



APPLICATION NOTES FOR SATEL RADIO MODEMS

Municipal Police Station in Gdansk:

SATELLINE-3AS EPIC in the municipal system of spatial information

A Municipal System of Spatial Information is being developed in Gdansk. It is to become a basis for the operations of the Municipal Rescue Services and Municipal Transport Management System. The project is based on the Global Positioning System (GPS) co-operating with a network of SATELLINE-3AS EPIC.

In 2000, a network of GPS reference stations was installed in the Gdansk conurbation, within the framework of a special project financed by the national committee for scientific research (KBN). The principal entity involved was Warmińsko-Mazurski University in Olsztyn.

Many institutions are interested in the implementation and practical utilisation of the system, among them: the police, fire brigades, health services, transport, municipal services, land-surveying companies, Marine Board, Marine Institute and the Technical University in Gdansk.

The GPS reference stations were installed in the Centres of Land-Surveying and Cartographic Documentation of the Gdansk conurbation, in order to create the conditions indispensable for a precise geographical identification of the positions of sites, vehicles and ships in real time, and to provide technical conditions for precise satellite-based navigation on land and sea. Permanent

reference stations located on the ground transmit continuous radio messages, generally accessible, in the international standard RTCM 104 v.2.1, containing differential* adjustments and measurement data.

Such messages are available to any user having at his disposal a land-survey or navigation receiver. The above procedure increases hundredfold the accuracy of online satellite-based positioning, including:

- precise 3D positioning of moving and stationary objects;
- determining the parameters of the object's movement, such as speed and direction, and the height of the object's antenna above sea level;

- measuring the distance to designated interim points of the ultimate itinerary of the object

The reference station operated by the Centre of Land-Surveying and Cartographic Documentation in Gdansk provided several new opportunities, particularly in respect to:

- acquiring field data for the creation and updating of digital maps and bases containing descriptive data
- providing data required for land navigation and vehicle monitoring
- ensuring adequate security of the navigation
- optimising the urban traffic and transport, facilitating the movements of handicapped persons.

Pilot project of vehicle monitoring

Thanks to the perseverance of the city authorities, as a result of the above projects, in the early 2001 it was possible to implement a pilot project of monitoring, comprising 20 police vehicles. The exact location of the vehicles is determined using the DGPS technique. Each of the police cars is equipped with a SATELLINE-3AS EPIC radio modem with antenna. With this arrangement, it is possible to receive differential adjustments and

sending data about the location and condition of the vehicle to the monitoring centre.

The data are transmitted to all the cars at the same time, using wireless transmission, from the reference station in Gdansk. It transmits generally accessible radio messages continuously, in intervals of

1 second. Depending on the number of satellites seen by the vehicles and of their positioning in the sky, the software in the DGPS decides on the extent and manner in which the differential adjustments are to be used for the calculation of the current position

In the event the reference station supplies no data, the navigation is based directly on the GPS signal.

In the Monitoring Centre, the vehicles can be visualised



Monitoring centre at the Municipal Police Station in Gdansk

on a digital map developed by the Municipality of Gdansk. The Tracking Analyst software ensures the transfer of the positioning data received via the SATELLINE modem to the system ARC/INFO-Arc/View-ArcExplorer, selected for the development of the Spatial Information System for the Municipality of Gdansk.

The Tracking Analyst visualisation software offers the following possibilities:

- simultaneous monitoring of a fleet of many vehicles, with individual identification on a digital map
- receiving alarm signals coming from the cars
- transmission of directives
- creating and archiving databases pertaining to the monitored vehicles

Enhancing urban transport management

The system can be extended for an unlimited number of vehicles. Its functionality is to be enhanced, in particular with respect to the registration of road incidents, connection to the Municipal Centre of Rescue Alarm in Gdansk, and meeting the requirements of various municipal services.

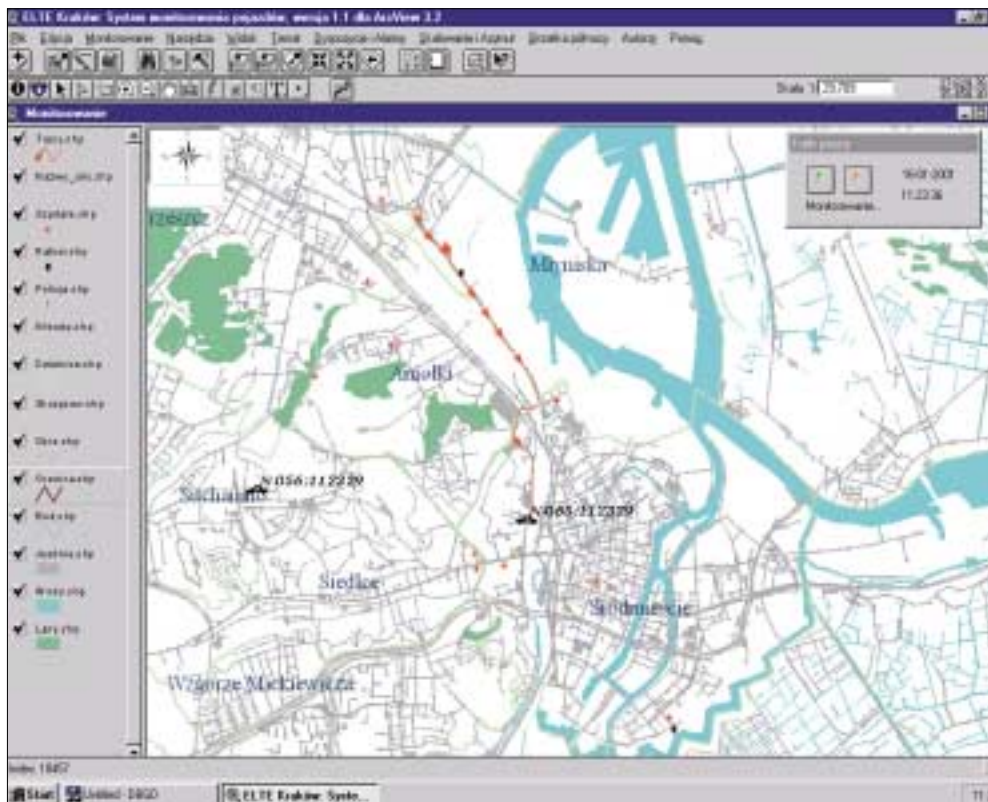
The main purpose of the Urban Transport Management System is to achieve a trouble-free passage of the urban transport vehicles through the city, moni-

ring the compliance with timetables, ensuring wireless communication with all the vehicles and online collecting and processing of traffic-related data.

In the future, a web site will be opened, where the inhabitants of Gdansk will be able to access most of the data generated by the system of monitoring the urban transport vehicles. They will get information about public transport timetables and traffic conditions in specific areas, for selected tramway and bus lines.

On the basis of the experience to date, it is clear that the installation of the reference station in the Centre of Land-Surveying and Cartographic Documentation in Gdansk has contributed significantly to a better work of the land-surveying services, making also a positive influence on the development of systems of municipal rescue and monitoring of incidents, and facilitating the development of a spatial information system. The above actions affect the taxpayer directly, enhancing his safety and improving the overall efficiency of the information services of the Municipality of Gdansk.

Bogumił Koczot, Wiesław Patrzek
Municipality of Gdansk
ul. Nowe Ogrody 8/12, 80-803 Gdansk,
www.gdansk.gda.pl



Monitoring the itinerary of a police patrol - an example



Manufacturer:

Satel Oy, Meriniitynkatu 17, P.O.Box 142, FIN-24101 Salo
Tel. +358 02 777 7800, fax +358 02 777 7810, E-mail info@satel.fi
www.satel.fi