Regional Transportation Council

The Transportation Policy Body for the North Central Texas Council of Governments
(Metropolitan Planning Organization for the Dallas-Fort Worth Region)

TO: Regional Transportation Council Members
Surface Transportation Technical Committee Members
Mayors and City Managers/Administrators Over 5,000 Within the Metropolitan Planning Area

DATE: September 30, 2022

FROM: Michael Morris, P.E.
Director of Transportation

SUBJECT: Call For Projects: Certification of Emerging and Reliable Transportation Technology Program

In May 2022, the Regional Transportation Council (RTC) initiated a program to attract innovative transportation technologies to the North Central Texas region that require capital-intensive infrastructure needing certification or pilot testing prior to widespread use. This Certification of Emerging and Reliable Transportation Technology (CERTT) Program outlines a transparent process where transportation technology providers focused on moving people and/or goods have the opportunity to connect with interested local governments and to develop a certification facility or pilot project that would be converted for commercial use once its certification phase was complete. The goal of this CERTT Program is to create a level playing field for local governments to have the opportunity to submit suitable locations needing transportation solutions for these technology providers to consider. Further details about this program, its process, and the goals of the RTC can be found in Attachment 1, Policy Support to Develop Process for the Innovative Transportation Technology Infrastructure Certification Program.

On September 8, 2022, the RTC initiated the process for soliciting proposals for potential sites from local government entities for the implementation of **TransPod**, a hyperloop technology enabling high-speed long-distance transportation, and **JPods**, an overhead gondola-style technology suited for first/last-mile connections and local transportation. Each of these technologies and the vision of their providers is further described in Attachments 3 and 4. While the vision for each provider may include future expansion opportunities, potential location submittals from local governments should first clearly identify the limits of a certification facility/pilot project and note future expansion opportunities if they wish. Proposed sites will be reviewed by the respective technology provider, TransPod or JPods, who will decide if they wish to pursue further discussions with the proposing local government. Please note, as these are capital-intensive projects, locations submitted must be a part of the region's current long-range transportation plan, Mobility 2045 Update, or qualify for addition to a future long-range plan. Please coordinate with North Central Texas Council of Governments staff.

There will be an opportunity for interested local governments to attend a pre-submittal meeting with the technology providers to ask detailed questions. We encourage you to take the time to review the information that has been provided by these technology providers in order to begin thinking about which technologies may meet your city's transportation needs, and which locations may fit the specific niches of the providers. We request that you submit your questions in advance of the meeting by the deadline outlined below so the providers may have time to prepare responses for the pre-submittal meeting. Local governments looking for support in identifying locations should contact staff to discuss opportunities that align with current plan recommendations.

The information packet also includes the Submittal Form that will need to be filled out and submitted with a map showing the limits and alignment of your proposal as Attachment 2.

- Deadline for submitting questions and RSVP (preferred, not required) for pre-submittal meeting is **Friday, October 14, 2022**
- Pre-submittal meeting with providers is **Friday, October 21, 2022,** and will be held at the NCTCOG Offices located at 616 Six Flags Drive, Arlington, TX 76011
- Deadline to submit proposals is **Friday, November 18, 2022**

We encourage you to RSVP for the pre-submittal meeting; please use the link provided to RSVP – **https://forms.office.com/r/YXLCdeWktr.**

We look forward to working with you and further exploring the potential for partnerships with providers of innovative, emerging technologies that will help solve the long-range transportation needs of the North Central Texas region, as well as your jurisdictions.

If you have questions about CERTT, please contact Brendon Wheeler at BWheeler@nctcog.org or Martin Bate at MBate@nctcog.org. If you have questions about submitting proposals, please contact Martin Bate.

Michael Morris, P.E.

MB/BW:cmg
Attachments

Attachment 1 – RTC Policy

Policy Support to Develop Process for the
Innovative Transportation Technology Infrastructure Certification Program
(P22-02)

The Dallas-Fort Worth region has positioned itself as an innovator in using advancing technology to address transportation issues. The North Central Texas Council of Governments (NCTCOG) continues to receive interest from technology developers on implementing new and innovative infrastructure technology that is not currently in operation for a commercial application anywhere in the United States. As is the case with many new technologies, these transportation infrastructure solutions require certification by the appropriate governing entities (either local, state, or federal). This certification requirement may come in many forms, depending on the application, including safety certification to ensure the safety and welfare of the traveling public, as well as certification for use within the region as required by NCTCOG.

This policy outlines the guiding principles and process by which the Regional Transportation Council (RTC) may choose to coordinate with a technology provider to implement a certification facility in the Dallas-Fort Worth region for commercial application. To ensure flexibility with the various types of infrastructure being developed, the following process is structured in a transparent way for potential technology developers and local governments/transportation entities to express interest and collaborate on implementation opportunities. This process would allow for periodic expressions of interest to be facilitated in a timely manner.

The following are the guiding principles of this Innovative Transportation Technology Infrastructure Certification Program:

- Potential projects must serve a long-range transportation need as identified in the recommendations of the Metropolitan Transportation Plan or be considered for inclusion in a future Metropolitan Transportation Plan.
- The technology developer is solely responsible for navigating any certification process(es) with the appropriate regulating authority(ies) for the developer's specific technology as required.
- If the proposed technology is implemented and fails to perform as intended, or the certification process ends or fails, the project-sponsoring local government must have verifiable assurances that the transportation need identified will still be appropriately addressed. It is encouraged that this contingency be included in any technology infrastructure proposal. Public funds may or may not be used for the certification needs of the emerging infrastructure technology.
- NCTCOG will facilitate mutual cooperation between local governments and transportation entities where potential project limits extend across multiple jurisdictional boundaries.
- When considering locations for proposed technology facilities, local governments and transportation entities should consider the following:
    - Expected timeframes for infrastructure to be operational for public use
    - Public use goals and performance expectations of proposed transportation infrastructure.

Following the guidelines listed above, the RTC directs staff to implement the following transparent process outlined in the steps below once NCTCOG or the RTC is approached by an infrastructure technology provider to enter into this process. This process is structured to allow for periodic solicitation or acceptance of proposed technology infrastructure solutions. The following process outlines how proposals brought to NCTCOG will be handled and does not

preclude local governments and transportation entities from engaging directly with technology entities.

1) NCTCOG staff will confirm infrastructure technology solution proposed by provider conforms with this policy and a long-range transportation need as identified in the Metropolitan Transportation Plan.
2) NCTCOG staff will provide RTC with a summary of the technology provider's proposal, including any requirements and available details on the proposed operation of the technology. The RTC will take action on whether to initiate the development process for certification of the infrastructure technology.
3) Upon RTC action, local governments will submit potential locations of interest that utilize public right-of-way and serve a regional long-range transportation need.
4) The technology provider will determine the preferred location and project development opportunity to pursue based on the proposals provided by the local governments through NCTCOG.
5) The RTC will initiate project development activities and coordination efforts among the appropriate transportation agencies, local governments, and the technology provider. The RTC will direct NCTCOG staff to provide support in the project development activities and coordination efforts as needed. Project development activities and coordination efforts may include appropriation of public funds for project development and implementation.

The RTC directs staff to provide regular briefings when proposals are received and during project development. The RTC also directs staff to integrate the resulting recommendations from projects that advance into future mobility, air quality, safety, and other regional planning activities as appropriate.

Attachment 2 – Submittal Form

Certification of Emerging and Reliable Transportation Technology (CERTT)
Round 1 Submittal Form
Deadline: Friday, November 18, 2022, 5:00 PM
MUST BE PHYSICALLY DELIVERED IN HAND TO NCTCOG OFFICES

Entity Name:
Primary Point of Contact (POC):
POC Email:

CERTT Round 1 Technology (select one per form)	☐ **TransPod** ☐ **JPods**
Where would this facility be built? Limits? Please include a map with your submission. (Confirm location consistent with MTP recommendations)[1]	
What would be the length of this facility? (Please review attachments 3 and 4 for recommended minimum facility sizes)	
What is the status/ownership of the right-of-way?	
Would this be a pilot for a larger expansion in your jurisdiction, or a stand-alone project?	
Please provide a brief description of what transportation issue you are trying to solve with this technology.	

Please deliver this form to the NCTCOG offices, addressed as follows:

ATTN: Martin Bate
616 Six Flags Drive, Centerpoint Two
Arlington TX 76011

You may also submit a courtesy copy of this form by emailing MBate@nctcog.org. One submittal form per location and technology. Please attach this form, as well as a high-resolution map showing the proposed location(s) and connection(s), if any, to other transportation facilities.

[1] See Attachment 3A for restricted corridors on TransPod hyperloop location submittals

Attachment 3a – TransPod Information

https://www.transpod.com/

Provider and Technology Information	
How does your technology differ from today's technology?	Hyperloop; long-distance, high-speed (600+ mph) people and goods movement; fully electric - can include solar panels on the top of the tube.
How does technology meet long-term regional needs?	High-speed connections between DFW and other regions.
Examples of other locations advancing your technology?	Memorandum of understanding signed to build between Edmonton and Calgary (185 miles) Alberta, Canada; raised $550MM in private financing for initial phase; moving through environmental process and land acquisition.
Technology development level?	NASA's Technology Readiness Level 6/7 out of 9: Technology demonstrated in relevant environment / System prototypes demonstrated in an operational environment.
Development approach?	Feasibility study for overall, inter-city project first; then implement first leg as certification facility on preferred alignment within DFW (about 10+ miles).
Certification progress?	Working on certification with Canadian authorities; expect this experience aid in certification efforts in United States.

Development and Design Considerations	
What's needed from public sector?	Site selection, ROW identification and coordination process; privately financed - could include public involvement if so desired by public entity.
Existing or new ROW?	Depends - likely mix of both depending on route selection.
Estimated timeline?	2022-2024 Phase 1 - feasibility and environmental analysis 2024-2029 Phase 2 - construct certification center (1st leg in DFW) 2030-2035 Phase 3 - construct full inter-city line
Contingency should technology fail to certify or perform as expected?	Investors for Alberta project agree to convert hyperloop facility to traditional high-speed rail on same ROW, demonstrating sophisticated approach in balancing public and private risks. Expect similar approach in DFW.
Minimum footprints of support columns for the TransPod tube	Approx. 6 ft x 9 ft area for the columns, and approx. 9 ft deep is our plan in Alberta (Canada). It probably won't need to go as deep in Texas as in Alberta; the reason for the depth in Canada is to get below the frost (frozen ground) level. The columns are spaced out approx. 100 ft apart.
Minimum footprints of support structures for TransPod stations	The stations can be configured as necessary to fit into local constraints; the main idea is to have them at ground level rather than elevated on support structures.

Development and Design Considerations	
Minimum widths of TransPod tubes, stations	Tubes: 13.1 ft diameter, with two parallel tubes, meaning the corridor width for our tubes is approx. 30ft total. We also must include an access/maintenance road in our corridor development planning (this can be a pre-existing road if the local municipalities prefer), which would add approx. 50-60ft to the corridor in the event that a new road must be built. Stations: can be configured as necessary. A "big station" could be around 200,000 sqft.
Minimum and maximum heights of TransPod tubes, stations	Tube height depends on the characteristics of the ground underneath - in order to keep the tube relatively flat and straight, we will do our best to keep it at a somewhat constant height when passing over valleys etc. This means that it could range anywhere from 0ft to 100+ ft depending on the topography below. In general we aim to have an average of about 16-20ft. Some more detailed engineering and route planning in Texas moving forward will enable us to get a better idea of the height of the tubes based on the route selected. The stations can be configured as necessary to fit into local constraints (e.g. in Alberta we are currently working on the engineering to make sure that we stay under the no-fly zone when bypassing the Edmonton International Airport).
Maximum turning radii for TransPod (e.g., how tight of a turn can be made?)	This depends on speed and can therefore be configured based on land constraints (that is, if we need to make a tighter turn, we can just slow down). In the low-speed zones (e.g near stations), the turning radii can be quite tight and in the high-speed zones we prefer if possible to keep the turning radii in range of a few miles (so that the vehicles can move at high-speeds without interruption). (*Note from NCTCOG staff: consider any tight radii used in the interior of the proposed corridor may lengthen the overall project to ensure the certification track can accommodate high speeds needed for certification*)
Regarding the certification facility length, your initial letter of interest suggested anywhere from 10-50 miles. Longer lengths will likely require coordination across multiple jurisdictions. Would you say that the desired length for such a facility is closer to 10 miles or 50 miles?	Around 10 miles would be sufficient, and as you hinted at, we expect this would simplify the process by ensuring we stay within one jurisdiction, impact fewer landowners, etc.

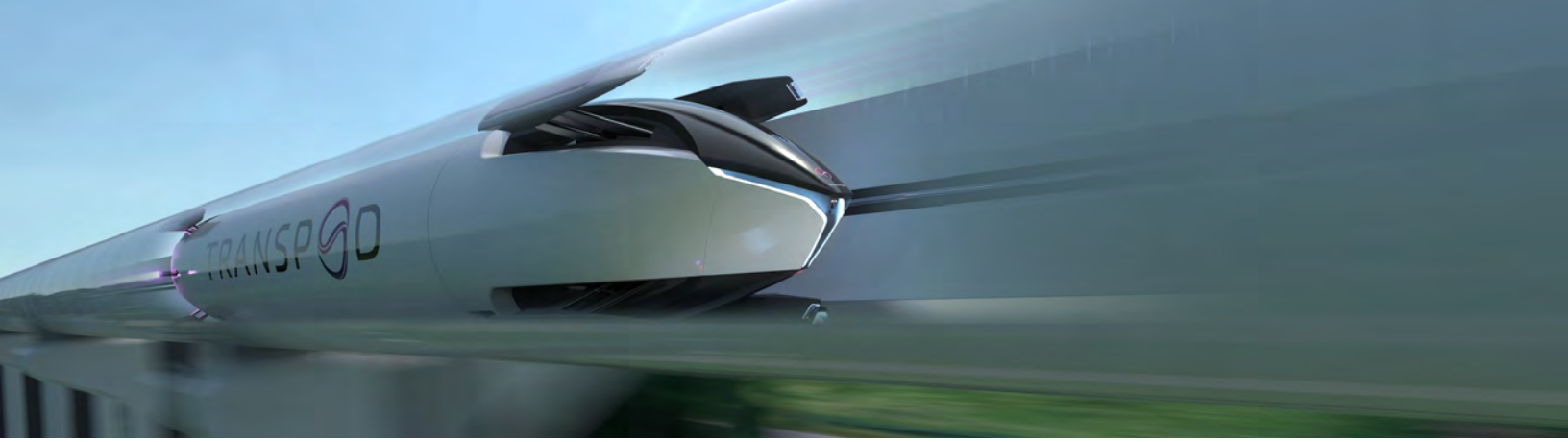
Please review the Mobility 2045 Update project recommendations map and map packets for guidance on corridor selection:
https://nctcog.org/trans/plan/mtp/mobility-2045-2022-update

This technology supports the following Metropolitan Transportation Plan programs:

- FP2-120 Freight System / Network Planning (PDF, page 13)
- TR2-003 Next Generation Transit Program (PDF, page 45)
- TR2-004 State and National Transit Connections (PDF, page 51)

****Note: Location submittals for TransPod's consideration between Fort Worth, Arlington, and Dallas (along IH 30), as well as Dallas toward Houston, will not be accepted since those corridors are reserved for high-speed rail technology.****

Attachment 3b – TransPod Brochure



TransPod: the leader in Ultra-High-Speed Transportation

TransPod is a Canadian company designing the next generation of sustainable ultra-high-speed transportation systems to enable passenger and cargo travel at speeds up to 1,200 km/h

TransPod Overview

- TransPod Inc. is a Toronto-based company founded in 2015 with global operations in Canada, France, Italy and the UAE
- **TransPod creates and builds the most practical, economically feasible, and operationally robust ultra-high-speed tube transportation (exceeding 1,000km/h)** due to cutting-edge technology and innovations which drastically reduce infrastructure costs.
- The system is powered by **environmentally-sustainable solar/electric energy** in a system that is unaffected by weather conditions
- TransPod has received official support from the Government of Alberta to build a 200 mile TransPod line between Calgary and Edmonton, and has private funding proposals in hand to fully finance the construction of the Alberta infrastructure, making it the first hyperloop company to achieve this commercial milestone. **The total project is valued at approximately US$18 billion.**
  - TransPod's infrastructure investor has requested the right to invest in future projects, meaning that **TransPod expects to be able to bring private funding to any future infrastructure project worldwide**, pending a strong business case
  - Several other major investors have provided letters of intent to fund future infrastructure projects as well.

In July 2022, TransPod unveiled a first fully-functional prototype of its system, at ⅓ scale

Benefits of the TransPod System

Multi-billion dollar economic output during the construction period, driving economic growth

Lower cost per kilometer than competing hyperloop systems; superior speed and cost performance compared to high-speed-rail

Tens of thousands of jobs created throughout the construction period in engineering, skilled trades, etc.

Dramatically reduces transport-related CO2 emissions by removing cars, planes and their internal combustion engines from operations and replacing them with an electric-powered transportation system

Smaller land impact than existing transport systems (e.g. rail, highway) due to construction on pillars rather than at ground level, meaning that it is unnecessary to cut a linear corridor of land to build the system

Merges distant cities into one super-connected region via an ultra-high-speed connection

Reduces car accidents by reducing the number of cars in operations and putting passengers instead into a safer, protected tube transportation environment

Leadership Team

Sébastien Gendron
CEO & Co-Founder

- Sébastien has more than 17 years of experience in managing engineering teams at Bombardier, Safran S.A. and Airbus Group

SAFRAN AEROSPACE · DEFENCE · SECURITY AIRBUS BOMBARDIER

Ryan Janzen
CTO & Co-Founder

- Ryan invented the TransPod system and has previously created several "firsts" including veillance flux (applicable in high-speed vehicle control systems) and aircraft power line communications

UNIVERSITY OF TORONTO

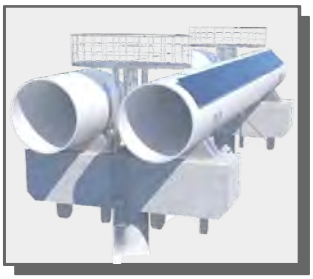
TransPod System Overview

1 The TransPod Vehicle

a. Vehicle fuselage
b. Propulsion traction and thrust
c. Vehicle power systems
d. Vehicle auxiliary systems
e. Avionics

2 TransPod Infrastructure

a. Route infrastructure
b. Systems infrastructure
c. Facilities infrastructure



TransPod's Technology Advantage

- **The TransPod system focuses its tech on the vehicle to deliver its ultra-high-speed performance with simpler infrastructure**
- **Advanced technologies include dual mode propulsion and levitation in an electronically powered system**

	TransPod's Structural Advantage		Other Vacuum Tube Transportation				
System Component	TRANSPOD	How it Translates Into a Structural Advantage	Virgin hyperloop one	HYPERLOOP TRANSPORTATION TECHNOLOGIES	ZELEROS	HARDT	NEVOMO
Levitation Technology	Active Levitation (JetGlide™)	▪ Active levitation allows TransPod to outfit its vehicles with pod-side electromagnets and ferromagnetic materials on the guideway ▪ TransPod's JetGlide™ technology keeps the vehicle levitated off the bottom of the tube guideway, creating a smooth ride, and reducing energy consumption due to an absence of mechanical friction between the vehicle and the infrastructure ▪ TransPod minimizes infrastructure and maintenance costs by placing the technology on the vehicle	Passive Levitation	Passive Levitation	Active Levitation	Active Levitation	Passive Levitation
Propulsion Technology	Linear Induction Motor ("LIM") With Axial Compressor	▪ LIM is a type of magnetic traction engine that provides thrust to accelerate the vehicle, and braking ▪ Allows TransPod to accelerate to top speed and maintain speed using an axial compressor ▪ All key propulsion subsystems are on the pod itself, further reducing infrastructure costs	Linear Synchronous Motors	Linear Synchronous Motors	Compressed Air Electric-Aerodynamic	Linear Synchronous Motors	Linear Synchronous Motors
Pressure State of Tube	Near Vacuum	▪ TransPod is able to lower tube pressure to near vacuum levels, allowing it to exceed typical tube environment speed limitations	Near Vacuum	Near Vacuum	High Pressure (Aviation-like)	Near Vacuum	Near Vacuum
Power Delivery	Quantum Power	▪ TransPod's system solves the impossibility of transferring power at a high speed safely by receiving electrical energy onboard the vehicle from conductors inside the tube, known as its Quantum Power™ system	On-Board Batteries	On-Board Batteries	On-Board Batteries	On-Board Batteries	On-Board Batteries
Pod Design Approach	Fully Integrated Proprietary IP	▪ TransPod is designing its proprietary technology with a full system view in mind as opposed to integrating subsystems from suppliers that are being designed in isolation ▪ TransPod's iterative and holistic approach ensures interoperability between subsystems	Proprietary IP Design	External Technology Integrator	Proprietary IP Design	Proprietary IP Design	Proprietary IP Design
Infra. Construction Approach	New Line Construction	▪ TransPod is building new infrastructure corridors with a complete vacuum tube system to avoid discrete construction stage risks, long drawn-out construction and implementation risk	New Line Construction	New Line Construction	New Line Construction	New Line Construction	Retrofit MAGLEV

Given its unique proprietary technology, TransPod is the only company prepared to develop ultra-high-speed tube transportation systems. It is imperative for states to begin working with TransPod on feasibility studies and pre-construction activities, so that they do not miss out on the impending transportation revolution.

Attachment 4a – JPods Information
https://www.jpods.com/

Provider and Technology Information	
How does your technology differ from today's technology?	Solar-powered mesh network automated pods on elevated guideway (4 seats per pod) 30-35 mph
How does technology meet long-term regional needs?	Connections between airports/hotels, shopping areas, entertainment or hospital districts; create safe passage where traffic accidents high; short to intermediate distances (think arterial grid-type of trips)
Examples of other locations advancing your technology?	Macon, Georgia (more information available here)
Technology development level?	NASA's Technology Readiness Level 5 out of 9: Technology validated in relevant environment.
Development approach?	Phased approach where they JPods begin with a small deployment and observe / collect customer feedback before expanding
Certification progress?	Refer to ASTM F24 standard on amusement rides and devices, JPods-specific certification not yet attained.

Development and Design Considerations	
What's needed from public sector?	Permission to build on public ROW, site selection; privately funded; offers 5% of gross revenues to public sector for use of ROW
Existing or new ROW?	Existing ROW
Estimated timeline?	24 months for planning, scheduling; 9 months to certify; construction schedule dependent on length/complexity of location.
Contingency should technology fail to certify or perform as expected?	Complete removal of sub-network within six months if no operation for 60 days, including restoration of ROW; use of "rescue rail" to for trial locations with lower upfront cost to test market is available option to reduce contingency risk.
Minimum footprints of support columns for the JPods guideway	Approx. 32" pipe with 3/8" wall, not including traffic barriers if needed. Can also use wickets, single-guideway networks, suspension trusses, and ropeways. Example schematic available here.
Minimum footprints of support structures for JPods stations	Varies based on design; mock-ups of different designs available here.
Minimum widths of JPods guideways, stations	Normal guideway with solar collectors: 4 meters wide, approx. 13.1 feet.
Minimum and maximum heights of JPods guideways, stations	None specified, depends on deployment location and regulations such as truck clearances without signage. Schematic above shows 4.9 m (16 ft) clearance between vehicle and ground, 7.79m height between top of structure and ground.

Development and Design Considerations	
Maximum turning radii for JPods (e.g., how tight of a turn can be made?)	JPods are articulated vehicles with two independent bogies/wheel sets. Capable of a 3 m / 9.8 ft turning radius for a 180 degree change in direction at low speeds.
Is JPods capable of both above-ground and at-grade stations?	Technically capable but prefer above-ground stations with secured areas for single-pier unloading points that move JPod to the ground.
Should JPods structures run down roadway medians or along sidewalks?	Prefer placement along side of the road to reduce risk of collisions with structures; can be cantilevered over roads if desired.
For certification and testing, would JPods prefer a small grid network or a small straightaway route?	Generally prefer mesh network / grid, but linear networks may be appropriate for certain applications.
What would be the minimum viable size / length of an initial network?	Areas with high use of transportation such as shuttle vans; areas with high accident rates; areas with linear barriers such as a road or river between two important nodes; as a feeder network to existing rail and bus routes.

Please review the Mobility 2045 Update project recommendations map and map packets for guidance on corridor selection:
https://nctcog.org/trans/plan/mtp/mobility-2045-2022-update

This technology supports the following Metropolitan Transportation Plan programs:

- TR2-002 Last-Mile Transit Connections (PDF, page 41)

Attachment 4b – JPods Brochure

JPods

Solar-powered Mobility Workbook

10X

Choice 1: 10X Innovation

Choice 2: More of what is failing

10X

Driving a paradigm shift requires a 10 times benefit, 10X.

JPods solar-powered mobility networks build on well-established facts to provide multiple 10X benefits:

Fact #1: By grade-separating, Morgantown's PRT and theme park trill rides are 10,000X safer than roads (.9 injuries per million versus 11,200 for roads). JPods are grade-separated.

Fact #2: By controlling the grade, freight railroads average 400+ ton-mpg, 140X the efficiency of roads. JPods grade-separation approaches railroad efficiencies.

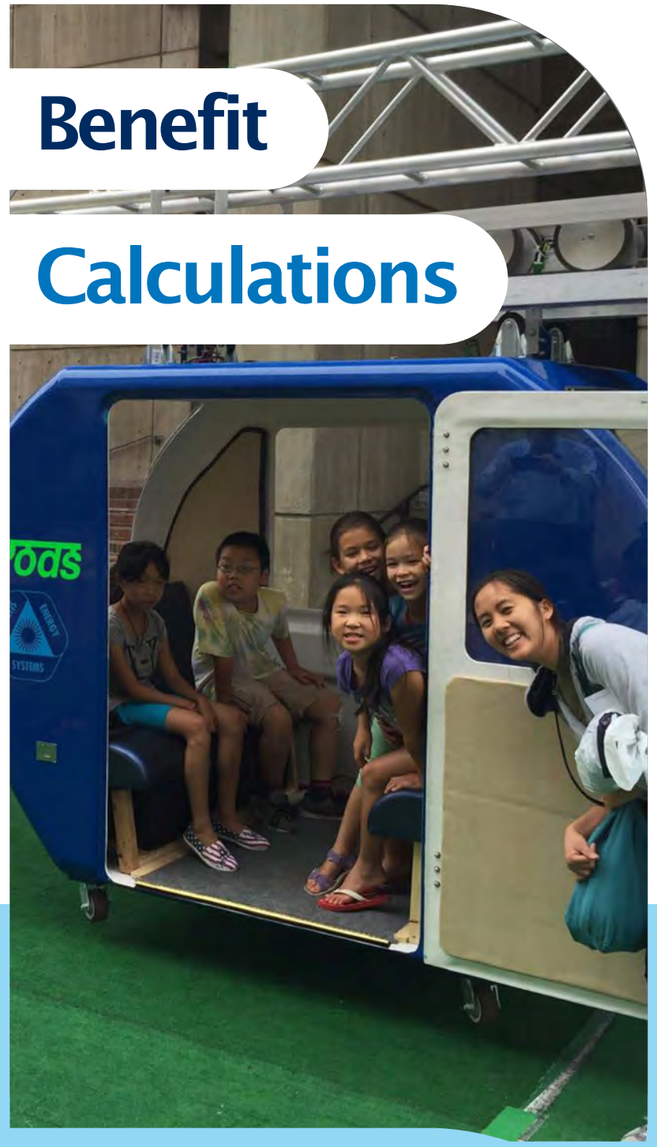
Fact #3: Self-driving cars are well-proven and valuable. Tesla is the highest valued car company in the world. JPods are self-driving.

Fact #4: Life requires energy. JPods guideway structures deploy enough solar collection to be energy self-reliant.

JPods Networks build on these facts creating multiple 10X benefits:

- No congestion on the guideways, non-stop to destination.
- Lower operating costs and capital costs.
- Better service, personal and on-demand 24x7.
- Better freight options.
- Less land use.
- Greater capacity.
- Lower energy and no CO2.
- Greater energy security.
- More stations and access points.
- Greater safety.

Benefit Calculations



Background:

- TEDx Atlanta
  - https://youtu.be/PgXHMHw_r4A
- Red Bull TV Documentary
  - https://www.redbull.com/int-en/episodes/transportation-liquid-science-s01-e06
- Metrics
  - https://www.JPods.com/metrics
- ROI Engine
  - https://www.JPods.com/why_JPods

Cars are expensive

- $8,643/year/car with 1.8 cars/family.
- $.82/mile to operate.
- 6 parking spaces per car.

JPods are affordable:

- No debt, Mobility As a Service.
- $.04/mile to operate.
- No parking required.

Start in niches, capital will fund

- Airports, hotels, car rental, and parking.
- Between malls with many accidents.
- City centers to hospitals to universities.

Prime Law of Networks

“Network value expands exponentially based on the number of interconnected nodes”.

Seed networks will spread across whole cities.

Capabilities

- Move people and cargo, on-demand, 24x7.
- Solar-powered, no pollution.
- Non-stop from origin to destination.
- No riding with strangers.

Why Choose JPods Solution

GRADE-SEPARATION: Having the guideways elevated with JPods preempts safety risks and simplifies the complexity of mixing existing traffic with self-driving vehicles.

CLEAN ENERGY: JPods guideways provide a mounting system for the solar collectors that gather 40,000 vehicle-miles of power per mile of guideway per day. JPods increase energy security by powering your city's mobility with your city's sunshine.

MOBILITY IS PERSONAL: You are not forced to ride with others, eliminating crime and contagion risks of mass transit. The family-size packet of JPods vehicles provides the same on-demand service of the family car without the capital costs of owning a car or the land consumption of cars.

CONTAGION SUPPRESSION: MIT Study, "Subways Seeded the Massive Coronavirus Epidemic in New York City" documents the contagion risks of queuing and transfers. Dr. Gosce's similar London Tube study documents queuing and transfers amplifing flu contagion by 6 times. JPods eliminate queuing with on-demand entry. Additionally between uses, JPods vehicles can be disinfected with UV and other means before being used again. If needed, vehicles move to a cleaning center between uses.

ACCESS: Family-size pods enable stations to be as tiny as a single parking space. Small, inexpensive stations makes it possible to have many more access points. In contrast, buses and trains require large stations, reducing the number of access points and quality of service.

FLEXIBILITY: Analogous to the internet packet-switching data, JPods packet-switch people, cargo, garbage, etc.

TIME AND ENERGY: JPods travel non-stop from origin to destination to eliminate the energy wasted by repetitive start-stops of cars, trains, and buses. This also reduces travel time.

PEDESTRIANS: Reducing car traffic will make walking and biking safer. As networks expand, stations will be within walking distance.

TOURISM: People will come from around the world to experience JPods. Time and money saved will be spent on more shopping, dining, and entertainment.

OPERATING COSTS: JPods are 10X less expensive to operate than cars, 25X less than trains, and 50X less than buses.

CAPITAL COSTS: JPods typically cost about $15 million per mile versus $100 million per mile to $1 billion per mile for light rail. JPods construction is privately funded.

SAFETY: Using JPods Insurance and Safety Fire, the ASTM F24, provides a 10,000 times better safety record.

NOISE: Removes the engine and road noise associated with cars and trucks on roads.

NO WAITING: No waiting at bus stops. JPods wait for people.

Scorecard of alternatives.

	More Personal Cars	More Rental Cars	More Ride Services	Light Rail	Buses	Gondola	JPods
Safety (Grade-Separated)	🔴	🔴	🔴	🔴	🔴	🟢	🟢
Energy Efficiency	🔴	🔴	🔴	🔴	🔴	🟢	🟢
Solar Powered	🔴	🔴	🔴	🔴	🔴	🔴	🟢
Privacy /Security	🟢	🟢	🟢	🔴	🔴	🔴	🟢
Contagion Suppression	🟢	🟢	🔴	🔴	🔴	🔴	🟢
Access (Frequent Stations)	🟢	🟢	🟢	🔴	🔴	🟢	🟢
Travel Time (Wait +Travel)	🟢	🟢	🟢	🔴	🔴	🟡	🟢
Congestion	🔴	🔴	🔴	🟢	🟢	🟢	🟢
Boarding Ease	🔴	🔴	🔴	🟢	🟢	🟡	🟢
Station Cost	🟢	🟢	🟢	🔴	🔴	🟡	🟢
System Cost	🟡	🟡	🟡	🔴	🔴	🟢	🟢
Land Use	🟡	🟡	🟡	🔴	🔴	🟢	🟢
Overall (Scale of 10)	5.0	5.0	4.2	3.3	3.3	6.3	10.0

Your Ride

Your ticket is your JPods App on your phone, a prepaid card, or your finger-recognition.

The JPods App lets you know the travel and arrival times for trips.

When you walk into a station, JPods are waiting for you. As you approach a JPods your phone is chatting with the vehicle. Its opens for you. As soon as your are settled in, you ride non-stop ride to your destination.

There is lots of headroom and foot room. You can bring your bike. If you are in a wheelchair, the vehicle will lock your wheels for you.

JPods stations are radically different from bus and train stations. Bus and train stations force people to wait for machines. JPods networks adapt to demand so machines are waiting for people. As a vehicle leaves, it is replaced by a vehicle waiting for the next person or family.

Traveling In Your JPods

Your time is your own while you travel:

- You select the heating and air conditioning choices.
- You select if you wish to connect to the on-board WiFI.
- You select if you wish to use your phone, voice, and/or the on-board computer during your ride.
- Unlike being forced to watch advertising on buses and trains, unless you request it, there is no advertising. It is your choice with credits being apply directly to your account.

During your trip you can ask the JPods team for information about your trip, or other interests.

You can speak to JPods in your language.

If a you want to change your destination in route, wants to get off, or have any emergency, you can use voice command, App, or Emergency Call Button on the computer screen to make adjustments or connect a system operator.

In an emergency, our team will keep you company via the on-board computer screen until the issue is resolved.

You may not notice at first, but riding in a JPods vehicle is quite. The grade-separated steel guideway and specially designed wheel minimize noise. Gone are road noises of riding in a car. Gone are potholes in the road and horns of stressed drivers.

You are alerted as you approach your destination. You might note that the trip was much quicker than a car, bus, or train.

As your JPods vehicle stops at your station, there is no loud speaker blaring “mind the gap”. There is no gap. The opening of the vehicle is aligned within 1/2 of an inch of the floor of the station. This facilitates safety and easy access by wheel chairs and baby strollers.

The System Elements

JPods are personal, just like your private car.

You get in JPods at a station where one is waiting for you. Once in, the JPods vehicle merges onto the traveling guideways to take you non-stop to your destination. It knows how to get there.

Approaching your destination, your JPods exits the traveling guideway to the Station guideway, just like an automobile on a freeway.

The offline Stations can be built into a building or free-standing depending on the best fit with a business or municipal need.

Illustrated below is a free-standing station with elevator, stairs, guardrails and other security and support features.

https://vimeo.com/99893372

Stations have multiple berths so passengers can more easily load and unload without lines or queuing.

Because JPods are like a chauffeured car, stations are small. It is highly likely in the future, many businesses and living complexes will have stations build directly into their buildings.

Temporary stations can be added to increase capacity during special events. Everything is tailored to provide immediate and on-demand mobility from origin to destination.

JPods

There are as many types of pods as there are types of vehicles on roads. JPods tailors the pod to meet different needs around 1200 pound payloads. Pods will be open source, so it you have ideas for how to design pods, join in the effort. Example JPods:

PASSENGER JPods are capable of carrying the same as the family car, one to six people and their luggage. At JPods, we think bicycles are 70% of the solution to personal mobility in a sustainable city, so with rare exception, JPods are equipped to accommodate someone's bike or scooters. The same mechanisms that secure bikes, secure wheelchairs.

CARGO JPods stream palletized payloads to feed and supply a city. We expect many more local grocery stores to be built within walking distance of where people live as JPods reduce the cost of supplying them.

MEDICAL JPods are capable of carrying a gurney, EMS people, and their supplies. As the system expands, the benefits of routing a person directly from a station to a medical facility without any hindrance from traffic will save lives.

SOCIAL AND SCENIC JPods add to the fun and tourism.

PRIVATE JPods are the same as owning your car. It simply stores itself when you are not using it and meets you when you call it.

DETACHABLE JPods are lowered from the guideway and clamp onto a chassis so they can travel off-guideway. You can have your things in your pod and drive it into your garage just as you do your car.

Guideway

JPods are suspended from the guideway.Traveling on an overhead guideway removes the safety,security,and traffic risks of traveling on roads. The guideway also provides the structure for deploying the solar collection system that powers the network.

Support Center

JPods' patent is for self-driving cars on grade-separated guideways. Like bees in a hive, JPods are autonomous. If there is a communications failure or a power failure, your JPods still carries you to your destination.

This self-driving capability of JPods vehicles is supported by the Monitoring Center. From a secure location, the automated capabilities of the vehicles and networks are reinforced by human oversight.

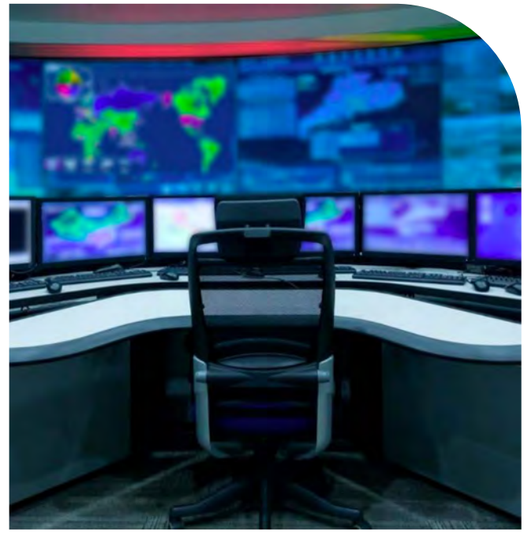
Combining human empathy and judgment with robot accuracy improves service, preempts accidents, and reduces energy consumption to within a solar budget.

People in the Center monitor every aspect of what is happening everywhere on the network. If you have a question, you can ask the people in the Center to come on your phone or computer screen to answer your question.

If anything unusual happens or if someone needs emergency services, the people in the Center can see what is happening, dispatch emergency crews, assist people, and coordinate the response.

If you are traveling in a foreign country, you can ask for support in your native language and the people in the Center will communicate in your native language.

The JPods team believes in the Lifeboat Paradox: "If you are self-disciplined to have a lifeboat and are skilled in its use, you are unlikely to need one." To be prepared, we drill many contingencies, even highly unlikely ones.



Maintenance

A Maintenance Facility provides the trained people and equipment for diagnosing, cleaning, and repairing every aspect of vehicles, stations, guideways, and their environments.

Durability and maintenance risks are minimized by the simplicity of the pods, their multiple motors, redundant sensors, redundant processors.

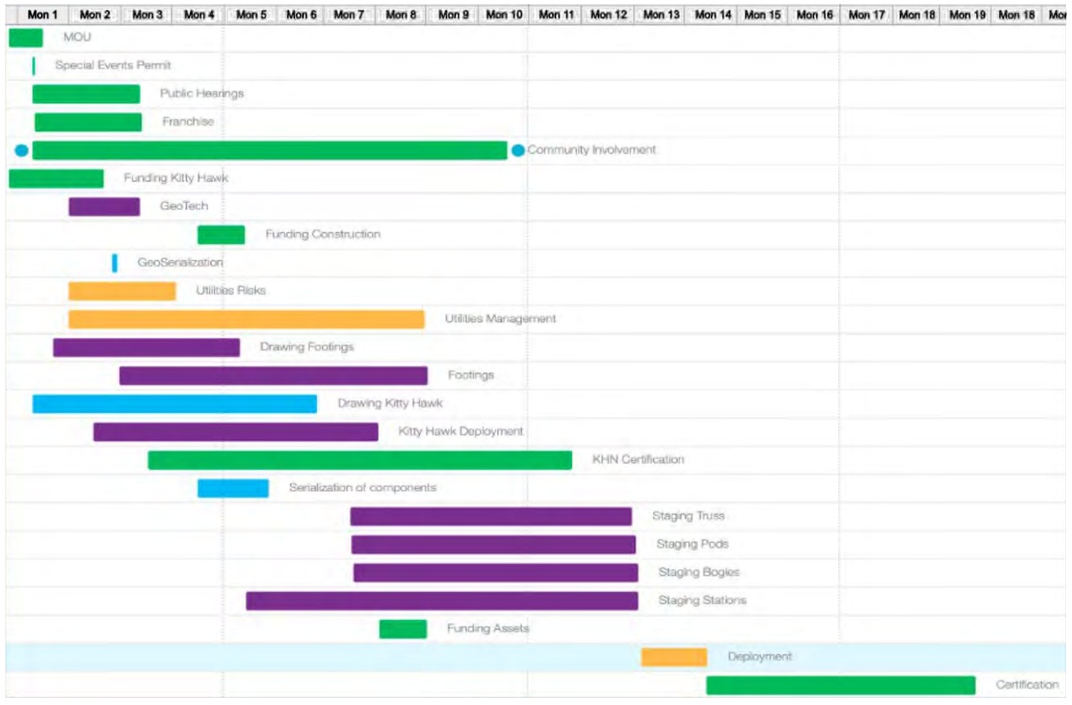
JPods mitigate contagion risks by disinfecting themselves between uses when necessary. The air in the vehicle is replaced in the vehicle and the inside irradiated with ultraviolet lights.

Power to sustain the network is gathered from the solar-collectors over the guideways. This distributed energy system powers the network and the ability to adapt in emergencies.

Timeline

Congressional Study PB-244854, “Automated Guideway Transit,” documents that deployment depends on known cost and delay of regulations. The Texas Department of Insurance (ASTM F24) provides such regulation stability with an injury rate 10,000 times better than roads (0.9 per million). Roads have an injury-rate of 11,200 per million.

The following schedule is estimated based on building under Texas Department of Insurance regulations.



Private Funding

Costs and Funding Model

JPods funding of projects is very similar to houses and hotels. Construction funds are used by construction companies to build. The certified guideways are then sold to operating companies to service customers. There are four basic steps in this funding cycle:

1. Define a project and the Franchise Agreement for Rights of Way and safety certification.
2. The construction company, JPods Mobility Company, builds the network.
3. JPods LLC certifies the operational networks complying with defined regulations.
4. The Local Mobility Company® buys and operates the certified networks (local ownership).

Goldman Sachs provided a Letter of Interest for funding JPods networks.

Essential to funding projects is the ability to define the cost of regulation. Congressional Study PB-244854, “Automated Guideway Transit” documents innovation has been delayed “four to six decades” because of regulatory barriers (page 41).

Texas Department of Insurance (ASTM F24) has a known cost of regulating theme park thrill rides and a safety record 10,000 times better than roads. Regulating safety using this standard is fundable.

Rights of Way regulations for cell towers and other networks that serve the public good are used.

As with communications networks, Networks pays 5% of gross revenues for non-exclusive use of Rights of Ways granted. As 50% car traffic is replaced by JPods, for every 100,000 cars a new source of local government revenues of $12-22 million/year is expected to evolve.

Summary

Mobility is physical liberty, the ability to go where you want, when you want regardless of age, ability or wealth.

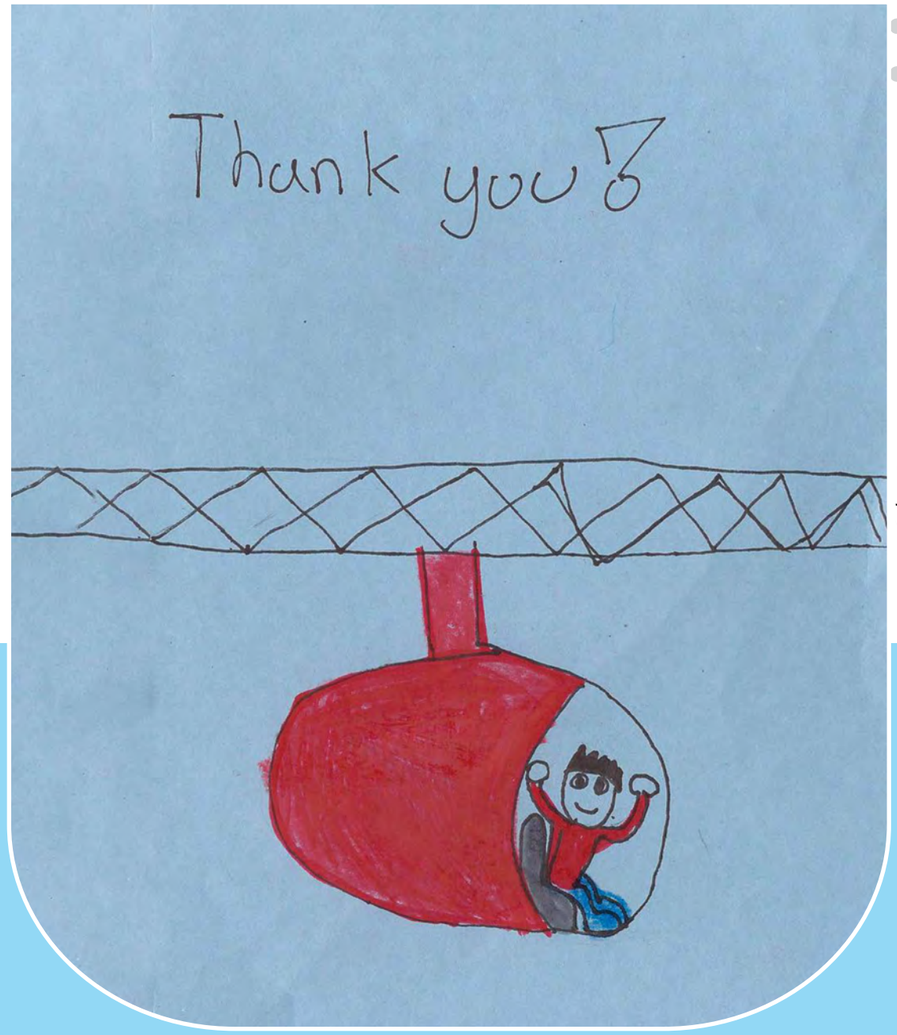
Mobility must be sustainable and equitable.

10X Benefits are multiple:

- Cleaner, faster, safer, affordable..
- 24x7 Service.
- Personal, on-demand.
- Energy security.

5X5 Standard provides a multi-million per year new source of government revenue:

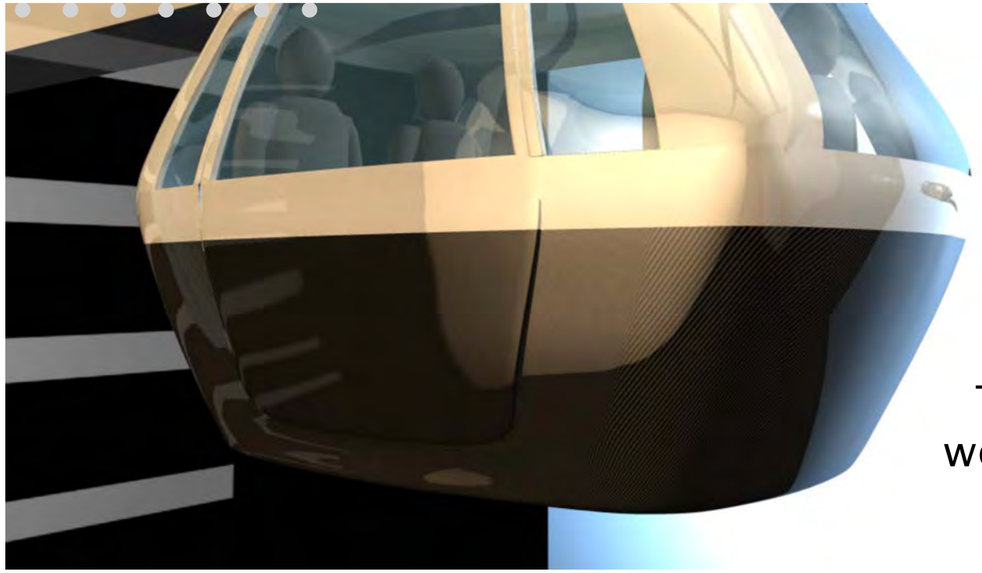
- For each 100,000 cars.
- 50% Reduction in car driving.
- 5% fee ~$12-22 million/year of new revenue.



3rd grader drawing after JPods team worked with the school's STEAM program.

JPods Mobility Company LLC

JPods Mobility Team



The team has worked together for years to restore free markets and change economic lifeblood from oil to ingenuity.

Charlie Fletcher, Chairman

Retired Major General. Former Commanding General of the Army's Transportation and Logistics during the invasion and rebuilding of Iraq.

Bill James, CEO

Inventor of solar-powered mobility networks (US Patent 6,810,817). Wrote enterprise software recognized as the "Best New High Tech Product of the Year" in Minnesota, Infantry veteran.

Bill.James@JPods.com

Mike Evans, Co-Founder

Managed multiple manufacturing facilities in North America up to $300 MM in sales. Owner of a multi-million, professional cleaning company in the Southeast US. Corps of Engineers veteran.

Mike.Evans@JPods.com

Auta Lopes, Co-Founder

Managed a $22 billion pension fund, Managing Partner for a capital company helping businesses and high net worth people manage risks and access capital in JPods

Auta.Lopes@JPods.com

JT Williams, Co-Founder

CPA and CGMA. Developed 16,000 acres of land in Florida and in Georgia. Chairman of Land Sales and Condominium Board in Florida for 16 years, Chairman of State Board of Education in Georgia for 9 years, Chairman of Transportation Projects - Georgia Governor's GRTA Board for 19 years.