TriTrans

– a complete information system for efficient and attractive public transportation

TriTrans

IVIS

vehicle system

RAPP

program for analyzing run-time data

VEMOS

traffic control system

INTRAINFO

bus stop system

RASC

signal priority system

DARS

radio system for data communication

TriTrans

– a complete information system for efficient and attractive public transportation

TriTrans is a module-based information system for public transportation (bus, tram, light rail, underground or commuter train). The system operates in real time and serves all parties involved – traffic planners, dispatchers, drivers and passengers. Each party receives the information needed to create and maintain a well-functioning and attractive public transportation system.

How it works

A computer that collects data from a variety of sources (odometer, GPS, etc.) is installed in each vehicle.

The data can be used to control visual displays of information and automatic-voice announcements in the vehicle. The data is also transmitted to a central system that processes it, compares the vehicle's location with that in the schedule, providing times of departure and arrival in real time. All information of importance is presented to the parties concerned. Examples:

- **Traffic controllers** are provided information on vehicles' deviations from schedule. The system helps traffic controllers plan traffic when deviations from schedule occur and enables them to communicate with drivers.
- **Waiting passengers** are given the information they need – in real-time – by means of visual display and voice announcements. The information can also be made available on Internet.
- **Passengers in vehicles** are informed by visual display and voice announcements of the stops or stations coming up.
- **Drivers** are given a greater sense of security. They experience less stress, are freed of various tasks, can communicate readily with traffic control, and have a highly advanced alarm function at their disposal.

All a driver needs to do is to log in when starting off on a route and register the start of each trip. Pressing two buttons suffices. TriTrans takes care of the rest.

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DARS, a radio system for transmitting data

The radio system connects the different TriTrans units. Its functions are as follows:

- Maintaining information-system contact between each vehicle and the central system or traffic control.
- Reporting the status of a vehicle and deviations from the time schedule.
- Sending text messages between traffic control and separate vehicles.
- Sending an alarm from a vehicle and information regarding its position in case of emergency.

VEMOS, a traffic control system

VEMOS (Vehicle Monitoring System) is an easy-to-grasp traffic control system that does the following:

- provides information on the geographical position of each vehicle in operation.
- shows deviations from the timetable for all vehicles in operation.
- reports any malfunctions that occur in vehicles
- sends an alarm in case of emergency.

In addition, the system sends messages between drivers and the traffic control unit. A matter of special interest is coordinating the transfer of passengers from one route to another. A vehicle at a stop where passengers from another route can board receives a message from the vehicle's computer indicating when it is allowed to depart.

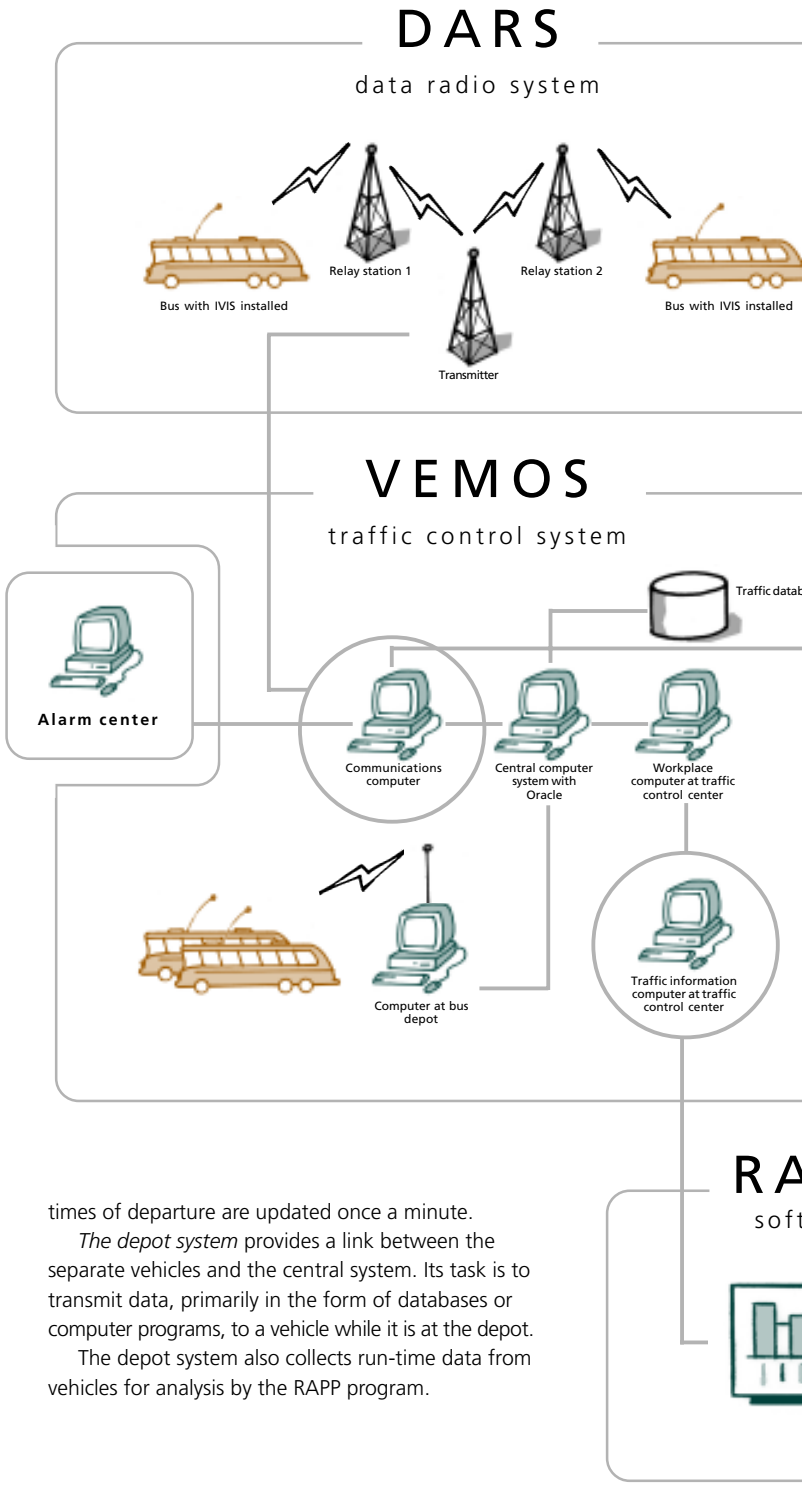
The traffic control system can be coupled in such a way that information transmitted within the system can also be sent elsewhere, such as to a public transportation company or an SOS unit.

VEMOS' major parts are a computer for communications within the overall system, and two component systems – a central system and a depot system – for handling data of various types.

The central system collects information and coordinates the constant flow of it – such as the time of day, timetables, departure times and additional traffic information – distributing it to other parts of the TriTrans system. The estimated times of departure are updated once a minute.

The depot system provides a link between the separate vehicles and the central system. Its task is to transmit data, primarily in the form of databases or computer programs, to a vehicle while it is at the depot.

The depot system also collects run-time data from vehicles for analysis by the RAPP program.



To learn more about the different TriTrans systems and the uses to which they can be put, visit our website – www.trivector.com. Along with descriptions of the systems themselves, information is available there on where they have been installed.

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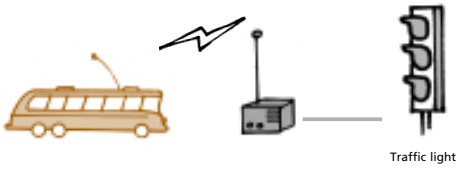
RASC

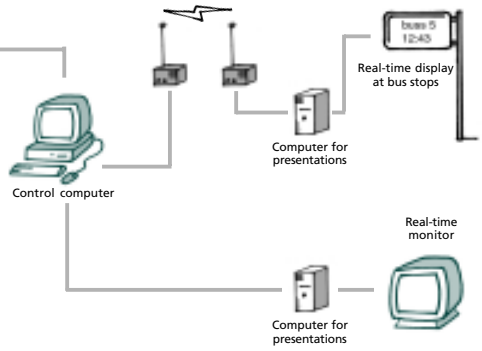
signal priority system



RASC, a signal priority system
RASC (Radio Signal Control) is a separate system for giving priority to buses at selected intersections where there are traffic lights.

INTRAINFO

bus stop system



INTRAINFO, a bus stop system
IntraInfo presents information to waiting passengers at terminals and at stops for buses and other public transportation vehicles. Timetable information is complemented by real-time information so that passengers can be informed of actual departure times. The information provided is based on reports of where vehicles are currently located.

The information is presented by visual displays and by voice announcements, a wide variety of types being available.

APP

tware

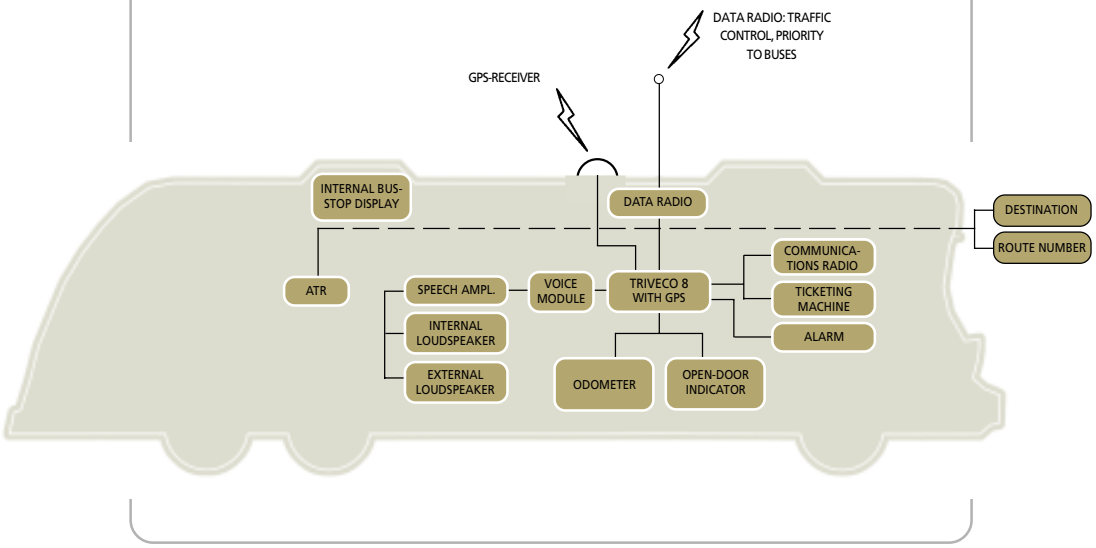
RAPP, a program for analyzing run-time data
RAPP – Route Analysis Program Package – is a separate program that analyzes, compiles and presents trip-route and trip-time data, along with distances covered, periods the doors of the vehicle are open, periods the vehicle is standing at a stop, numbers of passengers getting on and off, etc.
In Sweden, RAPP has saved public transportation systems large sums of money and done much to give drivers a better working environment.

A flexible solution

The modular construction of TriTrans makes the system highly flexible. Separate parts of the systems described can be selected and assembled in the way most suitable for the uses to which they are to be put. They can also be combined and integrated with other types of components, such as to enable the ticketing machine to adjust the price automatically for a change of zones.

IVIS

system for buses or other public transportation vehicles



IVIS, vehicle system

IVIS (In-Vehicle Information System) is installed in each vehicle. It makes use of the vehicle computer Triveco 8, which provides the driver an interface to all the other component systems of TriTrans and to the following functions:

- Displays within the vehicle that inform passengers of the stop coming up and of how long getting there will take.
- Displays on the outside of the vehicle that indicate the route and the destination.
- A voice module for announcements to persons either inside or outside the vehicle.
- A GPS receiver that determines the geographic location of the vehicle.
- A radio modem for transmission of data between the vehicle and other parts of the system.

The system performs the following tasks:

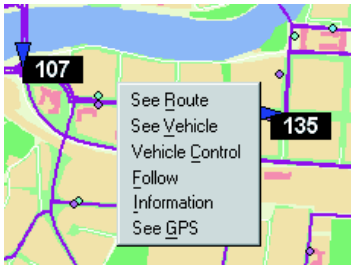
- Directs information to displays that indicate to passengers inside the vehicle the route involved, the destination, and the stop coming up, and to provide them voice announcements of the destination and of the next stop.
- Allows communication between the vehicle and the central system to take place, and enables the driver to send text messages to traffic controllers and receive text messages from them.
- Sends an alarm in case of emergency. The driver can trigger an alarm to the traffic control unit, to an SOS receiver or to some other operator, all of them able to locate the vehicle and follow its course on a monitor.
- Controls the status of visual displays, public address systems and the like to determine whether they are functioning properly.
- Gives priority to the vehicle at crossings with traffic lights.
- Collects and stores run-time data, including information on numbers of passengers (using an APC: automatic passenger counter). The data collected is transmitted to RAPP.

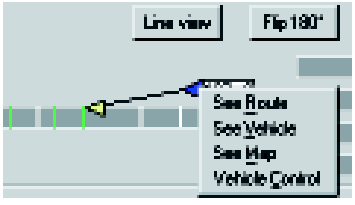
Vehicle computer

Each vehicle is outfitted with its own computer, which plays a key role in the functioning of the system as a whole. Triveco 8, the computer installed here, is Sweden's most modern vehicle computer. It is being perfected and improved continually and uses the newest hardware available.

Easy and straightforward to use

The simple interface of VEMOS makes the TriTrans system easy to use and provides access to a large number of different functions that allow tasks to be performed quickly and reliably. The graphic presentations enable the situation at hand to be readily grasped. Special pop-up menus also make it easy to shift from one figure or table to another.





Quick-selection functions
Each table or figure has pop-up menus enabling the user to make quick selections of displays. Through clicking on a particular object – such as a bus or a bus stop – one can gain access to detailed information about it or go directly from there to some other display.

A table showing the different trips to be made
The upper part of the table indicates, for the day in question, all the trips that are to be made. This information can be sorted and arranged in terms of times of departure, route or trip. A particular trip, or a number of selected trips, can also be displayed.

Times are shown both according to the timetable and in real-time, the latter indicating more exactly the actual times of departure.

In the lower part of the table, the various stops and departure times are shown for a particular trip.

A table for one or more stops
Selecting the table for a particular stop allows one to see all the departures to be made there. It is also possible to sort the information available in terms of the names or numbers of different stops, to look at a whole route or to look at only a single stop on the route.

A table also provides information on:

- when a vehicle should have reached a particular stop and when it actually reached it
- the stops the vehicle will actually stop at and those it will pass by
- which vehicle will make a particular trip
- unified departure times when buses in a rendezvous-system are delayed.

A map
The map shown at the right indicates the position of different vehicles and stops. It also shows whether a vehicle is late. In addition, one can follow the course of one or more vehicles and receive information on the GPS position of each.

Buses appear on the map as arrows of different colors. The color indicates to what extent a bus is on schedule.

It is easy to zoom in on different parts of a map to examine them in detail. A map can also be scrolled in different directions.

A chart of an individual bus route
A bus-route chart shows a particular bus route and the various buses that are in service there. The current position of each bus is indicated, along with where it should be according to the timetable.

The scheduled position of a bus is shown by a small arrow, and the actual position by a small square. The color of the arrow and of the square reveal where the bus stands in relation to the time schedule.

A multiple bus-route chart
This chart provides the same type of information as the chart of an individual bus route, but allows the buses on several different routes to be followed at the same time. The selection of routes involved can be changed quickly.

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TriTrans was created by **Trivector System AB** – a company that develops and markets systems for traffic informatics. These are hard- and software systems that collect, process and present different types of traffic information with the aim of creating a more efficient and attractive traffic system.

Trivector System AB is a member of the Trivector Group together with three other companies:

Trivector Traffic AB is a company concerned with traffic problems. It does consultancy, research and development work aimed at creating an efficient and environmentally friendly traffic system. Its specialties are public transportation, traffic safety, traffic planning and mobility management.

Trivector Logiq AB provides consultancy within the area of process-based business development. It has both private industrial companies and governmental organizations as customers.

Trivector Information AB is concerned with effective communication. It investigates an organization's communication needs and uses the insights gained to develop strategies for more effective flow of information, helping also to implement the strategies it recommends.