Hello everyone,

This is the first "AutoMate" newsletter. It includes a brief overview of the world of PRT (Personal Rapid Train, i.e. fast personal train) as I understand it today. This understanding comes after a short, intensive exposure to PRT during the fourth annual conference of "POD Cars" (small cars with centralized automatic guidance) held in the Silicon Valley city of San Jose on Oct. 27-29, 2010.

In the second part of this document I will share my thoughts about the possible future of "AutoMate". While the first part is based on open sources, the second part represents my vision. Clearly, when you received this newsletter you became a partner to my secrets.

The organization heartily thanks the dear fellow that worked tirelessly this week and took care of all my needs: food, shelter, showers, sports, sight-seeing and advanced packaging services. Thank you, Noam!

I hope you enjoy the read.

(-) Neta

Part One – The World of Personal Trains

Personal Rapid Transit is defined as an autonomous vehicle guided by a computer that is remotely controlled by a central system. The vehicle is designed to serve one to six people so it's "personal" rather than "public", with the emphasis on the passenger's ability to choose the destination of the trip.

The main interest (today) is in city vehicles and vehicles in airport areas traveling a closed circuit. The purpose of the system is efficiency and streamlining the traffic load.

There many automated train systems (such as the JFK Sky Rail) but these all fall under a different category: "Light Rail". But "Light Rail" is not "personal" (and therefore will not stop where "you" want but rather where "it" wants).

Every country has a different name for this field. I will mention only one more popular name: "Pod Cars" that virtually means "small cars".

- To date there are three ("real") companies that build PRT systems:

VECTUS a British company (incorporated in England) owned by the Korean iron corporation "POSCO" ($35 billion, similar to "SAMSUNG or "HYUNDAI") with offices in Sweden and Korea.

o The company started as a research effort at the University of Stockholm.

o Once the Koreans company saw an opportunity for producing iron rails, it became a commercial company.

o VECTUS has a 400 meter railway around a football field in distant Umpalla, Sweden. PRT PODs have been "travelling" the rails since 2006. The PODs are powered by linear motors located in the rails. This is the only (!) railway of this size in the world.

o VECTUS has more than 3000 hours of testing and 2000 passengers have "experienced the ride".

o Each POD weighs 800 kg and is meant to reach a maximum speed of 60 km/h (40 mph). The distance between PODSs is 3-6 seconds, derived from the requirements of a "brick wall stop" (see following).

o VECTUS is expected to complete the first system in Korea in 2013. This system will be used by families and visitors wanting to reach the nature reserve in Suncheon.

http://www.vectusprt.com/company/overview.php

ULTra PRT   a British company controlled by BAA (British Airport Authority). This company also started as a research effort but in this case by British aviation engineers. They brought the idea to the company running the Heathrow (London's largest airport and busiest in Europe) as a way for saving time and operating costs. BAA liked the idea, installed the system and bought control of the company…whoever arrives at Heathrow can ride the system.

- o The system entered the "pilot" stage on Oct. 19, 2010 and today anyone needing to get from the parking area to Terminal 5 may use the system.

- o The ULTRA system is based on independent PODs with electric propulsion running in a raised concrete railway. Laser sensors estimate the distance from the sides of the railway. The average speed (max) = 25 mph (40 km/h).

- o POD weight is approx. 1200 kg and the batteries are charged after every trip. This system is also designed to serve up to 6 people.

http://www.vectusprt.com/system/propulsion.php

2getthere   a Swedish company operating since 1994 building automated travel systems (no driver). The company started by building buses and cargo transportation at the ports. The "2getthere" flagship is the construction of a PRT system in the city of Masdar, located in... Saudi Arabia. This is the most "interesting" system due to the multiple stations serving a "real" city.

- o Masdar is designed to be built in "layers" with the automatic transport "under" the city. Due to the economic crash of 2008, the project suffered cuts (astounding, they also have less money) and the scope was reduced.

- o The "2getthere" system is unique due to a "4 tiered laser sensor" (whatever that means) that maps traffic problems up to 50 meters in front of the car. In their point of view: "better one stop extra than one stop short…".

- o The "2getthere" vehicles have no railway (external) and they track magnets laid every 2 meters in the road. Location offset is made by correction (half of the error) between the magnetic sensors and the number of wheel rotations.

- o The vehicles weigh about 1500 kg of which 450 kg is the weight of the batteries. Batteries are expected to work for 5 hours between chargings.

- o The system is under construction and should start operation in 2011.

http://www.2getthere.eu/Personal_Transit

- **Who leads the field and why now (or, "where's the money"):**

It turns out that the subject of PRT (at least according to the current conference and participants) is led by the Swedes (the conference organizers with a delegation of 25 from the government and various companies), British, and Koreans. OK, so why is the conference in America?!

The Americans, and more so, the San Jose city financial leaders, "decided" that they are leaders of the field. Why? Because California, in general, and the Silicon Valley, specifically, are the world leaders in innovation.

And what does this have to do with PRT?? Enter the American understanding that the world they built is about to change: gas has become a real problem and it's time to think of something new. So, to "leave a better world for their children", they use the potent buzz words of "Sustainable Transportation" or "Sustainable Communities".

During the 20th century Americans created a web of roads and airports that made America amazingly accessible. Now, for the 21st century, they need a new solution because they're about to run out of gas. Therefore, in order for society to become sustainable, society must change and the future has to be foreseeable (predictable).

Every relevant graph shows that America has a problem: CO_2 emissions are too high, there are too many miles, the road system will not be able to grow, and so on.

What are the solutions? First of all, **energy** must become renewable energy (sustainable). In other words, energy from the Sun (including bio fuels) or other "green energy" sources (wind, water, nuclear?!). The second thing to change is what most Americans like best: **their car**.

It has become apparent that during a lifetime, an American spends 25% of his income on transportation and its products; starting with the car (having an annual cost of $8000-$10000), flights, public transport, insurance accident funding, road systems funding (via taxation), GPS, radio systems, parking space, urban parking space, a large private parking space for two huge cars and so on and so forth...Moreover, 37% of air pollution in America is caused by cars (23% worldwide) with private cars responsible for 75%.

They have finally realized that a suitable technological solution **can** transport all the people (and more) anywhere, in less time, using less energy and it is green (does this remind you of something?).

All we have to do now is map out how to do it!

For example: http://faculty.washington.edu/jbs/itrans/VA-DOT%20PRT%20report-09.pdf

Currently the PRT concept is being tested for three markets:

- o Down town.
- o Airports that in fact have turned into small towns themselves: a huge area with thousands of employees.
- o Military cities, these are actually similar to large factories with morning incoming traffic and evening outgoing traffic.

PRT's main competition is the LRT or Light Rail Transportation. PRT is the overall winner: much more "green" (uses less energy) and much cheaper. For example, San Jose wants to solve the transportation problem between the "fast train" station, the airport and the city center. The LRT is-valued at $600 million while the PRT comes in at $200 million...

So what's the problem? The big problem is "the egg, the hen and the carrot", or in other words, there is no one to feed the carrot to the hen so the hen can lay the "golden egg". And for those who do not appreciate my metaphor, it is like any new technology: the problem is finding initial funding. No one is willing to risk their own money.

The financial backbone required to develop and demonstrate a primary system is $30 million, in addition to an organization willing to "take a risk" with a robot driver (surely not in California, where any small difficulty becomes a billion dollar damage suit…).

Unlike other public transport systems, the government does not know how to approach a pilot project having a large potential risk. Therefore, the prevailing opinion is to obtain financial funding that integrates government backing (similar to the Knesset's guaranteed minimum income to Road 6), accompanied by the manufacturing company (meaning that the company will provide the equipment and payment will be dependent on project income).

If, for a moment, we leave America and return to the world, we see a world that is far less "spoiled" and public transport is much more common (up to 70% compared to 2%-5% in America). As previously stated, Sweden is the leader and the Swedish government is expected to end several years of research with a decision to establish PRT around Stockholm. Korea and Abu Dhabi have begun building their first system, as well.

Two additional places that are certainly on the edge of your tongue are India and China. China has a clear technological edge with the world's fastest magnetic levitating train (Shanghai MAGLEV train) and this year India began building the sixth subway in Mumbai (the first system was established in 1996 in Delhi). No one doubts that these countries will jump on the bandwagon and might even take the lead because they do not have the American transportation solutions. Exactly like their preference in skipping all the intermediate stages in the world of communications. One conference participant went so far as to say that "up to 500 years ago the Chinese were the world cultural leaders. For them, the fact that Europe and the United States took the lead is only temporary ...".

China and India also do not lack funds. But they, like America, are not keen to be the first. However, I have no doubt that as soon as the first system is deployed, Chinese deployment will be of an order of magnitude greater than the rest of the world.

- ==The San Jose conference and conference participants==:

Two years ago the financial leaders of San Jose, the third-largest city in California, (1,070,000 inhabitants, after Los Angeles and San Diego) and 10th largest in America, decided to publish an RFI (Request For Information) for a train system that would solve the urban transportation problem. There were 17 replies and it was obvious that PRT was the most economically attractive. But (alas) the technology was not yet ready. Therefore it was decided to get to the heart of the matter and convene all the sages of Earth along with the sages of Sweden and give the subject a "good going-over".

As proper with a new beehive (with a city treasury overflowing with $75 million, searching for a diploma-carrying train installer!), all the bees, flies and bears arrived, totaling 250 experts from the edges of the world and many visitors:

  o the **Swedes** sent a 25-man delegation of engineers, politicians, businessmen and even a scaled-down demo of a suspended PRT system (http://www.beamways.com/)

  o The **British** sent excellent marketing people representing ULTRA and BAA.

  o The **Americans** sent the best minds: engineers, planners, animation companies (that demonstrated a trip to Umpalla complete with new hotels and PRT vehicles traveling on a modern MAC machine), politicians (of all levels: municipal, state and governmental), bankers and analysts. Even a Google representative honored the event. He came to hear the competition to the Google car.

This is a good place to mention that the idea of an automatic train is not at all foreign to Americans. It was first raised in the late 1960s. Indeed, most people in this field were born in the 1940s and 1950s.

Really. I'm not kidding. I was the youngest participant, significantly younger than the median age. Most of them carry deep scars and say that financing for research stopped in 1974 after Nixon. http://www.advancedtransit.net/content/board-directors).

Even tiny Israel sent one crazy entrepreneur that mingled with the participants, trying to tell them that they were missing something...

Conference participants saw movies that described the existing systems. The presentations included all areas of interest: engineering, planning, control, software, financing, regulation and marketing.

One thing was missing: competition; no alternatives were presented. The entire conference was dedicated to the city leaders and project leaders, explaining that PRT is the correct solution and there is no sense in discussing anything else!

One interesting statement was made a by a 75 year old certified engineer who considered the systems presented at the conference to be an insult to engineering intelligence (these were his own words!!!). This is the result of "bending" technology to pre-historic regulation of "regular" trains. This regulation seems to reflect that someone is horrified by the concept that a computer would make more errors than a vehicle driver or a train engineer…

Why the "insult" to intelligence?

Well, when you examine the effectiveness of mass transport system, the most important aspect is cargo capability or Capacity. They call it "mass", right? But! If you require a system that is designed to carry one passenger (or two) and maintain a distance of 3 to 6 seconds between pods, you simply kill the system. Therefore we should aim for High Capacity PRT.

Another brilliant session was given by a transportation analyst who said that the cognitive change required by people (especially Americans) to choose to travel in a computerized carriage is closer than we realize. In contrast to us (and our fathers and grandfathers), our children are not so excited by a passing Lamborghini or Maserati. This might seem strange to us, but they really want to continue to play their iPod! In other words, there's a chance that the new generation will see transportation as a service for getting from one place to another, and not an object you long for or admire....

To sum up: I have to say that the conference was excellent, professional, organized and informative. For me it was academic.

Part Two – AutoMate and the American Dream

There is no doubt that America is the RIGHT place to be to make AutoMate happen It is perfectly clear why America is the land of unlimited possibilities. The market is infinite. There is an entrepreneurial environment that respects excellence. There is patience and tolerance. There is order, respect for others. There is no endless struggle for life and it's alright not to think only of peace and security. Both exist.

However, I think Americans are more than satisfied which means they will take less risk. On the other hand, the Green Buzz is really Green. They really want to keep society stable for the coming generations. So where does this put me?!

I really think there is no reason we can't develop transportation projects in "Silicone Wadi". Just like "Silicone Valley, the Israel's high tech industry can support all the necessary aspects for a new industry of automatic vehicles. Ultimately we are dealing with knowledge intensive (and not sweat intensive) based on command and control ("Elbit"), human interfaces (software) sensors ("Tower"), billing ("Amdocs") and communications (abundant…). All that's left is to convert the Aeronautical Engineering faculty (the "Lavie" is no longer) to Vehicle Engineering (just kidding, of course, but you get the point…)!

So at this stage I definitely see why quick marketing and sales visits to America is enough (at least for now…).

To wrap up:

1. If you do not want to be a subscriber, please email me again and will be immediately removed from the distribution list.

2. We are recruiting (!): linguistic editor and guest writers will be warmly welcomed. We promise satisfaction through doing. The financer has not appeared, yet.

3. We welcome all notes, enlightenment or questions.

4. In the future the bulletin will also be distributed in Hebrew (!).This is part of our strategy.

5. People will travel in computer controlled cars. This is only a matter of time.

6. If someone has an idea how to persuade the Government of Israel and the Dean of the Technion how to understand this, may they be blessed.

Have a good week.

Neta