

# Personal Rapid Transit System for the City of Santa Cruz

## RFQ Response



### General Transportation Fund

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## Overview

The General Transportation Fund (GTF) is very excited by the City of Santa Cruz's decision to consider installing a PRT system to solve challenging transportation issues facing the City. Given that PRT is an emerging technology, extra time and care must be taken to choose the best technology and install it correctly to produce a successful transportation system. We have identified the following steps as critical to the successful implementation of a PRT system:

1. Recognize the need for a PRT system
2. Define the project (in-depth analysis of routes, ridership levels, technologies, and financing options; identification of stakeholders)
3. Choose the route and system technology
4. Gain political acceptance of system by all stakeholders (including entitlements)
5. Finance the system
6. Hire contractors and technology providers and install the system
7. Maintain and run the system

The "Report on the Feasibility of Personal Rapid Transit in Santa Cruz, California," published March 9, 2007, provides an excellent overview of the challenges and advantages of installing a PRT system in Santa Cruz; it essentially fulfills the requirements of Step 1 above. GTF believes the next step for the City is to define the project. This will take a tremendous amount of analysis, consensus building among various stakeholders, and very smart engineering.

GTF has been set up with the goal of helping cities with this development process, beginning with Step 2. If the City of Santa Cruz chooses GTF, we will work closely with the City, the University of California, Santa Cruz, and other stakeholders to design and analyze the myriad of options currently available. The financial viability of the system choices will be concurrently analyzed as we move forward. This in-depth project definition will engage all interested parties to work together to solve traffic issues and to address global warming gas reduction in Santa Cruz. At this time, we do not believe that all the stakeholders in Santa Cruz are ready to move forward with a PRT project. It will only be through a series of discussions, education, and tough decisions that the City will be able to gain the political momentum to complete this project.

In the Swedish city of Uppsala, a PRT movement led by Christer Lindstrom, co-founder of GTF, has produced one of the first PRT test tracks in the world. Additionally, Uppsala and a group of other Swedish cities are currently working together to develop full-scale PRT systems for each respective city. By taking risks and showing strong leadership in the field of PRT, Uppsala has become a technological magnet drawing worldwide attention and investment. With Mr. Lindstrom's first-hand experience of Uppsala's efforts, GTF can utilize all that has been learned there as a base to build the next generation of PRT systems in Santa Cruz. Just like in Uppsala, if Santa Cruz develops its own PRT system, we believe it could draw new businesses, investments, as well as international recognition in the field of transportation.

GTF's response to this RFQ does not respond directly to the information requested in the RFQ. We do not believe that there is a company in existence that can, at present, develop and build a PRT system for Santa Cruz, including our own. We believe that a consortium must be formed that brings together the expertise of professionals in many different fields; a group that will collectively

have the skills and experience necessary to successfully undertake such an innovative project. We think GTF is in a perfect position to form such a group, and that this RFQ provides an ideal opportunity for such an undertaking. Our first task will be to form an initial team to work with the City to comprehensively define this PRT project. Once we have a clearly defined project we will be able to attract world-class developers and financiers, along with the appropriate technologies to be part of the consortium.

We have divided our response to the RFQ into four primary sections: 1) Consortium, in which we describe how GTF can help Santa Cruz pull together the team necessary for a successful project; 2) Project Definition, which describes what we will complete in this initial phase; 3) Financial Model, in which we briefly describe a PRT system ownership and funding model; and 4) Relationships and Experience, which describes why GTF is in a unique position to work with the City of Santa Cruz.

## Consortium

GTF will form a corporation that will bring together the best possible mix of technology, construction, engineering, and project management skills. This corporation's goal will be to successfully develop and construct the Santa Cruz PRT project. The membership of the corporation will be determined at the time of incorporation by the requirements stipulated by GTF, the City of Santa Cruz, and the other participants. As the project progresses, more members will be added to the consortium. For more details about companies that GTF recommends, see "Relationships and Experience," page 5.

## University and Independent Research Involvement

GTF personnel have coordinated PRT research activities with Swedish universities and at the University of California, Santa Cruz. Additional research efforts are under consideration. Building upon the City of Santa Cruz's PRT initiative, GTF will further engage UCSC and coordinate support for PRT research from government agencies, industry, and private parties.

## Project Definition

### Expected PRT Development Route

We believe the initial route should be from UCSC to downtown. The high ridership levels we can expect from students should provide an economic base for the initial route. Once this portion is up and running we can look at further implementation that serves downtown and the boardwalk.

### Project Definition

GTF will work with stakeholders to define the route serving the university and the downtown. This phase will be completed in the overlapping stages outlined below to produce several model layout choices. We expect the project definition phase to take approximately nine months.

#### Stage 1: Form Consortium

GTF will form the consortium discussed above. This will set in place long-term relationships that will be needed to complete both the initial project definition through to the installation of the PRT system.

#### Stage 2: Secure Financing for Project Definition Phase

Once GTF has been chosen by the City of Santa Cruz to perform the project definition for this project, GTF will secure financing from grants, corporations, and private investors. We expect the

overall cost of the project definition phase to be in the region of \$200,000. In the spirit of a public-private partnership, the City of Santa Cruz will be required to provide some of the primary funding for this phase. The exact amount can be determined at a later date. The City's participation will also include staff time to help specify requirements and parameters for the project, with staff members working in conjunction with consortium members to clarify and define the final model outcomes.

### Stage 3: Basic Requirements

The consortium, working with the City, will generate a chart of requirements for a successful PRT project. This list will include, but is not limited to, the following requirement variables:

- Capacity
- Optimal Land Use
- Energy Usage/Energy Production
- Social Aspects
  - Safety Issues
  - Alarms
  - Rescue Procedures

These requirements will be appended and further refined with input from participants.

### Stage 4: Selection Process

Once the requirements of the system are determined, we can build a number of possible models based upon variable parameters, such as:

- Station Quantity and Locations
- Guide-Rail Pathway
- Target Markets Served
- Development Timeline and Benchmarks

### Stage 5: Initial Modeling

The models that the consortium decides to develop will be analyzed further with the Encitra suite of software. This software package will provide an interactive visual simulation of a proposed PRT system, including stations, traffic flows, and impact on existing traffic modes. Through a computer simulation, the viewer will be able to enter a PRT vehicle, travel to a destination, and exit the vehicle, much like in a video game. However, in this case, the environment surrounding the vehicle will be a realistic representation of a specific geographic location, including buildings, greenery, and other true-to-life features of the area. Existing traffic patterns can also be programmed in and visualized, making it easy to see the effect the PRT system has on existing traffic patterns.

This real-time modeling will allow the design staff, architects, and engineers to analyze the requirements and parameters to optimize each model. Further peak load and financial analysis will round out the models so that they can be comprehensively compared. (For more discussion on Encitra software, see "Marketing and Modeling: Encitra," page 5.)

### Stage 6: Selection Reiteration

After an initial analysis of the models is complete, new refined modeling will be used to pare down the options. This process will rotate the team back through Stages 3, 4, and 5 until only a few final models are selected as being optimal in regards to all set requirements and parameters.

### Stage 7: Final Models

These final models will be further refined and packaged to present to all citywide stakeholders. The visual modeling will clearly show all interested parties — from the general public to the city council— the routes, impacts, and experience of riding the PRT system.

## Project Definition Phase Deliverables

By the end of this exhaustive, iterative, multiple input process, the consortium will provide the City with the following deliverables:

- Model Visualizations
- Simulation Data
- Financial Data
- Ridership Data
- Industrial Development Data
- Employment Data
- Environmental Impact Data

## Financial Model

The consortium will develop a business model to meet the Santa Cruz requirements based on experience from earlier models in Sweden. GTF envisions a privately owned and operated PRT system in Santa Cruz. This will relieve the City of Santa Cruz of upfront capital investment. In this scenario, the consortium would require that the City guarantee a minimum ridership level. The key to success is to generate a large enough customer base for PRT, with smart system route design, incentives to use the system, and selection of reasonable traffic densities as the ridership base. This will help reduce the financial risk to both the consortium and the City. Other financial structures are possible and can be developed through the project definition phase.

## Relationships and Experience

The implementation of a PRT system is a larger undertaking than any single entity or organization can achieve on its own. GTF proposes to form a team of organizations and companies that will in sum provide all the knowledge, financing, and experience needed to optimally build the PRT system. Below are companies that have the necessary expertise and the long-term commitment needed to install a successful PRT system in Santa Cruz. The partners and team members suggested below are independent entities and GTF has not formalized these relationships except for Encitra Inc., which is a subsidiary of GTF Inc.

### Partners

#### Project Development: Barry Swenson Builder

Barry Swenson Builder (BSB) is a leading real estate developer in Santa Cruz, with strong and long-lasting relationships with the City. Key to the success of a transit system implementation are land use and real estate issues, two areas in which BSB is a proven leader. Additionally, BSB will be a strong player in maximizing return of investment for the City and all other stakeholders. (See Attachment 1, BSB Letter, and Attachment 2, BSB Qualifications.)

#### Marketing and Modeling: Encitra

Encitra is a software company specializing in dynamic visual modeling of traffic systems. Real streets and buildings are rendered in a three-dimensional graphic world. The existing car, bus, train, bicycle, and pedestrian traffic flows can be programmed in and visually represented. As viewers interact with the model, their actions affect the flows of all other objects in the model. This allows for a clear and simple analysis of the impacts that a PRT system can have when superimposed on existing traffic flows.

The Encitra modeling technique offers a unique opportunity for the entire sales process and entitlement process — from early evaluation and internal discussions of possible solutions and their alternatives, to a full-blown public presentation of PRT for residents, business owners, media, and key decision makers. Visit [www.encitra.com](http://www.encitra.com) to see a sample modeling visualization. (Also see Attachment 3, Encitra Presentation.)

### Photovoltaic Integration: EcoSage Inc.

EcoSage Inc. is a photovoltaic (PV) integrator based in Santa Cruz that has developed large commercial PV projects in Santa Cruz and the greater Bay Area. They have also co-developed innovative commercial racking solutions, and Ron Swenson, CEO, has developed a model characterizing the feasibility of powering PRT systems with PV that is attached to the rail structure. EcoSage's continual innovations and experience make them an ideal partner to work with PV manufacturers to design and specify a PV generation plant for the Santa Cruz PRT system.

### Proposed Team Members

Our suggested team members are determined by a number of factors, including technological capabilities, depth of experience, previous collaboration experience, and location (with preference being given to local operations). GTF has had only cursory conversations with the following firms to gauge their interest in participating in the consortium. Once the City of Santa Cruz has agreed to work with GTF, we will enter into talks with the chosen parties and form partnerships or strategic relationships.

### PRT System: Beamways or Vectus

We have identified Beamways and Vectus as primary contenders to be the PRT system vendor. We believe Beamways offers the best system for Santa Cruz primarily because it offers a two-way hanging post and beam system that has one of the smallest land and visual footprints. Given the City's restricted right-of-way space, the two-way post system solves a number of development problems and keeps costs down.

We will work with the City to develop a process whereby the contenders will be fully vetted and the selection will be made based on well-reasoned criteria. (See Attachment 6, Vectus Brochure, and Attachment 7, Beamways Brochure.)

### Infrastructure Consultants and Systems Integrator

We have had preliminary discussions with highly qualified candidates for this significant portion of the implementation and will make recommendations during the project definition phase.

### Finance and Industrial Development: Montgomery & Hansen LLP

Montgomery & Hansen LLP (M&H) is one of the most prestigious and successful law firms in Silicon Valley for start-ups in the green technology arena. Their commitment and achievements represent the kind of strength that the Santa Cruz RFQ needs for maximizing success. They have access to a vast array of financial resources and venture capital for the industry spawned from PRT development.

### Other Relationships

#### Systems Engineering: Aerospace Corporation

Aerospace Corporation (ASC) is one of the most unique centers for systems integration and systems knowledge in the world. They have an outstanding reputation for integrity, and their comprehensive and long-term experience in systems planning makes them an invaluable resource. We strongly recommend that the City of Santa Cruz initiates talks with ASC, listens to their advice regarding the Santa Cruz PRT initiative, and invites them to consider participation in the team as independent advisors.

### **Institute for Sustainable Transportation**

GTF is also in close relationship with the Institute for Sustainable Transportation (IST) in Sweden, the main force behind the implementation of the Vectus test track in Uppsala. IST has previously executed two international conferences on the topic of PRT technology and its place in urban settings, Podcar City I (Uppsala, Sweden) and Podcar City II (Ithaca, NY). Both conferences produced considerable interest at the local, state, and federal level in the European Union and the United States, with the recent one in Ithaca being covered by almost all major news networks in the US. It is the intent of Christer Lindstrom, CEO of Encitra and founder and board member of IST, to initiate a Podcar City Conference in the Bay Area which will give Santa Cruz worldwide exposure. (See Attachment 4, IST Podcar I Brochure, and Attachment 5, NY Times Podcar II Article.)

### **Kompass/GTS-X**

GTF representatives have participated in two other important initiatives: Kompass, the international association of cities engaged in Podcar (PRT) development, and GTS-X, the international organization (currently forming) that will develop standards to interface PRT systems from competing vendors. During the project definition phase, GTF will introduce the City of Santa Cruz to these organizations and will encourage the City to participate in them.

### **About GTF – General Transportation Fund**

GTF was founded in 2008 by Ron Swenson and Christer Lindstrom as a vehicle for creating an dynamic network around PRT systems. GTF has been a co-sponsor of the successful Podcar City Conference in Ithaca, and has initiated the Encitra modeling technology and company. GTF acts as a powerful catalyst and broker, with strong local, state, and federal political leverage in California, other parts of the United States, Sweden, and the European Union. Mr. Swenson and Mr. Lindstrom are both active entrepreneurs and have extensive political experience turning ideas into reality.

### **Ron Swenson**

Mr. Swenson, president of Swenson Ventures, is co-founder and investor in a number of ventures in the green technology space. He has extensive experience developing and implementing commercial and remote photovoltaic systems and has completed renewable energy projects in California, Mexico, Bolivia, Ecuador (Galapagos), Bhutan, and Peru. He co-founded Mexico's solar racecar team, which competed in the World Solar Challenge (1996) and SunRayce (1995), and he has built numerous specialized electric vehicles.

### **Christer Lindstrom**

Mr. Lindstrom is the founder of IST, the Institute for Sustainable Transportation, and is politically active in Sweden. He is also the CEO of Encitra Inc., based in Santa Cruz, with an office in Irvine, California. Mr. Lindstrom is currently working on several projects for PRT implementations in the United States and Sweden, and is working as a consultant for the Swedish government institute SIKA in the creation of long-term research and funding for PRT technology cooperation between the US and the EU.

## Addendum 1: Statement of Qualifications

This addendum addresses our response to the City of Santa Cruz according to the sequence presented in the RFQ and is included to assist in the review of our submittal.

### 1. Transmittal Letter

See attached transmittal letter.

### 2. Client References

GTF is a new company formed for the purpose of developing PRT projects. Client references for individual project team members will be available as they join the consortium.

### 3. Project Team

Please see section titled "Relationships and Experience."

### 4. Organization Chart

Until we move forward, we have no guaranteed organization other than GTF.

### 5. Company Resumes

Please see section titled "Relationships and Experience."

### 6. PRT System Requirements

#### Level of Development of Existing Systems

Currently we are not working on any systems, although Encitra is in the process of signing contracts to work in Uppsala, Sweden, and Ithaca, New York. It is our intent to collaborate with Podcar vendors which have achieved the most progress in this emerging industry.

#### Status of Regulatory Submittals, Review, Testing, or Approvals

Once the consortium decides the best technology to be used in Santa Cruz, we will be able to include the status of the technology development.

#### Financial Plan and Capabilities

Please see section titled "Financial Model." Before a financial plan can be finalized, we need to define the system in cooperation with the City and consortium members.

#### Energy Use and Environmental Impact of Proposed System: Viability of Solar or Alternative Energy Use

Once we have defined the parameters of the PRT system, we can examine the environmental impacts and analyze how to offset the global warming gases produced through the system. We have done sufficient analysis to demonstrate that a high capacity PRT system can be powered 100% (net over 24 hours) by solar panels (photovoltaics) placed directly within the guide-way.

#### Design and Operational Considerations Specific to Santa Cruz

Before this can be finalized, we need to define the system in cooperation with the City and consortium members.

**Construction, Maintenance, Operation and Safety**

Before this can be finalized, we need to define the system in cooperation with the City and consortium members.

**Detailed Timeline That Addresses Each Phase of Development, Implementation, and Operation**

Before this can be finalized, we need to define the system in cooperation with the City and consortium members.