short.
- Cargo handling requires larger cranes, stronger wharves, expanded Customs and other support services, and expanded storage capacity - an issue when many of Florida's seaports already are eking out every inch of capacity.
- Landside transportation requirements are enormous: a megaship terminal could handle throughput of 450,000 to 900,000 TEUs per year through its gate. With a 40 percent share for on-dock rail (generous by the standards of most Florida seaports), the megaship terminal would generate 2 to 4 unit trains per week and 1,730 to 3,460 truck trips per day, according to VZM/TranSystems. With no on-dock rail, the terminal would generate 2,880 to 5,770 truck trips per day.

Because megaships are most efficient when they call on a relatively small number of ports, their development is accelerating a consolidation among seaports. Many in the maritime industry predict that a small number of "superports" or "hub ports" will emerge, with other seaports serving as feeders to and from these larger facilities. Increasingly, Florida's seaports face choices: do they want to invest in the facility expansions necessary to compete as a hub port? How do they want to position themselves to compete against or team with hub ports in other states or nations?

Large-scale transshipment ports capable of handling megaships are being developed or planned in Freeport, Bahamas; Kingston, Jamaica; San Juan, Puerto Rico; and both coasts of Panama. In many cases, these sites may offer deeper channel depths and lower cost structures than Florida's seaports. Major shipping lines interviewed for this study confirmed that some foreign-to-foreign transshipment cargo already is shifting from Florida's seaports to Freeport. If this trend continues, Florida's seaports will see their future tied even more directly to local exports and imports or U.S.-to-foreign transshipments. This shift creates more opportunities for Florida to add value to the cargo moving through the state, but also increases the importance of efficient landside highway and rail connections.

High-Technology Cluster

Economic and Logistics Trends

The high technology cluster includes companies in the information, bio-medical, and aerospace industries. The cluster accounted for an estimated 185,000 jobs in 1996, or 35 out of every 1,000 workers, according to the American Electronics Association. The average annual wage for high-tech workers was \$37,800 in 1995, some 50 percent higher than the average wage for all workers in the state. More than half of all high-tech jobs in the state are located along the I-4 corridor from Tampa through Orlando to the "Space Coast," while about one in four jobs are located along the I-95 corridor in south Florida (see Figure 6).

With low business costs, an attractive quality of life, and access to major universities, Florida has many of the attributes that have characterized other successful high-tech centers such as Silicon Valley, Route 128 in Boston, Seattle, and Austin. Florida's high-tech industry cluster has ben-

efited heavily from the state's well-developed telecommunications infrastructure. Florida ranks among the top five states for employment in manufacturing of communications equipment, defense electronics, and electromedical equipment, as well as computer, data processing, and information services.

High-tech goods now account for 46 percent of total exports in the state. Florida businesses serve global markets in industries such as microelectronics, communications equipment, medical equipment, and aerospace. Because of its distance from many of the key markets, however, transportation service and costs are even more significant in Florida than in other states.

Transportation Requirements

High-tech business transportation needs focus on highways and air. Because of the high degree of specialization and outsourcing in the industry, high-tech companies tend to have long supply chains and distribution networks. This is particularly true of Florida's microelectronics industry, which produces intermediate inputs for computers, consumer electronics, and other goods. These companies also tend to have short product cycles and narrow delivery windows. For example, Datamax, an Orlando company, manufactures specialized thermal printers with a two to three day order cycle. Domestic freight shipments tend to be small but high-value, moving via air or less-than-truckload. International shipments to Asia or Europe move almost entirely by air.

Movement of people also is important in this knowledge-intensive industry. High-tech executives and design staff frequently must travel to business meetings and conferences, particularly in other high-tech business centers. Many of Florida's largest high-tech businesses are suppliers, affiliates, or divisions of larger companies that are based elsewhere in the United States. Finally, high-tech companies require access to trained labor with specialized expertise, who use the highway system for commuting.

Conversely, technology is becoming a more important requirement for efficient transportation in Florida. Motor carriers are investing heavily in mobile communications and global positioning systems to track cargo. Seaports and airports are looking for ways to automate operations. The launch vehicles using the spaceport are themselves technology-intensive transportation tools, using sophisticated guidance, tracking, propulsion, and life support systems. Florida has been at the cutting edge of several major intelligent transportation systems (ITS) demonstration projects (see box).

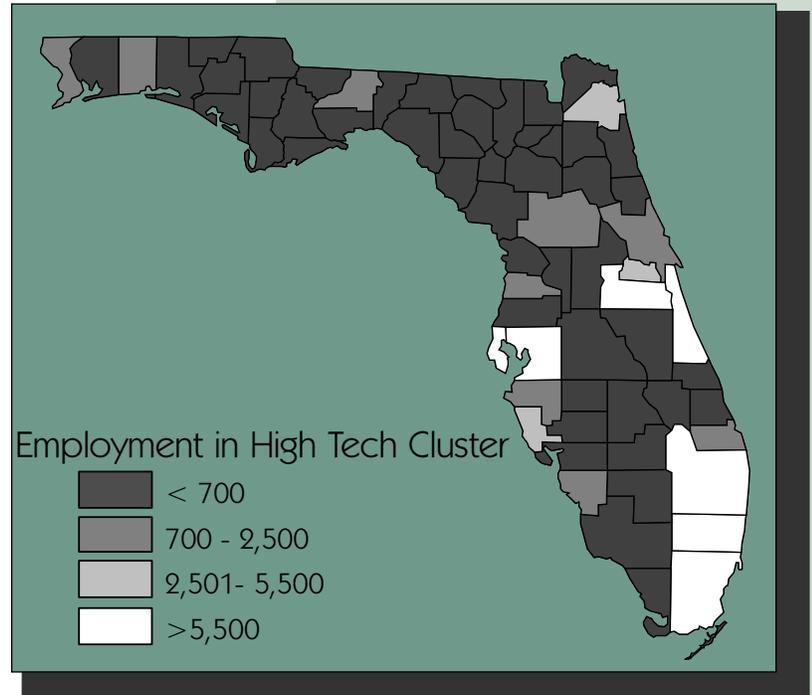
Transportation Deficiencies

High-tech companies require rapid, reliable transportation to key markets. The core issues in Florida are:

- **Heavy congestion along I-4 and I-95.** The critical arteries for high-tech business in Florida, I-4 and I-95, also carry major flows of commuters, residents, tourists, and freight. Congestion

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Figure 6 High-Tech Cluster
Regional Distribution



Source: U.S. Bureau of the Census, County Business Patterns.

ITS Projects in Florida

Advantage Commercial Vehicle Operations (CVO) Mainline Automated Clearance System – Florida is a member of a public/private partnership involving six states and one Canadian province. The system enables electronic screening and bypass of safe and compliant motor carriers at weigh stations along I-75.

I-4 Surveillance and Motorist Information System – The freeway management system in the Orlando metropolitan area includes loop detectors, closed circuit television cameras, and changeable message signs along 64 km of I-4.

Orlando Travtek – Orlando led the world's first successful demonstration of advanced navigation and traveler information devices supplemented with real-time traffic information.

Case Studies

High-Technology Cluster

BellSouth Corporation

The Miami operations of the telecommunications giant sees continued growth potential, but worries about access to workers. For welfare-to-work employees filling lower-skilled jobs, transportation availability is surpassing child care as a critical need. At the same time, affordable direct air service for business travelers to domestic markets is scarce as airlines pursue the lucrative international market.

Datamax Corporation

Headquartered in Orlando, Datamax makes custom-order thermal printers and labels for medical, transportation, and retail businesses. With a typical lead time of two to three days, Datamax must gather components from Florida, Illinois, and Asia; assemble the goods; and deliver the finished products worldwide. More than 80 percent of outbound goods move via air freight, with half going to Europe. Transportation accounts for between 5 and 20 percent of the delivery cost of Datamax goods. Localized highway congestion adds to these costs and threatens the company's ability to meet its narrow delivery windows.

Jabil Circuit, Inc.

Based in St. Petersburg, Jabil is a contract manufacturer of printed circuit boards and one of many intermediate goods producers in the state's complex high-tech supply chain. Components arrive from California, New England, and Asia, and circuit boards are shipped via truck or air to major computer manufacturers in California and South Dakota. As in other major metropolitan areas, congestion is growing on the local roads that provide access from Jabil to the Interstate system. Congestion's impact on company operations is minor today, mostly involving changes to schedules and driver assignments.

Plasma-Therm, Inc.

Plasma-Therm is a front-end equipment manufacturer for the semiconductor industry with operations in St. Petersburg. Freight flows, most of which originate or terminate outside of Florida, are projected to increase 50 percent over the next five years. With most goods moving via air freight or less-than-truckload, transportation accounts for about 10 percent of the final delivery cost of Plasma-Therm products. Congestion on I-275 and local access roads is making Plasma-Therm rethink its scheduling, particularly for time-sensitive shipments of components and international goods that must clear Customs during limited work hours.

Solutia

A longtime fixture of the northwest Florida economy, Solutia manufactures specialty chemicals for carpet and tire producers at its 2,500 employee plant in Gonzalez. Inbound shipments of bulk petrochemicals move from Houston or Port Arthur via barge to the plant, since the local port offers limited facilities for liquid bulk shipments. Outbound shipments move via highway to Alabama for final production, or to the ports of New Orleans or Savannah for export. Highway traffic in the Panhandle is generally acceptable, but air travel from Pensacola to key destinations such as Atlanta and St. Louis is expensive. Many employees are opting for drives to Mobile or New Orleans to catch less expensive flights.

in these corridors makes it difficult to satisfy just-in-time delivery requirements, particularly where groundside access to the airport becomes difficult. Delays of as little as 20 minutes, which are merely annoying in many business operations, can paralyze high-tech companies that are waiting for parts and trying to fill orders for specialized equipment in three days or less. This congestion also makes it difficult to attract or retain skilled labor in tight labor markets.

Uneven airport service. High-tech companies give high marks to airport service overall, although they note concern about ground access. The major airports in Orlando and Miami are perceived as assets. However, the lack of direct flights to major high-tech business centers such as Seattle or San Jose could keep Florida cities off the short list for out-of-state businesses that are scouting new locations. Smaller cities that do not offer air service with the frequency or destinations of these larger markets may have difficulty growing their high-tech industries.

Tourism Cluster

Economic and Logistics Trends

Tourism is one of the key engines of Florida's economic growth. The state's 47 million visitors in 1997 contributed nearly \$41 billion in taxable spending, or one-fifth of the statewide total.

Feeding, housing, entertaining, and otherwise supporting these visitors accounts for 275,000 jobs in the state's lodging, amusements, motion pictures, and broadcasting industries, and an additional 500,000 jobs in related industries such as retail trade and restaurants. The major concentrations of tourist activity are in central Florida (about one-quarter of all activity), south Florida, and the Tampa Bay Area (see Figure 7). In the northern part of the state, notable tourist destinations are Panama City and Jacksonville.

The number of visitors to Florida has grown rapidly in the past decade, and is projected to continue to grow due to rising incomes and favorable demographics in the United States, Europe, Canada, and Latin America, Florida's major origin markets. Nevertheless, the industry is changing rapidly. The old model of a family of four driving from the Northeast for an extended driving tour of the state is a relic of the past; today's "typical" visitor flies into Orlando or Miami for a weekend at a theme park or beach, may make only a single stop, and may not even rent a car.

Transportation Requirements

Over 56 percent of Florida's out-of-state visitors now arrive by air, a significant shift from a decade ago. While automobiles are the primary mode of arrival for visitors from Alabama, Georgia, North Carolina, South Carolina, and other Southeast states, air is used by the majority of visitors from Northeast, Midwest, and West states such as New York, Pennsylvania, and California as well as for international visitors. The air/highway split also varies geographically within Florida, with many visitors driving to the Panhandle but most flying to Miami. Fewer and fewer tourists are "excursionists" who stop in multiple cities during a period of several days; many tourists go to a single spot and may not leave a relatively small radius except to move to and from the airport.

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continued on page 29

Case Studies

Tourism Cluster

American Airlines

With 250 flight operations per day, American has filled the void created by the demise of Eastern Airlines and Pan American World Airways to become Miami's dominant air carrier. Miami is the largest international gateway in American's system, the funnel for passenger and cargo traffic to and from Latin American and the Caribbean. American is the largest private employer in the Miami metropolitan area, with more than 9,000 direct jobs and an estimated economic impact of \$4.7 billion in gross regional product. Airside capacity at MIA, as well as difficult local highway and transit access, loom as constraints on American's future growth.

Orange County Convention Center

Orange County is the second largest convention center in the United States with more than 1.1 million square feet of exhibit space – and that's before a planned expansion to 3 million square feet by 2010. The convention center must accommodate over one million visitors each year, sharing congested International Drive with theme parks, hotels, and other attractions. Freight is important too – a large tradeshow may require 300 or more truck trips each for setup and breakdown over a short period. To enable the planned expansion, the county is investing tourist development funds in a series of transportation projects that begin with widening a portion of International Drive to six lanes, the construction of a truck-only access road to the center, and the construction of a car-only flyover on the Bee Line Expressway. The center will partner with Universal Studios to make additional road improvements in and around their facilities. Plans are progressing for a regional light rail transit system with the first segment serving the convention center in the year 2002.

Premier Cruises

Formed by the merger of three separate cruise lines in 1997, Premier Cruise provides excursions for more than 175,000 passengers each year out of Port Canaveral, the Port of Miami, and, in the near future, Port Everglades. The company has been one of the pioneers in creating hotel and cruise vacation packages. With the vast majority of guests arriving by air, efficient groundside connections between the airport and seaports is a competitive requirement. Current connections are spotty: at Miami International Airport, shuttle buses cannot drive up to the curb due to low overhangs, so passengers must cross several lanes of traffic to get to the bus. The company is shifting operations to Port Everglades in Fort Lauderdale, largely due to its proximity to the airport.

Saddlebrook Resort and Conference Center

Saddlebrook is a golf and tennis resort north of Tampa that caters to business meetings. The facility hosts about 600 conferences each year, bringing about 90,000 visitors to the area. Saddlebrook staff note that few of the resort's competitors can offer easy, door-to-door transportation access to a major airport. Few guests report major transportation problems. But with a tight labor market and no public transit to the facility, management is concerned about filling positions among its 1,000 person staff.

Universal Studios

Universal Studios and other major theme parks have contributed to Orlando's growth as a tourist destination. Universal is growing rapidly, with a \$2.6 billion entertainment complex and associated resorts opening in spring 1999. An additional 2,000 acres are on the drawing board, which will include the planned expansion of the convention center. Like other major attractions, Universal is investing in its own access improvements: a \$54 million interchange between I-4 and Universal's new, 21,000 space parking garage is being financed by Universal with a tax increment finance payback from the city and Orange County. Congestion on I-4 exasperates Universal visitors, employees, and delivery vehicles alike. The park is contributing toward the construction of the region's light rail transit system. A stop will be located at Universal's "front door."

Three segments of Florida's tourist market are growing at particularly strong paces:

- **International** – Florida drew 6.1 million international visitors in 1997, primarily from Canada, Europe (particularly the United Kingdom and Germany), and Latin America (Brazil, Argentina, and Venezuela). The three largest airports in the state for international visitors are Miami, Orlando International, and Orlando Sanford. International visitors bring with them high expectations about the quality of transportation service, particularly for transit and passenger rail. Tampa and Orlando are bidding jointly for the 2012 Olympics, which would bring a worldwide audience to the state but also would require major improvements to the transportation system.
- **Business and conventions** – Planned expansions at the Orange County Convention Center and the Osceola World Expo Center will make the Orlando area one of the world's largest convention destinations. Other cities are expanding their convention and business meeting activity as well. Business travelers often spend more money per day than vacationers, but also have higher expectations about the quality of transportation services.
- **Cruise passengers** – Florida's seaports handled 8.1 million cruise passengers in 1997, including 3.5 million in Miami. This figure is expected to nearly double by 2002, with particularly strong growth at the ports in Canaveral, Palm Beach, and Tampa. These seaports require efficient connections to airports, theme parks, and other attractions.

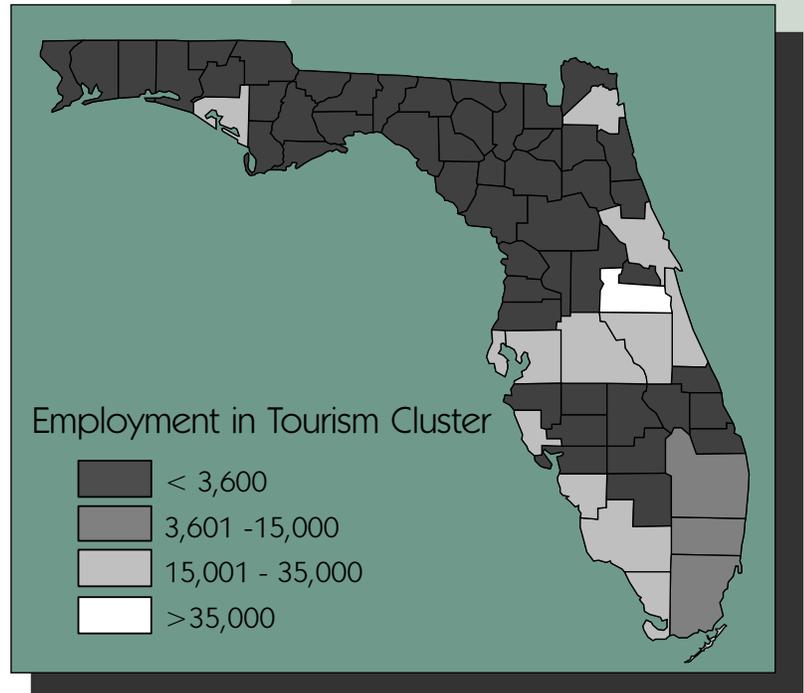
Freight is a less-noticed yet vital requirement for the tourist industry. Major theme parks, cruise ships, hotels, and convention centers consume vast quantities of food, beverages, paper goods, and other supplies, and must have convenient access to a large number of delivery vehicles on a regular basis. These freight movements can rival those of large manufacturing plants or distribution centers: a large trade show at the Orange County Convention Center, for example, can bring some 300 trucks in and out of the facility in a period of two to three days.

Transportation Deficiencies

The continued strong growth anticipated in tourist activity will require continued investment in transportation, not only to manage this growth but also to ensure that the state's pockets of tourist activity are connected effectively. The core issues are:

- **Inefficient multimodal access to airports and seaports.** At virtually every airport in the state, arriving tourists leave for their final destination by rental car or private shuttle bus. The large number of private vehicles frequently clogs the access roads to these facilities, which often also must carry time-sensitive cargo and rushed business travelers. Similarly, cruise passengers struggle with the same landside highway access problems that are bottlenecks for freight, often using the same access roads. In major markets like Miami, Fort Lauderdale, and Orlando, airports and seaports or theme parks are not linked via transit lines. Transit would provide seamless door-to-door service for both visitors and their luggage. More seamless trans-

Figure 7 Tourism Cluster
Regional Distribution



Source: U.S. Bureau of the Census, County Business Patterns.

portation options also would encourage cruise passengers to package their visits with stays at theme parks, beaches, or resorts in the state – and thereby increase the economic impact of their spending.

- **Highway congestion.** Although the majority of tourists arrive by air, private vehicles are the mode used to arrive at the preponderance of destinations. As multiple attractions, hotels, and restaurants begin to locate in single areas like Orlando’s International Drive or Miami’s South Beach, nearly continuous gridlock results. This congestion discourages tourists from making return visits, and, along with limited options for public transit, impedes efforts to fill low-wage service jobs in tight labor markets. The solutions – elimination of left-turn lanes, upgrades to limited access facilities, or development of new circumferential highways in congested areas – are worse than the problem if they limit direct highway access to destinations that are most reliant on pass-by traffic.
- **Airport and seaport capacity and service.** Continued growth in air and cruise passengers in Florida will strain capacity at major airports and seaports, even as these facilities are struggling to accommodate growth in cargo shipments. The potential reopening of Cuba will add to this growth. Significant constraints are looming in Miami, where both the seaport and airport are running out of space for future growth.
- **Limited information on travel options and tourist destinations.** From a tourist’s perspective, the transportation system is not sufficiently information-rich or user-friendly. Highway signage often provides limited information, and usually just in one language. In the past, tourists who drove were deluged with travel information and maps at rest stops. Today, tourists arriving by air often have limited information on the destinations they could visit beyond the major theme parks, and have virtually no information on bus schedules and other transit options. Tourism is marketed for individual attractions, but not for corridors or travel options that could get visitors to take excursions across the state. These characteristics discourage tourists from visiting smaller attractions or making multiple stops.
- **Limited evacuation routes and parking at barrier islands.** Florida’s beaches and barrier islands - from Key West to St. Augustine to Panama City – are among the state’s crown jewels. Growth in many of these communities is constrained by limits on parking. In addition, many coastal communities have limited evacuation options during major storms.

From a tourist’s perspective, the transportation system is not sufficiently information-rich or user-friendly.

Institutional and Policy Context

These transportation challenges must be understood in the context of the institutional and policy environment that shapes transportation financing and planning in Florida. The transportation community includes multiple stakeholders:

- Highways are planned, constructed, operated, and maintained by the Florida DOT (working through its eight districts, including the Florida Turnpike), several toll authorities, 25 metropolitan planning organizations (MPOs), 41 county governments, and a plethora of cities and towns;
- The rail system is 97 percent owned and operated by private freight carriers, with the exception of the commuter rail line in south Florida;
- The seaports and airports are owned by institutions ranging from city or county agencies to quasi-public authorities; and
- The spaceport is supported by a statewide authority and federal agencies.

These public and quasi-public organizations fulfill their responsibilities through a complex system that is difficult for businesses to understand or influence. The transportation planning process evolved primarily to meet the needs of the state's residents and to address important environmental, safety, community, and financial goals. In many ways, this planning process runs counter to the common needs of businesses in a competitive, evolving economy:

- Businesses often conceive of “long-term planning” as a two- to three-year cycle; a transportation project may take six years just to get on the work program for an MPO or the DOT, and, as in other states, a major project may take up to 20 years to move from planning through design to construction and full operation. Delays are associated with the backlog of projects already in the program, funding constraints, environmental assessment requirements, and other regulations such as right-of-way acquisition policies.
- Businesses operate on regional, national, or international scales; transportation planning occurs at a decentralized level driven by individual counties and MPOs. METROPLAN Orlando and the Sarasota-Manatee MPO are among the few MPOs in the state to comprise more than one county. MPO boundaries generally do not match the economic regions within which businesses operate. With a few exceptions (such as METROPLAN Orlando and the Volusia County MPO, and the West Florida Regional Planning Council, which staffs the MPOs in Pensacola, Panama City, and Fort Walton Beach), MPOs coordinate across their borders only on an informal basis.
- Businesses (particularly shippers) focus on the complete trip, crossing multiple modes; transportation planning at the DOT and most MPOs traditionally has been “stovepiped,” focusing on individual modes and not the connectivity across modes. The DOT is now beginning development of an intermodal systems plan that will address these issues. Metropolitan areas may begin to follow suit, also drawing from the examples of the Jacksonville Port Authority, which manages the seaport and airports in Jacksonville; and the Jacksonville Transportation Authority, which manages the expressways and transit system.

With some notable exceptions, the link between economic development and transportation planning is tenuous in many Florida agencies. The DOT's Statewide Transportation Plan and many MPO long-range plans offer general goals for economic development, but do not define measurable performance objectives. Not all MPOs have standing business or freight advisory committees, although many do coordinate with local economic development agencies. In particular, freight is not visible in the planning community – just over half of the state's MPOs have initiated freight planning efforts. Project prioritization generally reflects “home to work” issues such as travel time, safety, and mobility, and not “goods to market” issues such as freight mobility and economic development.

Conclusions: Florida's Transportation Challenge

Florida's economic opportunity is strong.

The 1990s continued the pattern established throughout the past few decades in which Florida's economic growth outstripped the nation as a whole, and this pattern shows little sign of abating. This study confirms the major

The transportation planning process in many ways runs counter to the common needs of businesses in a competitive, evolving economy.

conclusions of both *Cornerstone* and *International Cornerstone*: Florida is poised for continued economic growth in three areas:

- As a pivotal “crossroads” economy, handling a growing share of world trade among the United States and Latin America and the Caribbean;
- As part of the next generation of global high-tech centers, hosting research, production, and distribution functions in the electronics, communications, biomedical, and aerospace industries; and
- As one of the world’s leading tourist and convention destinations, with opportunities to spread visitor spending among attractions and across geographic areas.

Transportation is critical to reaching this opportunity.

Transportation is the cornerstone of the Florida economy. The key to the growth and competitiveness of Florida in all three of these industries – as well as in Florida’s economy more generally – is an efficient, intermodal transportation system. Each growing market area relies heavily on major regional, national, and international flows of goods and people, particularly tourists. The first and foremost transportation need is for highway improvements. There also are critically important needs for improvements to other modes, including rail, marine, air, and, increasingly, space. Without a balanced transportation system with strengths in each mode, Florida’s economy will lose competitiveness compared to other states and nations.

Florida businesses are increasingly concerned about current and future transportation service.

Concern about the availability of high quality transportation service to key markets cuts across all industries studied – from theme parks to electronics producers – as well as across all regions of the state – from Pensacola to Jacksonville to Miami. The core issues, and their implications for Florida businesses include the following:

- Inefficient landside access to seaports and airports and congestion on truck routes is increasing the cost of shipping goods in Florida, particularly those destined for international markets. The risk is a loss in the market share of Florida gateways, particularly for transshipments that could be handled in other states and nations – and consequently, fewer local jobs in manufacturing, distribution, and trade support services.
- Congestion along key highway corridors such as I-4 and I-95 in South Florida is making it difficult for high-tech businesses to meet just-in-time delivery requirements and attract or retain skilled workers. The risk is that high-tech businesses will select other states for new or expanded facilities, taking thousands of high-wage jobs elsewhere and affecting businesses in key supplier and customer markets.
- A lack of multimodal travel options and inefficient intermodal connections between airports, cruise terminals, and major attractions is inhibiting Florida’s communities from enjoying the full benefit of business and personal travel in the state. The risk is that travelers will avoid multiple-stop visits to the state, or select other destinations entirely. For Florida’s 2012 Olympics bid to be successful, these needs must be addressed.
- Capacity constraints at major seaports, airports, and the spaceport will limit future growth of Florida’s most critical gateways. The bottlenecks include landside access, waterside or airside capacity, spaceport launch capacity, and the availability of U.S. Customs and other

Transportation is the cornerstone of the Florida economy. Without a balanced transportation system with strengths in each mode, Florida’s economy will lose competitiveness compared to other states and nations.

support services. The risk is that freight and tourists who are not able to move efficiently through these facilities will seek other states or nations entirely.

- A lack of competitive options for transportation service, most notably for passenger air service in smaller markets and for freight service in some parts of the state, is reducing the choices available to businesses to satisfy their customer demands in a dynamic environment. The risk is that businesses will begin to look to other states or nations for future expansion.

Florida businesses are resilient and adapt to some transportation problems.

The case studies revealed numerous ways in which Florida businesses are adjusting their operations to deal with transportation problems. Motor carriers and distributors are adjusting their schedules and routing to deal with recurring congestion problems. Major exporters like Tropicana are investing in their own specialized equipment to ensure that their transport needs are being met. Increasing numbers of businesses are using telecommunications and information systems to manage their transportation systems. This flexibility is a source of the competitive strength of many businesses in the state.

But many transportation problems are out of business' control.

However, many of the state's most pressing transportation problems – the growing imbalance between highway capacity and demand, the capacity and access constraints facing many seaports and airports – remain beyond the ability of an individual business to control or influence. Instead, these decisions remain the purview of a complex, decentralized state and local institutional structure. The transportation planning process often proceeds with minimal involvement from the business community, and is a source of frustration for businesses because it tends to emphasize local rather than regional projects; home-to-work rather than goods-to-market flows; individual modes rather than intermodal connectivity; and long-term planning rather than short-term projects. In such an institutional environment, it is difficult to adequately address business needs.

New solutions are needed.

For these reasons, Florida must act now to address the transportation needs of its growing economic sectors. The solution is not simply one of adding new or upgrading existing highways and terminals – it also must involve changes in the way that this infrastructure is operated, planned, and financed. Without taking these steps, the risk is one of lost jobs and business investment, higher business costs and consumer prices, and reduced economic growth and competitiveness for the state.

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Strategies for Future Transportation Investment

To meet the demands of its 21st century economy, Florida must enact a program of strategic investment in its freight and passenger transportation systems. Coordinated actions are needed in the areas of infrastructure, operations, policy, and funding.

Infrastructure: Focus on Trade Corridors and International Gateways

Infrastructure investment should focus on the major trade corridors and international gateways in Florida – the seaports, airports, rail lines, and highways that link Florida’s economy to other states and nations. These are the critical links for moving passengers and cargo between Florida and the rest of the world; increasing their safety and efficiency is required to ensure future growth of Florida’s trade, high-tech, and tourism industries.

1. **Accelerate major improvements to the I-4 corridor between Tampa and Daytona Beach and to the I-95 corridor between West Palm Beach and Miami.** These two corridors are critical to the growth of all three clusters studied. They handle important flows of freight, commuters, and tourists. Capacity constraints should be addressed through multimodal solutions that couple highway widening and reconstruction with other effective solutions such as high-occupancy vehicle lanes, transit, and passenger rail. This is particularly true for I-95, which already is at the maximum number of lanes prescribed by DOT policy. The corridor improvements should include enhancements of the feeder roads that link local communities to these Interstate facilities.
2. **Establish a “Trade and Economic Corridors Program”** for coordinated planning, design, and construction of corridors of statewide significance to promote economic development and international or inter-regional trade. This program, which would be modeled after the new federal trade corridors initiative, would be targeted at implementing multimodal transportation solutions on multi-county corridors that handle substantial flows of trade or tourists. Early priorities for planning activities could include:
 - The Bee Line Expressway from Orlando to Port Canaveral;
 - SR 60 from Bartow to Tampa;
 - The U.S. 301 corridor between Tampa and Jacksonville; and
 - The I-110 to I-65 connector from Pensacola to Alabama.

In addition, consideration should be given to improving other east-west corridors across central Florida. This corridors program should be developed and administered by the DOT with input from Enterprise Florida, the MPO Advisory Council, FSTED, and the Florida Tourism Commission. Specific projects should be defined with input from individual MPOs; economic development organizations; convention and visitors bureaus; seaport, airport and spaceport authorities; railroads; motor carriers; and other stakeholder groups.

3. **Set priorities for expansion and modernization projects in the state’s seaports and airports** based on emerging global economic and logistics trends. The DOT should work cooperatively with seaport, airport, and spaceport authorities and MPOs to achieve this goal. This process can build upon the institutional framework already established by the FSTED. Criteria for evaluating expansion needs should include current and projected international freight and passenger flows, and potential economic returns from the investment. Resources should be provided to grow the seaports and airports that serve as the state’s most strategic gateways:
 - The five major seaports – Port Canaveral, Port Everglades, Jaxport, the Port of Miami, and the Port of Tampa – that together comprise more than 85 percent of the state’s international cargo and passenger movements; and

Infrastructure investment should focus on the major trade corridors and international gateways in Florida – the seaports, airports, rail lines, and highways that link Florida’s economy to other states and nations.

- The two major airports – Miami International Airport and Orlando International Airport – that account for 60 percent of all passenger flights and 80 percent of all air cargo.

This initiative also should focus other seaports and airports on growing market niches or, where feasible, should develop these as reliever facilities to ease pressure on other gateways. Finally, there should be continued investment in the Florida Spaceport, an element of growing importance in the state's 21st century transportation system.

- 4. Improve landside highway and rail access for both freight and passengers** to seaports, airports, and the spaceport. The DOT should work with appropriate seaport and airport authorities and MPOs to strengthen these connections. In keeping with its goal of linking major commercial centers in Florida, important highway connections to the state's largest seaports and airports should be added to the Florida Intrastate Highway System. Public-private partnerships should be explored for increasing on-dock rail service to major seaports. In addition, particular attention should be given to assuring the seamless movement of tourists between airports, cruise terminals, and major tourist attractions, as demonstrated by Miami International Airport's proposed Miami Intermodal Center and East-West Corridor connecting the airport to the seaport and central business district.
- 5. Explore the feasibility of an "intermodal freight transfer center" at one or more sites with efficient truck and rail access.** The goal of these intermodal centers should be to improve the efficiency and

"Best Practice" Examples of Recommended Infrastructure Strategies

TEA-21 National Corridors Planning and Development Program – The 1998 Transportation Equity Act for the 21st century (TEA-21) has created a federal funding program for coordinated planning, design, and construction of corridors of national significance. Projects will be selected that have a high potential for promoting economic development and international or interregional trade. Major corridors that are likely to compete for these funds include I-5 (Washington to California), I-35 (Minnesota to Texas), and I-69 (Michigan to Texas).

Louisiana Port Prioritization Program – Louisiana has implemented a system for prioritizing port investment among the state's six seaports and 18 river ports. The program requires all port investments to support statewide economic development, and rates projects on the basis of benefit/cost ratios and job impacts.

Virginia Ports Authority – The VPA provides coordinated regional development of three separate ports in Hampton Roads under a common governing body.

Sea-Air "Mainport" Strategy – The Netherlands has sought to develop Schiphol Airport and Rotterdam Seaport as central nodes in the European distribution network. Through a combination of port promotion, multimodal access projects, and information technology applications, these ports are become global business centers whose growth is not limited by the size of local markets.

Hong Kong International Airport Core Program – To address competition from other Asian cities and looming capacity constraints, Hong Kong developed the new Chek Lap Kok airport. The airport construction was the core of a \$155 billion

multimodal transportation project, including an airport railway; new bridges, tunnels, and highways; and new residential development on reclaimed land.

Alameda Corridor – This \$2 billion project will provide a 20-mile combined truck and rail access corridor connecting the ports of Long Beach and Los Angeles with the major rail lines serving Southern California. The project will consolidate the operations of three freight rail lines into one high-speed, high-capacity corridor.

Port of Houston Barbour's Cut – Houston is constructing additional rail lines to connect the port to the mainline double tracks. The project is expected to eliminate approximately 1,200 truck trips per day.

BART Airport Expansion – San Francisco's Bay Area Rapid Transit service is being extended to the San Francisco International Airport as part of the development of a new airport terminal.

Columbus Inland Port – The Columbus chamber of commerce and MPO have led coordinated public/private effort to expand distribution activity via truck, rail, and air in the Columbus, Ohio area. The effort has been successful in attracting regional and national distribution centers.

Virginia Inland Port – Virginia has developed an intermodal container facility on Norfolk Southern lines in close proximity to I-81 and I-66 in Front Royal, Virginia. The facility provides international cargo service via the ports at Hampton Roads, but shifts container storage and processing to inland locations.

reliability of long-haul freight service between Florida and the rest of North America by consolidating multiple options for truck and rail service in strategic locations. These locations should have efficient connections to a major seaport and airport and substantial space for supporting distribution and warehousing activities. The centers would be critical links between Florida's international gateways and the North American highway and rail distribution system, as well as relief valves for moving container storage, cargo handling, and Customs clearance activities from multiple, expensive seaport locations to inland sites. The DOT should work with freight railroads and motor carriers to assess the potential market. Enterprise Florida should identify these facilities as a targeted industry.

Operations: Link Transportation and Technology

Florida should prepare its transportation system for the 21st century, in which data and telecommunications will be as important as asphalt and concrete. Building upon existing pockets of technology deployment, Florida should invest in intelligent transportation systems and other transportation technologies with a goal of maximizing the use of available infrastructure and providing cost-effective, near-term benefits to personal and business travelers. Moreover, investing in transportation technology will support further growth of one of the state's emerging high-tech industries.

1. **Enable Florida's international seaports and airports to become "smart gateways" for the fast, efficient movement of international freight.** Advanced technologies should be used to increase the efficiency of cargo handling, ensure cargo security, streamline Customs clearance, enable in-transit asset visibility and management, and facilitate "one-stop" inspection and clearance of containers and international cargo moving through the state. The DOT should work with seaport and airport authorities and appropriate federal agencies to further the deployment of these systems.
2. **Establish "smart highway" advanced traffic management systems in major urban areas and along truck routes.** Advanced technologies should be deployed to reduce congestion and increase the reliability of travel times. Particular attention should be given to technologies that enable safe and efficient truck movement in congested urban areas. The DOT and MPOs should work with local communities to increase the use of these systems, which have been successfully deployed along I-4 and elsewhere in the state.
3. **Develop "smart traveler" information systems to provide Florida tourists and freight carriers with real-time information on traffic conditions and travel options.** Tourists need detailed information on the location of and directions to major attractions, as well as the schedule and fare information for transit and passenger rail services. This information should be provided in multiple languages. Freight carriers would benefit from more reliable information on travel conditions and expected travel times on major truck routes. The DOT should work with MPOs, state and local law enforcement agencies, state and local tourist and visitors bureaus, and the media to further the deployment of these systems, which have been demonstrated successfully in Orlando and other cities.
4. **Continue deployment of an advanced fiber optic network that links the state's major cities and commercial centers.** This network would serve as a springboard for future growth of the state's high-tech industry, as well as a backbone to enable the smart gateway, smart highway, and smart traveler initiatives. Telecommunications companies should continue to enhance Florida's status as a world-class telecommunica-

Florida should prepare its transportation system for the 21st century, in which data and telecommunications will be as important as asphalt and concrete.

tions center. The DOT should continue its efforts to use FIHS highway or major rail corridor right-of-way for deploying this infrastructure.

- 5. Attract or expand high-quality freight and passenger transportation services between Florida and key U.S. and international markets.** Enterprise Florida and the economic development agencies should give attention to increasing the frequency of direct air service between Florida and key international or high-tech business centers, including exploring ways to provide affordable air service from smaller markets as regional jets become more widely available. In addition, the economic development community should work with the seaports to expand the operations of cruise lines and regional ocean carriers between Florida and Latin America and the Caribbean, including preparing for the potential reopening of Cuba and for further development of Freeport, Bahamas.

“Best Practice” Examples of Recommended Operations Strategies

Port of New York and New Jersey – The Port Authority developed the ExpressRail Terminal at the Port of Newark to enable direct transfer of rail containers at the dockside, with an estimated savings of \$125 per container. In related efforts, Maher Terminals developed a paperless transaction system for equipment interchange at its facility in Port Elizabeth; and Conrail modernized its terminal gates at the South Kearney yard, reducing maximum motor carrier wait times from 90 to 16 minutes.

Port of Baltimore – The port introduced flexible work-rules to allow operation beyond the traditional 8:00 to 5:00 workday. With 11-hour port operation, motor carriers can dray up to 10 shipments per day, compared to about six for a standard eight-hour day.

Seattle TimeSaver project – Seattle is developing management systems to provide integrated freeway and arterial control, as well as transit and emergency signal priority and safe movement through rail-highway grade crossings.

AzTech tourist information system – As part of its ITS program, Phoenix is developing and enhancing personalized traveler information and route guidance systems and motorist aid technologies. The effort emphasizes enhanced accessibility to multimodal tourist information on car rentals, hotels, and attractions.

I-95 Corridor FleetForward – Public agencies and the motor carrier industry association have joined forces to develop a trav-

eler information service for commercial vehicle operators in the congested Northeast corridor. The system will provide commercial drivers and dispatchers with real-time information on congestion, incidents, weather, and construction projects.

SmartValley Inc. – In response to concerns about slowing economic growth and increasing business costs in Silicon Valley, a non-profit organization was formed to encourage technology deployment by the public and private sectors. Early emphases have included telecommuting, increased public access to the Internet, and increased emphasis on computer education in the schools.

Statewide Fiber Optic Network – Missouri formed a partnership with private industry to install fiber optic and wireless communication systems along the highway right-of-way. This network will form the backbone of the state’s ITS traffic management system, as well as increase the competitiveness of the state’s communication system.

Indianapolis Airport expansion – Indianapolis has emerged as one of the nation’s largest air cargo hubs as a result of successful efforts to attract Federal Express and U.S. Postal Service hub facilities. In addition, the city and state worked together to attract a major United Airlines maintenance center to the area, bringing much larger traffic to the Indianapolis airport than typically would be supported by a city its size.

Policy: Link Transportation Planning to Economic Development Priorities

These infrastructure and operations initiatives should be coupled with changes in transportation policies and planning activities.

- 1. Clearly and consistently link transportation planning with economic development activities at the state and local levels.** Some examples of how this might occur:
 - The DOT should view itself as the “Department of Transportation and Economic Development” and incorporate economic de-

velopment concerns into its ongoing activities.

- The DOT and MPOs should add explicit economic development goals into state and metropolitan long-range plans, and assign staff with responsibilities for overseeing the implementation of these goals.
- The DOT should establish a formal liaison with Enterprise Florida, and encourage MPOs to do the same with the economic development agencies in their jurisdictions.
- The DOT and MPOs should include economic development impacts as part of the criteria for setting priorities among projects. The DOT and Enterprise Florida should work jointly to develop prioritization measures, which should include projected changes in employment and regional income; improved connections to targeted industries or international markets; and benefit/cost ratios. The DOT should provide technical assistance to MPOs in incorporating these measures into project selection and capital programming activities.
- Finally, to lay the groundwork for future use of this emerging resource and to facilitate broader space-related economic development, the DOT should create a space transportation element of its long-range plan, much as it now maintains state rail and air systems plans. Space infrastructure requirements should be addressed as part of FDOT's investment planning process.

2. Coordinate transportation and economic development planning activities among MPOs within economic regions (such as southeast Florida or the I-4 corridor) to address regional projects with the potential for increasing business competitiveness. The DOT should continue to assume leadership for regional projects, and use its dis-

"Best Practice" Examples of Recommended Policy Strategies

Wisconsin Statewide Transportation Economic Development Program – WisDOT has established its own Economic Development branch within the Bureau of Planning. This group helps guide WisDOT programming, and implements its own program of funding and research to promote the use of transportation as an economic development tool.

Indiana DOT Major Corridor Investment-Benefit Analysis System – INDOT developed a series of statewide and corridor-level models to estimate and compare the transportation and economic benefits of proposed major corridor highway investments in Indiana.

Minnesota DOT – To streamline project delivery and address regional needs, Mn/DOT reorganized its districts to place Minneapolis, St. Paul, and their suburbs into a single district.

MTC Freight Partnership – The San Francisco Bay Area MPO has established a formal freight advisory committee with a long record of success in providing a business voice into regional planning activities.

Puget Sound Regional Freight Mobility Roundtable – The Seattle MPO and economic development agency established an ongoing advisory group to provide a voice for freight interests

in regional planning. The roundtable has encouraged coordination and facilitated a series of projects including the FAST-corridor, an integrated strategy of short- and long-term improvements to marine, air, rail, and highway programs.

Western Governors' Association – The WGA convened shippers, transportation providers, and state and federal officials to discuss major freight problems and identify promising futures. A Rail Roundtable gave all parties the opportunity to debate rail service issues at a time of major mergers among Western railroads.

Oregon Immediate Opportunity Fund – Oregon has developed a constrained investment strategy and an immediate opportunity fund to provide both a set of priorities for investment and some flexibility to respond to unforeseen circumstances. The identification of highway freight routes provides some additional guidance for the use of these funds.

Utah I-15 project – Utah is using innovative design/build contracting and other measures to complete the reconstruction of I-15 in time for the 2002 Olympics in Salt Lake City. The projected 10-year construction timetable has been reduced to four and a half years.

trict offices to foster cooperation and communication among MPOs within economic regions. MPOs should explore opportunities to work across boundaries, following the examples set by METROPLAN Orlando and the Volusia County MPO, or the Western Florida Regional Planning Council.

3. Increase business involvement in transportation planning activities. The DOT should maintain an ongoing Freight Advisory Group, building upon the work now in progress by the Florida Freight Stakeholders Task Force. MPOs should create or maintain similar groups, and add representatives of seaport or airport authorities to their boards, if they have not done so already. The Florida Chamber of Commerce and local chambers should provide leadership and encourage individual businesses to get involved in state and local planning activities. The Greater Miami Chamber of Commerce's network of highway, seaport, and aviation coalitions and the Greater Orlando Chamber's Transportation Roundtable provide strong examples of how local chambers can shape a common business voice on transportation policy and programs.

4. Elevate the importance of freight mobility in state and metropolitan transportation planning. The DOT should proceed with its effort to develop a statewide intermodal systems plan by February 2000. While this plan is being developed, the DOT should identify processes and resources to implement priority projects that will be identified in the plan. MPOs and transportation authorities should pursue similar initiatives at the local level.

5. Create a "fast-track" for projects with high economic impact. This will require several initiatives:

- The Economic Development and Transportation Fund should be expanded to enable expedited site access improvements for new or expanded business establishments in the state. Matching funds for these activities could be provided by local governments or through economic development funds.
- The DOT and MPOs should provide unallocated "economic development" line-items in their capital programs to provide flexibility for addressing low-cost, short-turnaround new projects in the context of adopted programs. A process should be developed for allocating these funds each year based on potential economic impacts.
- The Governor and legislature should explore potential new revenues sources that could be used to accelerate big-ticket infrastructure projects with high economic impact.
- The DOT should work with the legislature to identify where statutory and regulatory provisions, including environmental permitting requirements and right-of-way acquisition processes, may be adding delays or costs to projects, and develop strategies to mitigate these impacts while still fulfilling the core goals of these policies.

The DOT and MPOs should include economic development impacts as part of the criteria for setting priorities among projects.

Action Plan

A coordinated campaign will be needed to bring about the necessary funding and institutional changes to support these strategies.

1. Identify and leverage available federal, state, local, and private funds to implement these recommendations. Transportation investment needs significantly outstrip the resources available through existing

funding programs. The funding available through the new federal Transportation Equity Act for the 21st Century (TEA-21) will provide only limited resources for seeding these initiatives. In the long-term, the DOT, MPOs, transportation authorities, county and city governments, and other stakeholders should actively work with the private sector to identify and pursue new funding sources as necessary.

2. **Continue to develop a shared consensus that an increased level of transportation investment and improved services will reduce costs for Florida’s businesses, visitors, and residents.** Continued outreach and educational efforts will be necessary to increase the awareness and understanding of the role of the transportation system in supporting Florida’s economy and its potential as a catalyst for future growth. The Florida Chamber of Commerce should continue its leadership in this area.
3. **Establish a multi-agency, public-private working group to oversee implementation of the recommendations of this study.** The working group should include the DOT, MPO Advisory Council, FSTED, major airport authorities, Florida Spaceport Authority, Enterprise Florida, Florida Tourism Commission, and the Florida Transportation Commission. The Florida Chamber of Commerce should provide oversight of and advocacy for this group.

If you would like copies of this report or more information about *Transportation Cornerstone Florida: Moving Florida's Economy into the 21st Century*, please contact the:

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