Investigating User Acceptance of Cybernetic Cars for a University Campus

Shlomo Bekhor, Yoram Zvirin and Leonid Tartakovsky

Transportation Research Institute
Technion – Israel Institute of Technology
Haifa, 32000, Israel

E-mails: *sbekhor@tx.technion.ac.il*, *zvirin@tx.technion.ac.il*,
meryzlt@tx.technion.ac.il

ABSTRACT

This paper investigates the application of an innovative transportation system for a university campus. The system is based on cybernetic cars, which are defined as road vehicles with fully automated driving capabilities. A fleet of such vehicles forms a transportation system with on-demand and door-to-door capability. The fleet is under control of a central management system in order to meet particular demands in particular environment.

The investigation follows the methodology of two European-based Projects: CyberCars and CyberMove. The paper outlines the main characteristics of the new system and the methodology used to evaluate user needs analysis. The results of the user needs analysis are compared against those of the European partners involved in the project.

Keywords: Cybernetic Cars; Personal Rapid Transit; User Needs Analysis; Focus Groups; Structured Interviews

INTRODUCTION

The PRT concept

Personal rapid transit (PRT) is primarily an automated, low polluting, demand-responsive form of transport. The first PRT initiatives emerged in the early seventies, motivated by developments in electronic and aerospace technologies. Particularly in Europe, the sharp increase in oil price and the sudden necessity for alternative solutions accelerated investments to probe PRT technologies. The subsequent stability in prices reduced the motivation for searching alternative solutions to conventional transport. Several different projects were developed since then. For a review on PRT history, see Anderson (1).

There are many recent projects under development. Andreasson (2) presents a thorough review on innovative transit systems. A new approach for PRT appears now as an alternative solution: small automated vehicles which form part of public transportation system, complement mass transit and non-motorized transport, and provides passenger service for any location at any time. These vehicles can serve as a basis for new, trackless PRT systems. Such systems will avoid the many disadvantages of the conventional tracked PRT, because the infrastructure is much simpler and therefore also much less expensive, does not interfere with the landscape and all in all offers much more flexibility and convenience. These systems are called cybernetic transportation systems (CTS). See Zvirin and Parent (3), Clerget et al. (4) for details on the CTS concept.

In this paper, we focus on the application of a CTS system for a specific site: the Technion Campus in Haifa, Israel. Currently, there are neither PRT nor Automated People Mover (APM) systems in Israel, and the main transport modes are private car and bus. Therefore, the population in general is hardly aware of innovative systems. The paper investigates the results of the user needs analysis performed as part of the European Community (EC)- sponsored Projects CyberCars and CyberMove. The Technion is a partner in the Projects, which are briefly described in the following.

The CyberCars and CyberMove Projects

The main objective of the CyberCars and CyberMove projects is to accelerate the development and implementation of novel urban transport systems for movement of people and goods. Both projects focus on evaluation of existing arrays of technologies, rather than developing new ones. These systems aim at improving the mobility, while reducing negative effects of the private car use in cities, by complementing mass transit systems and hence offering a real alternative with better convenience and efficiency than the private car in the cities. The CyberCars project is funded through the IST-Programme (Information Society Technology) and started in August 2001. The CyberMove project is funded through the EESD-Programme (Energy, Environment and Sustainable Development – City of Tomorrow) and started in December 2001. Both projects are funded for three years. Detailed information can be found in the CyberCars web page (5).

The CyberCars project focuses on the testing, analysis and improvement of existing techniques, which are starting to appear on the market. In particular, technical improvements are expected for the vehicles in the fields of guidance, collision avoidance, platooning and vehicle control systems. For the infrastructure, technical improvements are also expected on fleet management, human-machine interfaces, remote operation and energy utilization. Existing systems will then be tested on private grounds in order to set technical goals for the improvements expected. The technical improvements will be performed, tested and evaluated on the same premises. The evaluation categories include technical and user needs assessment.

The CyberMove project focuses on bringing together all major European actors of this field, in order to test and exchange best practices, share some of the development work and make faster progress in the experiments. Several cities throughout Europe will collaborate with the partners in the Project, studying the potentiality to run such systems, providing their specific constraints and accepting to do some preliminary tests of technologies and demonstrations. Co-operative work with selected cities will lead to conceptual design of systems for specific sites, optimized with regard to mobility, energy, environment, safety and will lead to the evaluation of these designs. The evaluation categories include technical, user needs and economic assessment.

The CyberCars Definition

There is a distinction between the project called CyberCars and the cybernetic transport system (CTS) called CyberCars, which forms a basis for both the CyberCars and the CyberMove projects. The partners involved developed the following CyberCars system definition for both projects:

CyberCars are road vehicles with fully automated driving capabilities. These are non-standard vehicles of much smaller size than existing vehicles. A fleet of such vehicles forms a transportation system, for passengers or goods, on a network of roads with on-demand and door-to-door capability. The fleet of cars is under control of a central management system in order to meet particular demands in a particular environment.

At initial stages, CyberCars are designed for short trips at low speed in an urban environment or in private grounds. In the long term, CyberCars could also run autonomously at high speed on dedicated lanes. With the development of the CyberCars infrastructures, private cars with fully autonomous driving capabilities could also be allowed on these infrastructures while maintaining their manual mode on standard roads.

CyberCars are members of the general family of people movers and close to personal rapid transit, but they offer the advantage of being able to run on any ground infrastructure, which means they are cheaper and more flexible.

Motivation

This paper investigates a possible implementation of a CTS system in a university campus. Specifically, the site proposed is the Technion Campus in Haifa, Israel. Currently, the Technion is connected to the other parts of Haifa mostly by buses, as part of the urban bus network, which is efficient only during peak hours.

The objective of the project is to improve the accessibility inside the Campus for two main populations: students and visitors arriving by private car who park far from the main buildings, and persons arriving by public transport who have limited mobility inside the campus, because of long walking distances with slopes. In addition, faculty and staff would benefit from the system to move inside the campus.

SITE CHARACTERISTICS

The potential site proposed is the Technion Campus, including connections between peripheral parking lots and various campus areas and buildings.

Urban and Mobility Context

The Technion (IIT) campus is located on the hillside of Haifa east side. Haifa is the third largest city in Israel (250,000 habitants). The campus area is 1.34 sq. km; the approximate population figures are 12,000 full-time students, 700 faculty members, 2,500 staff and 3,000 others (pre-university students, participants in various courses, general visitors, etc.).

The Technion is connected to the other parts of Haifa mostly by buses, as part of the urban bus network (efficient during daytime). There is a limited urban service of shared taxis on prescribed routes (similar to those of the buses). A radio taxi station near the campus provides good service. In addition, the Technion provides organized shuttle bus services (morning and afternoon) to the staff. Approximately 10,000 vehicles a day enter the Campus, 8,000 out of them are private cars. The remaining 2,000 vehicles are mainly pickups, vans and buses.

Figure 1 presents a schematic map of the Technion campus. The main road is a circular loop, running up and down the hill with some steep slopes. A central avenue connects the west (main) and the east gates; part of it is a promenade. Most of the public buildings serving the Technion community are located along or close to it. There is a free shuttle van running on the loop road, connecting between peripheral parking lots and part of the central avenue. The shuttle service is infrequent and limited in operation, although it is free of charge. There is a severe shortage of parking, and the parking lots near most of the buildings have access only to persons working in them (faculty and staff).

[Insert Figure 1 here]

Site-specific problems and strategies

The Technion has limited parking available for students and visitors (only 1,000 parking spaces). The peripheral parking lots and also most of the student dormitories are located far from the campus center and main buildings, resulting in long walking distances (more than 1 km). In addition, there are quite steep slopes inside the Campus, in some cases more than 10%. Therefore, many students prefer to park in forbidden places, even at the risk of penalties (fine, suspension of entry rights, etc.). They prefer not to wait for the shuttle when going to their destinations.

In addition, there are intensive social, cultural and sports activities on campus in the evenings, when public transportation is very limited. An average of 1,500 students participate in evening activities.

There is a plan, at design stages, to build a cable car as part of a new projected mass transportation system, connecting the Technion and the Haifa University with the business and commerce area near Haifa east entrance. A new bus terminal was recently built, and a train station will soon open there. The new terminal in the Haifa east entrance will also provide direct service to Tel Aviv and to the northern and eastern regions of the country.

Application objectives and description

The objective of the project is to improve the accessibility inside the Campus for two main populations:

- Students and visitors arriving by private car who park far from the main buildings.
- Public transport riders who have limited mobility inside the campus, because of the long walking distances with slopes.

The project is divided into two main phases:

Phase 1: Connection between three big parking lots and some of the faculties in a linear line. Two of the parking lots are located close to the East Gate, and the third one is near the main promenade. The line passes near the projected cable car station, which also located near this gate. This phase is oriented to improve accessibility for students parking far from the main buildings. Figure 2 shows an aerial photo of the Technion campus with the proposed line.

[Insert Figure 2 here]

The length of the line is approximately 800 m with an average slope of 7.5%. This segment corresponds to the link between parking and entry to on-campus loop. Assuming 20 km/h average speed, the in-vehicle time is less than 3 minutes.

The vehicles will have to travel alongside existing traffic. It will be possible to control all the intersections in order to avoid conflicts. The existing right of way comprises two lanes in each direction; one of them is generally used for parking, which could be adapted for the CTS vehicles. Therefore, the vehicles can run independently in both directions. At both ends of the line there is enough room to accommodate the vehicles (recharge, store vehicles not needed, etc).

Phase 2: Completion of the initial line to a closed loop that connects most of the faculties and public buildings. This phase is oriented to serve both populations listed above. The length of the loop is 2.4 km.

Expected demand

Assuming that the demand will be derived only from drivers who park in the parking lots, we expect a total of 3,000 passengers a day, according to the following assumption: 1,000 drivers who will park in the morning hours and use the system, 1,000 drivers who will use the system to return to the parking lots in the afternoon, and 1,000 drivers who will use the system during the day. The peak hour is between 8 and 9 AM, in which 500 passengers are expected. These are conservative assumptions, since they don't take into account an increase on the public transport passengers due to the projected cable car. It is also assumed that the service will be provided free of charge for students.

Capacity

Phase 1: Assuming that the vehicle capacity is 8 persons, we will need approximately 60 trips per hour in one direction. Dividing this figure by 5 minutes (in-vehicle time + layover), we need 12 vehicles to fulfill the capacity. In this way, the average waiting time would be 2.5 minutes (half of the inter-arrival time).

In off-peak hours, we assume that we need at most 6 vehicles to run the system, and the average waiting time would be 5 minutes.

Legal and Institutional Framework

Since the proposed system is entirely inside the Campus, and the Technion owns the land, there is no apparent problem with National and Regional authorities, provided that pedestrian and vehicle crossings are controlled. In Israel, there are no specific safety regulations related to the fact that the vehicle has no driver.

With respect to local authority, the concern is mainly with parking regulations. There is a current need to increase the number of parking spaces inside the Campus, in order to fulfill the proportion required between the number of employees and visitors to the available parking space. Therefore, the project could also provide an additional benefit in terms of reducing parking places.

USER NEEDS ANALYSIS

Methodology

This section summarizes the methodology developed in the CyberCars project by McDonald and Voge (6) of the Transportation Research Group (TRG) at the University of Southampton, which were the project leaders in this task.

In the context of implementing, operating and using CTS, four general user groups can be identified, which consist of further sub-groups.

- Industry: Provides the technology for CTS
- Decision-maker: Decides over implementation of CTS
- Operator: Operates/ provides services for CTS
- End-user: uses or is affected by CTS

The user group industry will not be considered in the context of the user needs analyses for CTS and CTS applications, as the approach within the CyberCars and CyberMove projects is that the industry will provide CTS according to the established user needs. This leaves three user groups to be considered for the analysis, the decision-maker, the operator and the end-user.

These three subgroups are well defined for all public applications, but in the special case of a private application (e.g. airport, theme park, large business, university campus, etc.), though there is also a decision-making body and a system operator, they are part of the same institution. Therefore, the site classification distinguishes between public and private applications on the highest level leading to a combination of user groups and sub-groups. Table 1 describes the different user groups defined.

[Insert Table 1 here]

Based on the analysis framework described above, two main activities were devised to obtain responses from all user groups: focus groups and structured interviews.

Focus Groups

Moderated group discussions (focus groups) were carried out by a number of partners as a qualitative market research tool, to obtain responses on user requirements and perceptions on CTS by the end-user group, with general needs. Different participants characteristics (e.g. age, gender, car ownership, etc.) were established, to plan the recruitment of participants with the aim of covering a variety of characteristics.

The stimulus material used in the focus groups to present CTS as the topic for the group discussion contained about 15 slides. In addition, a video film showing two existing CTS systems and two animations was presented to the participants. The following three parts were presented.

a) Existing CTS related Systems

The aim of this part is to show that CTS technology is not something futuristic, that the technology is available and that CTS related systems are already implemented. The material contained descriptions, illustrations and videos for the Schiphol ParkShuttle and Rivium systems. More details of these systems can be found in the FROG Navigation Systems (7) web site.

b) The Short-term Scenario

The objective of this part is to describe what level of technology is possible in three years time, as a basis for the discussion on user requirements for this scenario. The material contained descriptions and illustrations for the Rivium extension.

c) The Long-term Scenario

The intention of this part is to describe the level of technology envisaged for the long-term, as a basis for the discussion on user requirements for this scenario. The material consisted of written description of the vision (demand-responsive, door-to-door) and a video of the RUF system of Jansen (8) as an example.

Structured Interviews

The focus groups activities only considered the end user with general needs. Structured interviews were used to obtain responses from end user / non-user with special needs. The structured interview approach was used for all these user groups and sub-groups, according to the common agreement, that the focus group technique is only suitable for covering responses from the end-user with general needs.

The interviews were carried out according to a common structure in order to obtain comparable results. A number of partners worked in parallel to obtain responses on user requirements and perceptions on CTS - by user groups end-user with special needs, decision-maker, operator and decision-maker / operator combined, which were not covered through focus groups, as this form of interview would be more suitable for these groups.

To ensure comparable results of all structured interviews carried out by partners involved in this activity, a common structure for organizing the results, analyzing them and reporting was developed. This structure was based on a topic guide developed for carrying out the interviews. All partners reported their results using this structure, which contained an analysis of responses under the following four headings:

- Awareness of CTS Technology
- Comments/ Views on CTS Technology
- Current Problems in View of Transport
- Future Plans in View of Transport

RESULTS

Local Interviews

The focus groups and structured interviews were conducted according to the above guidelines. A total of 6 structured interviews and 3 focus groups were performed. The focus groups were composed of 6 to 8 participants.

Table 2 shows the specific groups analyzed, in accordance with Table 1. The shaded cells in the table indicate that most of the interviews were related to end-users. Considering the fact that a specific project was analyzed, and the Technion is a private organization, less emphasis was placed on public applications.

[Insert Table 2 here]

The user needs analysis revealed that the students and staff would use the new technology if it offers a good door-to-door service for the whole campus. This means that the vehicle should run not only on the existing circular loop and/or the main avenue, but would also arrive close to building entrances. In this way, the users would not have to use their own vehicles. The integration of the cable car and CTS seems to be very attractive.

There are concerns about the performance of the vehicles, in particular power and energy parameters associated with problems of steep slopes and air-conditioning. Potential users think the vehicle will not be able to cope with these two problems and provide a reliable service. They assume that the service provided would be free of charge, just like the existing shuttle service. Table 3 presents the results of the focus groups in more detail.

[Insert Table 3 here]

The Technion management is interested (unofficially at this stage) in the project, and efforts are currently being made towards finding a donation for construction of a CTS, which would provide service as well as an inter-disciplinary research project. Table 4 presents the results of the structured interviews in more detail.

[Insert Table 4 here]

Comparison with European partners

7 partners in 6 countries carried out a total of 23 focus groups. As mentioned above, all focus groups were carried out and analyzed according to a common and agreed structure for comparable results. In the context of the formal interviews as part of the structured interview activities, 6 partners in 6 countries carried out 27 interviews. Table 5 shows the number of formal interviews and focus groups carried out by each partner in each respective country, separated for user groups covered.

[Insert Table 5 here]

A detailed description of the results can be found in McDonald and Voge (6) and are not presented here. In this paper, we focus on the contrast between local needs and general needs. Since all partners involved in the project presented the results in the same format (as described in Table 3 and Table 4), it is possible to compare both the focus groups and structured interviews.

Focus Groups

As expected, general issues like congestion, pollution, parking and other well-known urban problems appeared in all responses and therefore are not repeated here. There were few differences related to the short-term scenario, in particular the vehicle speed perception. Low vehicle speeds were positively perceived in Israel, because of safety concerns. However, in most European responses, low speeds were negatively perceived, because of travel time concerns. Another major difference noticed was the lack of environmental concerns among Israeli users, in contrast to European users.

Mixed responses were also observed with respect to security concerns. While Israeli users reported only concerns related to vandalism, European users expressed security reservations related to the fact that they would ride a public vehicle without a driver, another person that could help in case of theft, robbery, etc.

Another interesting difference is related to the comparison between long-term and short-term scenarios. Local users seem to be not interested in long-term scenarios, and this was reflected by the lack of interest in the responses. They tended to view the system as futuristic. The European users were more interested in the long-term scenario, because they felt that the short-term scenario would not help to solve urban problems.

Structured Interviews

The comparison of the local responses is performed separately for each of the four headings described above.

- Awareness of CTS systems:

The replies on the awareness of CTS technology were mixed. Some interviewees in Europe (especially in the Netherlands) were aware of specific systems presented, like Schiphol ParkShuttle. Few European ones mentioned related systems, including airport people mover, LRT schemes, guided busways, in-vehicle telematics systems. Most of Israeli interviewees were not aware of CTS systems at all.

- Comments / Views in CTS technology:

The overall reaction was positive. Public European operators were the most skeptical with respect to success of the proposed system. In Israel the focus of the interviews were related to a private operation in a technical university, and the interviewees expressed confidence in a practical implementation of the system.

- Current Problems in View of Transport:

In this particular point the differences observed were the most prominent. This was due to the nature of the specific application proposed for the Technion Campus. Since the campus is located on a hilly terrain and does not offer many parking spaces, many concerns were raised with respect to these issues, like long walking distances. In Europe the problems observed were more general.

- Future Plans in View of Transport

The main difference noticed between Israel and Europe in this context is that local Israeli authorities have urgent need to expand the infrastructure, both in highways and public transport projects. European counterparts expressed less concern in terms of highway networks, and more emphasis on public transport and slow modes.

SUMMARY

This paper analyzed the user needs regarding the implementation of an innovative system in a university campus. The user needs analysis was performed in a prespecified way, common to all partners in the CyberCars Project. The differences between local users and other European users were outlined.

At this stage of the project, there is a consensus among potential users that the proposed system can succeed. This is mainly because the project was designed to cope with existing difficulties, such as parking problems and poor accessibility. For this reasons, the short-term scenario was highly positively perceived, in contrast to other European users.

ACKNOWLEDGMENT

This research was carried out within the framework of the CyberCars / CyberMove Projects. The CyberCars project is funded through the IST-Programme (Information Society Technology). The CyberMove project is funded through the EESD-Programme (Energy, Environment and Sustainable Development – City of Tomorrow).

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Figure 1. Schematic Map of the Technion Campus

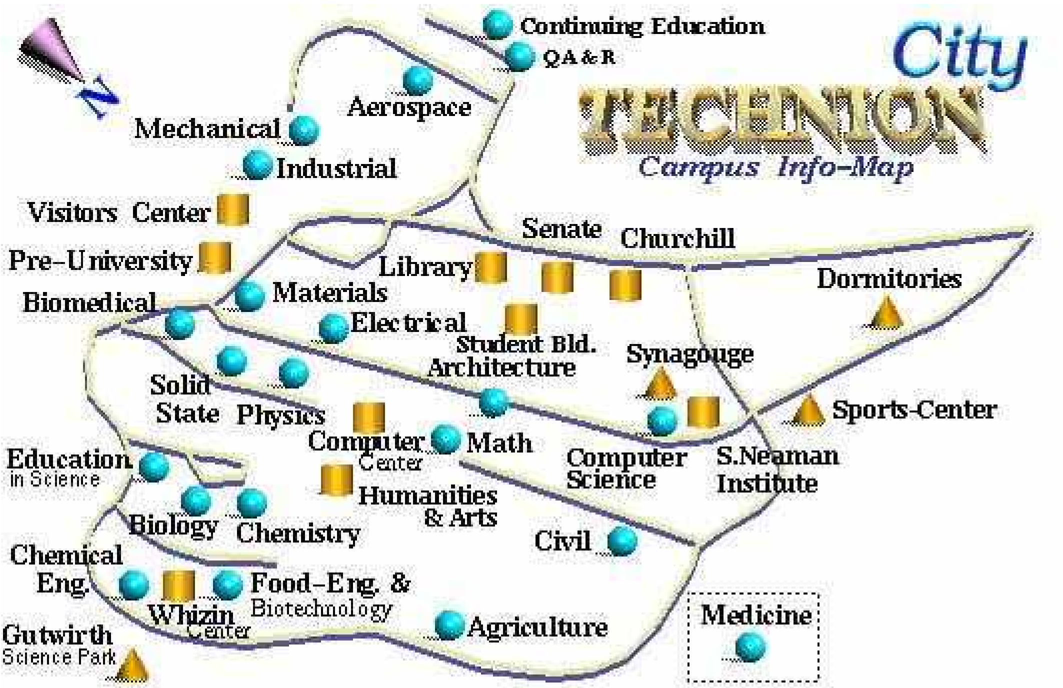

Figure 2. Proposed Line (Phase 1).

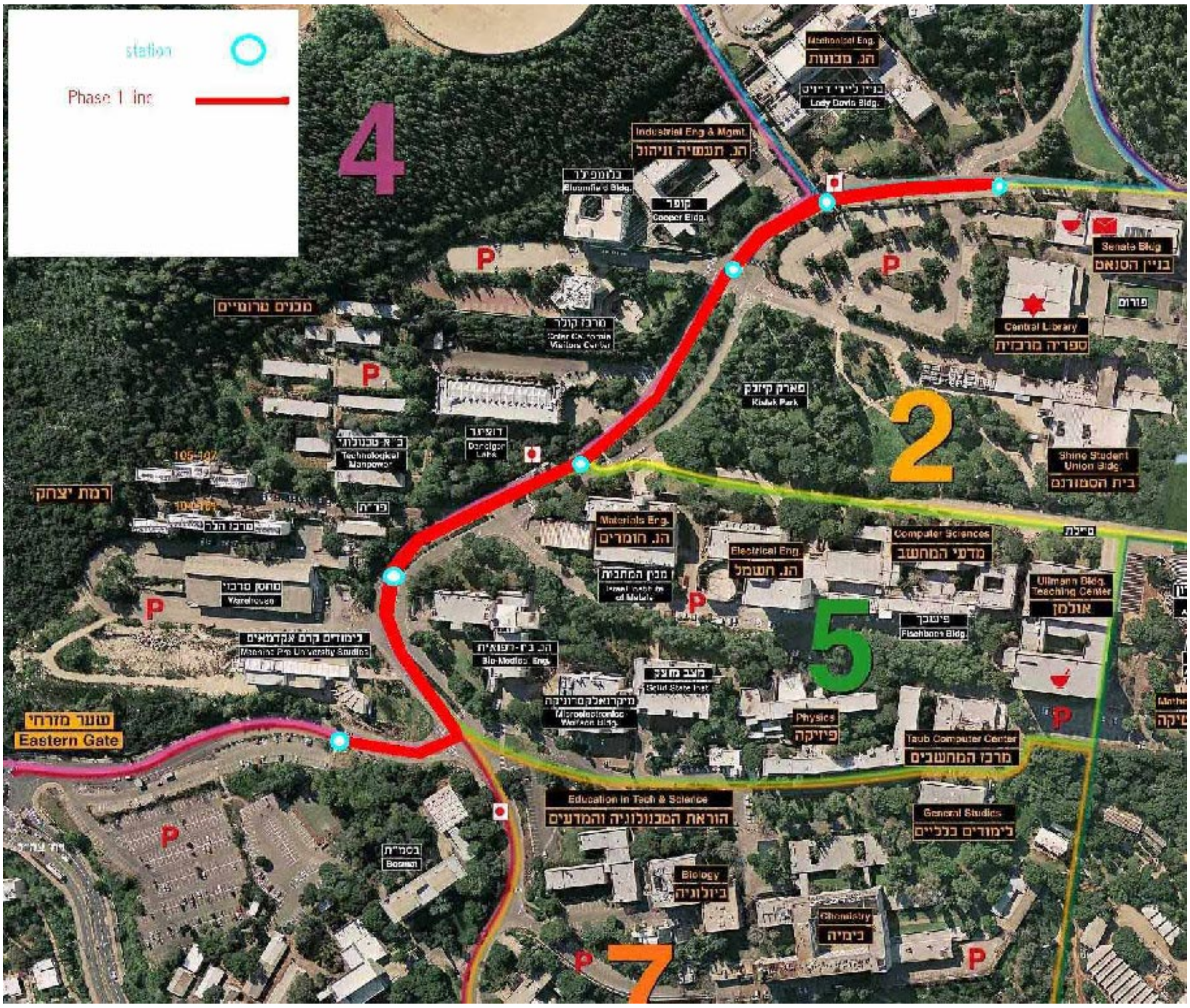

Table 1. User Groups and Sub-groups for CTS

End-user	Potential User	Special Needs	Elderly, Disabled
			Motorists
			Cyclists
			PT User
		General Needs	
	Non-user	Residents	
		Shops& Businesses	
Decision maker (Public Application)	Non-elected	National Level	
		Regional Level	
		Local Level	
	Elected	National Level	
		Regional Level	
		Local Level	
Operator (Public Application)	Public Transport Operator		
	General Service Provider		
Decision maker& Operator (Private Application)	Airport		
	Theme Park		
	Large Business		
	University Campus, etc.		

Table 2. Specific User Groups Investigated in the Technion Proposed Site

End-user	Potential User	Special Needs	Elderly, Disabled
			Motorists
			Cyclists
			PT User
		General Needs	
	Non-user	**Residents**	
		Shops& Businesses	
Decision maker (Public Application)	Non-elected	National Level	
		Regional Level	
		Local Level	
	Elected	National Level	
		Regional Level	
		Local Level	
Operator (Public Application)	Public Transport Operator		
	General Service Provider		
Decision maker& Operator (Private Application)	Airport		
	Theme Park		
	Large Business		
	University Campus		

Legend:

Shaded Dark Grey: Structured Interviews

Bold Light Grey: Focus Groups

Table 3. Summary of Focus Group Results

Topic Category			Summary of Results
Present urban transport issues	General issues		Congestion, poor transit accessibility, environment and energy.
	Location-related issues		Parking problems, limited car access to the campus, hilly area and long walking distances.
User perceptions for the short-term scenario	General issues		Positive reaction. Belief in technical feasibility, but conflict with benefits of walking on campus.
	Operation Issues	*System*	The system should be extended to a network, instead of only a single line. A door-to-door operation would be preferred to an operation only between fixed stations.
		Vehicle	Acceleration might be problematic due to hilliness of the area.
		Safety	Use of an obstacle avoidance system is necessary. Interaction with pedestrians is problematic.
		Security	Concern about possible vandalism.
		Access	-
		Payment	In case of a campus application the system has to be free for the end user, funded through the university. For public application the fare should not be above fares of other modes/ services of public transport.
		Features	Air conditioning.
	Possible applications		A CyberCars system could be useful for connections between other modes/ services of public transport.
User perceptions for the long-term scenario	*General issues*		Perceived as being similar to a busway network. The benefits of this system are not clear enough.
	Operation Issues	*System*	The system seems to be too futuristic.
		Vehicle	-
		Safety	Concerns about operation on the monorail in terms of safety.
		Security	Worries about potential accidents when the vehicles access the monorail.
		Access	-
		Payment	-
		Features	-
	Possible applications		Could be a solution to congestion in city centers and could provide faster access from suburbs.

Table 4. Summary of Structured Interview Results

Interviewee: Haifa Municipality Transport Company (Yefe Nof)	Summary of Results
Awareness of CyberCars Technology	Not specific, but good knowledge of PRT projects.
Comments/ Views on CyberCars Technology	Very positive reaction towards long-term scenario, short-term scenario can provide only local solutions.
Current Problems in View of Transport	Congestion on suburban roads leading to the city centre, insufficient bus systems.
Future Plans in View of Transport	Substantial improvement of road and public transport network, including LRT and cable car.
Additional Results	Good prospects of CTS for Technion campus especially connected with cable car. For private vehicle systems car manufacturers/ government should be committed, for public systems entrepreneurs should be involved.

Interviewee: Technion Campus Administration	Summary of Results
Awareness of CyberCars Technology	Not specific, but good knowledge of APM concepts, e.g. monorail systems.
Comments/ Views on CyberCars Technology	Very positive, especially for short-term scenario. Potential for campus application and connection with cable car
Current Problems in View of Transport	Students have to park in the periphery, far from buildings, leading to long walking distances. Steep slopes.
Future Plans in View of Transport	Improvement of roads (campus), more parking spaces. Cable car to connect Technion, bay area and University.
Additional Results	CTS seen as research project at this stage, not as a practical solution to day-to-day traffic.

Interviewee: Disabled (Technion)	Summary of Results
Awareness of CyberCars Technology	Not aware of CTS technology.
Comments/ Views on CyberCars Technology	Positive reaction, but concern about vehicle features, regarding disabled passengers. The system should provide real door-to-door service and should also connect destinations outside the Technion campus.
Current Problems in View of Transport	The topography of the Technion campus is very problematic for disabled persons.
Future Plans in View of Transport	Improvement of the accessibility to and inside the Technion campus.
Additional Results	Conflict with benefits of walking on campus. Good information systems are necessary. Positive aspects of CTS technology include improving quality of life (pollution, noise) and energy savings.

Interviewee: Motorists (Technion)	Summary of Results
Awareness of CyberCars Technology	Not aware of CTS technology.
Comments/ Views on CyberCars Technology	Very positive, as CTS is possible system to connect parking spaces and faculty buildings
Current Problems in View of Transport	Limited parking places and long walking distances with steep slopes.
Future Plans in View of Transport	Improvement of road network on campus and additional access roads to the campus.
Additional Results	CTS vehicles should be powerful enough to cope with existing slopes. Vehicles should be air-conditioned.

Interviewee: Public Transport User (Technion)	Summary of Results
Awareness of CyberCars Technology	Not aware of CTS technology.
Comments/ Views on CyberCars Technology	Very positive, especially when connecting it with cable cars. But it should be a network not only a single line.
Current Problems in View of Transport	Existing PT system/ network results in long waiting and walking times.
Future Plans in View of Transport	Improvement of PT options, especially increase of service frequency and possibly closing the campus to cars.
Additional Results	Concern about travel time savings with CTS and cable car for users commuting to the Technion campus.

Interviewee: Consulting Company for the Ministry of Commerce	Summary of Results
Awareness of CyberCars Technology	Aware of Schiphol’s ParkShuttle and Parking Hopper.
Comments/ Views on CyberCars Technology	Very positive. Potential for park as transport solution and attraction in itself, but concern about steep slopes.
Current Problems in View of Transport	Very hot and dry area, where walking is difficult. CTS should connect entrance and site attractions.
Future Plans in View of Transport	Considers choice between or combination of CTS, ‘amusement park train’ and shuttle buses, e.g. train or bus for peak and CTS for off-peak, to reduce operating cost (no labour costs for CTS) and passenger waiting time.
Additional Results	Decision on system difficult, as government ministries, municipality and national park management are involved. And difficulty of ensuring funding for the system.

Table 5. Overview of Structured Interviews carried out by Country

Country	**Focus Groups**	**Structured Interviews per User-group**			
		End-user	**Decision-maker**	**Operator**	**Decision-maker/ operator**
France	2	-	1	-	-
Israel	3	3	2	-	1
Italy	6	-	1	2	-
Netherlands	4	2	1	3	1
Portugal	4	-	-	-	-
Switzerland	-	1	1	2	-
UK	4	1	4	-	1
Total	**23**	**7**	**10**	**7**	**3**