

BAYAMÓN STATION AND ITS SURROUNDINGS: Desirable Characteristics Needed To Attract Non-Metropolitan Potential Riders

Introduction:

Our civilization and high-living standards has reached to the conclusion that fast, reliable, efficient and safe transportation is very critical to us. The TU has come to reinforce the competitive Metropolitan region (San Juan) in the areas of commerce, tourism and living standards. It's time to explore the transportation breakthrough that a Rapid Transit System as the TREN URBANO (TU) can grant the island of Puerto Rico.

The economy of the Metropolitan Area is not only aided by those living in this region, but the economy is also reinforced by those that are constantly traveling to and through the Metropolitan Area. This brings up an important detail and key element to my research: Is the Bayamón Station and its surroundings prepared to satisfy all the Non-Metropolitan potential riders? The TU's end of the line stations must have desirable characteristics in order to attract possible users. The Bayamón Station is very important and must be prepared to give the greatest impression of what the TU is really all about...

Countries Studied:

- | | |
|--------------------------------|------------------------------|
| United States
- BART | Colombia
- TransMilenio |
| Mexico
- Mexico City Subway | Venezuela
- Caracas Metro |
| Spain
- Bilbao Metro | Argentina
- Subte |
| Brazil
- Curitiba | Chile
- Santiago Metro |

Objectives for:

Stage
2

Study the perceptions of outer area populations and how can they become potential customers of the TU.

Study the Bayamón Station and its environment to see if it's prepared to satisfy outer population's, expectations.

Recommend specific strategies needed to attract outer populations.

Recommend new strategies to maintain and increase the potential ridership of Metropolitan residents.

Objectives for:

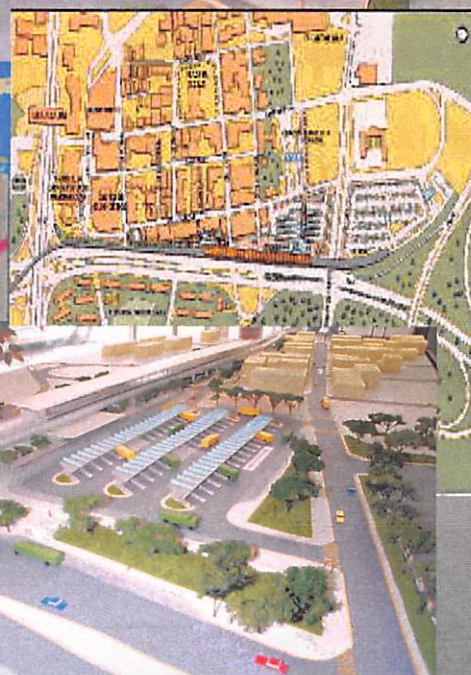
Stage
1

Analyze the profiles of people who are constantly entering the Metropolitan Area by car.

Identify strategies and actions that have been implemented and used to increase ridership in various countries with Rapid Transit Systems similar to the TU.

Identify what has been done in other countries to attract outer area populations to use their rapid transit systems.

Study the characteristics of "end of the line stations" and its surroundings in other countries.



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\$689,000 millones para el presupuesto 2002 del Departamento de Transporte federal” (Delgado, 2001, p. 8).

En cuanto a la tarifa para el TU, se estima que será de \$1.00 (dólares al año 1994, según la demanda al año 2010) ([FTA], 1995, p.1). Como la mayoría de los sistemas de transporte éste opera subsidiado. El costo operacional por pasajero por milla para la Fase I del TU se calculó como \$0.29; en promedio la eficiencia operacional de este tipo de proyecto es de \$0.40 (Squires, Notes October 10, 2000, hoja suelta).

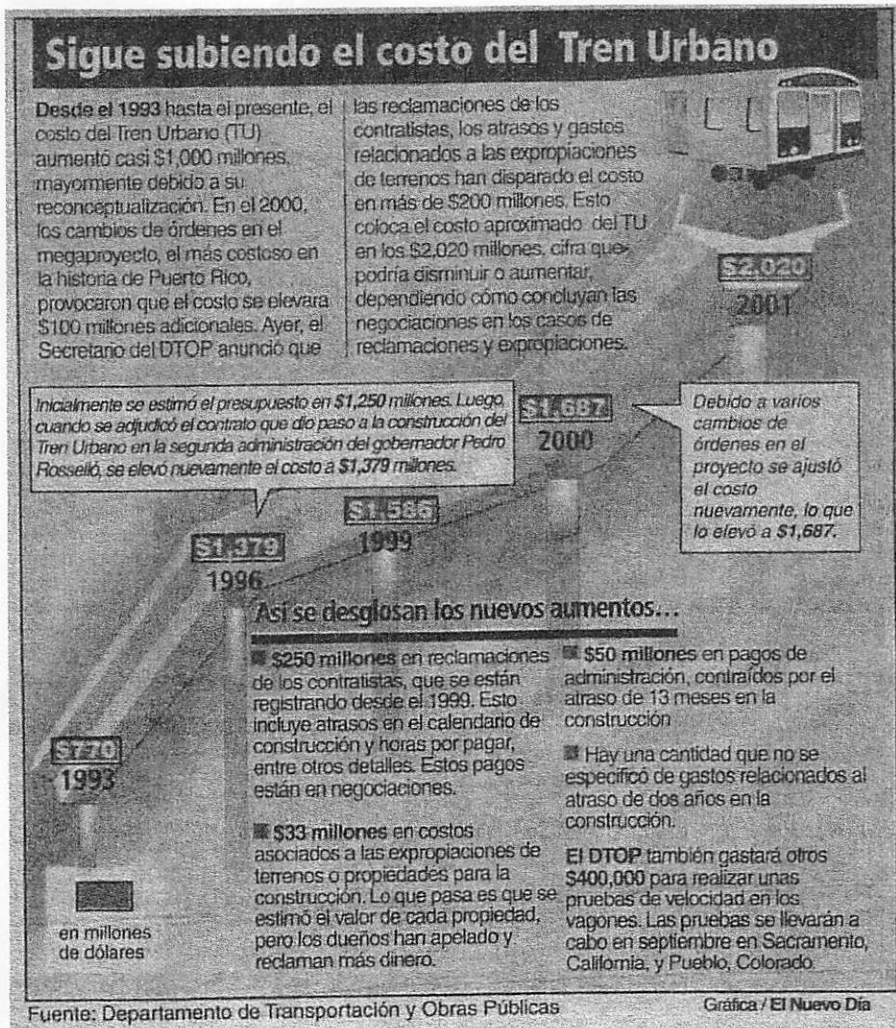


Figura 114: Aumento en el costo de la primera fase del Tren Urbano
Fuente: Roldán, C. (2001, 11 de julio). Sin freno las cifras del tren. *El Nuevo Día*, 4.

Tren Urbano Dynamic Route Planner

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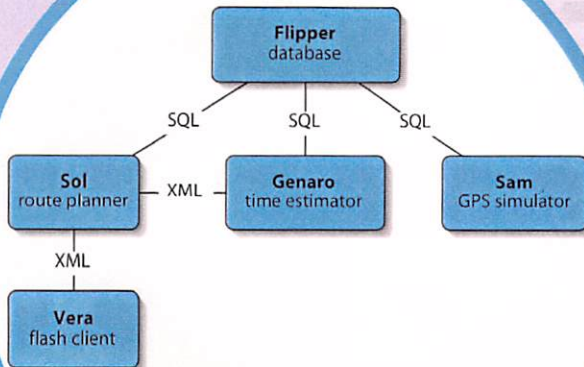
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As Tren Urbano is set to open next September, new technologies become available that can transform San Juan's mass transit system into an Intelligent Transportation System. These technologies, however, often remain underdeveloped, and the potential for a better city remain untapped. Key among these empowering technologies are GPS, which enables the new ATI to know the location of the vehicles of its fleet in the metropolitan area and new Internet protocols such as Wi-Fi that enables wireless communication even from handheld devices. Dynamic Route Planners, previously niche tools onboard luxury vehicles or restricted to desktops with Internet access, are now accessible to potential riders whether they are at their desk or in the middle of a city street. Key to their success and commonplace adoption is the integration of disparate systems (GPS and other real time sources, historic traffic information and passenger information system interfaces such as kiosks and websites). This project aims to succeed in this integration and create a prototype for the *Tren Urbano Dynamic Route Planner*.

System Components



The Tren Urbano Dynamic Route Planner has been split up into the components shown above. This allows for the distribution of tasks among different computers. Intercommunication is accomplished via industry standard protocols.

Objectives

To build the Tren Urbano Dynamic Route Planner prototype in a modular fashion, so that its components can be distributed among various interconnected computers.

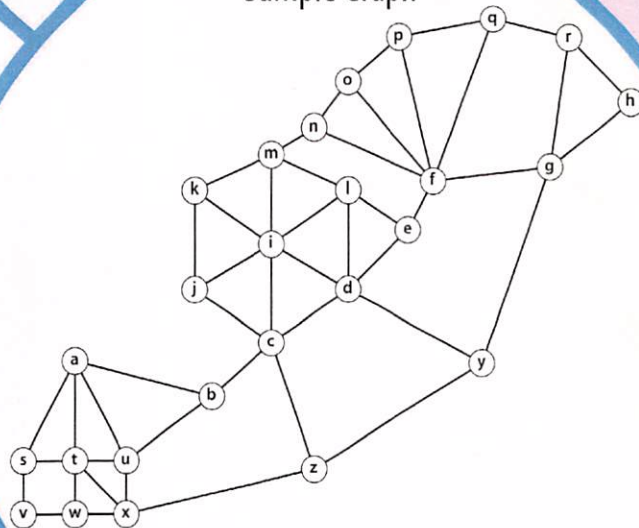
To create a prototype that can take advantage of varied sources of information, such as real-time and historic vehicle information.

To test this prototype with a subset of the San Juan region and thus examine its behavior under relatively real conditions.

Methodology

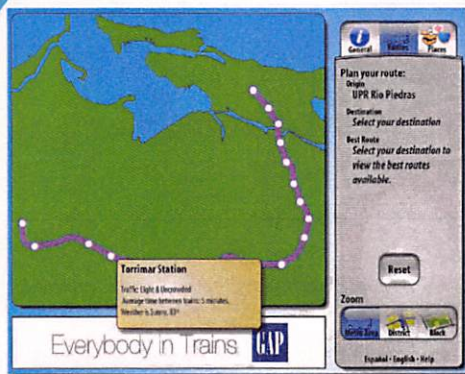
This project's principal product is a software prototype. In order to build this prototype, standard Software Engineering methods will be followed. The process basically consists of drafting an initial design, further refining it and specifying its components, followed by the implementation and testing of this design.

Sample Graph



This graph is a visual representation of the information set used to test the first prototype of the Route Planner. This will eventually be replaced with actual San Juan map data.

Interface Mockup



A future version of the Route Planner may feature an interface such as this one, and may offer other information services and advertising.

Algorithms

Among the most interesting processes in the system is the A* Shortest Path Finding algorithm. It is responsible for finding optimal routes quickly through a graph such as the one shown above. Other algorithms designed by third parties are also utilized in areas such as time estimation.

Completed & Pending Work

The components named *Sol* & *Vera* are already past the first prototype stage as of December '02. Successfully implementing limited functionality for route-finding, these prototypes have acted as proof-of-concept for our project. During the second half of the project, efforts will focus on implementing the remaining components and the important testing phase, with implementation centering around enabling those features that make the system not only complete, but advantageous for San Juan. Testing will focus not only on correct operation, but on satisfactory operation given it is operating on a subset of the San Juan Metropolitan Area.



TREN URBANO

Welcome to Puerto Rico!

An enthusiastic welcome to Puerto Rico is hereby given, we appreciate your kindness in accepting our invitation to participate in the UPR-MIT Encuentro IX Conference on Tren Urbano. We offer our assistance in making your stay in Puerto Rico comfortable and enjoyable.

Enclosed you will find the final program agenda. For those of you who will be making presentations, you are also invited to join us for any section of the program you may find of interest, but especially for the Welcome and Closure Receptions. Please see the attached program for date and time information. The vans will depart from the Embassy Suites Hotel.

Each morning of this week we will meet at Tren Urbano by 9:00 AM for the day sessions. The vans should depart from the Hotel at 8:30 AM. Please make your morning schedule to fit the complementary breakfast before 8:30 AM.

The conference venue is the Tren Urbano Office, 398 Jesús T. Piñero Avenue, San Juan, phone: 787-765-0927, fax 787-765-3885. Most activities will be held at Conference Room # 4.

If you have any special needs, please let us know. Contact the Tren Urbano Office at 787-765-0927 ext. 1203 or ext.1388

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Please do not hesitate to contact us if you have any questions or doubts.

¡Bienvenido a Puerto Rico!

Con gran entusiasmo le damos la bienvenida a Puerto Rico y le agradecemos su amabilidad al aceptar nuestra invitación a participar en el Encuentro IX UPR-MIT sobre el Tren Urbano. Deseamos ofrecerle nuestra ayuda para que su estadía en Puerto Rico sea cómoda y placentera.

Le incluimos la agenda final del programa. Para aquellos que estén a cargo de dar presentaciones, le invitamos a participar de cualquier parte del programa que sea de su interés. En particular, nos gustaría participaran con nosotros en las Recepciones de Bienvenida y Despedida. Las vans saldrán del Lobby del Hotel Embassy Suites.

Cada mañana de ésta semana nos reuniremos en la Oficina del Tren Urbano a las 9:00 AM para las sesiones del día. Las vans saldrán del Hotel a las 8:30 AM. Favor de hacer su rutina mañanera de tal modo que aproveche el desayuno que ofrece el Hotel con su estadía antes de las 8:30 AM.

La sede de la conferencia es la Oficina del Tren Urbano, en la Avenida Jesús T. Piñero #398 en San Juan, tel. 787-765-0927, fax 787-765-3885. La mayor parte de las actividades se llevarán a cabo en el Salón de Conferencias # 4.

Si tiene alguna necesidad especial, por favor déjenos saber. Comuníquese con la Oficina de Transferencia de Tecnología al 787-765-0927 exts. 1203 ó 1388.

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Por favor no vacile en contactarnos si tiene alguna pregunta o duda.



TREN URBANO

**9th UPR-MIT Conference on Tren Urbano
January 7-12, 2003, San Juan, Puerto Rico**

Moving Towards a Transit Oriented Region

Tren Urbano UPR-MIT Professional Development & Research Program

The Caribbean island of Puerto Rico will be the point of encounter for a diverse group of transit professionals from government and the private sector, academics and students, to discuss Puerto Rico's progress towards becoming a transit-oriented region. At Encuentro IX, sponsored by the Commonwealth of Puerto Rico and the Puerto Rico Department of Transportation and Public Works, representatives from the government sponsors, Tren Urbano, the University of Puerto Rico and the Massachusetts Institute of Technology will be joining professionally for the ninth consecutive year.

Tren Urbano, a 17.2-kilometer heavy rail metro in the San Juan metropolitan area is scheduled to start operating in September 2003. However, Puerto Rico has decided to do more than initiate a single rail transit line. Public policy goals, as stated in the "Project for Puerto Rico in the 21st Century", promote a multimodal, integrated and competitive transit system that will also be sustainable. That policy advocates creation of a transit system of high quality, efficiency and balance, which promotes development of strategic areas. To implement this policy, Puerto Rico is creating a multimodal, integrated transportation system that will incorporate many different means of transportation.

Aware of the great challenge that this poses, we will discuss these issues at Encuentro IX, a six-day conference in San Juan. Different panels and conferences, field visits and an opportunity to get to know the San Juan metropolitan area will be a part of this experience.

Key participants in the event are the students from the University of Puerto Rico and the Massachusetts Institute of Technology who are part of the UPR-MIT Professional Development & Research Program. The program is a highly recognized multi-disciplinary program to train transit professionals in an island that has not had rail transportation in the last fifty years. Over 300 students have participated in the program during the past nine years, and for many it provided the springboard to a career in transit. It is important to note that all the students participating from the University of Puerto Rico and the Massachusetts Institute of Technology are conducting research related to public transit and will present progress reports on their research. Professors from both universities who are advising in the student's research will also participate.

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Tren Urbano and Non-Work Travel

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Myth: Mass transit is only good for peak-hour commuting to the central business district

Fact: Non-work travel is a large share of total transit ridership

In the seven largest US metropolitan areas, non-work trips comprise between 33% and 45% of total transit trips, and between 53% and 75% of total transit trips with a destination other than "home," according to the 1995 National Personal Transportation Survey.

Fact: Non-work travel is a growth area for transit

A simple comparison of census journey-to-work data and transit ridership data reveals that non-work travel helped increase transit ridership in the 1990s, in most major US metropolitan areas. For example, in San Diego, journeys to work grew by only 8%, while transit ridership grew by 39% -- growth in non-work travel contributed to increasing ridership. In St. Louis, journeys to work fell by 12%, but transit ridership still grew by 17% -- growth in non-work travel avoided declines in ridership. In Washington, journeys to work fell by 8%, but transit ridership fell by only 2% -- growth in non-work travel kept ridership losses from being worse.

How can Tren Urbano best serve non-work travel?

Implications for transit service

This thesis will identify specific actions that transit agencies can take to attract non-work travelers, such as increasing the hours of service, adjusting the fare structure, or modifying feeder bus routes. At Tren Urbano, a rare opportunity exists to establish these policies before service begins, so as to maximize the attractiveness of the service to non-work travelers.

Implications for Transit-Oriented Development

This thesis will identify the types of neighborhoods that are niche markets for transit-based non-work travel, because of favorable demographic and land use characteristics. The characteristics of these neighborhoods can be replicated near Tren Urbano stations through Transit-Oriented Development.

Research methodology: Case studies of St. Louis and Chicago

St. Louis opened its first rail transit line in the early 1990s. From 1990 to 2000, total transit ridership in St. Louis increased by 17%, even though transit journeys to work actually fell by 12%. Non-work travel has been critical to the success of the new rail line. A case study of St. Louis will help identify practices that can be replicated in San Juan. St. Louis will be compared to Chicago. Although considerably larger, Chicago is also a major Midwestern city with a multimodal transit system, but Chicago did not experience the same growth in non-work transit use during the 1990s. In Chicago, transit journeys to work decreased by 8%, and total transit ridership also decreased by 8%.