Supraways

RFI – SAN JOSE
New Transit Options: Airport-Diridon-Stevens Creek Transit Connection

September 2019

SUPRA WAYS
Fly in your city

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1 Respondent Profile

Legal name of company: Supraways

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Legal status (i.e., Sole Proprietorship, Partnership, Corporation): Simplified joint-stock company

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High level description of concept
Supraways is developing an aerial, fast and premium public transport mode. A light infrastructure supports autonomous cabins for passengers and goods which circulate above public spaces. We organize this transportation system as networks of interconnected loops, which means that people won't suffer from connection time. They will choose a destination and go there directly, without any intermediary stop, 3 times faster than with any other existing urban transportation mode.

High level description of business plan
Supraways aims to be one of the major providers in the future world of urban transportation. Our value proposition to urban dwellers aims at granting them what they can't have today in urban transit: comfort, safety, speed and a seamless experience. And we'll design our range of solutions in a sustainable way. Supraways will create a range of light, efficient, electric and autonomous vehicles for people and goods.

Unlike the other urban public transport modes, often subsidized at around 80%, Supraways targets profitability, which is key for a global deployment, all over the planet. This profitability comes from the combination of competitive CAPEX, with prefabricated infrastructures and low ground impact, and low OPEX as a driverless system. Moreover, on the revenue side, our efficient and attractive solution will seduce dwellers and our guideways will be open, at off-peak hours, for logistics, to delivery and waste players (specific freight cabins). Last but not least, we will propose, if the MPO allows it, to use our stations as trade or business centers, in order to improve the global business model.

Supraways is building partnerships in various field: construction, artificial intelligence, engineering, transport operator, vehicles builder, etc. Some discussions are already well engaged with major market players. In the Silicon Valley, Supraways already works on specific technical issues with the San Jose State University, and has a potential with a local building company.
Simultaneously, Supraways is already working with several clients in France and Swizerland on feasibility studies of the system. For instance, the conurbation of Saint-Quentin-en-Yvelines (230 000 inhabitants) is interested to construct a 6.2 miles network before 2024, in anticipation of the Olympic Games. Indeed, the network will serve 3 olympic events. Other French and foreigner cities/conurbations study to implement the Supraways technology: for example,

Versailles Grand Parc (270 000 inhabitants), Sillon Lorrain (1.1 million inhabitants), Métropole Européenne de Lille (1.1 million inhabitants), the City of Grenoble, etc.

2 Proposed Concept

SUPRAWAYS designs, develops, integrates and markets elevated rapid public transit networks. It integrates autonomous cabins (called Supras) transporting between 7 and 9 passengers or freight, circulating above public spaces and traffic on a fully dedicated aerial infrastructure, offering a high-speed and uninterrupted service.

The unobtrusive infrastructure is composed of a guiding rail, supported by pillars positioned at a distance of around 30 meters. Thus, the vehicles can circulate above public space and urban traffic, without interfering or disrupting any activities on the ground. The advantage of such segregated lanes is the crossing over of constraints and of natural and artificial urban cut-offs (ravines, relief, roads, parking, etc.).

All stations are bypassed, so every Supras can enter and exit the network without disturbing other vehicles. By doing so, passengers can travel to their destination avoiding any intermediary stops. As a result, the average travel speed is much higher than for other transportation means, especially during peak hours. During off-peak hours the freight vehicles (logistics and waste cars) will use the infrastructure, thereby enhancing the system's profitability.

The Supraways transit solution represents the missing link in the urban transit area. We study these networks, after analyzing the existing transportation infrastructures, and build our offer in order to feed majors stations and hubs (i.e., train and metro stations, airports, ports, tramway lines). Under our elevated network, we design active mobility and clean areas at ground level in order to make life better and safer.

Supraways is an efficient alternative to cars in high density areas, as our vehicles will go faster and will be available 24 / 7. Supraways networks will bring a better service coverage in areas that are poorly served by conventional means of transport, for a much lower total cost of ownership for the public transportation authorities.

3 Physical Elements – The Guideway

What does it look like for a person walking by, and for a person using the system?

The picture here aside shows the system integrated in a French city. The aesthetic aspects of the infrastructure can change depending of the environment in which the system is deployed and taking into account the urbanistic, architectural and aesthetic requirements of the zone.

In vehicles and stations, the service design must meet the expectations of the 21st century's users in terms of comfort, safety, ergonomics and experience. In the Supraways network, a user will

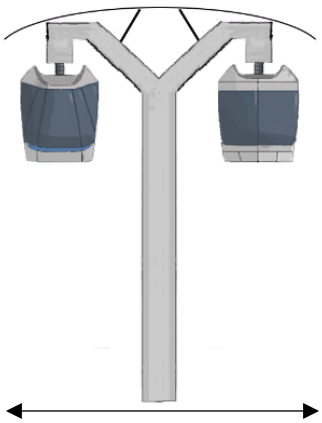
hold a virtual ticket (credit card, subscription, smartphone application). An ergonomic and modern application allows it to be connected in real time to the system and to benefit from information, help and services related to the Supraways network (waiting times, travel time, vehicle services, station, intermodality , title purchase, VIP service, etc.). In the departure station, the traveler inquires on screen or on his smartphone application if a Supras, programmed by another user, leaves for the destination of his choice. If so, he books his place, sits down and fastens his belt; otherwise, the system will assign the passenger's destination to an empty vehicle. The user has two options then: privatize the cabin by paying an additional fee, or share it with other people. A transport on demand and privatizable!
For safety and anti-fraud reasons, the vehicle will leave only if each traveler is seated, fastened and with a valid transport ticket. The Supraways stations are therefore not equipped with security gates. Designed to promote fluidity and meetings, they are living spaces offering services and trade.
A reception and security staff comes to answer all types of questions, information or problems. The accessibility of the system for people with reduced mobility (disabled, elderly, injured, etc.) remains optimal, with the integration of lifts and escalators in all stations. Vehicles have space to be able to place a wheelchair or pram, immobilized through an isofix system or equivalent.

How it is grade-separated?
Supraways is an aerial transportation mode supported by pillars with different heights in order to bypass bridges, roads, etc. and erase ground irregularities. The low point height of the infrastructure and vehicles is defined by local regulations. In France, it is around 20 feet, 5 feet above the height of road gauge in order to be considered as a fully segregated system. The total height of the Supraways system will approximately measure in France 32 to 39 feet. In California, we'll have to check the regulation with local authorities.

What are its right-of-way needs?
Supraways network combines both single and double tracks. The double tracks are the structure of the network, one side per direction, no possibility to cross on the same side. Single tracks offer flexibility and better network penetration. Indeed, we can create a single track to fetch a specific neighborhood, a university, or an hospital without needing a large right-of-way. You will find below the characteristics of each kind of track.

Single track

Double tracks



The distance between to pillars will be around 120 feet, with a very low ground impact.
Pillar diameter at grade will be around 3 feet.

4 Physical Elements – Stations/passengers access points

What do they look like for a person walking by, and for a person using the system?
How will the system integrate with existing transit systems?
As we can see in the picture below, the Supraways station is above a bus station and near a train station. In addition, stations for soft mobility (bike, scooter, autonomous shuttle, etc.) will be created. The idea is to provide to the users an all-in-one transportation hub.

Citizens will enjoy a corridor under our infrastructure to move safely.

What are the right-of-way and land needs of a station/access point?
Each station will be sized depending of the number of passengers using it. This dimensioning is based on the specific study and modelling of the network.
However, a station has at least two parallel platforms. The idea is to avoid a blockading of the station in the case one of the platforms cannot be used (broken down vehicle, difficulties with the boarding or disembarking of the passengers, etc.). So, for a double tracks station, there are 4 parallel platforms (two for each side).
A station with four platforms will have a right-of-way of 7 685 sq ft.

How will stations/access points integrate with the surrounding urban fabric on the Stevens Creek Line?
A specific study needs to be completed in order to find the best integration of the system in the urban fabric on the Stevens Creek Line. However, the infrastructure's and the stations' right-of-way allow the system to be easily integrated into various urban fabric. In addition, the infrastructure and design of the stations will be adapted to fit in better with the local architecture.

How will the proposed system connect with rail platforms (either BART or other heavy rail) at Diridon Station? How will the proposed system connect with airport facilities and parking at SJC?
The aerial aspect of the Supraways system allows different solutions to connect it to the existing facilities. The stations can be implemented above a parking, above a train station, etc.

Otherwise, the stations can be situated near the train station entrance. In addition, the small size of the vehicles and the absence of significant vibrations also make it possible to consider integrating the Supraways stations directly into existing buildings, thereby improving passenger intermodality. A specific study needs to be done in order to find the best way to implement the system in the environment of the San Jose network.

How do the system's vehicles operate within the network?
The system's vehicles operates like autonomous cars with the important exception that they are in a network of dedicated guideways separated from other traffic. This particularity has several advantages. First, the advanced technology needed to operate the system is less complex than the one developed for autonomous cars. Indeed, there is no interference between the system and other transportation modes (cars, pedestrians, bikes, etc.). The vehicles only need to take care of what happens on the network, not all the surrounding environment. Secondly, the collision's risks between the system and other transportation modes are feeble as we are talking about segregated mode and as we will equip the infrastructure with connected technology in order to prevent from any kind of risk.
The switch mechanism is embedded in the vehicles, the infrastructure is completely passive. Supraways owns a patent on a bogie which allows vehicles to make turns on the network by themselves, valid in the US. Moreover, the vehicles communicate with each other. They will be equipped with radars, lidars and various cameras so they can be aware, at all time, of the position of the vehicles located in the front and in the rear. A specific management fleet software will coordinate the overall movement of the vehicles, including the empty ones, in order to serve the passengers in the most efficient way possible, in particular thanks to machin learning mechanisms to adapt in real time the offer on demand.
For all these reasons, the headway can be reduced compared to classical transportation modes. The company's objective is to reduce the headway to 5 seconds at first, then to 3 seconds. At the end, Supraways covets to allow vehicles platooning on the network, reaching high capacities.

Is there level boarding?
The level boarding is at around 20 to 25 feet. The boarding platforms are at the same level than the departure and arrival areas.

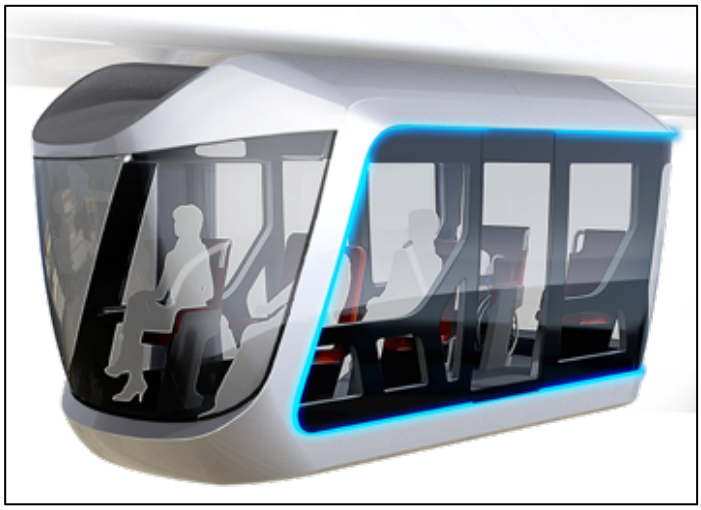
Platforms are accessible at the second floor by stairs or elevators.

How will the system be designed to be compatible with "complete streets" if the system is aerial?
The system is aerial, above the road jigs, it will not collide with other transportation mode. This particularity is one of the strengths of the solution.
Here is in the image below, a case partially over a street:

If the main guideway is aerial or underground, how do passengers get to grade level?
See station descriptions above. Each station will be equipped with an elevator and an escalator.

5 Physical Elements – the vehicles

What do they look like for a person walking by, and for a person using the system?
In the Supraways system, every passenger will be seated and fastened. The equipment of the vehicles depends of the City's public transportation strategy. For example, a digital screen can be integrated in each seat of the vehicle (ie. : like in a plane). To avoid the problems of sight and of opposite, the windows of the cabins will be able to darken punctually when passing in front of a building for example.
Moreover, the Supraways system allows freight vehicles to ride the network. This kind of vehicles will be able to transport standardized pallets (additional benefit for an network connecting and airport).



Passengers vehicle

Freight vehicle

For a person walking, cabins will appear as modern and silent moving elements. Under the Supraways system, streets might be arranged with walk ways or bike ways and green areas. The Supraways system might become a smart emblem of the city.

How many passengers and how much baggage can fit in a vehicle?
Two types of vehicle can be deployed on the network depending on the network's characteristics, the territory particularities and the potential passenger carrying objective.

7 passenger vehicles:
Those vehicles are sized in order to fit 7 passengers and as much baggage. There is one door on each side of the vehicle.
A special seat is reserved for disabled passenger in the rear of the vehicle. In that case, the vehicle can fit 6 passengers.

9 passengers vehicles:
Those vehicles are sized in order to fit 9 passengers and as much baggage. There are three doors on each side of the vehicle.
A special seat is reserved for disabled passenger in the rear of the vehicle. In that case, the vehicle can fit 8 passengers.

How do passengers board and alight from the vehicle? How long does it take?
In the Supraways station, each vehicle is surrounded by an exit platform and an entrance platform. The vehicle has one door on each side.
When the vehicle stops in a station, the first door opens in order to let the passengers exit. Studies have shown that it takes approximately 10 to 14 seconds for 7 fastened and seated passengers to leave the vehicle. Once all the passengers are unboarded, the door closes and a camera checks that nothing has been forgotten in the cabin. Then, the door situated of the other side of the vehicle opens. Boarding passengers can take place in the vehicle, it takes approximately 10 to 15 seconds for the 7 passengers to board.

With 9 passengers vehicles, the disembarkment and boarding process are faster because there are 3 exit and 3 entrance doors. Thus, it takes only 6 to 8 seconds for 9 passengers to leave the vehicle. Nine passengers can board the vehicle in 7 to 10 seconds.

What is the top speed, and how quickly is it achieved?
In urban areas, the top speed is 50 miles/hour. With an acceleration of 3.6 meters/s^2, the vehicle is able to achieve this speed in approximately 6 seconds.
Between two cities, the top speed is around 80 miles/hour, it can be achieved in 10 to 12 seconds.

The system can achieve these top speeds because all the passengers are seated and fastened. The vehicle speed will vary during the itinerary based on the guideway curves and the vehicle weight.

Are vehicles autonomously operated?
Yes, the Supras are fully autonomous vehicles. They do not require drivers and people can travel on demand within the network.

What do vehicles do when they are not operating? Do the vehicles require space off the guideway for storage? Do the vehicles require a maintenance facility? If so, describe the facility requirements (e.g. number of facilities, connection to the system, size of facility, etc.).
A facility will be used for both storage and maintenance purpose. This facility will be connected to the network by a specific guideway. When the system is not operating , the vehicles will be stored in the storage facility and in the stations platforms.

The size of the facility depends of the vehicles fleet size.

How are vehicles powered (e.g. battery, catenary, third rail, etc.)?
The vehicles will be powered by electricity, avoiding CO_2 and fines particles emission. Batteries will be embedded in the top of vehicles. Photovoltaic awnings placed on the guideway and the stations will produce part of the energy needs. Batteries will store this energy inside the stations which will be also connected to the electricity network of the City.
At this point, we'll start to use classical lithium batteries, however the technological revolution of hydrogen energy may be a game changer. We are currently discussing with experts and industrial firms in order to choose the best technology for our system. The use of battery eliminates any kind of grid maintenance on the beam and it greatly facilitates future extensions of the network. CAPEX are also distributed on a longer time scale with the fleet expansion.

Do the vehicles need to move or be moved in order to be redistributed to meet demand on a regular basis? Describe how this is performed (by operator, autonomously, by user, etc.) and how often.
The vehicles move within the network in order to meet the demand. Empty vehicles will be reallocated in real time to do so.
The fleet management system will be designed to predict the incoming users in the network. For example, if a Supraways station serves a train station, the system will send empty vehicles to this station in advance of the train arrival. The system will learn, based on the traffic data, the pattern of the trips in the network. Doing so, it will be able to predict the demand and move the vehicles accordingly.
Moreover, whenever a user asks for a ride, the system provides the nearest empty and available vehicle.
The Supraways solution is an on-demand transport system, so the reallocation of the vehicles to meet the demand will be done in real time, depending on the users' requests and the traffic patterns.

6 Operational Elements

Can the vehicle travel outside the grade-separated guideway (e.g. provide point-to-point service utilizing city streets?)
No, the vehicles are bound to the infrastructure. Doing so would generate several kind of issues. First, it would be difficult to control the available fleet in the elevated guideways and meet the demand in real time. Second, it would be impossible to protect vehicles from damages or control their state of cleanliness. Third, it would be possible to hide explosives inside a vehicle and in our time it is better to secure the fleet as best as we can. Last but not least, we think that driverless cars in open road are not for tomorrow, due to accident risks and costs for the cities which will have to invest in a connected infrastructure in addition to street maintenance costs.
For all these reason, we think that driverless vehicles can be efficient and safe at reasonable costs in a fully segregated areal network. Nobody to cross, perfect control of the fleet and more space at grade for bicycles and walkers.

What is the potential travel time from SJC to Diridon?
Considering an average speed of 31 miles/hour and a 3 miles travel distance, it will take less than 6 minutes for a passenger to reach Diridon from SJC.

What is the potential frequency of the service?
Supraways is an on-demand transportation mode. It will be available 24 hours a day, 7 days a week.

What is the potential passenger carrying capacity?
The potential passenger carrying capacity depends on vehicles capacity and the headway.

PPHPD*	Headway	
Vehicle capacity	**5 seconds**	**3 seconds**
7 passengers	5 040	8 400
9 passengers	8 400	10 800

*pphpd: passengers per hour per direction

How can capacity scale up if demand exceeds initial supply?
The stations and the vehicle fleet sizes will be designed in order to meet the transport demand. If the demand grows, it will be possible to add more vehicles in the network. For example, in the last study we did for a French client, we worked on a 6,2 miles network with 7 stations. We estimated that 3 600 passengers will use the system during the morning peak hour. By adding more vehicles, the network will be able to absorb more than 6 500 passengers in one hour, improving the capacity by 80%.
With time and experience feedback, we will be able to shorten the headway allowed by the official safety authorities. Platooning is the Supraways end objective.

What is the dwell time of a vehicle at a station?
The dwell time of a vehicle depends of various aspects:

- As soon as the vehicle is full, it leaves the station. In order to decrease the dwell time, we can allow the vehicles to leave the station once at least 6 passengers are seated and fastened. Fifteen seconds are enough for 7 passengers to take place in a vehicle. Considering that most of the vehicle will not be empty when arriving in a station. An average dwell time of 30 seconds seems to be a fair hypothesis.
- We can decide to start the vehicle even though not all the seats are occupied. During the peak hour, it is important to vacate the platforms quickly in order to let a new vehicle enter the station. For example, the studies we conducted for French clients show that a maximum dwell time of 30 seconds during peak hours is the best compromise between the effectiveness of the vehicle and the fluidity of the network. However, during off-peak period, the vehicles can stay longer in the station to improve the average number of passengers/vehicles.

A specific study of the network in San Jose is mandatory in order to be able to estimate what is the best dwell time of a vehicle at a station.

What is the reliability of the service?
Supraways wants to become a standard and the company will cooperate with the best world experts to create a safe and reliable transport. Full segregated networks are the best way to set good bases for reliability.
High level of safety with all the necessary redundancies will be developed. We will also work on cybersecurity as in our time risks are elevated. Discussions are now started with Airbus on this topic, that we cannot disclose.

Can the service be ticketless? If so, how will fares be collected?
Yes. Supraways is part of the generation of transit mode that will be ticketless. People will plan a trip with a smartphone, like it is now the case in Paris. Different solutions can be implemented to collect the fares. For example, a specific application will be created. Otherwise, the system can be incorporated in an existing application for public transportation (Mobility As A Service – MAAS).

7 Current Status of Concept Technology

Provide a description of the current development status of your concept (e.g., conceptual, design, development, pre-production testing, or production).

The system is still at the concept stage. However, we are currently working with different partners and clients in order to develop the technology.

Supraways owns a patent for the track and self-driven bogie (embedded switching mechanism, electric propulsion, intelligent suspension) that, thanks to its innovative features, avoid any switch with infrastructure participation. The infrastructure becomes passive and thus, through implemention of this new technology, the patented technological complex will become a new standard on the market.

Moreover, the patent development is realized in partnership with the San Jose State University laboratories under the patronage of Mr. Ron Swenson. A first proof of concept has been designed in 2016 in San Jose. Another one, much closer to the final version, will be developed in Lyon at the end of 2020.

Nowadays, the patents are already delivered in USA, China, Japan, South Korea and Russia, the requests are still under examination in Europe, India and Brazil.

We also underline that other technological blocks dedicated to the automated management of the system, vehicles as well as infrastructure will be developed and patented during R&D phase.

Supraways will open a test track near Paris in 2021, we will sign the agreement for the fields at the end of 2019. The idea is to build a 2 300 feet track to test the vehicle behavior, suspension and measure sub-elements fatigue and weaknesses. This technical facility will be the Supraways R&D center.

For the US, we think that we will have to build another test track, maybe in California where we have our partners.

Include a schedule for development of a fully deployable system, if applicable. Identify key assumptions for this schedule.

A study was executed for a French client taking into account the particularity of the French regulation requirements. Based on the research and the assumption that the technology will be developed and tested within 3 years, it is possible to implement a fully deployable system in the next 4 to 5 years, if all administrative and financial issues are solved in parallel. Of course, this time frame should be adjusted taking into account the particular requirements of the federal and Californian transport regulation. Only real implementation studies can accurately define the opening horizon of a public transport.

Include examples of successful similar implementations if available.

There are no examples of similar implementations so far, we are talking about innovation.

Identify areas of notable risk that would be investigated further.

The main risks are :

- Complex project to be adapted to the local regulation context;
- Homologations in the US;
- Legal and financial arrangements to be decided, with probably a public/private partnership;
- Third party acceptation level: we know that first studies in San Jose led to incredible high cost conclusions in a very recent past; the MPO will have to hire consultants and experts able to accept new concepts and open their mind ; for this reason we will invite them first to visit our R&D centers in order to start changing. Innovation will born to better this world, not to degrade cost and safety levels.
- Political decision and risk.

8 Concept Requirements

Describe key requirements for implementation of the system (e.g., infrastructure, utilities, regulatory and/or policy) and estimated length of time required to implement the system.
The implementation of public transport meets specific regulatory requirements: implementation studies, environmental impact studies, consultation with citizens, applications for approvals and authorizations by the competent authority, etc. This is the same procedure as for any guided transport system (tram, subway, cable car, train). We know the French procedure and we will have to study the procedure for California.
In France, we estimate that this procedure will last about 4 years. Our objective is to build a first 6,2 miles network for the Olympics in 2024, with stations at 3 olympic sites.

We need to make an implementation study in order to determine what is the exact right of way requirement. According to the OD matrix, the final design of the network, the location and size of the stations, etc. we will be able to precise needs and specify the points of vigilance.

Could the system function in either an aerial or underground configuration? Could it transition between aerial and underground? What are the maximum allowable grades for the system to ascend/descend?
This system is an aerial transportation mode, however it is possible to create some underground sections to bypass specific obstacles. The transition between aerial and underground sections could be operate within a short distance since the Supraways system can allow up to 15% slopes. In this case a full protection of the infrastructure and vehicles will be requested in order to stay in a 100% segregated corridor.

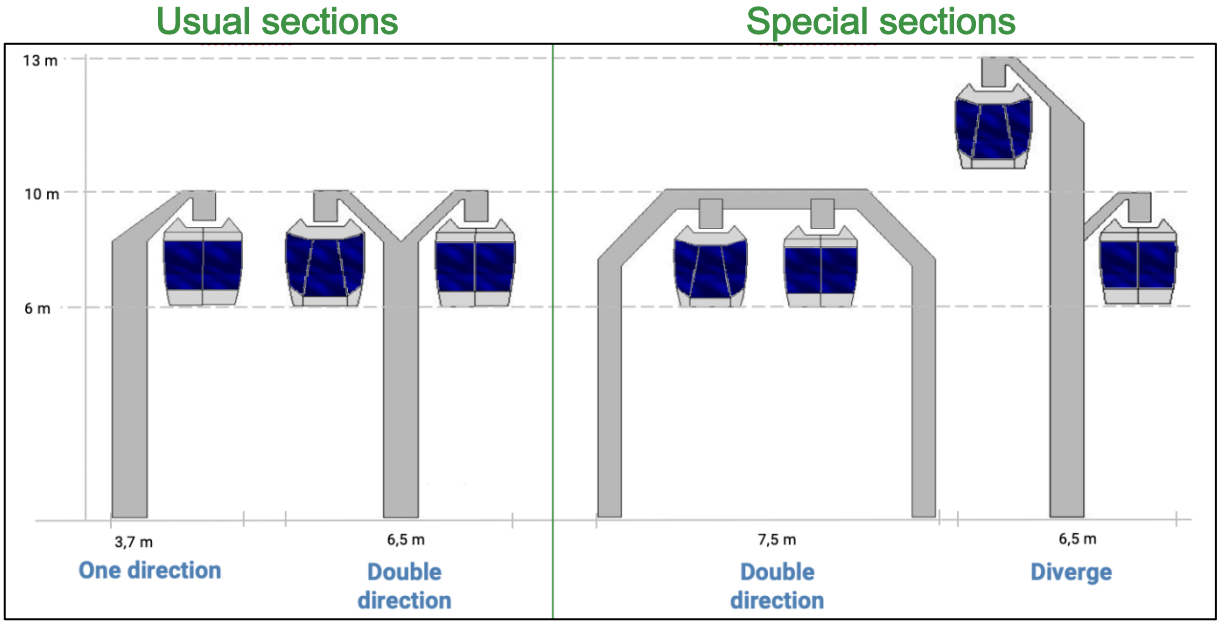
Could the system be extended in the future? Could stations be added to the system in the future?
Yes. This system can easily be extended in the future, this one of the main interest, as the network efficiency grows together with its expansion, allowing vehicles to be reallocated more easily according to the demand needs. Every station is off-line and connected to the network. The infrastructure is completely passive, the guideway system is embedded in the vehicle. This particularity allows a quick and easy extension of the network in the future (plug & play principle).

What are the maintenance requirements for the guideway, vehicles, stations, etc.?
The guideway does not require special maintenance apart from the need to regularly check its strength, expansion joints and other weak points (if any). The stations are maintained like any other building welcoming the public. The main maintenance is actually in the vehicle storage center, in the workshop. This feature drastically reduces the costs associated with this load (no maintenance at height, no immobilization of vehicles, etc.).
In our first assumptions, we assume that stations costs might be diegested by the building owners. Today stations in urban transportation are part of the city life and must be considered and integrated as commercial areas, residential buildings or office buildings. Costs or station operation and maintenance will then be relatively low compared to the whole building O&M costs.

9 Costs

What is the cost per mile to deliver the fixed infrastructure needed to operate the system, not including stations and land acquisition costs?
The cost for the fixed infrastructure needed to operate the system depends on the type of pillars and the network configuration. Supraways will offer a range of elements which costs from 4 to

8 millions $/mile. This cost must be adapted through a precise layout study, defining the structures in a real street configuration, etc.



What is the incremental cost of a station and/or access point?
As previously explained, every station is different and adjusted to meet the displacement demand. The number of platforms can vary a lot.
In case of a 4 platforms station with 3 stages, the estimated cost is approximelty 4 to 5 millions $. In the first studies made in France, all included, stations costs between $m 1.5 to 7 according to their size and level of equipment. But it would not be serious to talk about costs before knowing sizes, exact location, multimodality questions and architectural requests.

What is the cost of the vehicle fleet needed to begin operations?
A specific study needs to be completed on the network in order to be able to estimate the number of vehicles needed to meet the demand. It is the precise study of local travel, especially during peak hours, which will make it possible to define the number of vehicles required. For example, a 6.2 miles French project requires 85 cabins to transport 3,600 people per hour. We estimate the cost of the vehicle at around 250 k$ each as we are starting. When industrial costs will be reached, we think that vehicle will cost less than 70 k$ each.

Summarize the capital costs for delivering the full system for each potential project, Airport Connector and Stevens Creek Line. Assume six stations on the Stevens Creek Line and three stations on Airport Connector, plus Diridon station for both routes.
The overall cost for delivering the full system depends of too many factors (vehicles fleet, stations sizes, environment constraints, civil works, etc.). So, we cannot deliver this kind of information without a more thorough study of the network.
In France, the all-inclusive cost of a Supraways system is around 15 to 16 million euros per kilometer for a double direction infrastructure, 85 vehicles and 7 stations.

Provide a high-level estimate of the ongoing operations and maintenance costs, as well as equipment replacement costs and schedules.
Operating costs can not be seriously estimated without a system implementation study. However, they will be at least 30% lower than the operating costs of conventional transit systems.

10 Business Plan

Describe the business plan to deliver and operate the proposed project. The City is looking for innovative ways to fund and operate new transit systems.
To build, operate and maintain the system, a consortium of private players will sign a public-private partnership with your city. The regulatory and legal arrangements in California will have to be studied but we have a strong will to create win-win partnerships between the public sector and the private companies.
The consortium will include a building company, a real estate development company and an operator.
Supraways business plan is based on several pillars:

- ⇨ Lower the costs as far as we can, by prefabricating the line infrastructure and by considering stations as part of a real estate building;
- ⇨ Replace drivers by a lond term reliable mobility service offer, in order to deliver a unique service for fleet management, station management and vehicle control.

With low CAPEX/mile and competitive OPEX, this system will be highly competitive. Moreover, on the revenue side, we think we should add specific stations for logistics hubs and warehouses, in order to attract different sources of revenues and amortize the infrastructure during the off-peak hours.

It will be useful to study your legal environment and the way transportation networks are ruled in California, what is the scope of work of BART, what can be done or not. We don't pretend to understand all this and will need experts to do so.

Who will operate the system once constructed (VTA, the builder, PPP, other)?
See above

What is the passenger fares strategy?
The pricing strategy will have to be defined after studies. We will build a financial model and a proposal for a business plan based on the real costing of the operation and according to local practices and benefits for people and companies (passengers and logistics clients).

What are the expected fares for passengers to use the system?
The expected fares for passengers depend of the network and the strategy of the City. A study of the network is necessary to estimate its cost and the number of potential trips per day. The passengers fares will be adjusted based on those results in order to achieve financial viability, if that is what the City is looking for.

What is the strategy to maximize ridership?
24h availability, possible vehicle privatization with a premium price to reserve the vehicle for a group, large parking areas connected to the network, in order to dissuade people to use their car, nice stations with shops, restaurants, and/or offices and apartment, a unique experience (comfort, travel time and reliability).

Can capital and operations costs be funded through passenger fares?
Yes, this is the aim of the system, but we will have to study this business case to check if possible or not.
The vehicles are autonomously operated. It will decrease drastically the operations costs. For example, in France, the driver's cost represents more than 55% of the overall operations costs.
Moreover, we plan on diversify the use of the system by allowing freight vehicles to ride the network. By doing so, we will be able to connect both residentials and logistics areas with the Supraways system.

Describe opportunities or strategies to maximize farebox recovery and/or offset operations and maintenance costs.
The maximization of maintenance and operating costs is mainly due to the absence of a driver and maintenance in the workshop.
In the Supraways solution, as each passenger has to be sat and fastened, we control the number of people in each cabin. Then we plan a simple way to maximize farebox recovery: cabin won't start if one fare is not duly paid or does not correspond to the travel.

11 Impacts

What are potential negative impacts during construction?
The potential negative impacts during construction are much better than the classical urban transportation modes as we build over transversal obstacles. And the construction work will be a lot more shorter because , thanks to its passivity and its replicability, the infrastructure will be entirely pre-constructed.

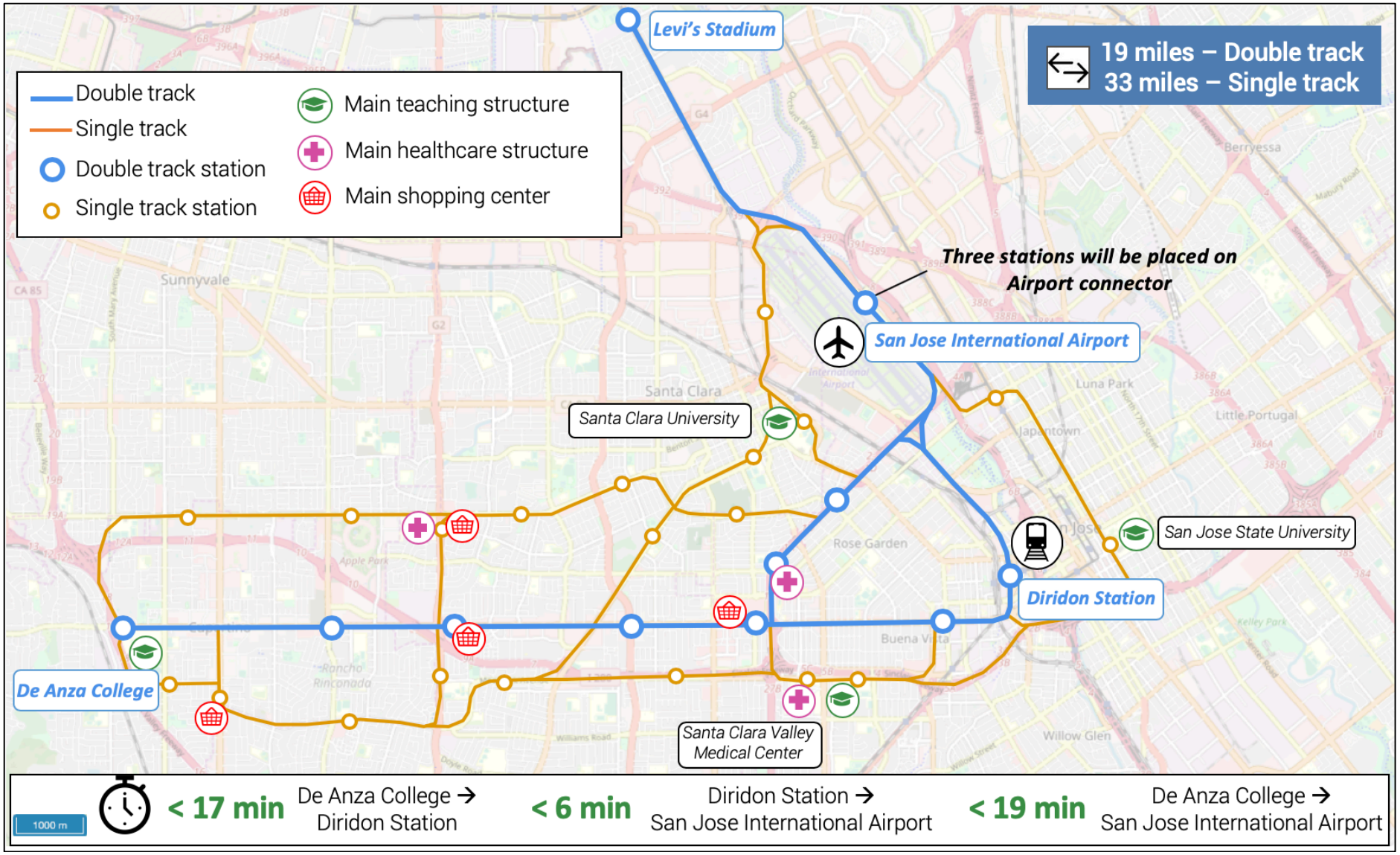
What are potential negative impacts during operations?
The potential negative impacts during operations are quite feeble. Indeed, the vehicles will not make a lot of noise thanks to the infrastructure shape which will mitigate the resonance. Moreover, the system is powered by solar energy and use electric engines. The atmosphere quality will be preserved.

How can negative impacts be mitigated?
Some solutions can be deployed to mitigate the visual impact of the system. For example, the infrastructure can be hidden from the residential areas when it is possible. We can plant some trees alongside the infrastructure.
We are currently working with architects to conceive different shape and color of the infrastructure. All the cities and territories are different, the infrastructure needs to be able to adapt itself to fit in the urban fabric.

What might the community outreach and engagement strategy look like?
The city might organize meeting and maybe a showroom of the operation. About architecture of the stations, it would be really interesting to let citizens choose and decide. New technologies (virtual reality, photomontage, etc.) will also help to get the project accepted, we will have to enhance all the positive aspects and benefits also. It is even possible to imagine involving citizens in the design of the project to unite them. Above all, it is a question of precisely studying the implementation of the system to reduce from the start the possible issues and anticipate reactions.

12 Proposal for San José

In this RFI, you think line and not network. The design of a Supraways network makes it possible to serve a territory more efficiently for equivalent costs. You will find here below the image of a fictitious network so that you can appreciate the interest of interconnected loops. The single tracks allow to reach various point of interest around the main tracks.
We propose you, if you show interest for our approach, to talk with French cities which works with us since a few years. Then we would like to make a study and design and quote a network in your city, starting with the area around the airport.


Levi's Stadium
19 miles – Double track
33 miles – Single track
Double track
Single track
Double track station
Single track station
Main teaching structure
Main healthcare structure
Main shopping center
Three stations will be placed on Airport connector
San Jose International Airport
Santa Clara University
San Jose State University
Diridon Station
De Anza College
Santa Clara Valley Medical Center
Sunnyvale
Santa Clara
Rose Garden
Buena Vista
Willow Glen
Luna Park
Little Portugal
Berryessa
1000 m
< 17 min
De Anza College → Diridon Station
< 6 min
Diridon Station → San Jose International Airport
< 19 min
De Anza College → San Jose International Airport

13 Conclusions

The answers we provide in this document can unfortunately not be precise since no implementation study has been carried out. Analysis of a system such as Supraways requires special expertise based on knowledge and understanding of the characteristics of this type of transportation. A Supraways network is not designed the same way as a classical public transit system (bus, tram, etc.). Supraways teams are trained and specialized in this kind of studies. They have acquired and developed adequate tools.

To improve the accuracy of calculations and results in implementation studies, Supraways has two complementary simulators.
A first tool is used to position existing transport networks, design the Supraways network, to check the intermodality and complementarity of the proposals made, to generate isochronous maps and travel time matrices. Supraways also has a unique static and dynamic simulation software, adapted to its technology, validated by the IFSTTAR City Mobility Transport Laboratory
(France). This multimodal dynamic simulator:

- ⇨ performs static simulations based on a "4-step model", taking into account the distribution of flows between different modes of transport through a generalized time analysis;
- ⇨ dynamically simulates the operation of a network;
- ⇨ compares networks according to the "LOGIT" method, and calculates modal share transfers.

This will allow us to design and dimension the Supraways network, the Supras fleet of vehicles and the stations.

We hope that this response will receive your full attention and that it will allow for discussions between our two organizations.