



CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL

Del 27 al 30 de junio de 2017

Mendoza - Argentina

WINTER MAINTENANCE DECISIONS SUPPORT SYSTEMS IN POLAND

Paweł Sobiesiak

www.vialidadinvernal.org.ar

ORGANIZAN



Asociación Argentina
de Carreteras





CONFERENCIA INTERNACIONAL
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Area of Poland - 312 679 km²
69th largest country in the world
9th largest in Europe

POLAND

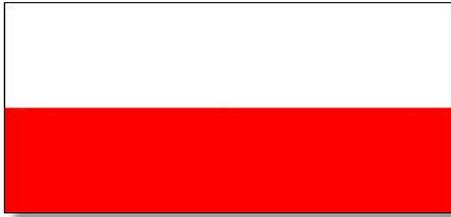


Population of over 38.5 million people
34th most populous country in the world
6th most populous member of the European Union



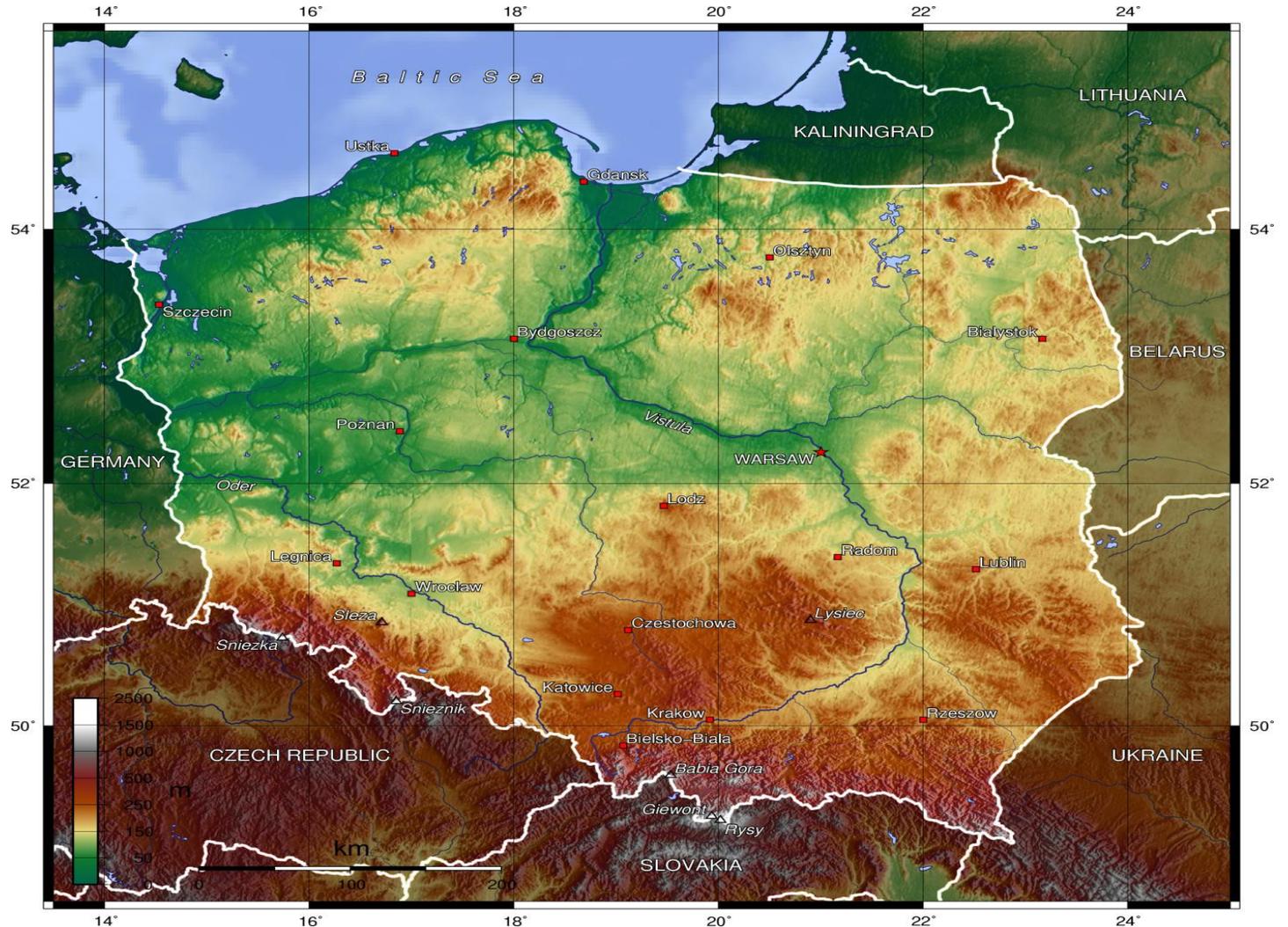
CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL
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Mendoza - Argentina

POLAND



The dimensions of Poland

- north-south : 650 km
- west-east : 690 km



GENERAL DIRECTORATE FOR NATIONAL ROADS AND MOTORWAYS (GDDKiA)



**Generalna Dyrekcja
Dróg Krajowych i Autostrad**

General Director for National Roads and Motorways

is the central administration authority for issues related to the national road system in Poland.

The General Director

manages the national roads and implements the state budget to the maintenance and extent of the national road system.



GENERAL DIRECTORATE FOR NATIONAL ROADS AND MOTORWAYS (GDDKiA)

The General Director performs its tasks with the support of the General Directorate for National Roads and Motorways.

General Directorate for National Roads and Motorways:

- 1 Headquarter - **Warsaw**
- 16 Provincial Branches (1 Provincial Branch equals 1 Voivodeship);



- 104 Local Divisions;



- 273 Local Subdivisions;

GDDKiA manages over 19 000 km motorways, expressways and national roads.



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GENERAL DIRECTORATE FOR NATIONAL ROADS AND MOTORWAYS (GDDKiA)



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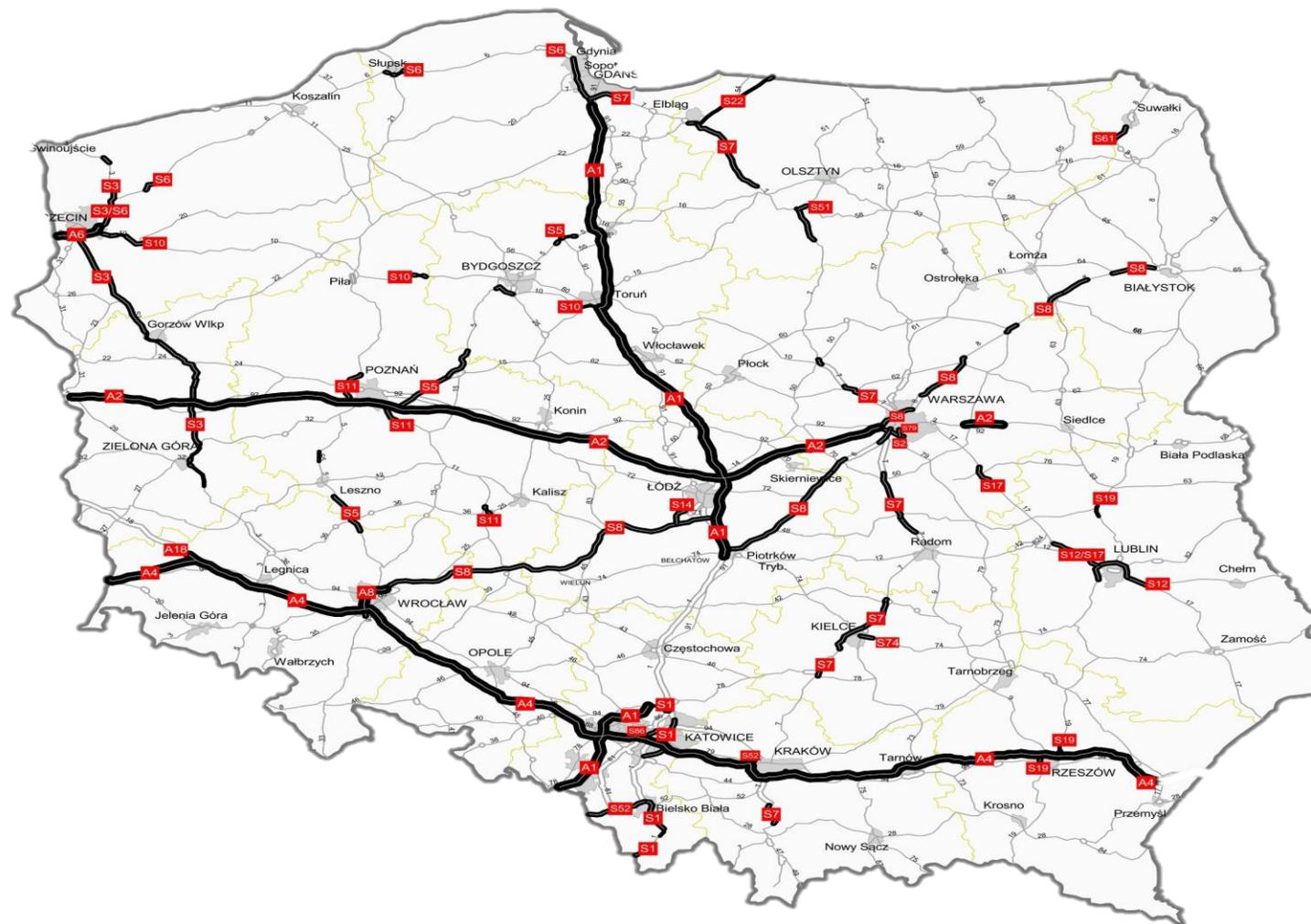
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GENERAL DIRECTORATE FOR NATIONAL ROADS AND MOTORWAYS (GDDKiA)

Road network in Poland

- motorways (1 555 km)
- expressways (1 450 km)
- national roads (16 000 km)

(Data for June 2017)





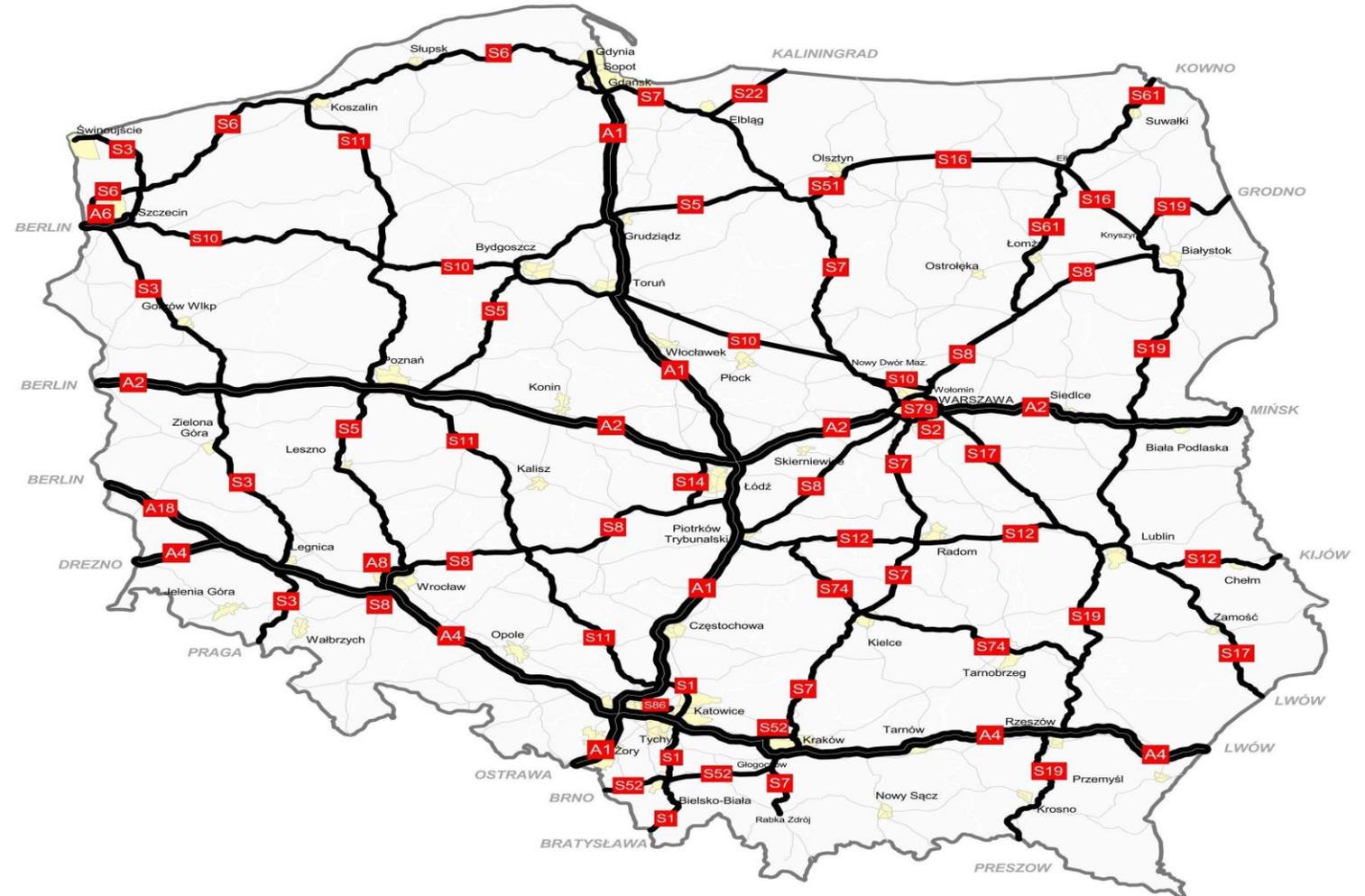
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GENERAL DIRECTORATE FOR NATIONAL ROADS AND MOTORWAYS (GDDKiA)

Road network in Poland

- motorways
- expressways

(2020-2021 forecast)



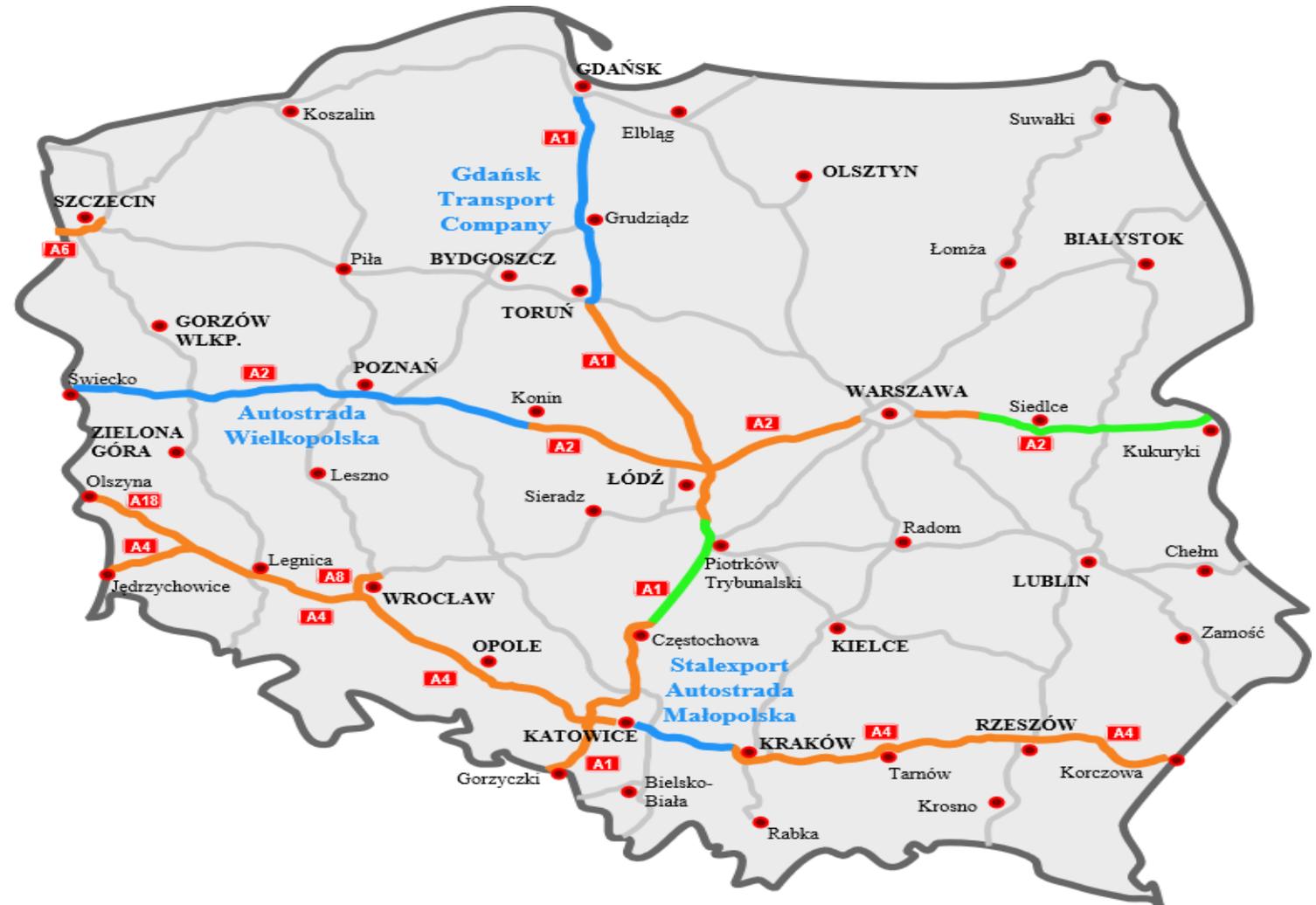


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GENERAL DIRECTORATE FOR NATIONAL ROADS AND MOTORWAYS (GDDKiA)

Road managers in Poland

-  GDDKiA
-  concessionaires;
-  analysis of the
implementation
system



WINTER MAINTENANCE GUIDELINES

„The Winter Maintenance Guidelines” (*Wytyczne Zimowego Utrzymania Dróg*):

1. *Preparation for the winter season.*
 - 1.1. *Preparation of roads and bridges.*
 - *Visual assessment of technical condition;*
 - *Implementing necessary protection providing actions.*
 - 1.2. *Organizational preparation.*
 - 1.3. *Vehicles preparation.*
 - 1.4. *Back up preparation.*
 - *Winter Maintenance Management Points (24/7);*
 - *Social facilities.*





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WINTER MAINTENANCE GUIDELINES

„The Winter Maintenance Guidelines” (*Wytyczne Zimowego Utrzymania Dróg*):

2. Preparation and storage of de-icing materials.
 - 2.1. Solid & temporary storage facilities.
 - 2.2. Rules of storage of de-icing chemicals.
 - 2.3. Accumulation of materials.
 - 2.4. Rules of compounds preparation.
 - 2.5. Blending equipment.
 - 2.6. Testing of de-icing materials.
 - 2.7. Responsibility for the use of materials not in accordance with the contract.





WINTER MAINTENANCE STANDARDS

STANDARD	DESCRIPTION
I	Snow and winter slipperiness are removed over the entire width of the roadway. There is no layer of snow on the road.
II	Snow and winter slipperiness are removed over the entire width of the roadway.
III	Snow is removed over the entire width of the roadway and winter slipperiness is removed in: <ul style="list-style-type: none">• intersections with hardened public roads;• intersections with railways;• roadway sections with >4% tilt;• bus stops;• other places set by the road administration.
IV	<i>Snow is removed over the entire width of the roadway and sprinkled on the sections that determine the traffic possibilities set by the road administration.</i>
V	Snow is removed from the roadway (at least one traffic lane) and sprinkled on the sections that determine the traffic possibilities set by the road administration.

WINTER MAINTENANCE LEVELS

LEVEL	DESCRIPTION	ACTIVITIES		
1	PREPARATIONS TO WINTER SEASON	<ul style="list-style-type: none"> • preparatory and organizational activities 	<ul style="list-style-type: none"> • information handling for the Purchaser • self-monitoring for activities performed within the framework of the Winter Maintenance • ensuring monitoring of activity of the Winter Maintenance vehicles 	THROUGHOUT THE WINTER PERIOD
2	WINTER MAINTENANCE OPERATION	<ul style="list-style-type: none"> • Winter Maintenance actions 		
3	END OF WINTER SEASON	<ul style="list-style-type: none"> • activities assuring roads tidiness 		

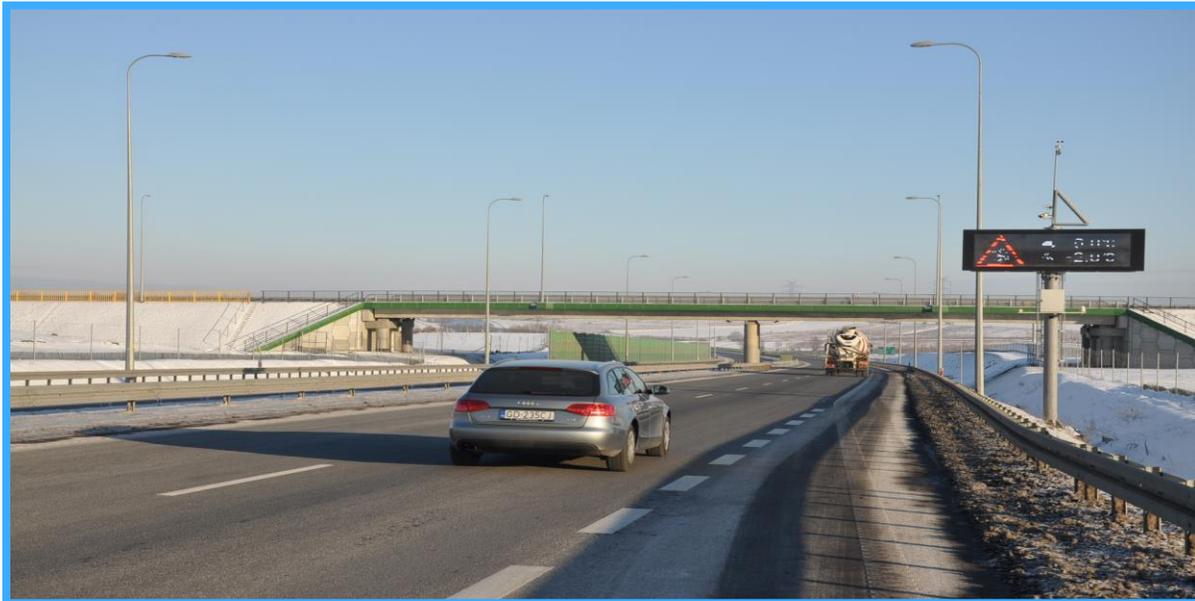
WINTER MAINTENANCE ALERTS

ALERT TYPE	DESCRIPTION	ACTIVITY
WHITE ALERT	READYNESS STAGE	<ul style="list-style-type: none"> • Keeping a constant monitoring of the weather; • Routine Winter Maintenance duty on a 24-hour system 7-days a week in all Local Subdivisions; • Maintain the preparedness of the vehicles.
YELLOW ALERT	PROPHYLACTIC STAGE	<ul style="list-style-type: none"> • Prophylactic activities (using de-icing materials);
ORANGE ALERT	PROPER ACTIONS STAGE	<ul style="list-style-type: none"> • Winter Maintenance activities provided by the entire amount of available vehicles (snow ploughs and salt spreaders).
RED ALERT	CRITICAL ACTIONS STAGE	<ul style="list-style-type: none"> • Winter Maintenance activities; • Usage of hard vehicles is permitted; • Cooperation with local authorities & services (Police, Fire brigades etc.)

DECISIONS SUPPORT SYSTEMS IN POLAND

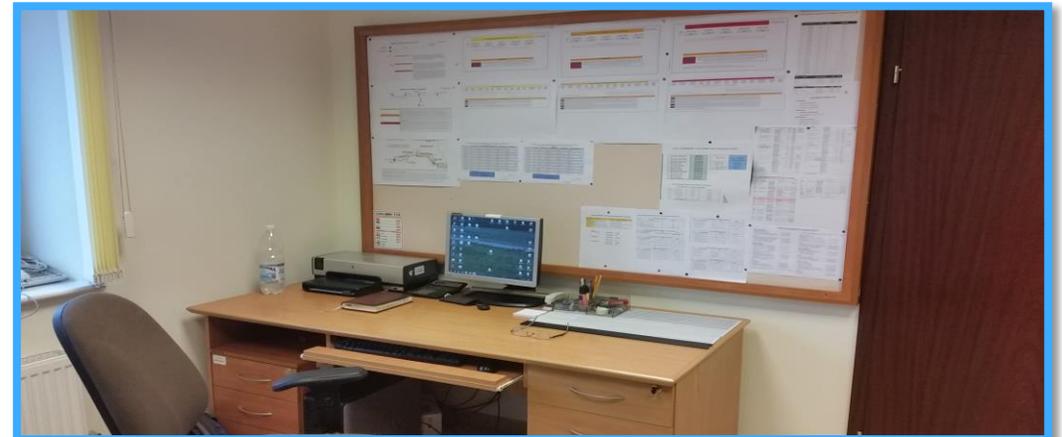
GDDKiA is expected to lead to equitable and safe roads, adapted to the increasing road traffic and the continuous development of the road network, conducive to road users comfort and the efficiency of the economy and the security of the country.

In the 21st century, an entity with such complex tasks is unable to fulfill its statutory objectives without multiple tools supporting its functions. Therefore GDDKiA is based in practice on systems supporting management.



DECISIONS SUPPORT SYSTEMS IN POLAND

- Road Data Bank (*pol.: Bank Danych Drogowych*)
- „Winter Road Maintenance” software application (*pol.: ZimaWIN*);
- „Traffic Difficulties” software application (*pol.: UtrWIN*);
- „SATIS GPS” – vehicles positioning system;
- Road Information Point (*pol.: Punkt Informacji Drogowej – PID*);
- Weather forecast and Road Weather Stations;
- Traffic Cameras.



DECISIONS SUPPORT SYSTEMS IN POLAND

Road Data Bank

The system database is a basic collection of information about roads used by almost all other decisions support programs. The system collects data on the national road network, records them, enables statistical analyzes and road administration.

The system includes the following functions:

- administration - configuration and assignment, database archiving;
- editing - updating and viewing data;
- road evidence - national road network, road book;
- reports;
- maps.

According to the data included in RDB (road cross-section, number of lanes, etc.) a specific action can be taken in order to achieve and maintain a proper standard of roads winter maintenance.

DECISIONS SUPPORT SYSTEMS IN POLAND

„Winter Road Maintenance” software application

Features:

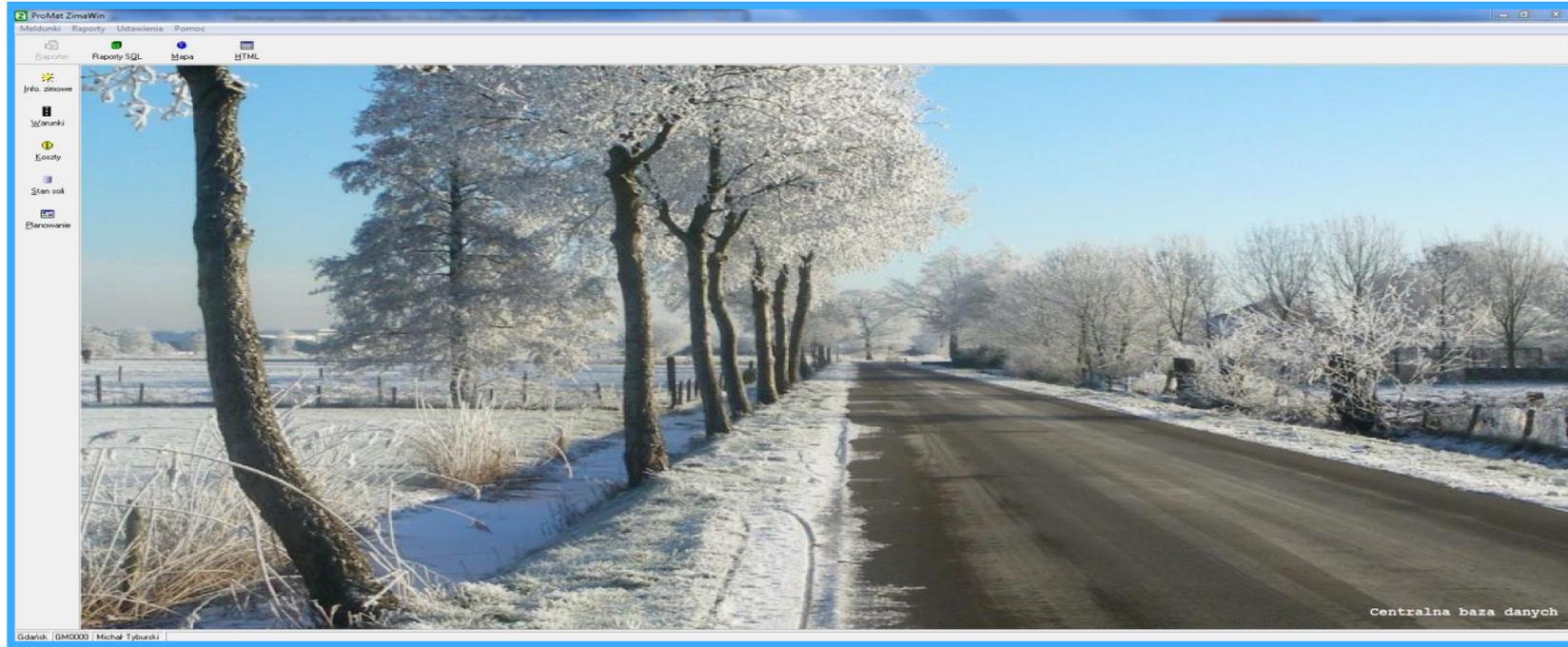
- the program collects information on road condition in winter;
- data are sent by the program from each Local Division and Sublocal Division to Provincial Branches and further to the Headquarter;
- Informations regarding winter conditions on the roads are also available on the GDDKiA website.

The system includes the following functions:

- collection of winter informations – weather conditions, pavement condition, number of working vehicles and employees,
- information about closed roads and usage of vehicles,
- travel conditions, pavement condition;
- cost valuation of vehicles work, used materials and other,
- planning and preparation for Winter Maintenance and its Summary.

DECISIONS SUPPORT SYSTEMS IN POLAND

„Winter Road Maintenance” software application



The program runs on individual computer stations in Headquarter and also in each Provincial Branch, Local and Sublocal Divisions.

The program is operated by the employees responsible for Winter Road Maintenance.

DECISIONS SUPPORT SYSTEMS IN POLAND

„Traffic Difficulties” software application

- program is intended to provide information on traffic difficulties in every Provincial Branch;
- data are sent by the program from each Local Division and Sublocal Division to Provincial Branches and further to the Headquarter;
- Informations regarding traffic difficulties on the roads are also available on the GDDKiA website.

The program provides the following information on closed sections of roads:

- road repairs,
- accidents,
- catastrophes,
- natural disasters, etc.

The program works on individual computer stations in Headquarter and also in each Provincial Branch, Local and Sublocal Divisions. The program is operated by the employees responsible for Road Maintenance.



DECISIONS SUPPORT SYSTEMS IN POLAND

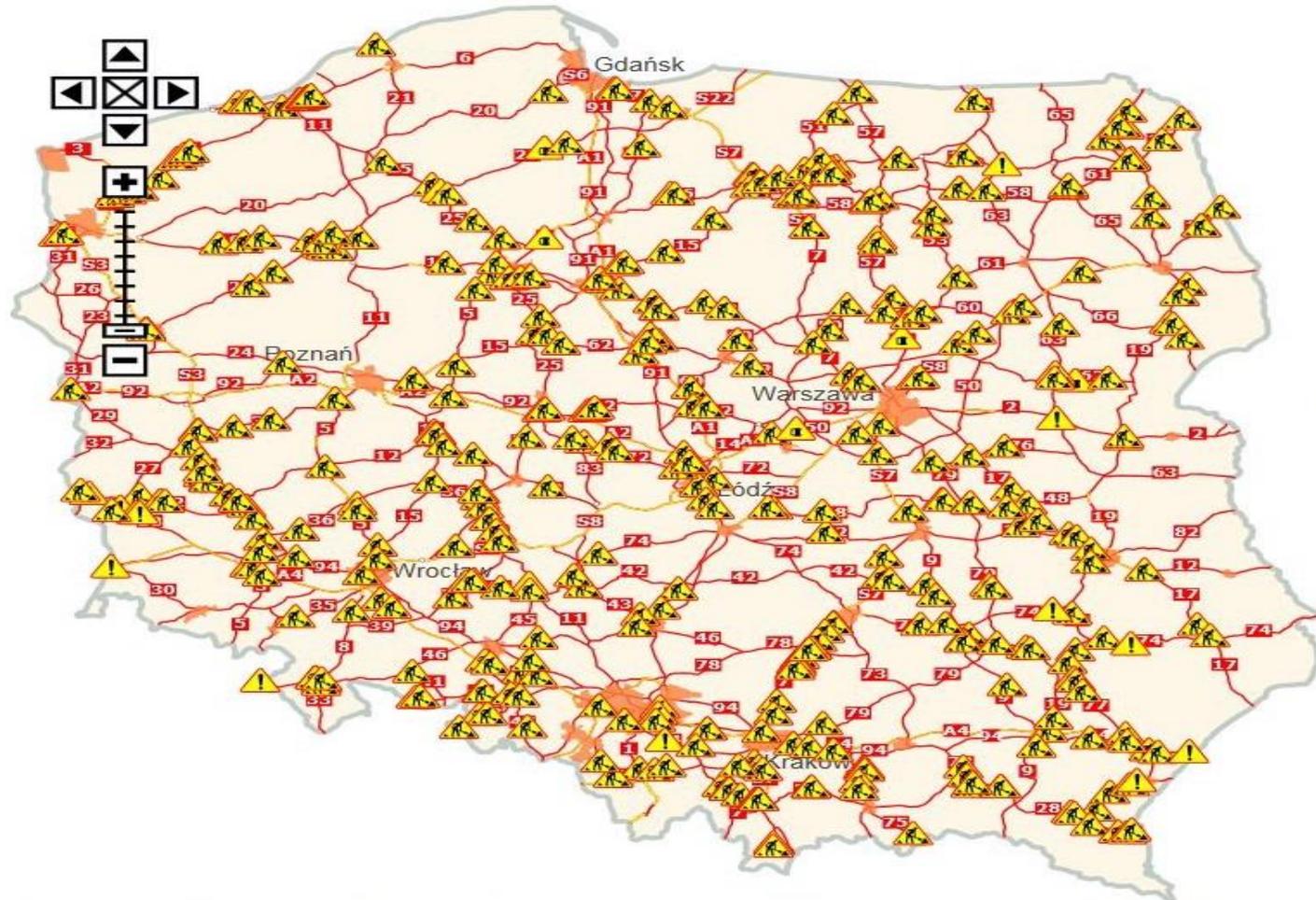
Software application "Traffic Difficulties"

The screenshot displays the GDDKiA website interface. At the top, the GDDKiA logo is on the left, and the text 'INFORMACJA DROGOWA' with the phone number '19 111' is in the center. On the right, there are logos for 'viatoll PL' and 'bip'. Below this is a navigation bar with links: 'SERWIS GDDKIA', 'ODDZIAŁY', 'SERWIS DLA KIEROWCÓW', 'ZAMÓWIENIA PUBLICZNE', and 'KONTAKT'. A secondary bar contains icons for 'MAPA STANU BUDOWY DRÓG', 'SERWIS DLA KIEROWCÓW', 'MAPA KAMER MONITORUJĄCYCH', 'FORMULARZ KONTAKTOWY', and 'MAPA WARUNKÓW DROGOWYCH'. The main content area shows a sidebar on the left with a list of services, including 'Mapa warunków drogowych' which is highlighted. The main area displays the 'Mapa warunków drogowych' application, featuring a map of Poland with various road condition icons. A legend on the right side of the map provides details for different categories: 'Widok' (View), 'Dane' (Data), 'Warstwy' (Layers), 'Info' (Information), and 'Legenda' (Legend). The legend includes symbols for 'Utrudnienia' (Obstacles), 'Opady' (Precipitation), 'Wiatry' (Winds), and 'Nawierzchnie' (Surfaces).



DECISIONS SUPPORT SYSTEMS IN POLAND

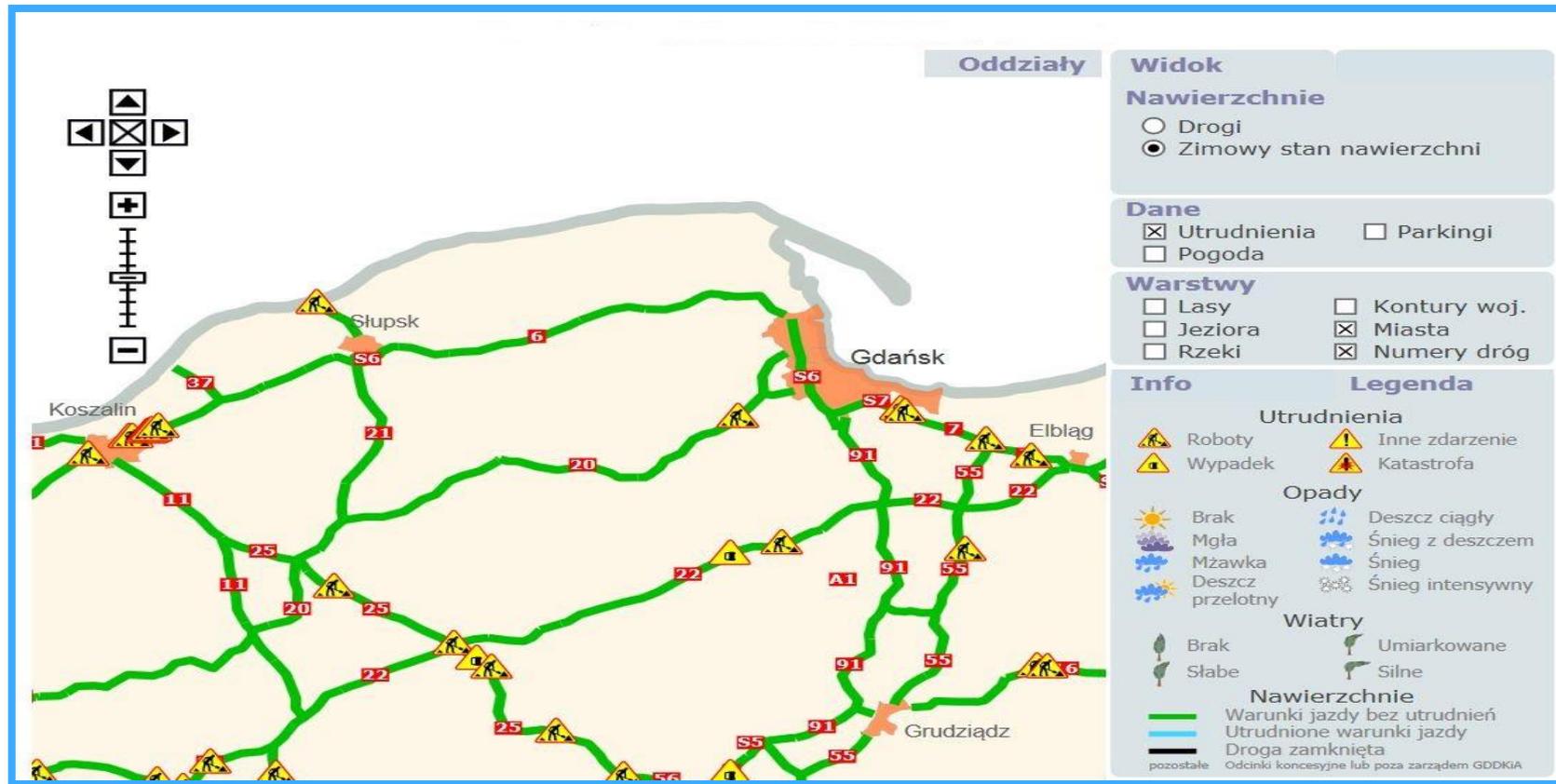
Software application "Traffic Difficulties"





DECISIONS SUPPORT SYSTEMS IN POLAND

„Traffic Difficulties” software application
„Winter Road Maintenance” software application

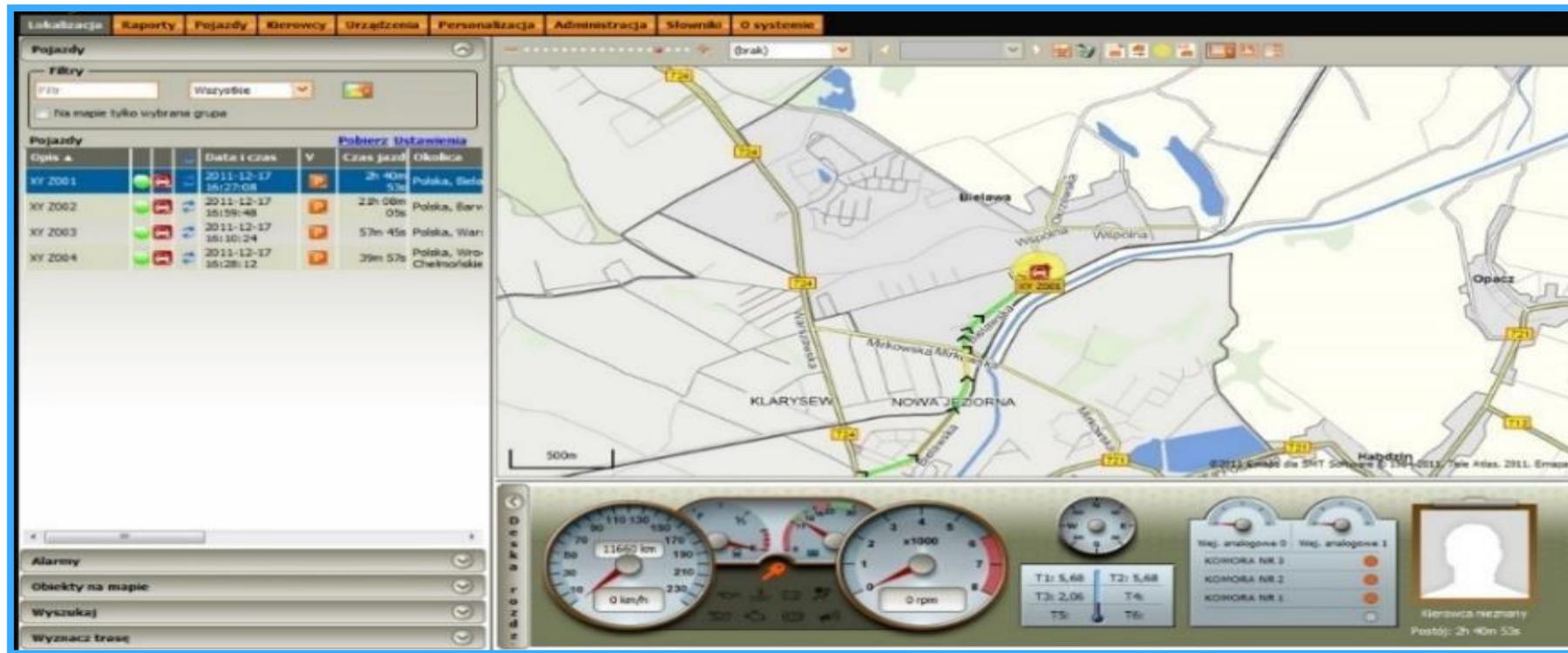


DECISIONS SUPPORT SYSTEMS IN POLAND

SATIS

„SATIS GPS” vehicles positioning system

- an indispensable tool for vehicles track monitoring;
- significantly increases control over the contractor's activities;



DECISIONS SUPPORT SYSTEMS IN POLAND

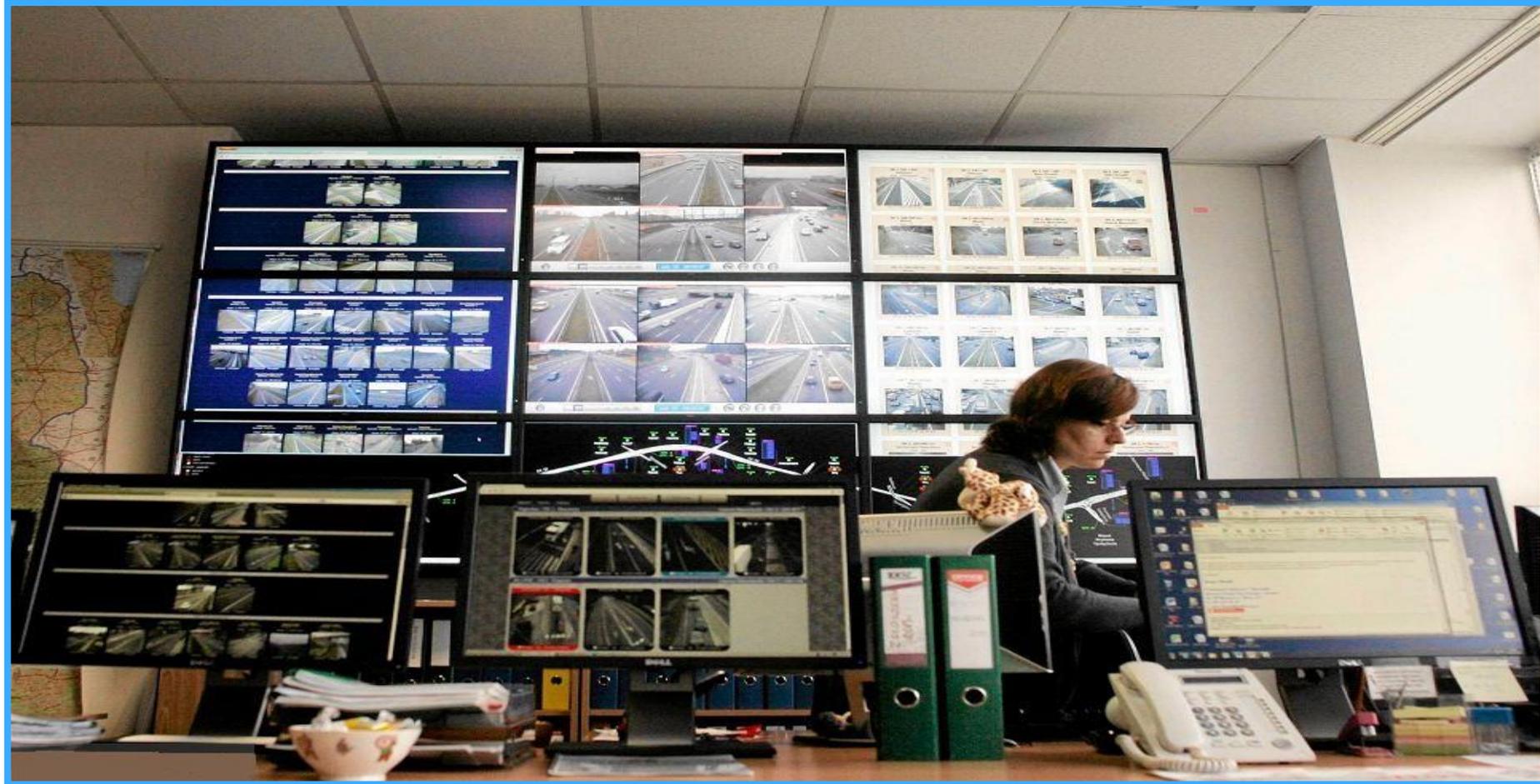
Road Information Point (*pol.: Punkt Informacji Drogowej – PID*)

- GDDKiA operates Road Information Points (PIDs) that collect road state data and transmit it to road users and mass media. The information is also available on the GDDKiA website (www.gddkia.gov.pl).
- Detailed information on national road traffic is also available at the GDDKIA 19 111 Road Information Number.



DECISIONS SUPPORT SYSTEMS IN POLAND

Road Information Point (Traffic Management Center in Wrocław)



DECISIONS SUPPORT SYSTEMS IN POLAND

Road Information Point (Headquarter in Warsaw)



DECISIONS SUPPORT SYSTEMS IN POLAND

Weather forecast and Road Weather Stations

GDDKiA uses weather forecasts to take in advance necessary preventive measures such as sprinkling salt or liquid on roads just before snowfall. For operational needs, more than 500 meteorological stations are installed. These devices receive the following data:

- view of national roads;
- measurement of temperature and humidity;
- measurement of surface temperature;
- measurement of wind force and direction.



DECISIONS SUPPORT SYSTEMS IN POLAND

Road Weather Stations

GDDKiA Gdańsk

tabela zbiorcza pomiarów z dnia 2017.01.11 (środa), godz. 10:10

opis lokalizacja wyloguj drukuj zamknij

Data 2017 01 11 godz. 10 10 pokaż < 10 min > aktualne
prędkość wiatru w m/s kierunek wiatru w stopniach sortuj wg alfabety alarmy

Pomiar Zbiorcze	Temp. pow.	Temp. odcz.	Temp. 20cm	Temp. 0cm	Temp. -5cm	Temp. -30cm	Temp. rosy	Wilg. pow.	Stan opadu	Int. opad.	Naw.	Przew. GS	Przew. GL	Sól	Ostrzeżenie	Prędk. wiatru	Prędk. wiatru max	Kier. wiatru
z pomiarów	14	14	11	15	15	3	14	14	-	12	-	15	13	15	-	14	13	14
min	-12.3	-25.1	-12.7	-11.6	-11.1	-0.4	-13.7	57.4	-	0	-	0	0	0	-	0	0	174
max	-6.3	-9	-4.5	-5.8	-5.4	1.9	-9.6	93.9	-	96	-	94.5	26.9	1	-	9.2	13.5	321
średnia	-8.8	-16.9	-8.5	-9	-7.8	0.5	-12.6	74.05	-	25	-	39.9	6.5	0.7	-	4.2	7.3	211
stacja	Temp. pow.	Temp. odcz.	Temp. 20cm	Temp. 0cm	Temp. -5cm	Temp. -30cm	Temp. rosy	Wilg. pow.	Stan opadu	Int. opad.	Naw.	Przew. GS	Przew. GL	Sól	Ostrzeżenie	Prędk. wiatru	Prędk. wiatru max	Kier. wiatru
Buszkowo	-	-	-	↑-9.1	↑-7.8	-	-	-	brak	-	wilgotna	↓6.4	↓1.5	0	ślisko	-	-	-
Bydłino	↑-6.3	↑-10.8	-4.5	↑-5.8	-5.4	-	-13.3	↓58	brak	-	sucha	0	0	1	brak	↓2.9	↓5.8	190
Bytów Mądrzechowo	↑-9	↑-9	↑-7.7	↑-9.7	-8.3	-	-11.9	↓79.9	brak	0	mokra	↓94.5	↓25.2	1	uwaga	↓1.4	↑5.6	223
Chwarzno	↑-7.8	↑-23.2	↑-7.5	↑-6.7	↑-6.9	-	↑-9.6	↑86.4	brak	↓8.3	sucha	↓0.1	0.1	1	brak	↓7.5	↓10.8	192
Gdańsk Południe	↑-7.8	↑-17.5	↑-5	↑-10.1	-8.7	-	↑-11.8	↓73.1	brak	-	mokra	↑79	↑26.9	1	uwaga	↓4.6	↓7.2	207
Gwieździn	↑-10	↑-15.3	-	↑-9.6	-8.2	1.9	-12.5	↓81.4	brak	0	mokra	↑70.8	↑19.7	1	uwaga	↓3	↑5.8	198
Kobylnica most	-6.3	↓-16.2	-	↑-7.9	↑-6.8	-0.4	-13.3	↑57.4	brak	↑15.9	wilgotna	20.2	2	0	brak	↑4.8	↓7.3	203
Lipienice	↑-10.4	↑-10.4	↑-10.3	↑-10.2	↑-8.9	-	-13.5	↓77.6	brak	↑16.7	mokra	↓71.5	-	1	ślisko	0	0	208
Pawłowo	↑-9.7	↑-17	↑-10	↑-9.3	↑-7.7	-	↑-13.7	↓72.1	brak	↓10.6	sucha	↑2.7	↑0.5	1	brak	3.6	↓5.1	174
Redzikowo I	↑-6.9	↑-24.2	-	↑-6.1	↑-5.7	0.1	↑-12.1	↓61.4	brak	↑5	mokra	↑32.5	0.1	1	brak	↓9.2	↑13.5	184
Rychnowy	↑-9.8	↓-25.1	↑-9.6	↑-8.6	↑-8.1	-	↑-13.5	↓73.9	brak	↓1.8	mokra	↓78.5	1.9	1	uwaga	↑7	↑8.2	195
Węzeł Gdynia Port	↑-9.3	↓-17.2	↑-9.2	↑-8.3	↑-6.9	-	-13	↓74.46	jest	83.7	mokra	↓12.7	↓0.9	0	ślisko	↑3.8	↑7.7	321
Wieżyca	↑-12.3	↑-12.3	-8.1	↑-11.3	-9.1	-	↑-13	↓93.9	brak	↓7.3	mokra	↑90.7	-	1	uwaga	0	-	264
Wolcza Mała	↑-9	↑-15.3	↑-12.7	↑-11.6	↑-11.1	-	↑-13.6	69.2	jest	↑54.7	wilgotna	↓36.8	↓5.2	1	uwaga	3.3	↑6.7	198
Żuławy Zachód	↓-8	↓-23.5	↑-8.7	↑-11	↑-7.6	-	-11.2	↑77.9	jest	96	mokra	1.5	0	0	ślisko	↑7.5	↑11.1	194
stacja	Temp. pow.	Temp. odcz.	Temp. 20cm	Temp. 0cm	Temp. -5cm	Temp. -30cm	Temp. rosy	Wilg. pow.	Stan opadu	Int. opad.	Naw.	Przew. GS	Przew. GL	Sól	Ostrzeżenie	Prędk. wiatru	Prędk. wiatru max	Kier. wiatru

DECISIONS SUPPORT SYSTEMS IN POLAND

Traffic Cameras

GDDKiA uses approximately 750 traffic cameras, through which there is a possibility to get a view of the national road network:

Kamery w GDDKiA Gdańsk
stan z: 2017-06-23 10:28
załoguj Koniec sortuj:

Brzezie kierunek: Czuchów Region: Szczególny droga: 25, 26, 794 km	Bydlińo kierunek: Słupsk Region: Szczególny droga: 21, 67, 45 km	Czerak kierunek: Starogard Gdański Region: Szczególny droga: 22, 277, 678 km	Dreżn kierunek: Słupsk Region: Szczególny droga: 21, 12, 1 km	Dworek (1) kierunek: Gdańsk Region: Szczególny droga: 7, 47, 625 km	Dworek (2) kierunek: Elbląg Region: Szczególny droga: 7, 47, 625 km	Gdańsk Południe kierunek: Gdańsk Region: Szczególny droga: 57, 0, 6 km	Gościcino (1) kierunek: Gdynia Region: Szczególny droga: 6, 288, 7 km	Gościcino (2) kierunek: Słupsk Region: Szczególny droga: 6, 288, 7 km
Kieźmierz (1) kierunek: Gdańsk Region: Szczególny droga: 7, 44, 239 km	Kieźmierz (2) kierunek: Elbląg Region: Szczególny droga: 7, 44, 239 km	Kościerzyna kierunek: Gdynia Region: Kościerzyna droga: 20, 258, 95 km	Kościerzyna kierunek: Gdynia Region: Kościerzyna droga: 20, 201, 62 km	Kwikowo kierunek: Słupsk Region: Szczególny droga: 21, 44, 79 km	Kwidzyn (1) kierunek: Malbork Region: Szczególny droga: 55, 61, 835 km	Kwidzyn (2) kierunek: Grudziądz Region: Szczególny droga: 55, 61, 835 km	Miszewo kierunek: Żukowo Region: Gdańsk droga: 20, 302, 15 km	Moszy kierunek: Słupsk Region: Szczególny droga: 6, 262, 083 km
Nowy Dwór Gdański (1) kierunek: Gdańsk Region: Szczególny droga: 7, 56, 739 km	Nowy Dwór Gdański (2) kierunek: Gdynia Region: Szczególny droga: 7, 56, 739 km	Rakowice kierunek: Gdańsk Region: Szczególny droga: 91, 80, 408 km	Sębórze kierunek: Gdynia Region: Szczególny droga: 6, 219, 16 km	Solnica kierunek: Gdańsk Region: Szczególny droga: 7, 65, 34 km	Strzebielino kierunek: Rada Region: Szczególny droga: 6, 279, 43 km	Subkowy kierunek: Gdańsk Region: Szczególny droga: 91, 51, 333 km	Suchorze kierunek: Słupsk Region: Szczególny droga: 21, 33 km	Sycowice kierunek: Słupsk Region: Szczególny droga: 6, 179, 1 km
Ustka kierunek: Ustka Region: Szczególny droga: 21, 75, 05 km	Wzrost Gdańsk Lotnisko kierunek: Gdynia Region: Szczególny droga: 56, 330, 003 km	Wzrost Gdańsk Orunia kierunek: Łódź Region: Szczególny droga: 56, 340, 213 km	Wzrost Gdańsk Południe (1) kierunek: Łódź Region: Szczególny droga: 56, 344, 21 km	Wzrost Gdańsk Południe (2) kierunek: Gdynia Region: Szczególny droga: 56, 344, 21 km	Wzrost Gdańsk Port kierunek: Straszyn/Obwodnica Region: Szczególny droga: 57, 8, 637 km	Wzrost Kack (1) kierunek: Gdynia Region: Szczególny droga: 56, 321 km	Wzrost Kack (2) kierunek: Gdańsk Region: Szczególny droga: 56, 321 km	Wzrost Osowa (1) kierunek: Gdańsk Region: Szczególny droga: 56, 324, 086 km



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Del 27 al 30 de junio de 2017
Mendoza - Argentina

DECISIONS SUPPORT SYSTEMS IN POLAND

Traffic Cameras

Kamery w GDDKiA Gdańsk
stan z: 2017-06-23 10:28

zaloguj Koniec sortuj:

<p>Brzezie. kierunek: Człuchów Rejon Człuchów droga: 25, 26.794 km</p>  <p>Szczegóły</p>	<p>Bydlińo. kierunek: Słupsk Rejon Słupsk droga: 21, 67.45 km</p>  <p>Szczegóły</p>	<p>Czersk. kierunek: Starogard Gdański Rejon Człuchów droga: 22, 277.678 km</p>  <p>Szczegóły</p>	<p>Dretyń. kierunek: Słupsk Rejon Słupsk droga: 21, 12.1 km</p>  <p>Szczegóły</p>
<p>Dworek. (1) kierunek: Gdańsk Rejon Gdańsk droga: 7, 47.625 km</p>  <p>Szczegóły</p>	<p>Dworek. (2) kierunek: Elbląg Rejon Gdańsk droga: 7, 47.625 km</p>  <p>Szczegóły</p>	<p>Gdańsk Południe kierunek: Gdańsk Rejon Gdańsk droga: S7, 0.6 km</p>  <p>Szczegóły</p>	<p>Gościcino. (1) kierunek: Gdynia Rejon Gdańsk droga: 6, 288.7 km</p>  <p>Szczegóły</p>



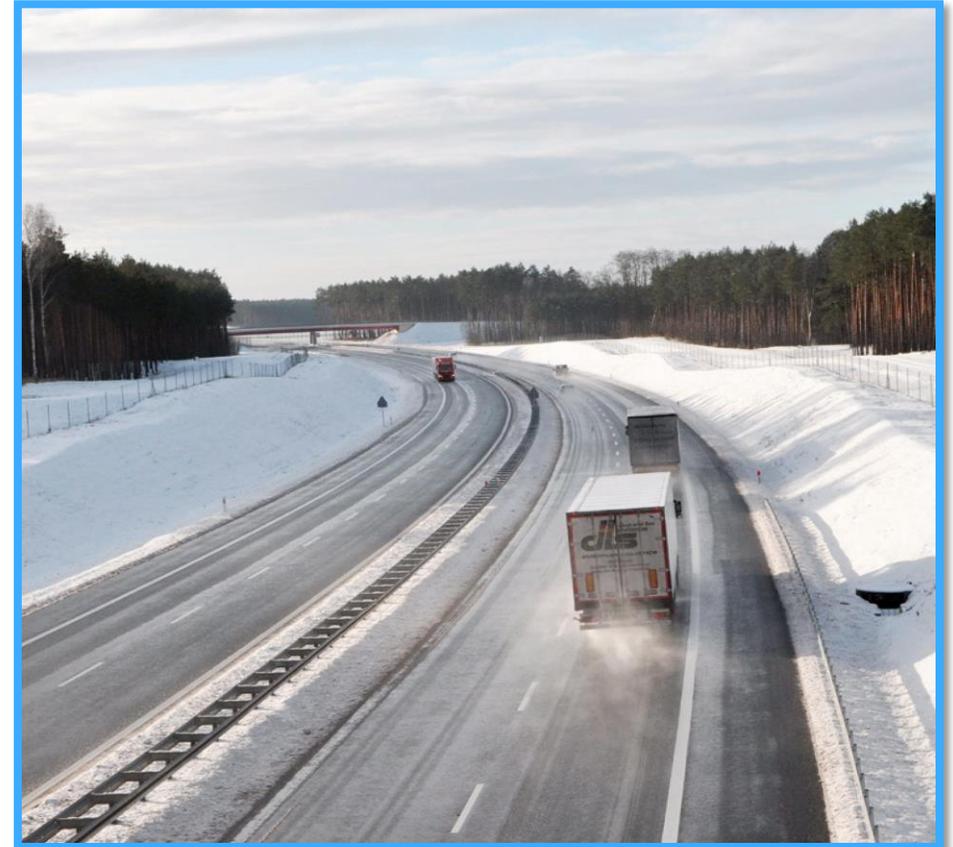
CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL
Del 27 al 30 de junio de 2017
Mendoza - Argentina

SUMMARY

DECISIONS SUPPORT SYSTEMS

provide:

- road evidence;
- grater control over the road network;
- more accurate funds planning;
- road data archive;
- control over the Maintenance Contractor;
- cooperating with mass-media and road users;
- complete weather conditions database;
- view of national roads;





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THANK YOU FOR YOUR ATTENTION



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