Special edition
Intelligent Transportation Systems

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FIMA

For those who follow the trends in intelligent engineering solutions

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Integrated ITS systems for **road infrastructure development**

The transport sector in member states of the European Union is continuing to grow rapidly. Ever-increasing flows of both passenger and freight transport along with the population's increasing mobility mean that new tools are needed urgently to **satisfy demands for mobility, reduce traffic jams and air pollution, improve road safety and control and the quality of public transport services without having to expand the road infrastructure itself.**

R. Šlekys: "When it comes to the implementation of hi-tech ITS measures, then video analysis that allows for both automatic and remote control of traffic will become increasingly significant."

When dealing with these challenges, the use of Intelligent Transportation Systems (ITS) based on the latest technologies has become a priority. ITS plays an important role in European transport strategy while the installation of innovative technologies is also a priority when it comes to the development strategy for the Lithuanian transport system. In the interview, the Director of Solutions Department of the leading ITS implementer in the Baltic Region Fima, Rokas Šlekys talks about advanced solutions, their application and trends of their development.

> *"A solution that has proven successful abroad can't be simply "copied and pasted" into Lithuania. Solutions that work in one country does not necessarily work in another. Our traffic flows are different, our transport system is organised differently, national legislation is different and, finally, the driving culture is different. There is a number of considerations that need to be taken into account when implementing an ITS solution and adapting it to the specific needs of a particular situation. These, coupled with the improvement of management algorithms, represent our key tasks.*

How much progress the Baltic States, including Lithuania, are making with the introduction of ITS solutions?

When it comes to comparing the Baltic states, I would consider Lithuania to be the leader because it is the most advanced in this field and continues to move in the right direction.

A very good example of purpose-oriented development is the traffic information system that our company implemented in Lithuania. An ever-growing

number of road-based electronic infrastructure devices are gradually being integrated into this system. Prior to this work, these devices all operated individually and, monitoring or controlling them centrally was not possible. The road weather stations network is a good example: In the past, data collected by these stations was not transmitted into a single database and access to them was difficult. At present, we have nearly 100 stations which collect data on weather and road conditions and this is then transmitted to a signal point – the Traffic Information Centre. The centre automatically receives data not only from road weather stations, but also from more than 100 video cameras as well as receiving information about traffic flows. Information about parts of the road network that are under reconstruction, road works or car accidents is now available in a single format from in one place. All this information is available to road maintenance services and drivers planning their journey.

Once the traffic information system installation project was implemented, it provided a firm basis for the further development of road infrastructure information and management and its functionality can be further extended easily. For example, video surveillance systems with intelligent video analysis functions could be integrated into a single system and could then serve as a tool for the automatic identification of traffic offenders as well as in the search for stolen vehicles etc.

Could a more active implementation of ITS help with some of the most urgent problems in the transport sector?

Two issues that face us today are the most urgent: road safety and the weighing and taxation of heavy goods vehicles. These are the main problems facing Lithuania when it comes to road transport and ITS solutions are the most actively searched for in these fields.

Speeding represents one of the biggest road safety problems. There are a number and a wide range of measures available in the fight against it. These include mechanical engineering solutions, such as roundabouts or speed bumps to force drivers to slow down. But drivers and residents often object to these measures because of the noise they cause in residential areas, the disruption to traffic flows and the potential damage to vehicles.

Road infrastructure experts are continuously analysing the effect of both preventive and punitive anti-speed measures. However, drivers gradually become used to them, adapt and find ways to avoid them. Therefore, new solutions are needed to combat these.

What is the advantage of ITS over conventional traffic control solutions?

Electronic engineering solutions do not interfere with drivers and do not cause any additional problems. So those drivers who observe traffic rules have absolutely nothing to worry about.

"We focus a great deal of our attention on ITS solutions and have made a significant investment in developing our staff's expertise in this area. Today, we boast a particularly strong ITS team: from project managers to expert engineers who can design and implement ITS systems of the highest complexity.

Take for example an electronic traffic sign displaying the speed of a moving vehicle near a pedestrian crossing. Such a sign is both informative and eye-catching enough to attract the attention of a speeding driver. Regular speeders are also caught by fixed speed cameras but there is a far more effective and comprehensive ITS solution on the market – average speed enforcement. When measuring average speed across a specific road section, it is far more likely that a driver will obey a speed limit rather than accelerate immediately he or she has passed the camera, something that is usually the case when a driver passes a traditional speed camera. The introduction of average speed measuring means that speeding drivers are successfully reined in on both short and long road sections.

In the places with an increased risk of accidents – for example at pedestrian crossings or near schools – traffic lights can be put up and these would automatically turn to red if a camera detects the approach of a speeding car. There are a number of inexpensive but effective IT solutions when it comes to road safety.

FIMA is the leader in Lithuania for the implementation of intelligent road infrastructure and specialists from your company have been involved in the country's largest ITS projects. How did you manage to consolidate your market position?

We have been active on the ITS market for five years now and we have been involved in various ITS projects which have been implemented in cities and on strategically-important roads. We have an excellent reputation in Lithuania because we have a deep and profound knowledge of ITS technologies and can offer a wide range of solutions. Our extensive solutions portfolio encompasses systems from traffic guidance in car parks right the way up to sophisticated traffic information centres. Our solutions are relevant for the business sector as well and we have implemented car parking solutions for a number of private companies including in shopping centres.

We focus a great deal of our attention on ITS solutions and have made a significant investment in developing our staff's expertise in this area. Today, we boast a particularly strong ITS team: from project managers to expert engineers who can design and implement ITS systems of the highest complexity. A solution that has proven successful abroad can't be simply "copied and pasted" into Lithuania. Something that works in one country does not necessarily work in another. Our traffic flows are different, our transport system is organised differently, national legislation is different and, crucially, the driving culture is different. There are a number of considerations that need to be taken into account when implementing an ITS solution and adapting it to the specific needs of a particular situation. These, coupled with the improvement of management algorithms, represent our key tasks.

New preventive measures on the roads are needed because people gradually get used to existing solutions, adapt to them and find ways to avoid them.

Our experience of ITS implementation in Lithuania has also proven to be of interest in neighbouring countries. FIMA has successfully exported ITS implementation services to Belarus, where we are currently implementing several intersections' modernisation projects in Minsk. We also have plans to offer our services to other countries in the Baltic Region.

What ITS development trends do you foresee and what will be the future direction of ITS solutions implemented in cities?

In the future, the implementation of ITS solutions will be more integrated and link not only cities but also countries. The transport sectors of different countries encounter similar problems and they are of the same importance in all European countries. Transport is one of the driving forces of the European economy, adding about 5 per cent of GDP every year and the EU is actively promoting the sector's growth. The European Commission has implemented the development of a common e-call system throughout the EU as well as common rules over heavy goods vehicles and a common passenger information system. The EU plans to assign significant funds to develop intelligent means of transport and the Baltic States could benefit from this as part of efforts to tackle their own transport sector issues.

The demand for common ITS systems is huge and demands for their implementation are getting louder. In the future, e-ticketing systems covering, say, individual cities like Vilnius, Kaunas or Druskininkai will become obsolete and will be replaced with common EU intermodal passenger information and e-ticketing systems which will allow travellers to choose and plan a route and to order a single ticket for the entire journey across several countries, even allowing them to use different means of public transport.

A road toll system for commercial vehicles should also be unified across Europe in the future when the individual systems of EU countries are integrated.

Cities should also be more active in implementing ITS solutions tailored to public transport including those that prioritise public transport, plan passenger flows, optimise route planning and passenger information systems as part of efforts to reduce city traffic jams and carbon dioxide emissions.

Meanwhile, when it comes to the implementation of hi-tech ITS measures, video analysis, that allows for both automatic and remote traffic control, will become increasingly significant.

Safer traffic on roads will be guaranteed by average speed enforcement

Speeding is one of the most common road traffic violations on Lithuanian roads and one of the biggest causes of accidents that result in hundreds of deaths. According to Lithuanian research from a few years ago, 44 per cent of drivers in the country are guilty of speeding. **To combat speeding, the developers behind advanced transport systems now offer a system that measures the average speed of a vehicle on a particular section of road.**

According to Mr Babachinas, average speed enforcement is more effective than fixed speed cameras, because it eliminates the so-called "kangaroo effect".

The „kangaroo effect" is eliminated

Overseas research revealed that a 15 per cent speed reduction results in a 25 to 35 per cent drop in road accidents in which people are injured while the number of fatal road accidents drops by 40 to 50 per cent. These figures have been confirmed by data obtained from fixed speed cameras in Lithuania. Analysis has found that drivers slow down when approaching speed cameras and that this results in a 45 per cent fall in the number of accidents, a drop of 50 per cent in fatalities and a 46 per cent fall in the number of injuries.[1]

However, FIMA representative Marius Babachinas said that the control of average speeds is much more effective than fixed (spot) speed cameras, because they eliminate so-called „kangaroo effect".

He said: „Fixed speed cameras make speeding drivers reduce speed, but this effect is short-term. Having noticed a speed camera, a driver suddenly

1 – Feasibility study of intelligent (advanced) transport systems implementation in Lithuania. Within the framework of the Agreement 1F-121 of 26 July 2010 between the Ministry of Transport and Communication and PI konsultacijos UAB, Rapp Trans AG and Blue Bridge UAB acting on the basis of joint activity. 15 February 2011, Vilnius.

Fixed speed cameras make speeding drivers reduce their speed, but the effect is only brief.

slows down, and, after passing the camera, accelerates again. The section of effect is short, often just several hundred metres. When average speed measuring is put in place, it makes no sense to behave in this way and drivers are much more disciplined when it comes to adhering to the speed limit."

Stations of average speed enforcement are fitted with video cameras which have a function of number plate recognision. Having recorded the time of a vehicle entering and leaving the controlled section, the system calculates the vehicle's average speed and compares it with the actual speed limit.

For prevention and control

The strength of an average speed enforcement system lies in its ability to automatically de-

> *"With growing traffic flows and in an effort to make the best use of the traffic police's resources, the installation of average speed enforcement systems can prove to be cost-effective. Why waste resources on road patrols when this job can be done automatically?*

tect a speed violation without the need for human input. Having eliminated the human factor, the likelihood of a defendant claiming that some kind of error occurred or trying to find ways to negotiate and bribe the officers and, therefore, successfully avoiding a fine is reduced.

The system is able to record every vehicle that enters and leaves the controlled section and eliminates the possibility of a speeding driver passing through unnoticed. Mr Babachinas said that cameras are able to record the number plate of every vehicle passing through the section irrespective of traffic intensity and speed. The equipment manufacturers guarantee that cameras can record vehicles moving at extremely high speeds, even those travelling at more than 200 km/h.

Knowing that they can't get away with speeding because every incident is recorded and that there is no chance of avoiding punishment, drivers take fewer risks and are more inclined to obey road traffic regulations.

For city and rural roads

An average speed enforcement system is suitable for city, urban and rural roads with high accident rates and heavy traffic.

„When it comes to Lithuania, these systems should be installed on the main roads first, which suffer from the heaviest traffic and highest accident rates. That would mean installing them on the trans-national Via Baltica motorway and the cross country motorway that connects Vilnius, Kaunas and Klaipeda. Putting the system in black spots on less-intensively used roads would also be beneficial. Signs usually limit speed on such sections but experience has shown that they rarely solve traffic safety problems," said Mr Babachinas.

> *"Average speed enforcement systems should first be installed on the main roads, which suffer from the heaviest traffic and highest accident rates.*

FIMA's representative emphasised that the system does not need to be installed on an entire road. It is usually enough to place it on the sections with the highest accident rates, for instance on transit roads or near pedestrian crossings or schools.

Additional functions

The functionality of a speed enforcement system can be further expanded by linking it to a wide range of databases. For example, a system can check in real time whether vehicles in the section are insured, have valid technical inspection documents or have been reported stolen.

In cities, video cameras can record offenders driving through red lights, using lanes designated for special or public transport or driving on the wrong side of the road etc.

In the constant drive to improve safety, speed measurement devices can be integrated with traffic lights in areas where the highest safety measures are needed – near schools, for example. If a video camera placed in front of a traffic light detects an approaching vehicle which is speeding, the light could be automatically changed to red.

Useful solution

With growing traffic flows and in an effort to make the best use of traffic police resources, the installation of average speed measurement systems can even prove to be cost-effective. The more that automatic traffic control systems are used – particularly ones like average speed enforcement systems – the more that police are able to divert resources to other important safety work like tackling drunk driving.

Operating principle

- Average speed enforcement technology is based on the principle of identifying a vehicle at two control points. Depending on the landscape and entry roads, vehicle recognition equipment is placed at a distance of two to five kilometres between them.
- Video cameras record the number plates of vehicles along with the times of their entry and exit from the section. Because the system knows the exact length of the section, it can accurately calculate the average speed of a vehicle and compare it with the speed limit.
- If the section was crossed faster than is possible while adhering to the limit, then a road traffic offence is recorded.
- Since both the time and distance travelled are calculated with high degree of precision, the margin of error of a sector speed measurement system is very small (less than 0.5 per cent or 0.5 km/h).

Example - Czech Republic

- The Czech Republic was among the first countries to successfully implement intelligent transport systems.
- There are 50 sections around Prague, the capital city, where the average speed is measured and this is backed up with a network of 25 vehicle video analysis and automatic weighing points.
- According to the Cezch police, the new systems resulted in a fall of about 30 per cent in the accident rate in Prague and that only few speeding cases were recorded after they were installed.

The weigh-in-motion will rein in dishonest hauliers and protect roads

There are many vehicles that are driven over the weight limit in Lithuania and the resources to control them are scarce. According to representatives of the Lithuanian Road Administration, **one in four of all heavy-goods vehicles (HGVs) is overloaded to the point that it is over the weight limit.** In the absence of an effective control system and random inspections, some hauliers risk carrying heavier cargoes than are legal and this is a direct threat to fair and open competition.

According to Mr Truncė, a weigh-in-motion system ensures precise measurement.

The majority of the country's roads are designed for a certain maximum load. Therefore, if roads are under constant pressure from overloaded vehicles, their service life is reduced and road maintenance costs rise accordingly. Overloaded HGVs also represent a real danger to the safety of other road users because overloading increases braking distances and reduces the manoeuvrability of a vehicle.

Solution - weigh-in-motion

But in the near future, it will be nearly impossible for hauliers who overload their vehicles to escape punishment. The Lithuanian Road Administration announced its plans to have automatic vehicle weighing gates fitted which will weigh every vehicle travelling on a road without the need for any human involvement.

According to FIMA Project Manager Sigitas Truncė, this technology may be cutting edge but a growing number of European countries are adopting it. The first country to legalise weighing gates was the Czech Republic with certified automatic check points already in operation in Poland, Germany and Austria.

> *"In the near future, offenders will find it extremely difficult to escape punishment. The Lithuanian Road Administration announced plans to install a weigh-in-motion system.*

Advantages of the system

Across Europe, including Lithuania, the authorities are being forced to look for more effective road transport weight control solutions because of the increasing number of trucks on the continent's roads. The volumes of heavy vehicles are forecast to increase by as much as 50 per cent in Europe by 2020. According to Mr Truncė, the effective control of such flows will be possible only if it is automated.

He said: "Automatic weighing gates can weigh cargo in a fraction of a second. Inspections conducted by traffic police with the use of mobile weighing scales usually take much longer – on average about an hour – because both the weighing itself and generating the documentation take a long time. The capacity of such an inspection system is very limited because only random vehicles are checked. Another issue is the high cost of organising non-automatic weight control which is the way that it is carried out at the fixed checkpoint in Klaipeda. The whole checkpoint infrastructure needs to be developed and maintained. Furthermore, checkpoints must always have people on duty. It has been noted that such checkpoints are usually

> *Weigh-in-motion systems operate without human involvement.*

The system weighs all vehicles travelling on all lanes of the road. It is also capable of recording vehicles travelling at over 200 km/h.

avoided by offenders who divert onto other roads. Automatic gates operate without any human involvement with officers receiving data via computer leaving them to issue fines to offenders. A network of automatic gates leaves no possibility for offenders to evade responsibility."

Operating principles

How does a weigh-in-motion system work? According to Mr Truncė, weighing gates consist of a complex set of technologies including piezoelectric sensors mounted in the asphalt road surface, automatic number plate recognition cameras and a data processing unit.

"Weighing and vehicle identification takes no longer than a second. Once a vehicle passes over the sensors, the system determines whether it is a car or a truck. At the same time, video cameras record the vehicle's number plate and determine its axle weight. Gross weight is calculated and compared with the permitted limits for the class of vehicle in question. The data is then combined and stored in a single file."

Additional dimension sensors fitted in the gates also check the external dimensions of a vehicle and can identify those that are higher, longer or wider than allowed.

The system weighs all vehicles travelling on all lanes of the road. It is capable of recording vehicles travelling at over 200 km/h. In order to prevent possible abuses by drivers trying to avoid the sensors, they are laid across the entire width of the road including the hard shoulder.

Minimum error

According to Mr Truncė, a weigh-in-motion system ensures accurate weighing and once properly designed and installed, has an error rate of less than five per cent.

„The resolution of piezoelectric sensors fitted into the road surface is 10 kg. If we are talking about 40 tons, it is not a lot and has no great impact on weighing accuracy. How does weighing take place? When force is exerted on a sensor, quartz crystals inside it generate surface load. With the use of special amplifiers, this generated surface load can be very precisely measured by the use of state-of-the-art devices. By using this system, the weight of every axle is calculated, the average is computed and the weight of the whole unit is determined."

The technology is protected against mechanical and any other external impact. Special requirements apply to the road surface underneath the gates: it must meet parameters for, among other things, firmness, elasticity and vibration transmission. The laying of surfacing several hundred meters in front and several tens of meters behind the sensors is sufficient.

Additional functions

The functionality of a weigh-in-motion system can be expanded further by integrating it with various databases. Passing vehicles can be checked to determine if they have been stolen or if their drivers are wanted by law enforcement institutions for other reasons, if they have insurance and if they have the necessary technical inspection tickets. The system can also collect data on traffic intensity and provide such information to the authorities tasked with maintaining roads.

Intelligent transportation **systems deal with a city's problems in a smart way**

Cities are suffocated by traffic jams. Carbon dioxide emissions pollute the environment while businesses lose money because the amount of time that staff and goods spend in traffic jams. A rapid rise in the number of vehicles is inevitably followed by a rise in the number of accidents. Lithuanian cities are, like many around the world, **searching for ways to improve road capacity, ensure safe and convenient communications and to rein in offenders.**

S. Šidlauskas: "The range of ITS measures is vast, but they all are dedicated to road users' convenience, safety and time saving".

New technologies offer the solution

According to FIMA Project Manager Simonas Šidlauskas, many countries in Western Europe are using state-of-the-art technologies to deal with the problems associated with traffic. The advantage of these hi-tech transport solutions is that one system often deals with several problems at the same time.

„All road transport issues are interconnected. Higher traffic volumes mean larger traffic jams and more carbon dioxide emissions, higher accident rates, more fatalities and greater wear on roads. Intelligent transport systems allow us to deal with these problems comprehensively rather than individually," he said.

Priority to public transport

Attempts to reduce the load on city streets and traffic jams in the city could be successful if more residents would use public transport instead of their cars. Therefore, a higher priority is given to developing effective public transport systems.

What solutions do intelligent transportation systems (ITS) offer in this sector? "The range of measures is vast, but they all are oriented to passenger comfort and saving time," said Mr Šidlauskas.

> *„" Public transport priority system is particularly effective during rush hours when traffic jams can paralyse city centres.*

One of the most popular systems which is being installed in Lithuanian cities is the e-ticket system. „We can say that Lithuania is at a very early stage of implementing electronic ticketing systems. Until now, Lithuanian cities have introduced these systems individually but ideally these should eventually be integrated into one single system. This system would apply not only to individual cities but the whole country and include different means of transport. Thus by buying a single ticket, a passenger could reach his/her final destination by various means of transport – for instance bus, ferry and train," said Mr Šidlauskas.

Saving time

To make public transport attractive to passengers, it must be effective: why should somebody use public transport if he/she can reach the destination faster and in more comfort by car even if this costs slightly more?

One of the promising ITS solutions currently being tested by FIMA in one Lithuanian city is a system that gives public transport priority at crossroads.

According to Mr Šidlauskas, the principle of the system is

very simple: special equipment is fitted to a bus or trolleybus. This communicates with traffic light controllers and when such a vehicle approaches a junction, the controller recognises it and switches the light to green. According to Mr Šidlauskas, quite a few of the country's largest cities have already assigned separate lanes for public transport, thereby the priority system would be particularly effective during rush hours when traffic jams can paralyse a city centre.

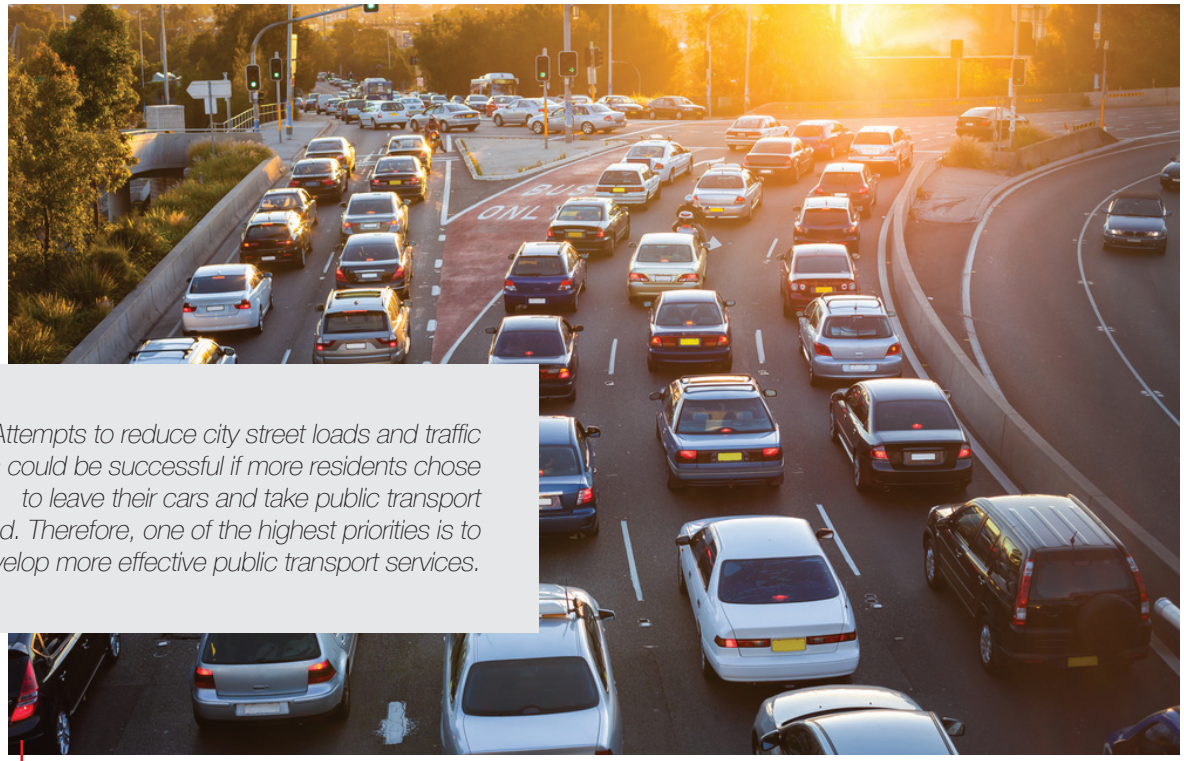
Crossing junctions without stopping

Mr Šidlauskas also noted that traffic jams in cities would be smaller if drivers chose an optimum speed and crossed junctions without stopping traffic flows. European cities are already introducing pilot systems enabling drivers to choose the optimum speed in a city.

„Stopping at a junction causes traffic jams. In some places this 'bottleneck' effect can be successfully solved if drivers choose a reasonable speed rather than speeding. An ITS system helps drivers to choose a reasonable speed by transmitting a signal from a traffic light controller to a computer mounted in the car. Upon receipt of the data, the computer calculates the optimum speed for the car to reach the next junction while the green light is on.„

Mr Šidlauskas added that another solution can be applied at junctions to inform drivers how long a red light will show. „Knowing how much time is left until the light changes to green means that drivers are more patient and calmer. They will not rev their engines or try to accelerate away dangerously from the light the moment it turns to green. There are quite a few stressed drivers on our roads especially at red lights. When drivers know exactly when the lights are going to turn green, they are ready to move away safely in good time thus increasing capacity at junctions."

> *"Attempts to reduce city street loads and traffic jams could be successful if more residents chose to leave their cars and take public transport instead. Therefore, one of the highest priorities is to develop more effective public transport services.*



Traffic jams, air pollution, road wear, traffic safety - the city is actively implementing ITS solutions to tackle all of these problems.

Centralised traffic control

A city traffic control centre assists with the ongoing monitoring of traffic flows and is able to adapt to changing conditions in the city. According to Mr Šidlauskas, depending on the size of the city, such a centre can occupy an entire building with lots of equipment fitted, as it is in Vilnius, or just a single laptop can do the job.

„A traffic control centre ensures remote traffic surveillance and control. All traffic controllers in the city - cameras, radars, wireless sensors etc. - can be accessed over an internet connection. Sensors operating in real time collect a wealth of information about road traffic. Appropriate corrections to traffic control operating programs can be made in response to that information. Let's say that upon detecting that one road is free of vehicles, the time a traffic light is green can be reduced and, when there are more cars on the road, it can be lengthened."

Electronic information signs connected to the traffic control system help to inform the drivers about the changing traffic situation and control flows. Thus drivers can change their journeys and divert via less congested streets.

For smooth car parking

Car parking is another challenge. The challenge for a driver is to find space for safe and convenient car parking. The challenge for a city is to prevent the non-payment of parking fees. Both problems are dealt with by ITS in a civilised way.

ITS solutions in car parks have already advanced significantly and are in quite wide use and the same is true for Lithuania. Parking machines are no longer a novelty on our streets. The capacities of modern parking machines are huge and they can have additional applications, for instance for paying for short-term bicycle rental. At a parking lot parking guidance systems calculate car parking occupancy and show drivers the shortest routes to vacant spaces while another part of a system organises payment for parking. For the convenience of VIP and regular customers, a number plate recognition system can be installed, which automatically recognises a car and opens the barrier.

FIMA is expanding its **portfolio of completed ITS projects**

FIMA has accumulated significant experience installing intelligent transportation systems - projects have been successfully implemented not only in Lithuania but also in other countries in the Baltic Region. Traffic control solutions, speed enforcement systems, passenger and driver information systems, car parking systems – these represent just a selection of some of the ITS solutions successfully implemented by FIMA.

Traffic information system for the convenience of drivers and road maintenance services

Implementing a project on major national roads of Lithuania, FIMA installed nearly 50 automatic road weather stations with weather observation equipment, video cameras and traffic intensity meters. All these devices and road weather stations already in use by the Lithuanian Road Administration were integrated into a tailor-made traffic information system which collects data on traffic and weather conditions. This data is then transmitted to authorities in charge of road maintenance and is available to drivers on the website www.eismoinfo.lt and via mobile applications.

Solutions for a centralised traffic control system in Vilnius City

As one of the contractors participating in a project to build a centralised traffic control system in Vilnius, FIMA installed a video surveillance system at some intersections in the capital, mounted electronic information signs on streets, and equipped the traffic control centre and data communication network.

The data communication network connects the traffic light controllers at all junctions into a single system managed from the traffic control centre. Traffic intensity on city streets can be remotely observed from the centre, traffic control system parameters can be efficiently adjusted, traffic offenders can be identified and road accidents can be investigated. Electronic on-road displays provide information about driving conditions and traffic jams and can suggest alternative routes as well as inform drivers about road works or other traffic restrictions.

Largest network of speed cameras in Lithuania

FIMA has installed and maintains Lithuania's largest network of 150 speed cameras. The company's specialists installed 139 fixed speed cameras on major national roads while 11 mobile speed cameras were installed in unmarked police patrol cars. Speed cameras record the time of every passing vehicle, its speed, direction and class.

New-generation intersections

FIMA is actively involved in the modernisation of signalized intersections infrastructure in Lithuania. Projects have already been implemented in Kaunas, Telšiai, Pakruojis and Jonava. Similar projects are currently under implementation in Vilnius and neighbouring Minsk. Traffic flow analysis technologies fitted at intersections enable more effective regulation of traffic as well as congestion reduction. By analysing traffic intensity, the system can give priority to a particular lane of traffic at an intersection. Having integrated several intersections into a single system, „green wave" effects are secured. Modern diode (LED) traffic lights are mounted at the intersections undergoing modernisation. These are more durable and cost-effective than older lamp-based signals. LED traffic lights with a dimming function use less power than older lights.

Car parking solutions

One of the most advanced solutions for car parking was adapted by FIMA experts for the two-storey underground car park at the Panorama leisure and shopping centre in Vilnius. FIMA installed a modern parking guiding system at the car park which has a 1,500-car capacity. This consists of sensors fitted above every parking space and LED lights showing if the space is vacant, electronic information signs informing drivers about the number of vacant spaces and traffic flow analysis software. The accuracy and reliability of the car flow control system increased the availability of parking spaces by 19.2 per cent and reduced the amount of time drivers spent parking by a fifth.
FIMA is implementing on-street parking solutions as well. For example, in Palanga 20 solar-powered parking machines were installed.

Traffic flow analysis solutions

At present, FIMA is installing a system to analyse traffic flows throughout Lithuania in real time.
Induction loops fitted in the road surface analyse passing vehicles and classify them by type: cars, trucks or buses. Based on the data, the authorities in charge of road infrastructure are able to plan road renovation works and the development of the road network.
Under this project, a network of video surveillance cameras is also being installed. This will help road maintenance institutions to make efficient decisions and implement road maintenance measures when needed.

New technologies to deal with urgent issues in transport sector

Traffic jams in cities, high accident rates, growing air pollution, ineffective public transport, ineffective traffic control, prompt assistance for people hurt on the road – these are just a few of the urgent **issues that face the transport sector and ones which intelligent transportation systems (ITS) are ideally placed to tackle.**

Intelligent transportation systems (ITS) are the application of advanced information and electronic communication technologies in the transport sector that are designed to improve efficiency, productivity, service quality as well as increasing mobility and reducing energy consumption and other negative environmental impacts.

Solutions offered by FIMA for transport infrastructure:

- Traffic management solutions,
- Traffic information systems,
- Speed enforcement systems,
- Automatic traffic incident detection systems,
- Weigh-in-motion systems,
- Toll solutions,
- Parking systems,
- E-ticketing systems.

Where intelligent transportation systems can be applied?

- Regulation of city traffic flows,
- Control of vehicle speed and weight,
- Recording vehicles that break traffic rules: driving through a red light, driving on public transport lanes, parking in unauthorised places, etc.,
- Automatic recording of accidents,
- Informing drivers and the relevant services about road conditions,
- Organising tolling for entrance into certain zones,
- Control of traffic flows in car parks,
- etc.

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Fima is the leader in intelligent engineering solutions in the Baltic countries, offering telecommunications, security, automation and data center solutions as well as individually tailored solutions for transport and energy sectors.

The company implements intelligent engineering solutions for businesses and governmental organisations in the Baltic states and Belarus and is continuously involved in projects of technological innovation. In two decades of operation, Fima has carried out several thousand projects of a various scale and degree of complexity.

Fima's headquarters are based in Vilnius, Lithuania. The company has subsidiaries in Latvia, Poland, Belarus.

Do you have ideas, suggestions or comments? Email us at **solutions.era@fima.lt.**