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Ultra-MTS PRT Technology

Ultra-MTS PRT solutions are environmentally sustainable, multi origin, multi destination, commercial transit solutions that have proven to be effective, safe and reliable. Using small, lightweight, electric, driverless vehicles that operate on a segregated guideway the system reduces congestion and pollution and addresses short distance transit needs that cannot be matched in terms of convenience, journey reliability and user appeal by any other transport mode. The system can deliver improved land usage / value by providing connectivity at airports, CBDs, campuses or mass transit and linking them to central car parking or high value urban areas thereby improving overall yield and utility of land.

Ultra-MTS and Strada Business Plan

Ultra-MTS and Strada have provided a high-level overview of the potential project delivery methodologies, structures for operating the service, and concepts for funding the project in the City of San Jose. It also includes ideas for how the technology might be utilized to enhance the user experiences with the project while effectively maximizing the project's use by integrating it into the overall transportation system as one of several mobility options available to travellers. There is also discussion on the opportunities for innovative financing through value capture, public-private partnerships, and corporate engagements.

Proposed Concept

Ultra-MTS PRT solutions are environmentally sustainable, multi origin, multi destination, commercial transit solutions that have proven to be effective, safe and reliable. Using small, lightweight, electric, driverless vehicles that operate on a segregated guideway the system reduces congestion and pollution and addresses short distance transit needs that cannot be matched in terms of convenience, journey reliability and user appeal by any other transport mode.

The system provides benefits to both users and owners. For users Ultra-MTS PRT delivers convenience and choice through an attractive transport alternative, the appeal of which may be considered through the following features:

- Immediate or very short waiting times for a journey to begin on an "on-demand" basis
- Very high certainty of time required for journey, which is non-stop and direct
- Privacy, comfort and safety
- Faster journey time than alternative transport or walking
- Incremental cost, if any charged, is not onerous

For owners / operators a PRT system can deliver numerous benefits, covering financial, environmental and political objectives:

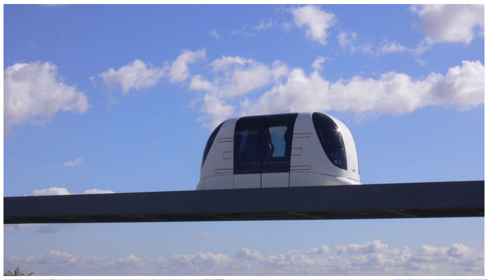
- Improved land usage / value
  First / last mile connectivity at airports, within central business districts (CBDs), campuses or linking to mass transit, central car parking or higher value urban areas, improving overall yield and utility of land
- Quality of space
  Reducing congestion and pollution thereby improving the quality of property in an otherwise congested and polluted space
- Environmentally sound
  No emissions from operation, negligible noise, low visual profile
- Efficiency and capacity
  Ideal solution for moving volumes of people where the people are arriving in a dispersed manner, e.g. carpark
- Reputation and Visual Impact
  The system is visually impressive, with secure and private vehicles that offer safety and reliability for passengers, thereby enhancing the reputation of the owner
- Incremental revenue
  From fares and advertising / sponsorship
- Attractive construction cost and delivery period
- Much quicker, smaller and more flexible than Light Rail Transit and can be designed and constructed within a 24-30 month period depending on the size of the system

Physical Elements

a. The Guideway
   At grade, the overall width of a single lane guideway is 2.1m (6.9 feet) and a twin lane is 3.95m (13 feet), with a curb 250mm (9.8 inches) high. A fence is required to ensure segregation of the vehicle lanes from publicly accessible areas. The fence can be designed and constructed from aesthetically pleasing materials, eg tensioned wire or glass panels.

b. Grade Separation

Grade separation is normally achieved with an elevated guideway. The elevated guideway is supported by slender columns, typically 500mm (19.7 inches) to 600mm (23.6 inches) diameter with spacing between the columns of 18m (59 feet). The automatic vehicles can also operate through tunnels where required. A lightweight, rigid steel construction helps ensure elevated guideway sections are unobtrusive.



c. Right-of-Way Requirements

Right-of-way widths need to be of sufficient size to accommodate the guideway (single or double width) and additional width for access during construction and operation / maintenance. Typically, right-of-way in city centers can be achieved using existing street or sidewalk rights-of-way. In areas where new guideway is required, a 7.6m (25 feet) to 15.2m (50 feet) right-of-way will be necessary.

d. Stations / Passenger Access

Stations are small scale and comprise a number of independent berths for passengers to board and alight from the vehicles. The vehicle movement area is separated from the platform area by automatic berth doors that only open when a vehicle is correctly positioned in the berth. The architectural design of the station shown in the photographs is modern. However, designs that integrate with the surrounding architecture may be more appropriate and can be achieved.

e. Right-of-Way and Land Needs of Stations / Access Points

Station rights-of-way are dependent on the size of a station / access point and the number of berths for vehicles. However, most stations can be integrated into at-grade locations that will require approximately a 10.7m (35 feet) by 13.7 m (45 feet) right-of-way size for a dual berth station. Stations can also be integrated into existing buildings and garage parking areas. Size will be dependent as above.

f. Stations / Passenger Access Integration with Stevens Creek Line Surroundings
The stations can be stand alone or integrated into buildings (without the need for strengthening the building structure). Station design is flexible and can be readily integrated into the urban fabric. The use of existing parking areas, buildings, and land use along the Stevens Creek Line allows for integration of elevated guideways and integrated stations.

g. Integration with Existing Transit
Because of the size and flexibility of the Ultra-MTS system, the infrastructure can be integrated into existing VTA transit stops and Diridon Station. Existing transit stations and rights-of-way can likely be used to accommodate the Ultra-MTS PRT system.

h. Connection with Rail Platforms (BART or Heavy Rail) at Diridon Station
The Ultra-MTS system can be integrated into the existing Diridon station, providing passengers transferring from VTA buses, BART heavy rail, CalTrain, and future High-Speed Rail access to the Ultra-MTS PRT system. See the video on the USB which illustrates how the system can be integrated with existing transit system stations.
Please see video.

i. Connection with Airport Facilities and Parking at SJC
The Ultra-MTS system can connect with existing airport facilities and SJC parking. See video provided which illustrates how connections can be made at Birmingham, AL airport and consolidated rental car parking.

j. Vehicle Operation within the Network
The vehicles operate autonomously taking the passengers non-stop from the station at which they boarded to the destination. (All stations are 'off line', which means vehicles come off the main guideway in order to berth in a station and therefore do not hold up vehicles that might be passing the station on a journey to an alternative station).

k. Level Boarding
All boarding is level, giving easy access to wheelchair users and the disabled.

l. Compatibility with "Complete Streets" if System is Aerial
The Ultra-MTS PRT system is complimentary to all other modes of transportation and an aerial system can be integrated into a "complete streets" strategy. Because of the minimal footprint of the Ultra-MTS PRT system, it has the ability to aesthetically blend the aerial guideway into the existing urban fabric. Placement of stations within a "complete street" could potentially use existing infrastructure by reclaiming on-street parking or underutilized surface parking. The Ultra-MTS system also can be integrated into newly reconfigured streets, minimizing impacts to drivers, and complementing travel for pedestrians, bicyclists, or other public transportation riders. For example, pedestrians or bicyclists can choose to access an Ultra-MTS system station if the weather changes, or they need to more quickly reach their destination. This provides a safe alternative for active and non-motorized travel, and access to other public transportation modes and car-free environments.

m. Passengers Getting to Grade when System is Aerial or Underground
As all stations are 'off line' the station can be at grade whilst the through guideway is at elevation. Gradients are limited to 6% down and 10% up. If there is insufficient space to accommodate the inclines/declines the stations can be at elevation with access via elevators (and emergency stairs). Stations can be located underground with access via elevators (and emergency stairs).

n. The Vehicle
The vehicles are of a modern and distinctive design with powered doors on both sides.

Overall vehicle height, length and width are 1.9m (6.2 feet), 3.7m (12.1 feet) and 1.44m (4.7 feet) respectively.

o. Vehicle Capacity
The vehicle has 4 – 6 seats and ample space for baggage, strollers, bicycles, wheelchairs etc

p. Boarding and Alighting
Measurements on the Heathrow POD Parking (Ultra PRT system at London Heathrow Airport) show that typical boarding and alighting time is just under one minute from the passenger selecting their destination to the vehicle departing.

q. Speed
The top speed is 40km/h (25mph) at Heathrow POD Parking. The acceleration and deceleration rates, as well as jerk rates, are limited by considerations of passenger comfort. Max acceleration and deceleration rates under normal operating conditions are 1.5m/s^2. Under emergency braking the maximum allowable deceleration increases to 2.5m/s^2. Work is being undertaken to increase top speed to 55km/h (35mph) and could be utilized in the San Jose system. A feasibility study would determine the optimal guideway route and the opportunity for increased speeds of up to 55km/h (35 mph).

r. Autonomous Vehicles?
The vehicles are autonomous.

s. Vehicles not in Operation
In normal circumstances the vehicle will wait at its recent destination for the next passenger(s) or be automatically relocated to a station where there is a demand or an anticipated demand. The system utilizes a vehicle redistribution system to manage empty vehicles to maximize efficacy.
Off Guideway Storage
It is recommended that a secure overnight vehicle storage facility is provided for when the system is not in operation.

t. Vehicle Power

u. The vehicles are battery powered with the batteries being recharged at the stations whilst passengers are boarding/alighting. The system also has queue lanes where vehicles wait until a journey is requested. Vehicles in queue lanes can also be charged if required.

v. Maintenance Facility
Vehicles require a maintenance depot that is connected to the guideway network. The size of the facility is, in part, dependent upon the size of the vehicle fleet. The Maintenance Depot at Heathrow is 200m^2 and services a fleet of 21 vehicles.

w. Vehicle Movement to Meet Demand
Redistribution of vehicles is achieved automatically as a result of a known/predicted demand (eg tidal flow conditions during morning and evening peaks) or as a result of specific passenger request (if no vehicle is waiting). At Heathrow POD Parking measured performance shows that more than 80% of passengers experiences no wait (ie a vehicle is waiting for them) and the average wait time is 9 seconds.

x. Pictures of Physical Elements
Please see Annex 1

Operational Elements

a. Operational Model – Travel Outside the Grade-Separated Guideway
The current design is segregated from other transport and civilian/pedestrian areas for safety reasons. When the technology is mature vehicles could be operated off the guideway in 'controlled' areas.

b. Travel Time SJC to Diridon
An estimated journey time from SJC to Diridon is 8.5 minutes, dependent on speeds and guideway configuration that would be determined during the feasibility phase.

c. Service Frequency
The system is an 'on demand' system. The system only operates when there is a request for a journey.

d. Passenger Carrying Capacity
The single line capacity is 2,400 passengers per direction per hour. This equates to a headway of 6 seconds, the same as the Heathrow Pod system.

e. Scaling Up Capacity
Capacity under most applications is initially limited by the number of vehicle available. Increased demand can be met by increasing the vehicle fleet size, without changes to the control system. We would also recommend that space is provided at stations for additional berths to be added where significant growth may be anticipated

f. Vehicle Dwell Time at Station
Measurements for the dwell time on the Heathrow Pod from vehicle arrival, passenger alighting and boarding, through to vehicle departure is typically just less than one minute.

g. Service Reliability
The recorded availability of the Heathrow Pod system shows that the monthly availability typically exceeds 99.5%.

h. Ticketless Service
Fares can be collected at the destination request panel (adjacent to each berth) with a smart phone or a card. An alternative is a fare collection barrier on entry to the station. This approach is being introduced on the Chengdu (China) PRT system. See below image.

Current Status of Concept Technology

a. Current Development Status

The Ultra PRT system has been in service for 8 years and Heathrow Airport (UK). It connects the business car park area to Terminal 5 and has carried over 3 million passengers and completed over 6 million km (almost 4 million miles) with a fleet of 21 vehicles.

The system is now being introduced at the new Chengdu Tianfu International Airport, connecting a remote parking lot with Terminals 1 and 2.

Feasibility studies have also been successfully completed into applications around the world, but of particular interest might be the application in Birmingham, AL and Wichita, KS. The Birmingham, AL application provided a downtown network and a connection with the airport. The Wichita, KS PRT application showed the viability of a University Campus network and links to urban areas.

b. Schedule for Development

Our experience indicates that overall timescales for each stage of the deployment programme is typically:

- Feasibility Study 6 months
- Infrastructure Design 6-9 months
- Construction 12-18 months
- Equipment installation 3-6months
- Test and Commission 3 months

The launch of the infrastructure design is critically dependent upon acquisition of land and planning approvals.

c. Similar Successful Implementations

Examples of successful implementations are the Heathrow POD Parking system at London Heathrow Airport, UK and the Chengdu Tianfu International Airport which is to commence passenger operations in July 2021.

d. Areas of Notable Risk

With two successful projects there are considered to be no notable risks to a similar application in San Jose.

Concept Requirements

a. Key Requirements for Implementation of the System

Because the infrastructure is light weight underground utilities can be ‘bridged’ without disturbance. Overheard utilities can often be attached to elevated infrastructure often to the enhancement of the street scape.

Regulatory and policy requirements (eg. environmental impacts or local zoning requirements) can be integrated into the planning and design of the system but will need to be identified during the feasibility study phase.

b. System Function in Aerial or Underground Configuration and Transit Between the Two

The system is designed to function in an aerial, at grade and underground configuration.

c. Maximum Allowable Grades

Maximum allowable inclination is 10% and maximum decline is 6%.

d. System Extension / Future Proofing
The system can be readily extended in the future; indeed many applications have future extension planned, including London Heathrow Airport.

e. Additional Stations
Because stations are 'off line' they can be added to the network without adversely affecting the performance of the system.

f. Maintenance Requirements
The guideway is passive and requires little maintenance. The vehicles require regular cleaning and servicing. A vehicle maintenance depot that is connected to the system is required. Stations require regular cleaning but minimal maintenance.

Costs

a. Cost per Mile for Infrastructure, Excluding Land Acquisition and Stations
The guideway costs at grade are typically $3.0m per mile
The guideway costs at elevation are typically $7.6m per mile

b. Incremental Cost of Stations / Access Points
A typical 4 berth station cost is $0.45m

c. Vehicle Fleet Costs
The cost of a vehicle is $150k for small quantities reducing to $120k for larger quantities.

d. Capital Costs (6 Stations Stevens Creek Line, 3 Stations SJC Connector and Diridon)
Budgetary estimate of the total capital cost of the Airport Connector is $72m
Budgetary estimate of the total capital cost of the Stevens Creek Line is $126m
Please note that these estimates are influenced by alignment details, guideway proportions at grade and elevation. These estimates do not include acquisition of rights-of-way that might be required.

e. O&M Costs
The Airport Connector total operating costs, including maintenance, equipment replacement, and energy is estimated to be $2.2m per year.
The Stevens Creek Line total operating costs, including maintenance, equipment replacement, and energy is estimated to be $3.7m per year.

Business Plan

a. Business Plan to Deliver and Operate Including Who Could Operate
The City of San Jose and their planning partners have placed a priority on delivering a project that is reasonably priced, that is able to be constructed in a timely manner, that can be operated efficiently, and that can be easily maintained. This project lends itself to different alternatives for project delivery and operations. These include:

- Design-Bid-Build (DBB);
- Design-Build (DB);
- Construction Manager at Risk (CMAR);
- Multi-Prime (MP), and;
- Integrated Project Delivery (IPD)

Each of these project delivery methods have advantages and drawbacks. However, the Ultra-MTS and Strada team's approach to identifying and selecting a project delivery methodology will focus on working with the City of San Jose and their planning partners on the front end of the project development process to choose the delivery method that works best for this project.
In addition to identifying a project delivery methodology, our team will work with the City of San Jose to determine the best strategy to address the project's operations and maintenance, both in the short-term and long-term. Operational strategies that might be considered include:

- The City of San Jose or the Valley Transit Authority (VTA) directly operating and maintaining the project;
- One of the project contractors operating and maintaining the project, or;
- Contracting project operations and maintenance with a third-party company

Funding options available could include bonding for the capital investment and using the fare collection to repay a part or all of the capital investment and operation/maintenance costs. This will need to be decided once a Feasibility Study is completed for the project. However, possible innovative options that have been shown to be feasible on other Ultra-MTS projects include:

- Government Funding – this can include local bonding or use of Federal transportation grants and loan programs.
- Private Funding – use of private investment funds for capital and possible operation/maintenance based on fare collection, other revenue possibilities, and local government investments.
- A Combination of Government/Private Funding – it is possible that a public-private partnership (P3) could be a solution that can be used to fund the system.

However, one of the intangible values associated with the Ultra-MTS system is the increased economic and commercial development value that the system brings to local properties and areas.
Possible funding sources and financing mechanisms available for a project such as this needs to include all probable sources. A feasibility study would initially investigate the potential revenues generated through parking charges that could be allocated to the project. We would propose to then consider other funding sources and financing mechanisms that can be used to supplement these revenues to cover the large intermittent capital expenditures as well as the annual operating and maintenance costs. San Jose would join a unique group of those that have implemented a system such as Ultra-MTS in both the United States and across the world. Based on a limited implementation and the lack of rigid design criteria, the structure for establishing an innovative and creative system has a high degree of flexibility, especially in the areas of planning, design, funding, and development.
San Jose has some unique opportunities utilizing SJC and its legislated authorities. We are assuming that San Jose is empowered with many of the same powers as that of a traditional municipality including right of eminent domain, annexation, and the ability to levy general obligation bonds which may be advantageous for the development of such an innovative, non-traditional transportation operation.
Understanding the legislated powers of San Jose and SJC and their financial structural opportunities allowed through utilizing various funding streams will afford us the ability to determine the feasibility not just of the size and type of system which can be developed but also the specific capabilities that the system should or could have in order to qualify for needed fiscal

support. We are providing thoughts on the options below although we are not determining the likelihood that such a project will receive specific types of funding. However, this will provide a basis for understanding the funding opportunities.

Value Capture

The ability of transportation investments to increase the property values of the corridor it serves is well documented in the United States. Development tools such as tax-increment financing (TIF) and benefit districts are being used to capture the revenue delta between the existing tax base and the increased taxes as properties in station areas and along the corridor appreciate. These revenues could potentially be captured and channelled into the debt service for capital investments and on-going operations and maintenance costs. While it may take some time to capture the increased value of the appreciated property through taxes, recent experience with US fixed-guideway transit investments shows that the appreciation can be rapid and exceed expectations in terms of revenue forecasts.

Parking Revenues

At Heathrow POD Parking, where the system is currently used, parking revenues provide a significant portion of the revenue to pay for the system. San Jose can also look to parking revenues to help fund the capital investment and operation/maintenance. Since the Ultra-MTS system is a high-level service providing point-to-point, on-demand service we believe that a parking should be looked at to determine the portion of funding that can be offset through these parking revenues. While this revenue stream will not pay for the entire system, it will help establish a consistent funding mechanism and offset as much of the capital and operation/maintenance costs as possible.

Since the system will consume all parking revenue in order to be self-financing, other sources of funds have been investigated. These other funding mechanisms are addressed below.

Internal Funding Sources

SJC Airport is positioned to support the development of the Ultra-MTS system through independent means. In addition to reassessing parking fees discussed earlier, another funding vehicle could be the implementation of the federally-authorized Passenger Facility Charge (PFC). The PFC program, administered by the Federal Aviation Administration (FAA), allows airports to collect up to $4.50 per boarded passenger. Airports are then allowed to use them to "fund FAA-approved projects that enhance safety, security, or capacity, reduce noise, or increase air carrier competition." During the Feasibility phase, PFC should be looked at to determine the amount it could contribute to the funding of the Ultra-MTS system.

Though this fee will not generate enough revenue to pay for the project at the onset, developing such a sustained source of funding would assist in the long-term costs associated with expansion, maintenance, and/or operation of the system.

A final internal mechanism by San Jose could use to generate revenue to support the development of a project such as this would be through levying general obligation and/or revenue bonds. Though we are not clear on the exact manner in which these bonds could be levied and how much revenue they could generate, the simple ability to do so is a great flexibility which could prove valuable in the development of this project.

In general, San Jose possesses significant means to generate revenues through internal means. While none of them independently may generate the immediate capital necessary to fully develop the proposed system, a combination of the sources would provide a sustained source of revenue to support such a system's development, operation and maintenance.

Public Private Partnerships and Sponsorship-based Funding Opportunities

The concept of project funding through public private partnerships and outside sponsorships has recently begun to rise in usage in response to continued cuts in federal and state transportation funding. Public private partnerships allow government agencies to partner with private organizations or funding sources to give them access to larger funding capabilities.

Sponsorship is another funding opportunity that many organizations are examining as a revenue generator, especially in the transit arena. Bus wraps (the marketing practice of completely or partially covering (wrapping) a vehicle in an advertisement) have been employed by agencies. The Heathrow POD Parking system at London Heathrow Airport generates significant revenue through vehicle wraps. Tourist destinations as well as numerous companies who possess large operations in and close to San Jose could be strong candidates for sponsorship.

Station Sponsorship is also a method for securing revenue streams. Finding companies, organizations, universities, and commercial venues (convention centers, high-rise developments, etc.) that want an Ultra-MTS system station in their building can generate funding to pay (and operate) for the station and a portion of the guideway. Since the station allows point-to-point access for riders the value of their buildings are increased and can be monetized in order to contribute to the capital and operation/maintenance of a portion of the system.

While each of these funding streams is non-traditional, all possess potential for supporting this type of project. Some could be accomplished with little to no outside involvement (i.e. sponsored vehicle wraps), others may require legislative modifications to allow for such a project to be funded by those means.

External Funding Sources

Though San Jose possesses the ability to raise capital through internal means, utilizing external funding sources to offset internal impacts might be necessary to develop and support long range project growth and development. However, since systems such as ours are unique in the United States, traditional funding mechanisms have yet to fully adapt to explicitly recognize them as eligible for existing sources of transportation funding. Many of the traditional federal funding mechanisms are possible for funding, we want to explicitly point out that there will need to be further discussion to reach external agency acceptance of such a project. Keep in mind, the use of external funding from federal or state sources also brings with it the potential for increased scrutiny and regulation. The external oversight that accompanies the money can also be a burden to project delivery. Additionally, other sources of funding sources need to be exhausted before relying solely or in part on federal funds.

The United States Department of Transportation (DOT) has many grants and loan programs that can be investigated for our system. Additional grants also exist through other agencies of the federal government (i.e. US Department of Energy (DOE) and Environmental Protection Agency (EPA)), it is not clear whether our system type would comply under their existing standard processes.

Additionally, many of these federal grants have state-level or local matching programs that could be utilized once a concept is more fully developed. The DOE also manages numerous incentive processes through its Office of Energy Efficiency and Renewable Energy (EERE) which could be used to defray the costs of many of the components used to develop this project. Each of these programs present a significant amount of opportunity to this project, however, it will be necessary to develop more understanding of the San Jose system to transit.

Additionally, federal funding for a PRT or ATN demonstration project may be available. The Mineta Transportation Institute's report on PRT titled Automated Transit Networks (ATN): A Review of the State of the Industry and Prospects for the Future recommends that a PRT or ATN demonstration project should be built in the USA.

State of California funding options may also be available. We have not investigated all the possible opportunities for funding participation from the state, but California has committed to fund many programs that would reduce GHG emissions and mitigate climate change. Our Ultra-MTS system would certainly meet these principles and may qualify for some state funding. We would suggest that this should be explored in detail during a deliberate feasibility study.

b. Fare Strategy

The passenger fare collection strategy will focus on improving the customer experience based on the types of expected users. This project is proposed to connect the Mineta San Jose International Airport, the Diridon Transit Station, and the Stevens Creek Boulevard Corridor to include the corporate and institutional uses located within it. Because of the diversity of the built environments that will be connected by the project, the project's users are expected to vary greatly in both income and socio-economic characteristics. As such the fare collection strategy will need to account for these differences by being able to accept fare media that is in common with VTA, Caltrain, and the Bay Area Rapid Transit (BART). Likewise, users should also be able to pay using credit cards and apps that are accessible to rideshare and shared mobility modes.

c. Expected Fares

Expected fares for use of the system cannot be determined at this time. Fare collection will depend on the final feasibility of the route, demand, and other funding sources. This is something that we would typically do during a Feasibility Study of our system. Additionally, because our system is on-demand and point-to-point, the fare determination needs to be developed for each station. A determination of whether fares need to be a fixed amount or vary by the different origin and destination will need to be prepared during the feasibility phase.

d. Maximizing Ridership

Strategies to maximize ridership will focus on developing a seamless transportation experience using technologies to provide frictionless travel. As such, the project will integrate Mobility as a Service (MaaS) technology. MaaS technology will enable the project to integrate with San Jose's existing transportation services and become part of a unified transportation system that includes other travel modes such as bus, rail, bikes, scooters, and rideshare. Using MaaS technology also will enable the project to incorporate real-time travel and navigation tools.

These tools will allow users to better understand how to travel through the overall transportation system, to include travel through this project's footprint. It will provide guidance about where to access the project from other travel modes, and vice-versa, as well as know where their vehicles are within the system and when they might expect the vehicle(s) to arrive to their location. In short, MaaS technologies will help to maximize project ridership by lowering the barriers to access and minimize user intimidation for using a new system. It is also important to note that our Ultra-MTS system accommodates passengers of all types including those that are bringing their bicycle along or are accessing the system in a wheelchair.

e. Funding Capital and Operational Costs
It is possible that capital and operation costs might be funded through passenger fares but unlikely. The ability to fund these costs completely through passenger fares is dependent upon several factors, namely utilization (ridership) and fare prices relative to capital, operating, and maintenance costs. However, the use of other funding sources as described above, will allow us to develop a fare pricing structure that will be reasonable and allow the maximum ridership while offsetting as much of the capital and operation/maintenance costs as possible.

f. Maximizing Farebox Recovery and Offsetting O&M
Opportunities to maximize farebox recovery and offset operations and maintenance costs lie with the ability of the system to attract revenues outside of passenger fares, grants, and subsidies. Revenues from advertising through vehicle wraps and interior ads have been a successful source of revenue for traditional transit services. Corporate sponsorships for service branding and station naming rights also have been used successfully to generate revenues outside of passenger fares. Likewise, corporate/company sponsorships of transit passes/fares as part of employee recruiting and retention programs, employee benefits packages, and corporate congestion relief programs can be used to encourage utilization of the system and improve farebox recovery.

Impacts

a. Negative Impacts During Construction and Operation, Mitigating Negative Impacts and Community Outreach and Engagement
A community outreach and engagement strategy can be designed to integrate the local community into the feasibility, design, construction, and operation. The following provides a sequencing of how the community can be educated and engaged in the new system:
   - During the feasibility study, a community outreach program would be designed to engage the local communities in what the objectives are for the system and their views on how it could be done to optimize its value to their interests. The local communities would include appropriate representation from the local citizenry, business leadership, non-profits, commercial interests, developers, users, and government agencies. This can be used to test route interest, design parameters, demand, fare collection options, and price sensitivity. This is also the stage where "early adopters" can be identified and included in the program for moving forward if feasible. These early adopters would include large organizations (e.g., city, companies, schools, etc) that may be willing to dedicate resources to the successful implementation of the system. This could include everything from committing to fare minimums for their employees, to sponsorship of vehicles and/or stations, to assisting in the development of the system. Once the feasibility is determined and a decision to move forward is made, then these "sponsors" can be more fully engaged during the design phase
   - During the design phase, the local community can participate and be engaged in the final selection of the route, guideways, and stations. They can assist in developing the system "brand" and even in naming the system. For example, a "naming contest" could be held with the local schools or with the general public to pull them into "owning" the system. Many different participation activities would be developed to keep the target audiences engaged in the system's success. This would also be the point, where we would reach out to possible major user sponsors. This could include local government agencies (like airports, museums,

parking authorities, other government centers, etc.), utilities (power companies, water/sewer utilities, etc.), large event venues (zoos, convention centers, sport stadiums, etc.), important commercial centers (e.g., shopping districts), and other major users (for example, major employers).

This period will also be used to work closely with those organizations identified during the feasibility phase to establish roles they can play to ensure the success of the system.

- During all phases but especially during the construction phase, Ultra-MTS would propose to design consistent methods of providing frequent updates on the progress of the construction and the “countdown” to the system going live. This would include an outreach program using a web site, social media, local media, a local “speakers bureau”, and frequent tours of the construction work being performed.
- Before start-up, an education and engagement program would be designed to tie the opening to local events of interest and importance. Ultra-MTS would then provide a deliberate program of outreach and engagement to show the success and ease of people using the system. This program would start with frequent engagement activities during the first few months and then go to fewer activities in the following months. An annual celebration could be planned for the first year anniversary to celebrate the success of the system and any future expansions / improvements.

Annex One
Physical Elements – Response y
Images of Physical Elements of Ultra-MTS PRT Systems

Guideway / Column Structure

Guideway Construction

Example Station Interiors

Infrastructure and Example Fencing

Control Room

Vehicle Interior

Vehicle Interiors

Twin Lane Guideway and Diverging Point

Example Stations

Station and Maintenance Depot

Destination Selection Panel

Snow and Ice Vehicle

Example Integration into Urban Environment