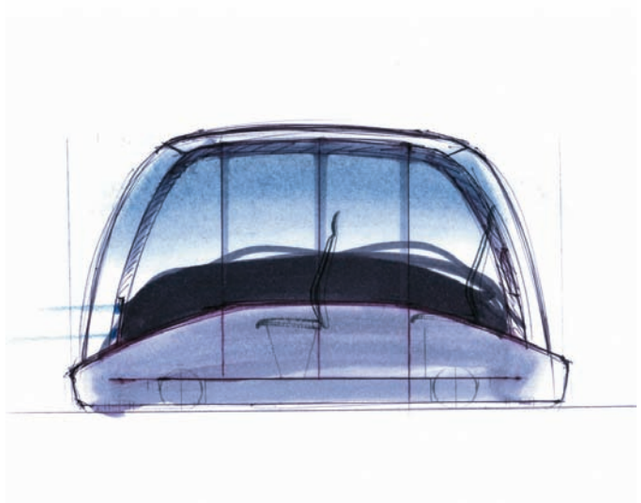
VECTUS
INTELLIGENT TRANSPORT

WELCOME TO A BRAVE NEW WORLD

“THE DRIVING FORCE BEHIND VECTUS IS TO CONTRIBUTE TO A RADICAL CHANGE IN THE FIELD OF TRANSPORT”



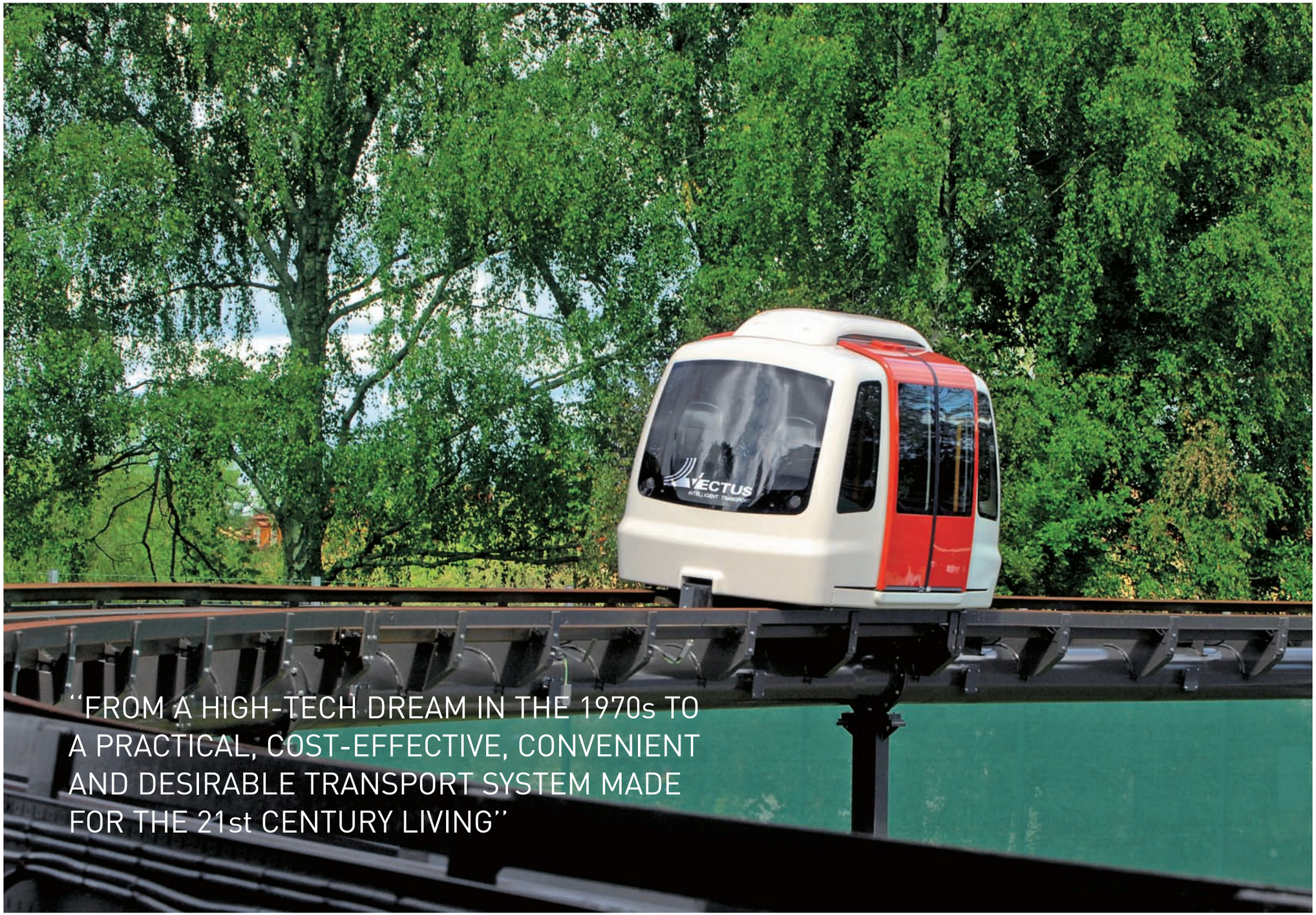
The Vectus vision

INVESTING IN A SUSTAINABLE PUBLIC TRANSPORTATION

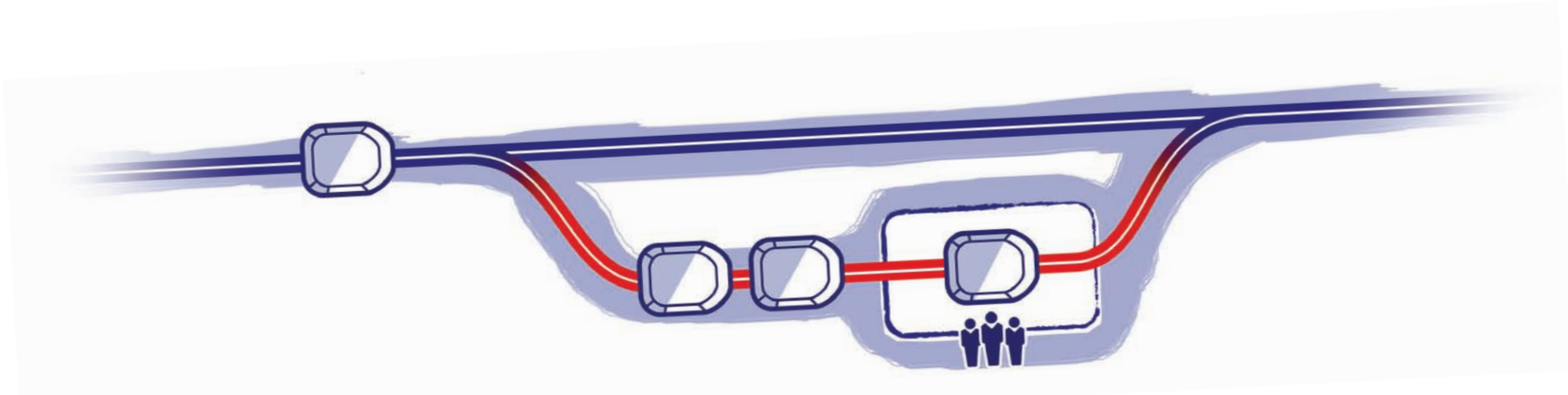
WHILE THE NEED FOR efficient and environmentally-friendly means of transport is constantly increasing, both personal and public, the quality and level of service is getting worse.

The driving force behind Vectus is to contribute to a radical change in the field of transport by providing PRT (Personal Rapid Transit). This personal and automated transit system can complement or even substitute conventional means of transportation, providing high levels of flexibility and comfort.

Vectus introduces a commercially successful PRT system combining advanced, established and proven technologies in novel ways, minimising the technical and commercial risks involved. Our uniquely designed solution will offer an enhanced urban transportation and improved lifestyle.



''FROM A HIGH-TECH DREAM IN THE 1970s TO A PRACTICAL, COST-EFFECTIVE, CONVENIENT AND DESIRABLE TRANSPORT SYSTEM MADE FOR THE 21st CENTURY LIVING''



The Vectus innovation

TAKING THE DREAM INTO A REALITY

THE BIRTH OF THE PRT concept can be traced back to the 1950s when research was first conducted into alternative public transportation methods – a new, innovative transport system using advanced, commercially-available automation to address the needs of urban transportation.

The 1970s witnessed considerable theoretical analysis of PRT, and how such a system would operate as a viable means of transit. However, the proposals were too advanced for the technology of the time and were considered too complex and expensive.

With today's advanced technology and the experience accrued over the last 30 years, together with the global imperative to pursue an eco-friendly, sustainable transport system, PRT has evolved from a high-tech dream in the 1970s into a practical, cost-effective, convenient and desirable transport system, custom made for the stringent demands of 21st century living.

What is PRT?

The Vectus PRT of today uses small, lightweight, driverless vehicles to carry individuals or small groups non-stop from the origin station to the destination station. Stations sit on the network of lightweight guideways.

Stations are off-line (located on the side track), meaning that vehicles are waiting for passengers at the station without blocking the traffic flow at the main track. This makes waiting times for passengers negligible and there are no intermediate stops during the entire journey, which reduces the user's total travel time.

Vehicles are personal and travel individually selected routes. The capacity of the PRT system is still substantial and comparable to any public transportation, thanks to the three seconds long intervals between the vehicles. Furthermore, since the system is operating on demand, energy is used only when there are transportation requests.

The Vectus advantage

THE COST-, TIME- AND ENERGY-EFFECTIVE TRANSPORT

SOLVING THE PRESSING TRANSPORT needs of a growing population is one of the biggest challenges facing governments worldwide. Land for building roads is a scarce resource and is often prohibitively expensive, and at peak hours many cities are already gridlocked with traffic congestion.

The capital and operating costs of extending conventional overground and underground rail networks are very high and invariably require subsidises; even then, building large rail stations and laying new track around existing infrastructure is sometimes impossible. Compounding these problems is the global obligation to reduce pollution by developing eco-friendly and sustainable forms of transport. PRT is the answer to all of these challenges.

More cost effective transport

PRT is more cost effective than traditional public transport – and it provides higher service level. The operating cost is lower because PRT is driverless and does not run according to any timetables. PRT system also uses lighter vehicles that require smaller guideways and stations, hence cheaper infrastructure cost.

Non-stop, on-demand service

Users of PRT will enjoy a range of benefits that were not possible before. For example, non-stop, on-demand service means that the total travel time is shorter than any conventional mass transit system. In addition, PRT users obtain higher levels of service in a private and secure vehicle. The great advantage in service level is evident especially at off-peak hours, when PRT still provides negligible waiting times 24/7 without an increase in cost.

A system accessible to everybody

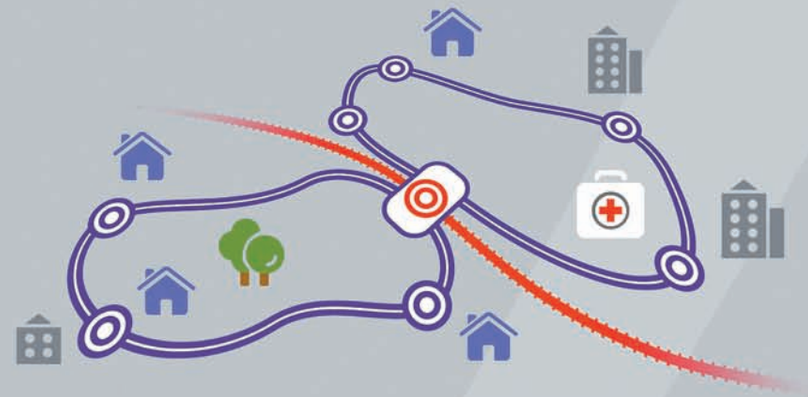
Many public transport systems are old and were designed without accessibility for the functionally disabled in mind. PRT systems, conversely, offer wheelchair access at every station, making the system accessible to everybody. In fact, PRT is inherently accessible in that the stations can be geographically well-spread and located more densely, allowing shorter distances to the nearest station. This is possible because the guideways are small and can be easily installed; the stations can be integrated inside or immediately adjacent to buildings, making travel direct and fast. To benefit from another unique quality of PRT, that it is a personalised system, an adequate proportion of vehicles can be specifically designed to accommodate not only carrying wheelchairs, but also groups suffering from rare conditions, e.g. very strong allergic reactions.

Environmentally attractive

Crucially, the environment is also a beneficiary with PRT. As motor vehicles are responsible for about 50 per cent of greenhouse gases and 26 per cent of the world's total energy consumption, encouraging people to use public transportation is a good thing. PRT, consisting of small, lightweight electric vehicles, will make public transportation a more attractive alternative to using your own car.

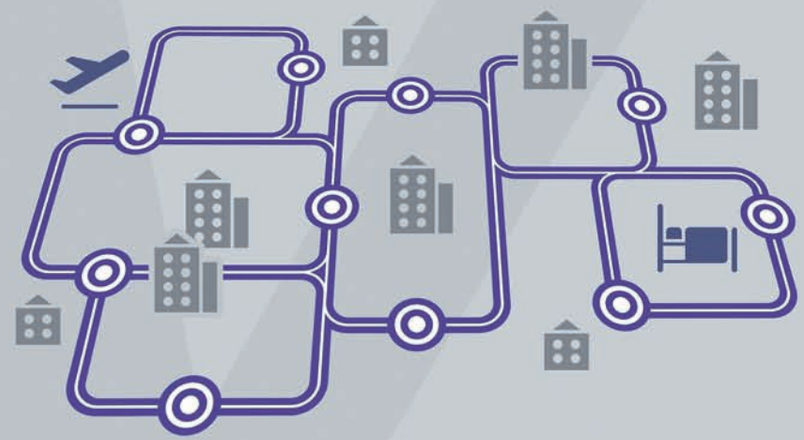
Potential applications

LOCAL CIRCULATION,
for travel in and
around urban village.



COLLECTOR/DISTRIBUTORS,
making it easier for people
from a wide area to get to
and from stations.

CITY-WIDE RAPID TRANSIT,
in which a number of
Local Circulators are linked
together to form a network.



The Vectus concept

THE FLEXIBLE TRANSPORT SOLUTION

THE DESIGN FLEXIBILITY of PRT has immediate advantages for town and city planners. Small, off-line stations that are relatively inexpensive can be densely positioned without slowing down the service, in contrast to conventional rail transit with large vehicles that stop at every station. Moreover, each station can be sized to local demand in terms of the number of berths and extra station lines.

With PRT, city planning does not need to be constrained by linear designs when planning a network that covers vast areas, rather than specific corridors. This is great news for city planners faced with areas where buildings are not conveniently lined up in a row. Instead of forcing developments to fit in around a transport system, PRT can be made to fit in around new developments. Indeed, its small guideways and stations can actually be constructed inside building lobbies.

Application sites

PRT can be used in towns and cities in a variety of applications, and can play a central role in developing an area into a thriving and vibrant location for its inhabitants and workers. Areas with a high demand for local transit, at off- and on-peak-hours, are ideal for PRT – university campuses, large shopping areas, large hospital areas, theme parks, airports, etc. PRT can also be used to complement traditional public transport. For example, it can be used to connect areas and neighbourhoods that are currently not served by existing public transport to large bus and rail terminals.

Passengers' perspective

People invariably use private vehicles in areas where public transport is inefficient, inconvenient or both, the unwelcome by-product being heavy congestion and even gridlock at peak travel times. PRT is a great alternative because it is efficient and convenient; always providing good service with low waiting time, and it is also eco-friendly. It can be used to transport users from a town or city centre to out-of-town car parks, minimising altogether the need for people to drive in to town or city centres. PRT will also be popular in areas that have limited or expensive parking charges.

Increase of property value

Furthermore, an area that is served by an easily-accessible, reliable transport system that provides excellent commuting opportunities is a more desirable place to live. This is excellent news for the residents of any region that implements a PRT system, as the value of property will rise.

The Vectus solution

A POWERFUL SYSTEM THAT MEETS SPECIFIC CUSTOMER NEEDS

VECTUS SELECTS AND ADAPTS the technology and method appropriate to the specific application: the capacity requirements for the system, the local environmental conditions and the specific customer needs. For example, a high volume of vehicles operating at very short headways (the amount of time between two vehicles passing the same point) can be best run and controlled with a propulsion system using linear induction motors (LIM). It is independent of the friction between wheels and the track, which is especially beneficial in arctic climate conditions when snow and ice can make for slippery conditions. It is also very quiet. With a less dense system, not so many vehicles or with longer sections of track, it can be more economical to utilize other types with drive systems.

Vectus uses a unique control concept based on asynchronous and distributed control system. It is independent of the propulsion system used. Each vehicle is individually controlled and adjusts the speed, and on the basis of the speed, also the required distance to the vehicle in front, to give the best possible traffic flow. At higher traffic flows this gives a significantly higher throughput compared to synchronous control and fixed block systems.

Design features

Essentially, Vectus PRT vehicles are flexible in design, allowing them to blend in to any urban environment.

Vehicles are minimalistic and aerodynamic in design, and have been designed with maximum comfort in mind. Each vehicle features automatic doors on each side, comfortable seats, HVAC (Heating, Ventilation, and Air Conditioning) and a passenger information and entertainment system; while glass window panes offer excellent scenic views.

In addition, the vehicles as well as the station have been designed to accommodate the requirements of functionally disabled passengers and wheelchair users in terms of special design solutions, colour codes and signs for maximal clarity and simplicity. All the buttons are illuminated and have raised tactile symbols, and are of course within the reach of a person in a wheelchair, and both audio instruction and information display will be available at the station and in the vehicles.

The Vectus knowledge

DEMONSTRATING THE FULL POTENTIAL OF PRT

THE FULL-SCALE PRT Test Track-project started in spring 2006, in Sweden. The location was chosen because the geographical region provides a challenging winter climate, where the temperature fluctuates around freezing point. A climate which is particularly challenging for advanced mechanical and electronic systems. The 400 metre long track was completed in November 2006 and overall system performance tests including vehicle running and control at stations is ongoing. The issue of safety is first priority for the entire project and includes the control system, propulsion system, brakes, doors and all other functions within the Vectus system.

Safety approval process

Crucial to the commercialisation of PRT is the approval of appropriate regulators and Vectus has applied in steps for safety approvals from the Swedish Rail Agency (SRA), so far successfully. The approval process is in full compliance with Swedish railway regulations and requirements, based on international and European standards. The safety work is based on the international standard IEC 61508.

Test and verification

Vectus will also demonstrate the full potential of PRT by running several vehicles on the test track. Tests include verification of core functions, such as switching techniques, shortest distance between vehicles, merging and station operation. Vectus is planning to continue the test activities in order to ensure the reliability and availability of the system, and demonstrate the quality aspects for passengers, all in order to provide the customer with proven system components and concepts at a lower overall cost than conventional alternatives both in investment cost and the cost of ownership.

SHORT FACTS ABOUT VECTUS PRT

Vectus PRT – General Data

- No intermediate stops
- Private, 1 to 4 person vehicle, no need to share
- Available 24 hours, 7 days a week
- No timetables, no waiting times
- On demand, waiting vehicles consume no energy
- All-electric transportation, not dependent on fossil fuels
- Fully computerized and monitored
- Quiet, secure and safe
- Carries wheelchairs, bicycles, baggage and groceries
- Special vehicles can be made to meet individual needs, e.g. groups with disabilities
- Elevated above the road traffic, at ground, or underground
- Provides substantial capacity (line capacity up to 5000 passenger per hour), by running the vehicles at short intervals, while using minimal space
- Covers vast areas rather than corridors, shorter distance to nearest station
- Total annual costs much lower than conventional alternatives
- Short implementation time
- Easy expansion with minimum disruption
- Flexible planning and investment

Vectus PRT – Test Track System Data

Guideway
- Open steel beam with overhead rails, where vehicle runs above
- Light steel structure
- Modular design – simple to install and to modify

Station
- Small and flexible. Inexpensive.
- Audio instructions for the visually impaired
- Information display for the hearing impaired

Vehicle
- Length: 3 500 mm. Width: 1 900 mm. Height: 2 240 mm
- Dual bi-parting doors (Width: 1 100 mm)
- 4 individual and comfortable seats
- Dual 7" LCD display, loudspeaker, individual LED reading lights, heating and air-condition
- Wheelchair seats/wheelchair accommodation available
- Fire- and graffiti-resistant cabin shell made of light weight, pre-preg phenolic GRP
- Laminated glazing tinted with solar control interlayer

Propulsion
- Linear induction motors in track
- Maximum speed: 45 km/h
- Maximum acceleration: 2 m/s^2

Braking
- LIM braking and permanent magnet station braking
- On-board electro-hydraulic emergency brake
- Maximum retardation: 5 m/s^2

Control System
- Wayside: Proprietary asynchronous distributed control system
- Vehicle Control: Interactive vehicle-wayside control system
- Communication: Multiple wireless communication

VECTUS LTD. SWEDEN OFFICE
HUSARGATAN 2, 752 37 UPPSALA, SWEDEN
PHONE: +46-18-55 80 70
E-MAIL: WEBMASTER@VECTUSPRT.COM
WWW.VECTUSPRT.SE

VECTUS LTD. KOREA OFFICE
SINAN BLDG., 89-8 MOONJEONG-DONG, SONGPA-GU, SEOUL, 138-200 KOREA
PHONE: +82-2-431 6128
FAX: +82-2-431 6067
E-MAIL: WEBMASTER@VECTUSPRT.COM
WWW.VECTUSPRT.COM

PRODUCTION: VECTUS LTD **AGENCIES:** FIREFLY COMMUNICATIONS AB AND SOFT REKLAMBYRÅ **PHOTO:** ANNA HÅLLAMS **COVER PHOTO:** URBAN HEDLUND/JOHNÉR