

## Section 1: Entrant Details

The South Florida Region's growth will continue to intensify the already existing problems of congestion, pollution, infrastructure optimization, limited resources, and sea level rise and flood conditions arising from climate change. At the same time, the southern states are facing a significant growing population (including aging, differently able and youth populations), increasing employment and technological trends, increasing demand for fast and on-demand mobility services, and rapid changes in technology. These trends are exacerbating the growing digital divide and accessibility gaps for disadvantaged groups, while intensifying the need for fast, shared-mobility innovations capable of transforming our national future.

This entry proposes to use Hyperloop to create new travel opportunities and services along one of America's fastest growing passenger, tourism and freight corridors connecting



Miami to Orlando – Atlanta – and ultimately Chicago to the North and potentially connecting to the Caribbean region and Latin

America( Cuba, the Dominican Republic and Puerto Rico) to the south for social, political and economic transformation of the region and fueling growth in **business, freight, leisure and space transportation** and all associated industries. This proposal is based on the assumption that the Hyperloop system will be able to integrate ongoing efforts cost effectively to promote equitable shared, connected and automated mobility (car-optional region) and address last mile connectivity in an efficient, modular and sustainable way.

This entry is prepared by Miami-Dade Department of Transportation and Public Works (DTPW), AECOM, Florida Department of Transportation (FDOT), and the Miami-Dade Metropolitan Planning Organization (MPO).

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**Miami-Dade County DTPW:** The newly created DTPW is responsible for planning and managing all aspects of mobility improvements and services, such as transit, traffic engineering,

traffic signals and signs, highway design, and serves as the regulatory arm for for-hire transportation services (i.e. taxis, limos, and transportation network companies). As the Community Transportation Coordinator (CTC), DTPW has the responsibility of creating programs, applying for the grants and coordinating transportation services for disadvantaged groups. DTPW is one of the largest departments in Miami-Dade County (MDC) government and is led by a Department Director who reports to the Deputy Mayor.

DTPW has partnered with regional agencies, MPO and the local district of FDOT to collaborate toward the development of a livable Miami-Dade. DTPW and FDOT are the two agencies that plan, design, operate and maintain all roadways, sidewalks, bicycle facilities, traffic control devices and public transportation within the County; while the MPO brings all partners together for the implementation of transportation related projects, programs federal funds and develops local consensus.

**AECOM:** AECOM is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries. AECOM has nearly 700 employees in South Florida and nearly 2,000 throughout the state focused on delivering on a wide variety of transportation and infrastructure projects. From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM had revenue of approximately \$18 billion during fiscal year 2015.



**Built to deliver a better world**

**FDOT:** The Florida Department of Transportation (FDOT or Department) is an executive agency, which means it reports directly to the Governor. FDOT's primary statutory responsibility is to coordinate the planning and development of a safe, viable, and balanced state transportation system serving all regions of the state, and to assure the compatibility of all components, including multimodal facilities. A multimodal transportation system combines two or more modes of movement of people or goods. Florida's transportation system includes roadway, air, rail, sea, spaceports, bus transit, people mover systems, as well as bicycle and pedestrian facilities.



**Florida Department of  
TRANSPORTATION**

Through the Florida Automated Vehicles (FAV) Initiative, FDOT is deploying pilot projects to establish Florida as a leader in the

automated vehicle movement. For example, in 2012 Florida was the second state to adopt legislation allowing for automated vehicle testing on public roadways.

**MPO:** The Metropolitan Planning Organization (MPO) for the Miami Urbanized Area guides the transportation planning process in MDC. The MPO was created on March 23, 1977 as required under Section 163.01, Chapter 163, Florida Statutes, and established by Interlocal Agreement between MDC and FDOT.



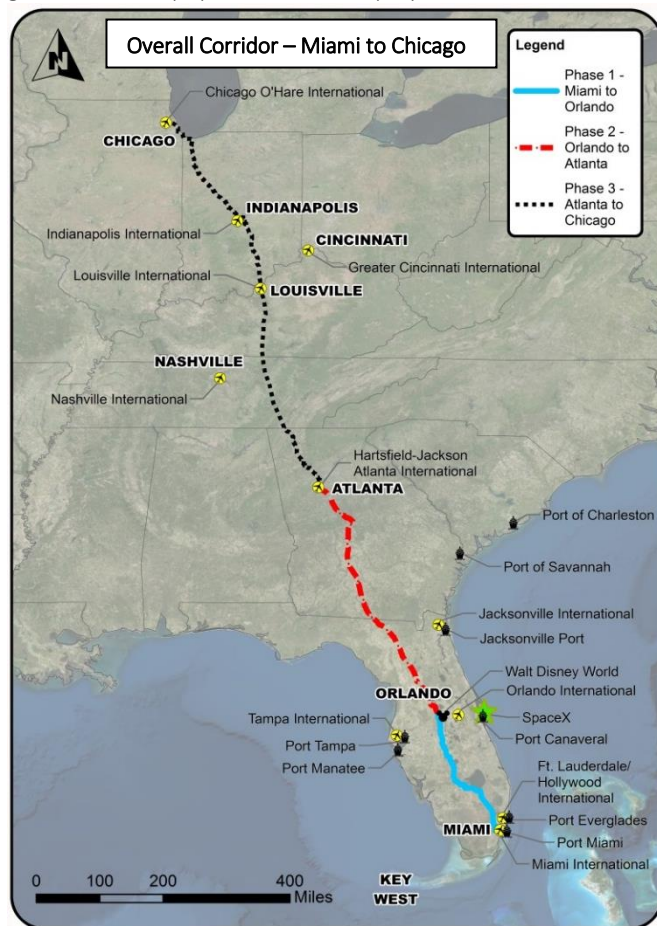
A major role of the MPO is to ensure conformance with federal regulations requiring that highways, mass transit and other transportation facilities and services are properly developed and deployed in relation to the overall plan of urban development and to approve plans for regional and state transportation network accessibility. In addition, federal guidelines require that the use of Federal Aid for transportation be consistent with MPO endorsed plans and programs. Federal, state and local transportation planning funds are utilized on an ongoing basis to insure the effectiveness of the MPO process.

The FDOT adopts the MPO's Long Range Transportation Plan (LRTP) as the plan for implementing transportation system improvements in MDC. The LRTP is focused on providing mobility options, and is guided by a comprehensive vision to "Provide mobility options for MDC residents and visitors and promote economic competitiveness by investing in the County's transportation infrastructure while protecting the environment and maximizing the efficiency of the existing transportation system."

As the application is developed further, additional project partners and stakeholders will be identified and added to the corridor development team, including relevant government agencies, institutional investors, infrastructure developers, technology companies and service providers. MPO is also instrumental in development of Strategic Miami Area Rapid Transit (SMART) Plan for MDC and incorporation of connected-automated vehicle technology into the County's transportation planning.

## Section 2: Corridor

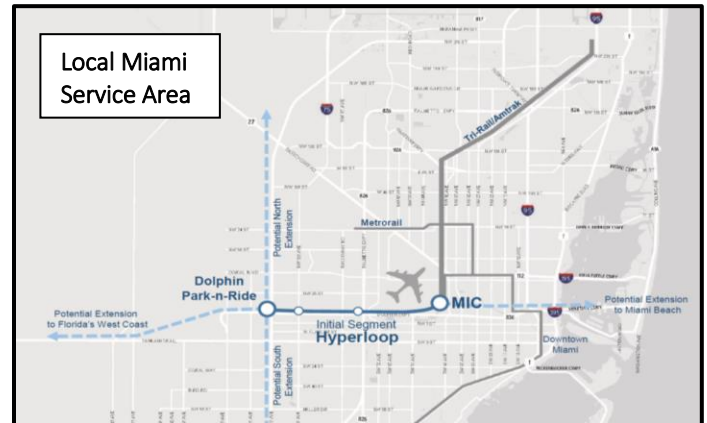
Miami offers extensive unique attractions of worldwide fame and importance in tourism, leisure, freight and space transportation market. The team proposes to initiate the Hyperloop in Miami with an ideal location identified that meets the requirement of Hyperloop concept to provide a quantum leap in future connectivity and modal reach for the entire transportation system moving goods and people within the primary travel corridor in South Florida connecting Miami and Orlando. The corridor is then envisioned to connect Miami and Orlando with the large metropolitan areas of **Atlanta, Nashville, Louisville, Cincinnati, Indianapolis and Chicago** and nearby cities once it's fully developed. The proposed Hyperloop corridor will connect the nation's traditional economic centers in the Midwest and Northeast with the growing southern region, home of the most populous, fastest growing states and economies, and with projections for continued significant growth in both population and employment.



### 2. Corridor Description Phase 1: Miami to Orlando

The initial segment is a 240-mile Hyperloop segment connecting Miami with Orlando, Florida with potential extension to the North, South, West and East. The alignment generally follows the Dolphin Expressway/SR 836, a tolled limited-access expressway facility located within Miami Dade

County (MDC). SR 836 is one of the most critical corridors connecting the heavily populated western MDC and travelers from North to the Miami International Airport (MIA), major commercial centers, and employment centers in and around Downtown Miami, and intercepts north/south commuters along SR 826 and the Turnpike (HEFT).



Phase 1 will begin from MIC and go west to the Dolphin Mall for approximately 10 miles and then move north along the rural areas of South Florida to the Orlando/Disney World area, **connecting South Florida to the Greater Orlando area by less than a 20 minute Hyperloop ride** as against an existing 4 hour trip by road and even longer by rail. The Miami Intermodal Center (MIC), a major multimodal transportation hub providing seamless access to all modes of public transportation including Metrobus, Metrorail, Tri-Rail, Amtrak, Greyhound, taxi cabs, and a rental car center. An automated people mover connects the MIC to MIA. Tri-Rail is a commuter rail connecting to Broward and Palm Beach County. Metrorail will also connect to All Aboard Florida's new rail passenger service. The team envisages the corridor to ultimately be developed in multiple phases:

- Phase 1: Miami to Orlando, 240 miles
- Phase 2: Orlando to Atlanta, 420 miles
- Phase 3: Atlanta to Chicago, 780 miles



Each of the area airports and seaports are projecting double digit growth in the next 15 years and so their users should benefit from engagement in Hyperloop development. Even

with numerous major airports, air travel within Florida is limited and expensive, and rail has not been effective either, so Hyperloop could become the best intra-state solution.

Miami-Dade, Broward and Palm Beach counties of South Florida have approximately 7M population with annual visitors of 20M which continues to grow, and the Orlando metro area has a population of approximately 3M with annual visitors of 66M, which is the highest in the country. The combined Phase 1 corridor attracts more than 80M annual visitors from the North, the Midwest and the South and worldwide.

### 3. Major Traffic Generators distances, and nodal links on or near the corridor:

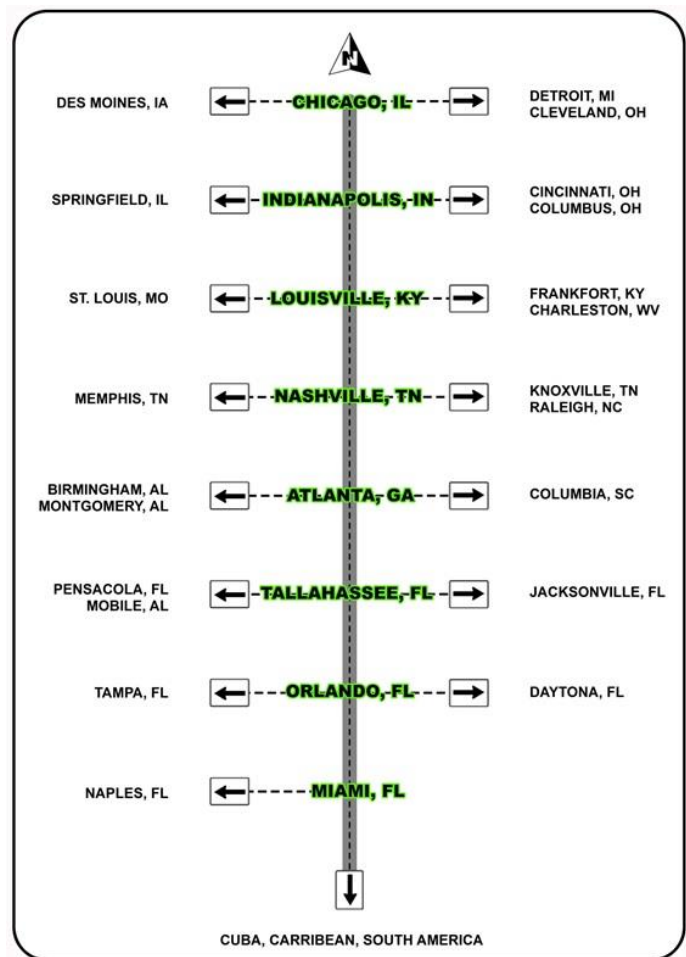
This corridor will connect and provide access to nation's top populated regions, transportation and trade hubs, and activity centers. The proposed Hyperloop ties into the major regional Airport/Seaports. South Florida is served by three major international airports, with Miami International Airport in MDC, Fort Lauderdale-Hollywood International Airport in Broward County and Palm Beach International Airport in Broward County. South Florida also is home to three major seaports, with PortMiami in MDC, Port Everglades in Broward County and Port of Palm Beach in Palm Beach County.

### 4. Distances between Key Points and Population Centers

Phase 1 from Miami to Orlando has a mix of relatively short lengths on either end to provide connectivity to key local nodes as well as a long haul distance of significant length as follows:

- PortMiami to MIC: 8 miles
- Mic to Dolphin Mall: 10 miles
- Dolphin Mall to WDW: 240 Miles
- WDW to Orlando Airport: 20 miles

This corridor ultimately could traverse four of the top 10 most populous states (e.g., Florida, Illinois, Georgia and North Carolina), two of the largest counties (e.g., Cook County in Illinois and MDC in Florida), and six of the top 20 fastest growing metro areas (e.g., Orlando and Tampa in Florida) in the nation. The overall distance that could be covered is nearly 1,400 miles.



### 5. Nodal Point Linkages

The Hyperloop can create linkages across wide areas that would serve to improve access to markets with the following characteristics:

- **States with highest Gross State Product (GSP):** Four of the top 10 states with highest GPS in 2015 (e.g., Florida, Illinois, North Carolina and Georgia).
- **States with highest job increase in 2016:** three of the top 10 states with the largest job gains from July 2015-2016, including Florida with the second largest job gain and job increase.
- **Metro areas with highest number of jobs in 2015:** four of the top metro areas with the highest job growth in 2015 (e.g., Orlando-Kissimmee-Sanford region (FL), Nashville-Davidson-Murfreesboro-Franklin(TN), Charlotte-Concord-Gastonia and Raleigh (NC-SC), and Atlanta-Sandy Springs-Roswell (GA).
- **Top U.S. transportation hubs for passengers:** Three of the top city markets for domestic passengers (e.g., Atlanta, Chicago and Miami), eight of the busiest airports by number passengers served in 2015 (e.g., Atlanta (largest airport in U.S.), Chicago, Charlotte, Miami, Orlando, Fort Lauderdale, Midway, and



Tampa), and three of the top airports with the most international passengers in 2015 (e.g., Miami, Chicago and Atlanta).

- **International trade hubs:** Four of the top 25 U.S.-international trade freight gateways by the value of shipments in 2014, including Chicago Airports, Miami International Airport, Port of Savannah and Port of Charleston.
- **Busiest cruise ports in the world:** Top three busiest cruise ports in the world (e.g., PortMiami, Port Canaveral and Port Everglades).
- **Busiest cargo airports:** six of the 2014's top 10 airports in total cargo throughput (e.g., Port Miami, Port Everglades, West Palm Beach, Port of Jacksonville and Port of Savannah).
- **Top tourist destinations in the world and the nation's most visited state and city:** the State of Florida and City of Orlando with the highest number of visitors in the nation, with 105 million visitors and 66 million visitors in 2015, respectively.
- **Busiest U.S. shopping and entertaining centers in terms of visitors** (e.g., Miami and Chicago metro areas), and the highest-sales generator malls in the county located in Florida (e.g., Miami and Orlando metro areas).
- **State with most migrant gains and fastest population growth:** Florida has the second highest migration rate in the nation). As the top destination for retired persons, Florida has the largest population of older adults in U.S. and projections of continued significant growth in both seniors and people with disabilities.
- **Sea level rise and climate change challenges:** Florida and the southeast Florida region are among the most vulnerable regions, facing the impacts of sea level rise and climate change. This Hyperloop corridor will provide resiliency and redundancy to the existing and future transportation system.

- Weak ground conditions and high water table in Florida
- Environmentally protected Everglades National Park
- Traversing through the heavily populated areas in and around Miami and Orlando
- Providing a resilient and weather proof design for the system

## 7. Network Map – Phase 1



## 6. Existing Right-of-Way (ROWs) and known topographical or geological challenges along the corridor.

The Phase 1 corridor follows an existing ROW from MIC to SR-836 to the west and Hwy-27 – a major arterial road connecting Miami with counties to the North and west of Lake Okeechobee to connect further north to Orlando. In the Orlando area the route would likely remain close to the principal transportation arteries of I-4 and State Road 417 which provides a direct connection to Orlando International Airport.

The following major challenges are envisaged along the corridor:

- Planning for Sea-level rise and climate change

## Section 3: Strategic Transformation

### 8a. When Hours Become Minutes

This corridor starts in Florida which has lead the world in development of state of the art, mega facilities and entertainment complexes related to leisure, space tourism, cruise travel and retirement havens. Florida is home to the largest Space Center (Canaveral), Disney World theme parks, and homeports of the largest cruise ships in the world. It was the second state to adopt legislation allowing for automated vehicle testing on public roadways. Tampa is one of the four selected locations where DOT is studying connected and automated vehicle technologies. FDOT, through its Florida Automated Vehicles (FAV) Initiative, is deploying pilot projects to establish Florida as a leader in the automated vehicle movement. These facilities were developed ahead of their time, when no one could have imagined them. The Hyperloop corridor in Florida will bring the giant leap forward in transforming this region further and making it an integrated, futuristic, fast, safe and most travelled corridor in the United States. This will lead to a transformative shrinking of the south Florida region making almost every major destination a feasible day trip and allowing the labor markets to merge and cross the region effortlessly. We are imagining:

- being able to get to Disney World from Miami in an hour or less,
- shipping fresh fruit grown in central Florida the same day for delivery in Coral Gables,
- people commuting from their homes in Orlando to their jobs in Miami
- students traveling to school and back among the various universities throughout Florida

### 8b. Shorter Long-Distance Trips than to the Suburbs

Hyperloop will transform travel in south Florida across the entire spectrum of the population and improve congestion, safety and accessibility at the same time.

#### Traffic/Congestion/Safety:

Traffic, congestion, travel time and safety risks have reached household discussion level in South Florida. MDC is ranked in the top 15 urban areas with the worst traffic congestion. In 2014, each Miami commuter experienced a Travel time of 52 hours stuck in traffic. This is 14 hours more than the average American; costing each commuter about \$1,169 per year due to freeway congestion

In Miami, Freeway planning time of 200% more than planned freeway driving time. This means that a 20-minutes freeway trip requires 50 - 60 minutes of planned driving time. Annual cost of congestion was \$4.4 billion. The concerns frequently air

on local television news and are the subject of many newspaper editorials and letters to the editor. Indeed such issues rank in the top three concerns for which South Florida voters demand better plans for improvement.

Because of this, a major, paradigm shifting long-range solution like Hyperloop is a viable option that local elected officials and local government public servants can advance, and it should be embraced because households are all impacted by not having real solutions for the long run.

#### Most congested cities by traffic congestion level (additional time that drivers experienced stuck in traffic):

The corridor will facilitate and alleviate traffic congestion in five of the top 20 large cities in U.S. with the most traffic congestion in 2015. It will connect three of the most congested big cities: Miami and Chicago, with 28% and 26% increase in travel time, respectively. Fast-growing cities in the South also ranked high in traffic congestion, including Atlanta, Tampa, Orlando and Nashville.



U.S. Cities with Most Traffic Congestion in 2015 by Congestion Level - Extra Time Stuck in Traffic (TomTom Traffic Index)

World Rank	U.S. Rank	City	State	Congestion Level (%)	AM Extra Time (%)	PM Extra Time (%)
66	7	Miami	FL	28	48	59
88	10	Chicago	IL	26	38	58
96	13	Atlanta	GA	24	45	60
98	15	Tampa	FL	24	34	52
99	16	Orlando	FL	23	28	49
105	19	Nashville	TN	22	44	61

### 8c. Capturing New Development Value

South Florida is home to urban sprawl in a significant way. Tax increment financing is a tool that can shape land use policy in a more egalitarian and sustainable fashion. Hyperloop can help structure future land use policies to adapt to a less auto-centric model. In particular, the proposed Hyperloop will shift development along the U.S. 27 Corridor: U.S. 27 is a largely undeveloped corridor with potential for diagonally shifting transportation activity away from the heavily populated areas closer to the coast, where the Florida East Coast Railroad (FECR), Interstate 95 and Florida's Turnpike run in a north-south manner.

### 8d. Liberating the Waterfront

Miami celebrates its waterfront but a large portion of Downtown is taken up by the Port of Miami complex. Miami Beach has already undertaken a globally recognized

transformation/restoration of Ocean Drive, the Art Deco District and other neighborhoods and the Hyperloop would allow the City of Miami and the County to do the same to its prime waterfront real estate. Space now used for backland operations, container storage and trucking operations could be freed up to provide waterfront access and room for parks, recreation, marinas, commercial developments and residential complexes.

## 8e. Supply Chain Evolution

The Hyperloop provides an opportunity to streamline and transform the supply chain for major industrial and commercial end-users. Perishable goods, refrigerated items and high end electronics would lead the way in benefiting from the reduced travel times and direct connections that Hyperloop would make available. Time now spent in transferring from a ship to a truck then to a train or airplane would be reduced eliminating dwell times and making the overall process cheaper and more efficient. Many areas of western Miami that have developed as transportation centers for warehousing, freight consolidation and freight forwarding could be repurposed to other land uses and much of the chronic traffic congestion in these areas such as West Miami, Sweetwater and Doral would be reduced.

## 8f. Just-in Time Deliveries

With shortened deliveries made within a region to region basis the overall travel patterns and truck distribution rates will alter dramatically. We envision the capability of creating major nodes that local deliveries converge upon. The need for long distance truck travel should be significantly reduced for high value cargo.

## 8g. Airport Linkages

The connection of MIA with MCO would create a broader airline market in terms of origins and destinations for both airports. Connecting flights could be scheduled at the two airports with an efficient Hyperloop link expanding the potential for air travel access throughout southern Florida to destinations around the globe.

## 8h. When Hyperloop Builds Powerhouse Economies

**This corridor will have the potential to transform two of the USA's MOST VISITED cities Miami & Orlando into one Super city** and connecting them with the two other major economic engines, Atlanta and Chicago, in the future. The incremental change in economic potential will likely be much greater than simply the sum of the two existing markets today. This gives us a vision of a changing America, and a glimpse of a demographic future dominated by those states that are either retirement havens or lower cost places that can compete with the traditional high-income economies, shaping our national future.



### Megaregions and Shifts in Population Centers

11 megaregions are linked by transportation, economics, and other factors.

They represent over **75%** of our population and employment.

In 2014, **365,000** people moved to the South—up **25%** from 2013—and moves to the West doubled.

**Population migration trend from north to the south.** More Americans are moving to the South and West. In 2014, 365,000 people moved to the southern region, a 25% increase from 2013. According to Internal Revenue Service (IRS) data from 2014, Florida was the second state gaining the most domestic migrants, including seniors and young professionals (aged 35-54) at the peak of their career. Indeed, Florida has an attraction ratio for people earning over \$200,000 a year of 223, the highest in the nation. In the last 10 years, Florida's population grew by an average of roughly 680 people per day (10-yr proportion growth rate of 13.9%). While natural growth — a state's birth rate outpacing its death rate — was the main source of growth in some states, migration accounted for the vast majority of Florida's growth (the majority of new residents moved to the state from within the country or abroad). Nearly 92% of new Floridians moved to the state, one of the highest migration rates in the nation.

Florida has the highest percentage of population of older adults in the nation, higher than the national average (14.5%) – nearly 1-in-5 residents is an older adult (65 years and over); and 1-in-3 older adults has a disability. By 2040, 24% of the State's population will be older adults (65 years and over). Furthermore, as the population continues to age, and with the likelihood of having a disability increasing with age, the number of individuals with disabilities in Miami-Dade County is expected to accelerate in the coming decades.

### Universities:

Southeast Florida is home to numerous universities with multiple campuses.

Major public and private universities in the three-county area, with current student enrollment numbers, include:

- Miami Dade College, with eight campuses and 21 outreach centers throughout Miami-Dade County (165,000);
- Broward College, formerly Broward Community College (67,000);
- Florida International University (FIU), with two major campuses in Miami-Dade County (54,100);
- Florida Atlantic University (FAU), with its main campus in Boca Raton in Palm Beach County and

five satellite campuses in Broward, Palm Beach and St. Lucie counties (30,100);

- Nova Southeastern University, with its primary campus in Broward County (24,100);
- University of Miami, with 12 separate colleges/schools (17,000).

These schools have large numbers of commuter students, and there remains need for additional student housing and/or other affordable living options. Students must have a fast, affordable way to get to and from classes. In addition, these schools may provide resources, including through government partnerships, to furnish research and funding related to transit solutions.

### **Additional Socioeconomic Factors:**

Miami-Dade County and local governments throughout South Florida have adopted resolutions to encourage reducing the number of trucks and other vehicles on Interstate highways and other roadways. Such resolutions typically call for increased use of rail and waterways. These efforts note safety reasons as well as air quality and environmental concerns. Hyperloop could well further enhance such efforts.

Another urgent need is to provide workforce housing and transportation so people living in economically challenged areas around Lake Okeechobee and Belle Glade can easily and affordably get to jobs in Miami-Dade and elsewhere where opportunities exist in South Florida. Hyperloop may be able address such concerns.



## Section 4: Passenger and Cargo Flow

### 9. Population and Economic Statistics

**Most Populous States in U.S.** The proposed corridor will serve nine of the top 50 largest states in the nation in 2015, including Florida and Illinois which are the third and fifth most populous states— all combined represents the 25 percent of the nation's population.

Florida is the nation's **3rd largest population** with 20 million residents and 100 million visitors per year. Florida has six of the top 20 fastest growing metro areas in the nation, including Orlando. Florida is anticipated to add another 4 to 9 million residents by 2040, and about 91% of the additional residents will come from other states.

**Largest U.S. States by Population – 2015 Population Estimates**

Rank	State	2015 Population Estimates (million)
3	Florida	20.3
5	Illinois	12.9
8	Georgia	10.2
9	North Carolina	10.0
17	Tennessee	6.6
18	Missouri	6.1
23	South Carolina	4.9
24	Alabama	4.9
26	Kentucky	4.4
<b>Total Estimated Population</b>		<b>80.3</b>

*Percentage of U.S. Population 25%*

The state has the highest percentage of population of older adults in the nation, higher than the national average (14.5%) – nearly 1-in-5 residents is an older adult (65 years and over); and 1-in-3 older adults has a disability. By 2040, 24% of the State's population will be older adults (65 years and over). Furthermore, as the population continues to age, and with the likelihood of having a disability increasing with age, the number of individuals with disabilities in Miami-Dade County is expected to accelerate in the coming decades.

**Top Largest Counties in U.S.** The corridor will also transverse some of the largest counties in population, including the counties of Cook and Miami-Dade which are the nation's third and seventh most populous counties. About five of the 50 largest counties are located in Florida.

Miami-Dade is the most populous county in Florida and the 7th most populous county in the nation, with a total urbanized

population of approximately 2.7 million and is projected to exceed 3.3 million residents by 2040. In Miami-Dade County, Older adults (65 years and over) make up over 15% of the County's population and 45% of the older adults have some form of disability in 2010. In 2000, 1-in-4 residents in Miami-Dade (25%) had a disability, higher than the national average of 19%. Furthermore, in 2000, the City of Miami, the largest city in the County, had the second highest percentage of individuals with disabilities in the nation (29.4%).

**Top States by 2015 Gross State Product**

Rank	State	2015 GSP (USD millions)
4	Florida	893,189
5	Illinois	771,896
9	North Carolina	509,718
10	Georgia	501,241
17	Indiana	331,126
19	Tennessee	310,276
26	Alabama	209,382
27	South Carolina	199,256
28	Kentucky	194,578

**Top Largest Cities in U.S.** The corridor will connect 12 of the top 50 largest cities in U.S. in 2015, including Chicago, the third most populous city with 2.7 million residents, Jacksonville, Indianapolis, Memphis and Atlanta among others.

### Employment centers: central business units, office parks, industrial zones

The corridor will serve, promote and sustain some of the largest and growing economies by connecting four of the top 10 states with the highest Gross State Product (GSP) in 2015. Florida is the nation's fourth largest economy (ranked fourth in Gross State Product (GSP) in 2015) and the 19th largest economy in the world (U.S. Bureau of Economic Analysis, 2014).

According to the Bureau of Labor, from July 2015 to July 2016, the second largest job gains (over 250,000 jobs) occurred in Florida, representing a job increase of 3.1% (third highest over-the-year increase).

According to the Bureau of Labor Statistics from 2004 through 2015, the top regions in job growth in 2015 includes: the Orlando-Kissimmee-Sanford region (FL), ranked third, with 4.64% job growth in 2015, followed by the regions of Nashville-Davidson-Murfreesboro-Franklin(TN), Charlotte-Concord-Gastonia and Raleigh (NC-SC), and Atlanta-Sandy Springs-Roswell (GA). These regions which also have shown a population growth will be connected by the proposed corridor. Others cities along the corridor considered to have a good job market in 2016 include the cities of Fort Lauderdale, Tampa, St. Louise, Kansas City, Chicago, and Cincinnati.

## 10. Passenger Demand

**Emerging Global Hub.** Florida's is emerging as a global hub for trade, visitors, commerce, and investment. The value of exports and imports moving to and from Florida more than tripled during the past 20 years, reaching a total of \$147 billion in 2015. The number of out-of-state visitors increased to 105 million in 2015, and is projected to exceed 159 million in 2025. The vast majority of international trade and visitor trips use Florida's airports and seaports and connect to surface transportation to reach a final destination.

**Top 10 Domestic City Markets by Number of Enplanements in 2015 – Enplanements by U.S. Carriers Only.**

Rank	City Market	State	Annual Enplanements (million)	Percent Change 2014 to 2015
1	Atlanta	GA	43.9	6.2
2	Chicago	IL	41.0	7.5
3	New York City	NY	40.9	6.1
4	Los Angeles	CA	36.6	4.8
5	Dallas/Fort Worth	TX	34.9	9.5
6	Washington	DC	29.1	6.1
7	San Francisco	CA	28.8	6
8	Denver	CO	25.2	1.2
9	Houston	TX	21.3	2.6
10	Miami	FL	21.0	9.4

**Airports:** The proposed Hyperloop corridor will connect three of the top 10 domestic city markets by number of enplanements in 2015: Atlanta (GA), Chicago (IL) and Miami (FL). Atlanta, served by three airports, is the top market with 43.9 million passengers. Chicago and Miami are the second and tenth market with 41 and 21 million passengers. Combined the three city markets received 105.9 million passengers.

There were 23 airports in 2015 with more than one million incoming passengers from international origins. Miami International Airport (MIA) is the second airport that received most international passengers, with 10.5 million passengers. From 2014 to 2015, the largest increase in international passengers was at Orlando International Airport, up 18.3 percent.

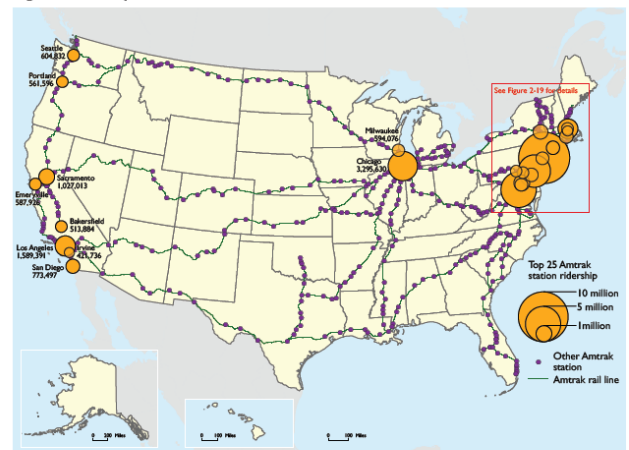
**Busiest U.S. Airports by Number of Enplanements in 2015 along the Proposed Corridor– Large Hubs**

Rank	Airport	Metro Area	State	Annual Enplanements (million)
1	Hartsfield- Jackson Atlanta (ATL)	Atlanta	GA	49.3
3	O'Hare International Airport (ORD)	Chicago	IL	36.2
8	Charlotte International Airport (CLT)	Charlotte	NC	21.9
11	Miami International Airport (MIA)	Miami	FL	21.0
14	Orlando International Airport (MCO)	Orlando	FL	18.8
21	Fort Lauderdale-Hollywood International Airport (FLL)	Miami	FL	13.0
24	Midway International Airport (MDW)	Chicago	IL	10.8
29	Tampa International Airport (TIP)	Tampa	FL	9.1
<b>Total Domestic Enplanements</b>				<b>180</b>

Between 2013 and 2014, real spending (output) on transportation-related tourism goods and services increased by 1.6 percent, to \$310.9 billion, reflecting growth in tourism travel. In 2014 passengers spent \$122.3 billion on air travel and \$65.9 billion on gasoline purchases. Categories with the largest percent growth between 2013 and 2014 were travel arrangement and reservation services (9.9 percent), intercity charter bus services (8.7 percent), and passenger water transportation services (7.7 percent).

**Passenger Rail.** Amtrak is the primary operator of intercity passenger rail service in the United States. In fiscal year 2015, 12 of the Nation's 25 busiest Amtrak stations served the Northeast Corridor and Chicago, with 3.3 million riders.

**Figure 2-21 Top 25 Busiest Amtrak Stations: FY2015**



KEY: FY = fiscal year.

SOURCE: Amtrak, State Fact Sheets, available at [www.amtrak.com](http://www.amtrak.com) as of February 2016.

## 11. Cargo Demand

**Trade Hubs.** In 2014 the top 25 foreign-trade gateways as measured by value of shipments consist of 11 water ports, 5 land-border crossings, and 9 air gateways. International trade is responsible for one in six jobs and 18% of Florida's economy, with Asia as our top source for merchandise imports. In 2014, Florida's total merchandise trade in imports and exports was \$153.2 billion, the third highest ever recorded. Florida is the leading state for merchandise exports to Latin America and the Caribbean, responsible for 32.1% of all U.S. exports to the region.

### Top10 U.S. Airports by Landed Weight of All-Cargo Operations in 2014

Rank	Airport	City	State	Cargo, lbs. (billion )
1	Memphis International Airport (MEM)	Memphis	TN	21.9
3	Louisville International Airport (SDF)	Louisville	KY	11.3
4	O'Hare International Airport (ORD)	Chicago	IL	6.9
5	Miami International Airport (MIA)	Miami	FL	6.8
6	Indianapolis International Airport (IND)	Indianapolis	IN	5.3
8	Cincinnati/Northern Kentucky International Airport (CVG)	Cincinnati	OH	3.4
<b>Total Domestic Enplanements</b>				<b>56</b>

**Busiest U.S. Ports.** Five of the top 25 U.S. ports by containerized cargo in 2014 are located along the proposed corridor, including Miami, Port Everglades, West Palm Beach, Jacksonville and Savannah. The state of Florida made investments in PortMiami, and deepened the main harbor channel from a depth of 42 feet to a depth of 52 feet. This dredge makes PortMiami the only major seaport south of Virginia currently capable of handling fully laden post-Panamax vessels. Recently restored on-dock intermodal freight rail service, operated by Florida East Coast Railway, connects PortMiami to 70 percent of the U.S. population in four days or less.

Large airports

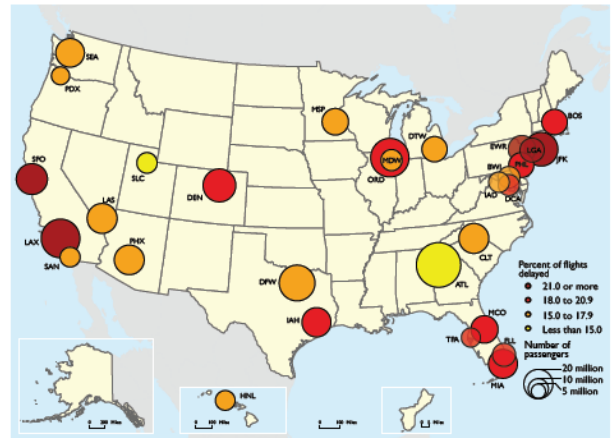
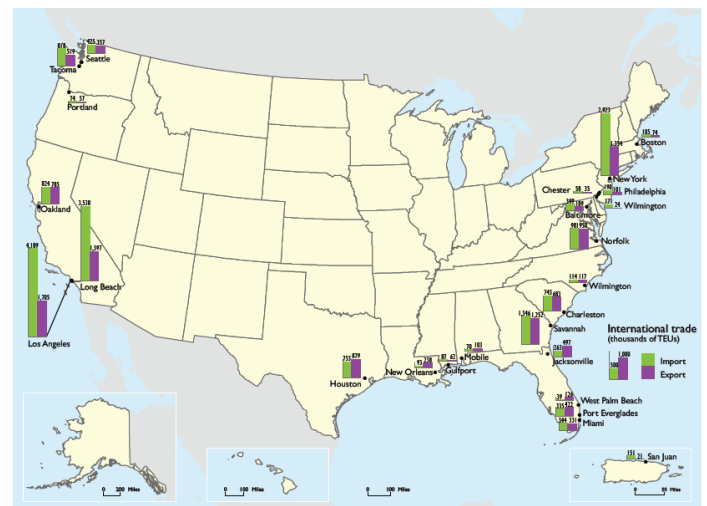


Figure 3-12 Top 25 Water Ports by Containerized Cargo: 2014

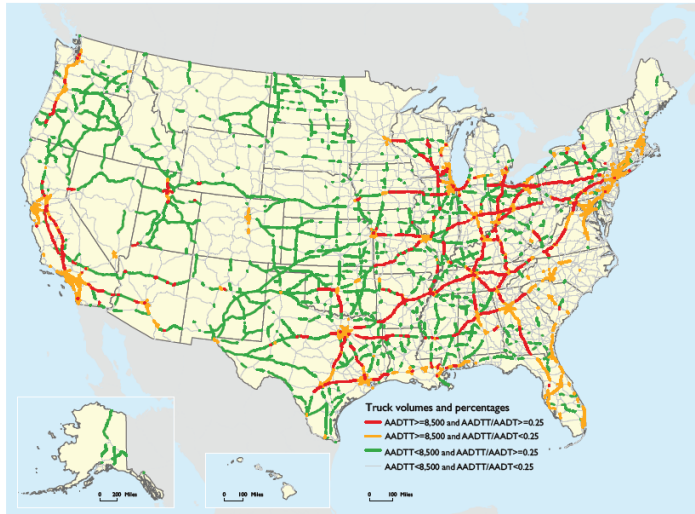


NOTES: The data include both government and non-government shipments by vessel into and out of U.S. foreign trade zones, the 50 states, District of Columbia, and Puerto Rico.

SOURCE: U.S. Department of Transportation, Maritime Administration, U.S. Waterborne Container Trade by U.S. Custom Ports, available at [www.marad.dot.gov/resources/data-statistics/](http://www.marad.dot.gov/resources/data-statistics/) as of June 2015.

**Freight Flow.** Trucks carry most of the weight and value of freight in the United States, but railroads and waterways carry significant volumes over long distances. Long-haul freight truck traffic in the United States is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity. Major truck routes on the National Highway System from Miami to Chicago are along the proposed corridor. In 2011, these routes carried a traffic stream consisting of 0.25 percent or more of heavy vehicles. By 2040 long-haul freight truck traffic in the U.S. is expected to increase dramatically on the National Highway System.

Figure 3-7 Major Truck Routes on the National Highway System: 2011



NOTES: Average annual daily truck traffic (AADTT) includes all freight-hauling and other trucks with six or more tires and includes all motor vehicles.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

Figure 3-5 Average Daily Long-Haul Truck Traffic on the National Highway System: 2011



NOTE: Long-haul truck traffic is defined as truck traffic that is used in movements by multiple modes and road.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

Figure 3-6 Average Daily Long-Haul Truck Traffic on the National Highway System: 2040



NOTE: Long-haul truck traffic is defined as truck traffic that is used in movements by multiple modes and road.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.5, 2015.

**Busiest Cruise Ports.** The top three world's busiest cruise ports by passenger volume are located in Florida. Port of Miami, the busiest cruise in the world and U.S., served nearly 5 million passengers in 2015, followed by Port Everglades in Fort Lauderdale and Port Canaveral. Port of Miami is also home to the global headquarters of five leading cruise lines: Carnival Cruise Line, Norwegian Cruise Line, Oceania Cruises, Regent Seven Seas Cruises and Royal Caribbean International.

## 12. Future Demand

Southeast Florida is the fourth most populous urbanized region in the U.S. The City of Orlando is the most visited city in the nation with annual visitors of more than 60 Million per year while Miami / Fort Lauderdale area has annual visitors of more than 20 Million per year and is home to the world's largest cruise port and the travel gateway to Latin America. The total available market size for use of the Hyperloop in Phase 1 between Miami and Orlando is estimated at 15 to 23 Million per year.

Travel volumes on key highways connecting Central and Southeast Florida are expected to exceed capacity by 2030, resulting in further delays and reduction in reliability. At a distance of approximately 220 miles, the journey from Orlando

to Miami is relatively short for air travel (with total air travel time disproportionately long for the distance given airport security and delays).

## Commercial developments: retail parks, tourism destinations

The Hyperloop will connect some of the largest and most visited shopping malls as well as top sales-generating malls in U.S., which are located in the metropolitan areas of Miami (Dolphin Mall, Aventura Mall and Sawgrass Mills), Orlando (Mall at Millenia and Orlando Premium Outlets). According to 2012 Travel + Leisure publication, the Aventura Mall and Sawgrass Mills, were in the top 10 America's most-visited shopping malls in U.S.

The Miami metro area, which includes Broward and Palm Beach counties, has more sales per square foot for non-anchor tenants (average of \$768) than any metro area in the U.S. Bal Harbour Mall and Aventura Mall, both located in Miami-Dade, are in the list of the top 10 highest sales-generating malls in U.S. Bal Harbour Mall is the most productive mall generating the highest sales per square foot in 2015 and Aventura Mall is the 6th most productive mall in U.S. The 2014's list of the top 10 malls ranked The Mall at Millenia (located 15 miles from Walt Disney World) and the Orlando Premium Outlets as the 7th and 8th most productive malls, respectively.

**2015 Top High Sales-Generating Malls in U.S. in Terms of Average Annual Sales per Square Foot (Green Street Advisors)**

Rank	Name of Shopping & Entertainment Mall	City, State	Metro Area	Annual Visitors (million)	Avg. Annual Sales per sqft
1	Bal Harbour Mall	Bal Harbour, FL	Miami	36	\$3,185
6	Aventura Mall	Aventura, FL	Miami	28	\$1,595
	The Mall at Millenia	Orlando, FL	Orlando	27	\$1,360
	Orlando Premium Outlets	Orlando, FL	Orlando	27	\$1,385

Dolphin Mall is the top outlet shopping and dining destination for international and domestic shoppers in Miami. Just five miles from the Miami International Airport, Dolphin Mall fits the niche of the layover guest. Buses run six times a day from the airport to pick up people who have hours to kill before a cruise ship or long-distance flight. Currently, the Dolphin Mall attracts over 36 million shoppers annually – more traffic than Magic Kingdom and Universal Studios combined– and about 41 percent of the mall's customers are tourists. Tourism shoppers spend 2.4 times local shoppers and Brazilian tourists spend 2.6 times locals. Tourism is especially important at Dolphin Mall.



**Tourist Destinations.** The corridor will serve and connect the top tourist destinations in the country. Florida welcomed 105 million visitors in 2015, becoming the first state to receive more than 100 million out-of-state and international tourists. In 2016, between January and June, Florida recorded 54.1 million tourists.

**Orlando** with a population of 2.3 million residents, is the theme park capital of the world and the most visited destination in the U.S. In 2015, **Orlando recorded 66 million visitors**, which includes in-state, out-of-state and international visitors.

**Greater Miami and the Beaches** is one of the world's most popular tourist destinations with **15.4 million overnight visitors in 2015**, who spent \$24.4 billion in direct expenditures in the area. Spending by international tourists is an important driver of mall sales in the U.S. International travelers already use MIA as a hub to come to the US and make shopping trips to the surrounding malls including the Dolphin Mall and Aventura Mall in MDC and Sawgrass Mills in Sunrise Florida. The bulk of visitors who came to the Greater Miami/Dade area were leisure travelers – the highest number recorded. There were just over 22 million arrivals at Miami International Airport (MIA) during 2015, an 8.0% increase over 2014. Arrivals into Fort Lauderdale-Hollywood International Airport (FLL) saw an even more robust increase of 9.4% during the same period, with more than 13 million leisure travelers. Miami Beach has the highest percentage of tourists (48%), followed by Downtown Miami (19%).

Intercity travel on the Florida Turnpike between Orlando and Miami has grown by an average of 3.5 percent per year since 2000 and air travel between these cities has seen annual growth of 3.2 percent during the same period.

An estimated 15 million trips per year can be captured on the Hyperloop without any new market. Based on the annual visitors coming to Orlando and Miami area, it is estimated that an additional 8M trips can be generated as new trips for visitors interested in taking the Hyperloop and combining the trip to Orlando and Miami tourism gateways. See the graphic

Hyperloop - New Market				CAR				Rail/Transit				AIR			
60,000,000	Orlando visitors (annual)			300,000	Florida Turnpike			1530	Miami/Fort Lauderdale to Orlando			1000	Miami/Fort Lauderdale to Orlando (assume)		
20,000,000	South Florida visitors (annual)			200,000	I-95										
<b>80,000,000</b>	Total annual visitors			<b>500,000</b>	Daily trips										
				290	Number of Days per year			290	Number of Days per year			290	Number of Days per year		
				145,000,000	Annual Trips			443,700	Annual estimates of Florida All Aboard			290,000			
10%	New Market Miami - Orlando Trips			10%	Miami - Orlando Trips (assume)			50%	Miami - Orlando Trips (assume)			50%	Miami - Orlando Trips (assume)		
<b>8,000,000</b>	Potential market for HL			<b>14,500,000</b>	Potential market for HL			<b>221,850</b>	Potential market for HL			<b>145,000</b>	Potential market for HL		
0.75	Average trip time - door to door			4.5	Average trip time - door to door			3.5	Average trip time - door to door			3.5	Average trip time - door to door		
				\$ 65.00	Cost per trip			\$ 100.00	Cost per trip			\$ 200.00	Cost per trip		

## Section 5: Government & Policy

### 13. Infrastructure Investment

The proposed corridor passes through several cities, MPOs, DOTs and States and therefore a multi-agency integrated approach will need to be developed along with various federal agencies to structure, fund, permit and regulate the project's development.

The first phase of the corridor from Miami to Orlando will be undertaken in Florida by FDOT and the MPO's of Orlando and Miami-Dade Counties and counties in between.

All major projects must be planned through the Metropolitan Planning Organization (MPO) in order to be eligible for federal government funding. Traffic models are used to generate forecasts of future congestion levels and evaluate the ability of individual projects to add capacity.

MPOs generate a Cost-Feasible Long Range Transportation Plan (LRTP) which addresses projects over a 25-year horizon.

National Environmental Policy Act (NEPA) studies will need to be initiated after the project has reached Priority II in the LRTP. Currently, major capacity and transit projects take 10 to 20 years from concept to implementation. Hyperloop will need to go through the same process if federal funding is contemplated. Using only state, local and private sources of funds would allow the development to happen more efficiently with only a State Environmental Impact Report (SEIR) needing to be developed.

FDOT is undertaking a project to incorporate innovative technologies in transportation and land use planning and aims to promote shared, connected and automated mobility (car optional region) throughout the state and the Hyperloop technology is a perfect fit in terms of innovation and resiliency.

**Public-Private Partnerships:** Florida has been a pioneer in the use of public-private partnerships for funding. The expansion of Interstate 595 in Broward County and development of the PortMiami Tunnel are two examples of megaprojects that involved federal, state and local public funding along with private investment. Also, two major projects in Broward County serving Port Everglades are further examples of such funding: The Florida East Coast Railway (FECR) intermodal container transfer facility (ICTF) and the Eller Drive flyover.

**State Funding:** The Florida Legislature has appropriated infrastructure funding for port and intermodal development related to the state's independently governed and operated seaports through the Florida Seaports Transportation and Economic Development (FSTED) program, managed by the FSTED Council. Projects typically require a 50-50 (or in some

cases 75-25) match and must meet certain criteria for enhancing cargo and passenger movement.

### 14. Completed Projects

Miami and South Florida have successfully completed many projects through this state and local government collaboration. In most cases, area metropolitan planning organizations (MPOs) also adopt these projects as high priority and contribute to securing funding and support.

Miami Dade County has a ½ cent sales tax in place to fund transportation infrastructure projects. In addition, the state through FDOT can contribute a significant percentage of a project's capital cost (25-50%) through state grants, the State Infrastructure Bank and other mechanisms that may also include Federal funding.

Successful recent projects in Miami Dade County include the **Miami Intermodal Center** completed in 2011. Located just east of the Miami International Airport, the **Miami Intermodal Center is a massive \$2 billion ground transportation hub** being built by the FDOT.

The MIC Program consists of several components: major roadway improvements, including a reconfigured Le Jeune Road, completed in May 2008; the user-friendly Rental Car Center



which opened for business in July 2010; the MIA Mover which became operational in September 2011 and connects MIA to the Rental Car Center; the Miami Central Station which opened in April 2015 currently offers connections to Tri-Rail and Greyhound services with Amtrak services scheduled to start in the fall of 2016; and Joint Development areas which are currently being explored for housing the Hyperloop station and associated infrastructure as well as supportive land uses.

The **Metrorail Extension** from the Earlington Heights station to MIA opened in 2012, extending the existing MetroRail system two and a half miles to connect with Miami International Airport at the Miami Intermodal Center. This project provides the first heavy rail connection to a major airport in Florida and extends the accessibility of transit

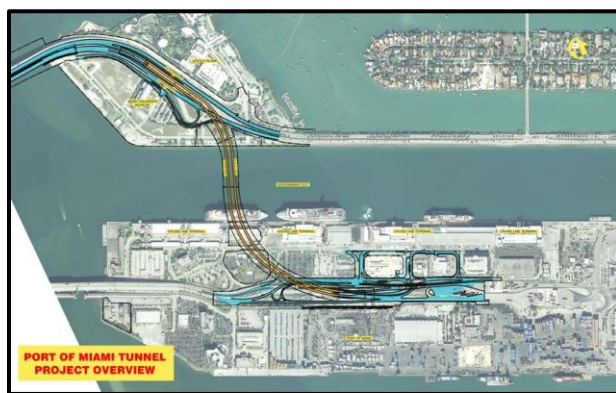
patrons throughout the greater Miami area to the airport. This was a \$506 million project completed on time and within budget performed by Miami Dade County.



The **Palmetto/Dolphin Expressway Interchange** was just completed now to rationalize the traffic flows through a complex four level interchange in the heart of Miami Dade County just at the southwest corner of Miami International Airport. This project was coordinated through both the FDOT and the Miami Dade Expressway Authority with multiple other key stakeholders. To reduce the traffic congestion and confusing traffic patterns at this critical interchange location. Completion of this \$550 million Design Build project was officially accomplished on September 27, 2016.



**Port of Miami Tunnel** project, one of the first P3 projects developed by FDOT, was completed in 2014 at a cost of \$667 million. This project provides a direct connection to the Port of Miami through twin  $\frac{3}{4}$  mile long tunnels leading directly from the I-95 and I-395 freeways into the port complex. This project significantly improved traffic congestion in downtown Miami by allowing the thousands of trucks traveling to and from the port on a daily basis to have a direct connection from the highway network.



## 15. Risk Mitigation

Most often the environmental clearance and preliminary engineering phases are completed under the auspices of a governmental entity in order to reduce risk for major transportation infrastructure projects. The risk of unknown subsurface conditions and major relocation and ROW acquisition are also typically handled by a government entity.

## 16. Transport Appraisal Model

The Southeast Florida Regional Planning Model is the standard in use at the present time for determining travel demand characteristics.

[http://www.fsutmsonline.net/index.php?/model\\_pages/modD44/index/](http://www.fsutmsonline.net/index.php?/model_pages/modD44/index/)

Transit modeling and ridership estimates are also developed via the Federal Transit Administration Simplified Trips on Project Software (STOPS) model.

<https://www.transit.dot.gov/funding/grant-programs/capital-investments/stops-%E2%80%93-fta%E2%80%99s-simplified-trips-project-software>

## 17. Model Effectiveness

The models currently in use in Florida would likely need major modification since they are not geared for major intercity travel estimation and cross jurisdictional application. The SERPM model is specific to South Florida and the FTA STOPS model is typically used on urban single corridor projects within a generally limited geographic area.

## 18. Value of Time

Typically the value of time ranges between \$15-\$20 per hour for personal users and between \$80-\$100 for commercial users based upon national research conducted by organizations such as the Texas A&M Transportation Institute. <http://mobility.tamu.edu/resources/related-tti-reports-and-presentations/>

## 19. Top 3 Socioeconomic Benefits

First, clearly the short term construction benefits of such a major undertaking would be significant in terms of design and construction jobs created. It would also create additional jobs in the future with the experience gained here in South Florida allowing for further job creation as the system expands. Second, the reduction in travel time and road congestion that could be realized would provide a paradigm shift in terms of productivity and accessibility for people of all income strata throughout the region. Third, the development potential near Hyperloop nodes would create modern hubs of residential and commercial development that could accelerate the concentration of population into livable communities.

## 20. Mode Shift Policy Measures

All of the Metropolitan Planning Organizations and most of the municipal transportation agencies in Florida have undertaken programs to support sustainable development, energy efficiency, congestion reduction and livable /walkable communities. Most programs are funded by a combination of federal, state and local funding as well as tax and zoning incentives for developers in some cases to develop housing and commercial/retail projects near transit stations as an example.

## 21. Support for Inward Investment

FDOT has been at the forefront in developing Design Build and PPP projects in Florida and would likely be an important partner in any Hyperloop project in the State of Florida. The State of Florida also has a State Infrastructure Bank that can help finance major projects as well as local sources of funding and mechanisms for allocating additional tax increment financing in various regions of Florida. Some areas of the state have had voter-approved sales tax measures passed to help with various infrastructure investments as well.

## 22. Legislative Approval Process

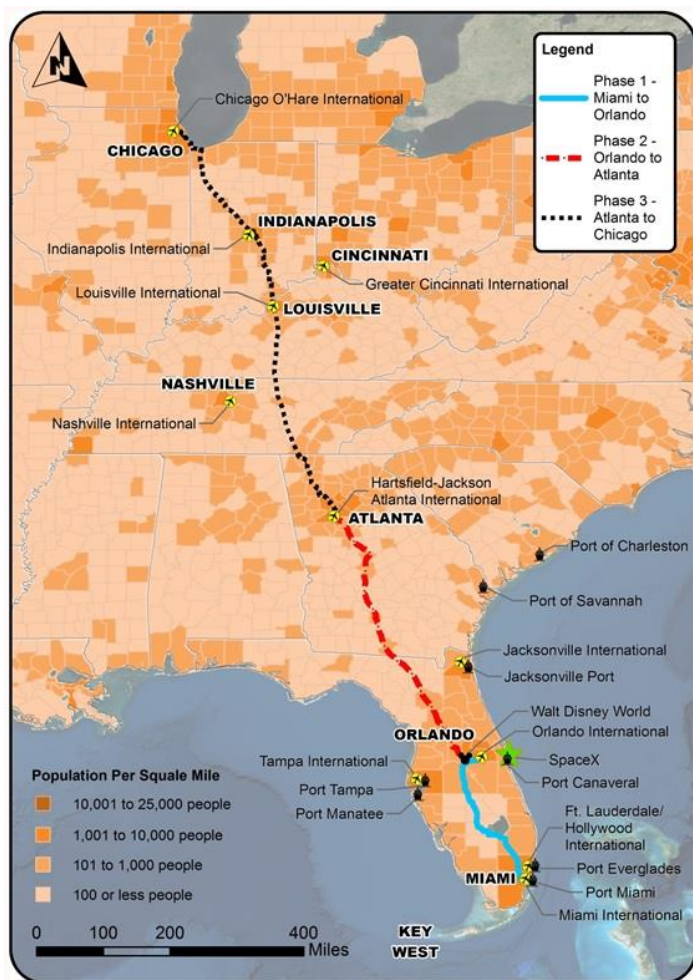
Projects with federal funding must follow the requirements of the National Environmental Policy Act and if only state, local and private funding is involved then a State Environmental Impact Report (SEIR) would be sufficient. Major infrastructure projects typically require a timeframe from 10 to 15 years from concept to construction and operation.

## 23. Transport Regulatory Bodies

For a project such as the Hyperloop, agencies with oversight support functions include the US Department of Transportation, the Florida Department of Transportation, and the transit agencies, Metropolitan Planning Organizations and Public Works departments of all the counties and municipalities along the corridor. Most agencies have a long range planning or strategic development group that would be the coordinator for such an undertaking.



## Section 6: Acceleration Plan



### 24. Accelerating Hyperloop

Accelerating Hyperloop development in this corridor can be accomplished by establishing a South Florida Hyperloop Authority comprised of all the key regulatory and oversight agencies along the corridor. Precedent exist for this in the previous establishment of the Florida High Speed Rail Authority, [http://floridabullettrain.com/fhsra/5\\_railauthority.html](http://floridabullettrain.com/fhsra/5_railauthority.html)

This Authority could then undertake all of the necessary regulatory approvals and legislative undertakings necessary to develop the Hyperloop project throughout the state of Florida.

### 25. Regional Partnerships

It is envisaged to potentially extend the Hyperloop project as far as Chicago, Illinois which would require the participation of six different states. Again, precedents for such an undertaking exist with the bi-state planning and development undertaken in the New York City region where many transportation and infrastructure projects are coordinated between New York State and New Jersey. <http://www.panynj.gov/>

Another example that we could draw upon is the I-95 Corridor Coalition that spans all the states from Maine to Florida. <http://i95coalition.org/>

Another organization that could serve as a model is the I-75 Mid-America Freight Coalition.

<http://midamericafreight.org/rfs/network-inventory/corridors/profiles/i-75/>

Establishing such a Coalition for the purpose of establishing a Hyperloop system and program in the region will lead to an expansion of the number and types of agencies that participate in Coalition projects and activities, including transit agencies and metropolitan planning organizations. Outside of the Coalition region, it may lead to expressed interest in participating in Hyperloop development work.

This region of the United States hosts many of the nation's vital governmental, business, industrial, agricultural, entertainment, and recreational activities. In order for the nation to thrive, the transportation facilities that serve these activities must be managed and operated efficiently and Hyperloop provides a wholly new means of accomplishing this. Since many of the trips resulting from these activities, whether transporting freight or people, cross over multiple state and authority jurisdictional boundaries, no single operating entity is responsible for the overall efficiency, safety, comfort, or cost of travel, or its effects on the environment.

The Coalition would bring to the table the key decision makers that have or will influence the operation of the Hyperloop Corridor including:

- State and Local Departments of Transportation,
- Transportation Authorities,
- Transit and Rail Agencies,
- Port Authorities,
- Motor Vehicle Agencies,
- State Police and Public Safety
- US Department of Transportation,
- Intercity Passenger and Freight Transportation Providers, and
- Transportation Industry Associations

### 26. Potential Investors

Miami-Dade County and private entities have all expressed an interest in providing funding for the construction and eventual operation and maintenance of the Hyperloop system. Additional interest will likely be generated during the organization of the Hyperloop Coalition where the County will reach out to potential investors looking for their support and participation.

### 27. Expertise for Further Study

The Miami–Orlando Corridor team can provide expertise in all elements including civil engineering, alignment selection, terminal design, demand forecasting, and operations.

## Appendix