AxxonSoft, Inc.

Auto Intellect Software Package

Administrator's Guide

Version 1.49

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Video Surveillance and Security Solutions

Contents

1 Introduction

1.1 The purpose and structure of this manual

The Auto-Intellect Software Package. The Administrator's Guide document is intended to be used as a reference by system administrators, installation and setup specialists, and administrator users of the Auto-Intellect software.

This manual includes the following:

1. General description of the Auto-Intellect software.
2. Main software and hardware components of Auto-Intellect.
3. Technical requirements for the software and hardware platform.
4. Personnel qualification requirements.
5. Installing the components of Auto-Intellect.
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7. Appendix 1. Description of the interfaces.
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9. Appendix 3. Procedures for the Auto-Intellect database and software for fine imposing interaction.
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1.2 The purpose of the Auto-Intellect software package

The Auto-Intellect software package was designed for automated traffic monitoring including the following functionality:

1. License plate recognition.
2. Matching the recognized license plate numbers with the numbers in the Auto-Intellect database.
3. Determining the speed of the vehicles.
4. Determining general parameters of traffic as a whole and determining traffic characteristics of each particular vehicle.
5. Centralized event registration and processing, as well as notification and action generation according to flexible algorithms.
6. Photo and video archive building.
7. The scalability of the software package.

1.3 How to use Auto-Intellect

The Auto-Intellect software package is installed as an extension for the Intellect software package.

To operate the software properly, please, follow these recommendations:

1. Fulfill your job description accurately.
2. Use the software for the intended purpose.
3. Do not use the computer with Intellect installed, to run other software which is not part of the Intellect package.

2 General description of the Auto-Intellect software

2.1 The structure of the Auto-Intellect system

Auto-Intellect includes the basic version of the Intellect software package with additional software modules, including those from third-party vendors that carry out particular functions: recognizing the vehicle parameters and registering the related events. Auto-Intellect includes the following software modules:

1. Auto-Uragan 3.3.5.18
2. Arena
3. CARMEN-Auto
4. Carmen-parking
5. Radar;
6. Traffic Detector;
7. External Plates Database;
8. Vehicle detector (included in information-gathering subsystem about traffic);
9. Vehicle processor (included in information-gathering subsystem about traffic);
10. Vehicle tracer.

2.2 The Auto-Uragan 3.3.5.18 module functionality

The Auto-Uragan 3.3.5.18 software module supports the following functionality:

1. License plates identification;
2. Saving the identified number to the plates detector database;
3. Identification and logging the determined speed of the vehicle to the plates database (while connecting the Radar module);
4. Identification and logging the determined class of a moving vehicle to the plates database (while connecting the Traffic detector module);
5. Check of identified license plates via connected search database;
6. Possibility to work with multilane driveway;
7. Identification of extended list of license plates types: all types of Russian license plates, all CIS countries and Baltic States, countries of Europe, Latin America and The USA. Worked out the main types of single-line plates of different countries, for each both civil and specialized (diplomatic, transit, military etc.);
8. Plates filtration according to their characters' sizes
9. Possibility to change level of plates' identification quality
10. Saving the frames of the identified plates to bmp, jpeg and avi formats
11. Calculation of the capture lanes in the area of identification restriction

The Auto-Uragan 3.3.5.18 software module restricts operation with different typical plates'sizes and templet recognition with the abscense of new licensing key.

The Auto-Uragan 3.3.5.18 software module uses the IPP 6.1 library.

2.3 The Arena module functionality

The Arena software module supports the following functionality:

1. License plates identification;
2. Saving the identified number to the plates detector database;
3. Identification and logging the determined speed of the vehicle to the plates database;
4. Identification and logging the determined class of a moving vehicle to the plates database.

2.4 The CARMEN-Auto module functionality

The CARMEN-Auto software module supports the following functionality:

1. License plates identification;
2. Saving the identified number to the plates detector database;
3. Identification and logging the determined speed of the vehicle to the plates database (while connecting the Radar module);
4. Identification and logging the determined class of a moving vehicle to the plates database (while connecting the Traffic detector module);

2.5 The Carmen-parking module functionality

The CARMEN-parking software module supports the following functionality:

1. License plates identification;
2. Saving the identified number to the plates detector database;

2.6 The ACCR module functionality

The ACCR software module supports the following functionality:

1. Identification of transport containers' license plates;
2. Saving the identified number to the plates detector database.

2.7 The Radar module functionality

The Radar software module supports the following functionality:

1. Registering the hardware devices of the speed-trap type.
2. Determining the speed of the vehicle using the speed-trap device.

2.8 The Traffic Detector module functionality

The Traffic Detector software module is designed for determining general characteristics of the traffic, as well as of each vehicle's parameters.

It supports the following functionality:

1. Determining the overall number of vehicles that passed in each lane.
2. Saving the date and time of vehicle registration.
3. Determining the class of the vehicle.
4. Calculating the total number of vehicles of each class.
5. Determining the speed of the vehicle (using the video image processing algorithm).
6. Determining the speed of the vehicles moving along a specified lane.
7. Calculating the average traffic speed.
8. Calculating the average speed of the vehicles by their class:
   8.1. motorcycle;
   8.2. passenger car;
   8.3. truck shorter than 12 m;
   8.4. truck longer than 12 m;
   8.5. bus.
9. Determining the distance between the vehicles (up to 255 m).

10. Calculating the road load.
11. Registering some moving violations:
    11.1. exceeding the speed limit;
    11.2. driving along the wrong side of the road;
    11.3. stopping violations;
    11.4. invalid reversing;
    11.5. driving forbidden types of vehicle.
12. Detecting traffic jams.

2.9 The External Plates Database module functionality

The External Plates Database software module is designed for comparing the recognized plate number with the number from the external database.

2.10 The Information-gathering subsystem functionality

The information-gathering subsystem module is designed for:

1. Determining the overall parameters of vehicles that passed in camera's view;
2. Gathering information about traffic in general on the basis of vehicles' parameters statistic analysis;
3. Saving the information about traffic to database.

To realize the information-gathering subsystem features the following program modules should interoperate:

1. Vehicle detector;
2. Vehicle processor.

2.10.1 The Vehicle detector functionality

Vehicle detector module is the information-gathering subsystem about traffic in the Auto-Intellect software complex.

Vehicle detector module is designed for:

1. Registering vehicle's entrance and exit from the detection zone;
2. Determining the speed of the vehicle;
3. Determining the class of the vehicle;
4. Transmitting the data about the vehicle to the Vehicle processor module for handling and saving to the database.

2.10.2 The vehicle processor functionality

The vehicle processor module is a part of the information-gathering subsystem about traffic in the Auto-Intellect software complex.

The module is designed for:

1. Statistic data analysis of vehicles, received from the Vehicle detector module to gather overall information about vehicles;
2. Saving the data about traffic to the database.

2.11 The Vehicle tracer functionality

Vehicle tracer module is designed for identifying vehicles that are on the wanted list or overspeeding. Identifying is performed in real time.

Note. The module is the interface object Vehicle tracer (see section «Setting up the vehicle tracer interface window).

The vehicle tracer module supports the following functionality:

1. Displaying the plates that are in identifying detectors' view;
2. Displaying vehicles' speed (the Radar module is to be connected while using the CARMEN-Auto module);
3. Registering vehicle 's overspeeding with controlled voice notification of the operator;
4. Registering the plate identification in the external database (for example in the search base) with controlled voice notification of the operator;
5. Alarm handling.

2.12 The Red light passing functionality

The red light passing module is designd for identifying vehicles that have passed on the red light. Identifying is performed in real time.

Note. The module is the interface object Red light passing (see section «Setting up the red light passing module"):

1. Setting the alarm when the red light passing is detected.
2. Registering the events in the database.

3 Main software and hardware components of the Auto-Intellect system

3.1 Software

3.1.1 Operating system

Auto-Intellect operates under OS Windows family (see. the “Operating system requirements” section).

3.1.2 Software kernels

Auto-Intellect is delivered in the following configuration versions:

1. Based on the full-scale Intellect software kernel (the intellect.exe software module). The full-scale software kernel supports the videoserver, administration workstation and operator workstation functionality.
2. Based on the reduced software kernel (the slave.exe software module). The reduced kernel supports the operator workstation functionality only.

The operator workstation software does not support system administration functions (object creation, deletion or setup, user registration, user rights management), as well as local database maintenance. The operator workstation module uses the remote database owned by the videoserver or the administration workstation and controlled by the intellect.exe kernel.
The intellect.exe full-scale executable module is used as the main software component. Other functional modules comprise the subsystems and interact with the main system kernel.
The distributed surveillance system is integrated using the interaction of the software kernels.

3.1.3 Functional software modules

The functional software modules are responsible for actual interaction with the hardware and produce the data about the status of the controlled objects. The kernel processes the information received from the software modules and integrates them.
The list of available functional modules depends on the delivery configuration of the system. The executables of the functional subsystems are launched automatically by the kernel during the system configuration.
For example, if a Camera object is created, the video video.run subsystem executable is launched immediately after the corresponding settings are configured.

3.1.4 The internal database of the videoserver

The videoserver internal database contains the following information:

1. system settings (information about the objects created in the system, their properties, the users and user rights, and other data);
2. events registered by the system (event logs) during the time period set in the configuration.

The internal database of the server has the MS SQL format. A list of versions MS SQL Server, supported in Auto-Intellect PC is given in Table 3.1-1.

Table 3.1-1 List of MS SQL Server versions

Version MS SQL Server	Supported edition
MS SQL Server 2005 - see. http://www.microsoft.com	Express Edition
	Workgroup Edition
	Standard Edition

	Enterprise Edition
MS SQL Server 2008 R2 - see. http://www.microsoft.com	Enterprise Edition
	Developer Edition
	Standard Edition
	Express Edition
	Web Edition
	Workgroup Edition

Attention! DBMS SQL Server 2000 is not supported in Auto-Intellect program complex. Technical support is not provided when using this DBMS.

Note. DBMS MS SQL Server 2000 is not supported, beginning from the version Auto-Intellect 4.7.6.

On default MS SQL Server 2008 R2 Express free version is installed with the Intellect software package. The technical characteristics and the limitations of the free version can be found on the vendor's site (see http://www.microsoft.com).

MS Access database format is supported for upgrading from the older Intellect versions.

The object data, the settings of the surveillance systems and the event logs may be automatically replicated from a videoserver or administration workstation to all databases of other videoservers and administrator workstations in the system. The full-scale Intellect kernels communicate with each other using the TCP/IP protocol (if such communication is enabled during the system configuration).

The object information is initially saved in the database of the videoserver or administration workstation which owns the corresponding objects. The information is automatically replicated when the data changes, the kernel is launched or the connection restored.

is used to maintain common event space across the distributed surveillance system.

The replication process is hidden from the user.

3.1.5 The internal database of the Auto-Intellect software module

The Auto-Intellect module internal database contains the following information:

1. the settings of the system objects;
2. events registered by the system (event logs) during the time period set in the configuration.

The internal database of the Auto-Intellect module has the MS SQL format. The free MS SQL Express version is used. The technical characteristics and the limitations of the free version can be found on the vendor's site (see http://www.microsoft.com).

Note. The Auto-Intellect software requires permanent connection to the MS SQL Server (see the Intellect Software Package. Administrator's Guide document).

A commercial version of MS SQL Server can be used to overcome the limitations of the free version of Microsoft SQL Server 2008 R2 Express Edition. See the site of the vendor to learn about the versions of Microsoft SQL Server 2008 R2 (http://www.microsoft.com/sqlserver/en/us/editions.aspx).

3.1.6 Software for the workstations

The digital video surveillance system based on the Auto-Intellect software package can include the following workstation types based on the Intellect platform:

1. Operator workstation;
2. Administration workstation;
3. Videoserver (also including the operator and administration workstation functionality).

The AutoIntellect v.4.7.4.msi executable module should be installed on the main computer in order to support the operation of Auto-Intellect on workstations.
To enable remote operation of Auto-Intellect, the Guardant hardware protection key should be installed on the main computer. The key is included in the Auto-Intellect delivery set. The computer with the administration workstation software installed also supports the operator workstation functionality in case the user logs in using the operator password. If no hardware protection key is installed, the Auto-Intellect software can be used in its demo version only.

3.2 Hardware

The following hardware and software components can be included in the video surveillance system based on the Auto-Intellect package:

1. The operator and administration workstations using IBM-compatible personal computers. Administration workstation functionality includes the operator workstation functionality;
2. Videoservers using IBM-compatible personal computers with specialized hardware installed (audio and video capture cards, USB audio input devices). Videoserver functionality includes the functionality of both workstation types;
3. Administration workstations enabled for videoserver functionality using the network (IP) audio and video capture devices;
4. Network video concentrators (WaweHub, LinuxHub, etc);
5. Network videoservers (Matrix, etc);
6. Analog and IP video cameras;
7. Speed-traps;
8. TCP/IP communications environment.

3.2.1 The Guardant hardware protection electronic key

The Auto-Intellect software package is protected. To install Auto-Intellect on the main computer, the Guardant electronic key for hardware protection must be present. A separate Guardant key is required for each of the following software modules: Uragan, Traffic Detector. When the Radar software module is used, the Guardant key common for both Uragan and Radar modules is used.

3.2.2 Communications environment

The communications hardware of the Auto-Intellect software package allows creation of automated monitoring systems for spacious and highly diverse sites. The components of the system communicate with each other automatically and form an integrated security system.
Local networks (LAN), the Internet (WAN), telephone lines (dial-up) and dedicated lines are used for data exchange and communications between system components using the TCP/IP protocol.

4 Software and hardware technical requirements

4.1 Main computer requirements

The Auto-Intellect software package is designed to be used on te IBM-compatible personal computers.
Computers with CPU Intel Core 2 Duo 3.0 GHz processor and not less than 1 GB RAM are recommended for the Auto-Intellect software package.

4.2 Operating system requirements

The Auto-Intellect software is compatible with both 32-bit and 64-bit license versions of OS Microsoft Windows (see **Ошибка! Неверная ссылка закладки.**). The NTFS file system.

Table 4.2-1 Operating system requirements

Windows version	Supported architecture	Supported release	Note	
Windows XP SP2	x64	Windows XP Professional	OS edition, enabling to use all the realized product functions.	
Windows XP SP3	x86	Windows XP Home Edition	Restrictions, imposed by OS release (1 physical processor, 5 SMB connections) – see. http://www.microsoft.com	
		Windows XP Professional	OS edition, enabling to use all the realized product functions.	
		Windows XP Tablet PC Edition	OS edition, enabling to use all the realized product functions.	
		Windows XP Media Center Edition	OS edition, enabling to use all the realized product functions.	
Windows Server 2003 R2 SP2	x86, x64	Standard Edition	OS edition, enabling to use all the realized product functions.	
		Enterprise Edition	OS edition, enabling to use all the realized product functions.	
		Datacenter Edition	OS edition, enabling to use all the realized product functions.	
		Web Edition (there is no x64-version)	Restrictions, imposed by OS release (2 Gb of main memory, 2 physical processors) – see. http://www.microsoft.com	
Windows Vista SP2	x86, x64	Home Basic	Restrictions, imposed by OS release (1 physical processor, 5 SMB connections) – see. http://www.microsoft.com	
		Home Premium	Restrictions, imposed by OS release (1 physical processor) – see. http://www.microsoft.com	
		Business	OS edition, enabling to use all the realized product functions.	
		Enterprise	OS edition, enabling to use all the realized product functions.	
		Ultimate	OS edition, enabling to use all the realized product functions.	
Windows Server 2008 SP2	x86, x64	Enterprise	OS edition, enabling to use all the realized product functions.	Full Installation type is supported. Server Core Installation type is not supported
		Datacenter	OS edition, enabling to use all the realized product functions.	
		Standard	OS edition, enabling to use all the realized product functions.	
		Web	OS edition, enabling to use all the realized product functions.	
		HPC	OS edition, enabling to use all the realized product functions.	
Windows Server 2008 R2 SP1	x86, x64	Enterprise	OS edition, enabling to use all the realized product functions.	Full Installation type is supported. Server Core Installation type is not supported
		Datacenter	OS edition, enabling to use all the realized product functions.	
		Standard	OS edition, enabling to use all the realized product functions.	
		Web	OS edition, enabling to use all the realized product functions.	

Windows version	Supported architecture	Supported release	Note
		HPC	OS edition, enabling to use all the realized product functions.
Windows 7 SP1	x86, x64	Starter (there is no x64-version)	Restrictions, imposed by OS release (2 Gb of main memory, 1 physical processor, 1 monitor) – see. http://www.microsoft.com
		Home Basic	Restrictions, imposed by OS release (1 physical processor) – see. http://www.microsoft.com
		Home Premium	Restrictions, imposed by OS release (1 physical processor) – see. http://www.microsoft.com
		Professional	OS edition, enabling to use all the realized product functions.
		Enterprise	OS edition, enabling to use all the realized product functions.
		Ultimate	OS edition, enabling to use all the realized product functions.

4.3 Camera requirements for the Auto-Uragan3.3.5.18 software module

The following camera requirements should be met in order to ensure the recognition of license plate numbers using the Auto-Intellect system (see Table 4.3-1).

Table 4.3-1

№	Property	Range	Comment
1	Camera type	CCTV	High resolution digital cameras can also be used. IP-cameras have not been tested.
2	Camera resolution	Not less than 520 TVL horizontally.	Only high resolution CCTV camera usage guarantees the recognition rate declared in the technical characteristics of the system.
3	Illuminance of the monitored area	Not less than 50 lux for cameras with 0.05 lux CCD sensitivity; Not less than 20 lux for cameras with 0.0002 lux CCD sensitivity; 0 lux for cameras with IR illumination.	At night time, standard auto road illumination devices are sufficient to provide 50 lux illuminance in full compliance with the building regulations.
4	Automatic amplification adjustment	LOW or MIDDLE depending on the camera	This function must be enabled. Unfortunately, the scene is usually not sufficiently illuminated, thus the image looks too dark in case this function is disabled. Enabling this function amplifies the whole video signal including the CCD noise. The amplification value is chosen for each camera separately.
5	Auto aperture and auto electronic shutter	- not more than 1/500 sec for vehicle speed below 40 km/h; - not more than 1/1000 sec for fast motions (vehicle speed above 40 km/h).	The image should be sharp. Sharpness can be achieved by locking the shutter speed (exposure). Locking the speed of the electronic shutter is a very important function. When the exposure is long, i.e. the shutter speed is low (1/100, 1/50 sec), the moving objects are blurred in the image. This most affects the small details, eg. the symbols in license plate numbers. The video sequence as a whole may look good enough, but the static frames that comprise it may be blurred, making LP number recognition partially or completely impossible. If the camera is not forced to operate at high shutter speed, it will

№	Property	Range	Comment
			automatically switch to long exposure in case of poor lighting conditions, preventing plates recognition. With the same settings, the camera can recognize the numbers in bright light only, automatically switching to short exposure. If the camera is installed at an angle more than 10 degrees to perpendicular to the license plate, we recommend to halve the shutter speed.
6	Color	Black and white image	No color camera is required for recognition of even colored license plates. Black and white cameras are recommended due to higher resolution and sensitivity compared to color cameras. Color cameras can be used if color images need to be saved only. In case of color camera usage, be sure to provide enough scene illumination at night time.

The following camera functions should be disabled:

1. Video information accumulation mode / night mode;
2. Permanent automatic image sharpness adjustment;
3. Motion detectors;
4. Any information from the camera (name, date, time, etc) inserted in the video image.

4.4 Camera requirements for the Traffic Detector module

The following camera requirements should be met in order to ensure the recognition of license plate numbers using the Auto-Intellect system (see Table 4.4-1).

Table 4.4-1

№	Property	Range	Comment
1	Camera type	Analog color PAL camera, or analog monochrome CCIR camera	IP cameras with not less than 25 fps and 4 Mbit/s bitrate also can be used.
2	Camera resolution	Not less than 480 TLV	
3	Illuminance in the monitored area	Not less than 0.02 lux	
4	Signal/noise ration	50 dB or more	
5	Auto aperture and auto electronic shutter	1/100	
6	Focal length	4-8 mm for 1/3'' CCD Lens with adjusting focal length and auto aperture can be used.	

The frame resolution after digitization should be not less than 352 x 288 (CIF).

4.5 Camera requirements for the Red light passing module

The following camera requirements should be met in order to ensure the recognition of license plate numbers using the Auto-Intellect system (see Table 4.3-1).

Table 4.5-1

№	Property	Range	Comment
1	Camera type	CCTV	High resolution digital cameras can also be used. IP-cameras have not been tested.
2	Camera resolution	Not less than 520 TVL	Only high resolution CCTV camera usage

№	Property	Range	Comment
		horizontally.	guarantees the recognition rate declared in the technical characteristics of the system.
3	Illuminance of the monitored area	Not less than 50 lux for cameras with 0.05 lux CCD sensitivity; Not less than 20 lux for cameras with 0.0002 lux CCD sensitivity; 0 lux for cameras with IR illumination.	At night time, standard auto road illumination devices are sufficient to provide 50 lux illuminance in full compliance with the building regulations.
4	Automatic amplification adjustment	LOW or MIDDLE depending on the camera	This function must be enabled. Unfortunately, the scene is usually not sufficiently illuminated, thus the image looks too dark in case this function is disabled. Enabling this function amplifies the whole video signal including the CCD noise. The amplification value is chosen for each camera separately.
5	Auto aperture and auto electronic shutter	- not more than 1/500 sec for vehicle speed below 40 km/h; - not more than 1/1000 sec for fast motions (vehicle speed above 40 km/h).	The image should be sharp. Sharpness can be achieved by locking the shutter speed (exposure). Locking the speed of the electronic shutter is a very important function. When the exposure is long, i.e. the shutter speed is low (1/100, 1/50 sec), the moving objects are blurred in the image. This most affects the small details, eg. the symbols in license plate numbers. The video sequence as a whole may look good enough, but the static frames that comprise it may be blurred, making LP number recognition partially or completely impossible. If the camera is not forced to operate at high shutter speed, it will automatically switch to long exposure in case of poor lighting conditions, preventing plates recognition. With the same settings, the camera can recognize the numbers in bright light only, automatically switching to short exposure. If the camera is installed at an angle more than 10 degrees to perpendicular to the license plate, we recommend to halve the shutter speed.
6	Color	Black and white image	No color camera is required for recognition of even colored license plates. Black and white cameras are recommended due to higher resolution and sensitivity compared to color cameras. Color cameras can be used if color images need to be saved only. In case of color camera usage, be sure to provide enough scene illumination at night time.

The following camera functions should be disabled:

a. Video information accumulation mode / night mode;
b. Permanent automatic image sharpness adjustment;
c. Motion detectors;
d. Any information from the camera (name, date, time, etc) inserted in the video image.

4.6 Speed-trap requirements

The following speed-trap models are compatible with Auto-Intellect:

1. Iskra DA/210;
2. Rapira

5 Personnel qualification requirements

The administrator of the video surveillance system based on the Intellect platform should have the following level of proficiency:

1. Windows 2000/XP local area network administrator;
2. AxxonSoft products expert. To obtain such proficiency level, one has to take the authorized course in AxxonSoft software products in the AxxonSoft education center.

6 Installation of Auto-Intellect software components

6.1 General description of the Auto-Intellect delivery set

The Auto-Intellect software system is delivered in the form of an installation package on a CD (see Fig. 6.1-1).

Fig. 6.1-1 The Auto-Intellect installation disk

The delivery set includes the following setup files for installing the system on the main computer:

1. setup.exe – starts the Auto-Intellect installation process;
2. setup.iss – contains the information for the installation file launched in hidden mode.

6.2 Hardware installation

The digital video surveillance system based on the Auto-Intellect software package includes the corresponding hardware components. This section describes the setup on main components of the system.

6.2.1 Mounting and setup of the cameras for the Auto-Uragan3.3.5.18 module

The declared recognition quality is guaranteed if the cameras are installed at angles of not more than 20 degrees to the perpendicular to the plate. In case of larger angles (up to 45 degrees) the numbers will be recognized, although the recognition accuracy will decrease.

Table 6.2-1 shows the main parameters required for camera installation.

Table 6.2-1

Parameter	Maximum value	Recommended (optimal) value
Camera height	20 m	6 m
Vertical inclination	30 º	18 º
Horizontal inclination	20 º	5-10 º
Maximum inclination of the license plate	10 º	10 º

Zone width of a CCTV camera:

1. 3 m – frontal camera location;
2. 3.2--3.7 m - side location with an angle of no more than 10-20.

Zone width of a 1 Mpix digital camera:

6.5 m – frontal location.

Zone width of a 3 Mpix digital camera:

6.5 m – frontal location.

6.2.1.1 Camera location on the road

By default, the cameras are installed at a height of 6 m above the controlled lane edge. The control zone center is located 20 m from the camera. The camera is tilted at an angle of18 degrees.

We recommend placing the cameras above the edge of the road, and not above the center. In this case, the horizontal inclination will amount to 4 degrees for the control zone width of 3 m (see Fig. 6.2-1).

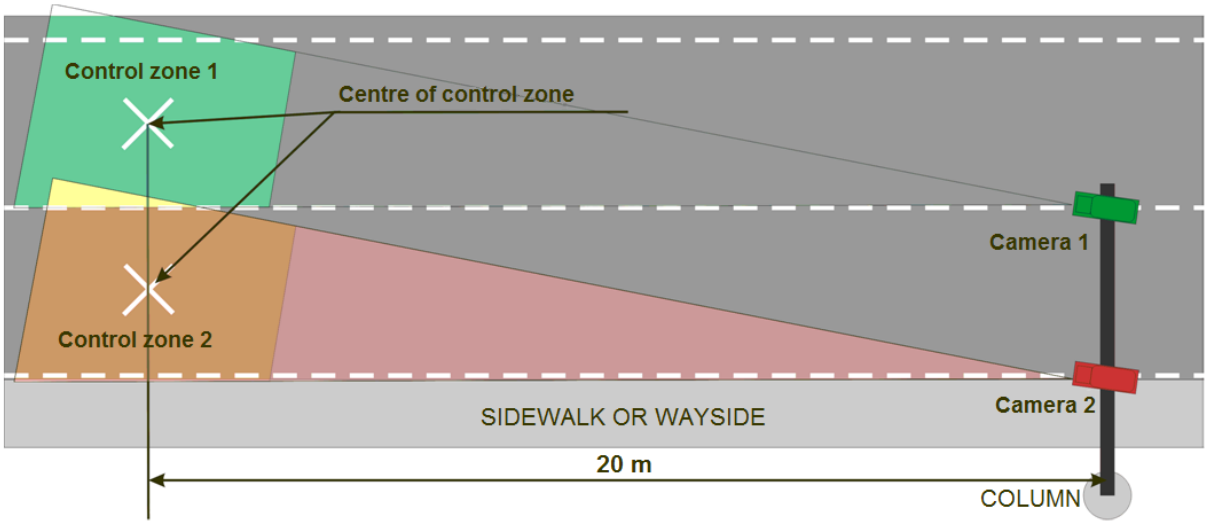

Fig. 6.2-1 Camera locations on the road

6.2.1.2 Camera location at the security sites

By default, the cameras controlling the security site entrances and exits are located at a height of 3 m above the lane edge. The control zone center is then located 11 m from the camera (see Fig. 6.2-2).

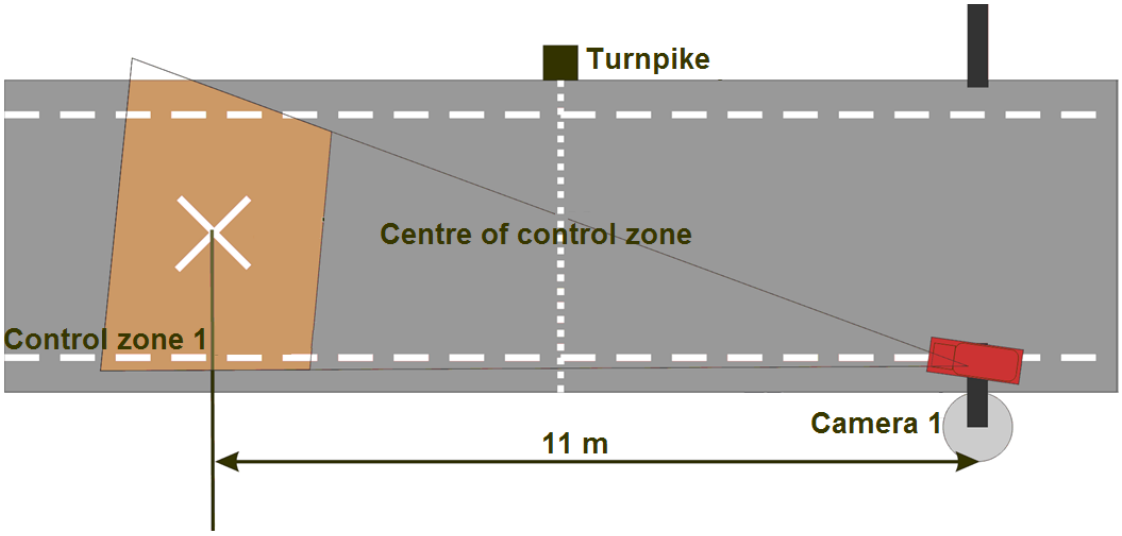

Fig. 6.2-2 Camera location at the security site

6.2.1.3 Setup of the lens focal length

After the camera is mounted, the lens focal length should be adjusted to the required viewing distance.

To set up the lens without the Uragan software, do the following:

1. Direct the camera at the road area where the license plate numbers are to be read;
2. Place a license plate in the center of the control zone. The plate should be perpendicular to the camera axis;
3. Zoom the lens to make the license plate occupy approximately 1/5 of the image at the center of the image;
4. Lock the zoom position;
5. Adjust the image sharpness.

6.2.1.4 Camera setup

To set up the camera, do the following:

1. Set the required shutter speed.

Note. 1/1000 sec is enough in most cases.

2. Set maximum sharpness and dynamic range of the signal, if the camera includes the video signal Level adjustment.

Do the following:

2.1. Aim the camera at a very bright object to catch as much light as possible (but not at the sun!). Decrease the Level value until the image disappears – the lens closes and the image becomes black.

2.2. Gradually increase the Level value until the image appears.

2.3. Close the lens for 5 sec using any opaque object (eg. the palm of your hand). Open the lens again.

2.4. Make sure the image reappears. If the image does not appear, increase the Level value and check the image again.

3. Set the image sharpness. The sharpness should be set up under poor lighting conditions (approx. 10 – 100 lux), when the noise level is just below the signal level. To achieve such conditions, the dark lens filter can be used.

6.2.2 Camera mounting and setup for the Traffic Detector module

The camera should be located at the top of the lamp pole at the edge of the road (side location), or at the horizontal truss above the road (central location).

If the camera meets the requirement described above (see the Camera Requirements for the Traffic Detector Module section) and is aimed at the recommended directions, up to six lanes can be processed in case of a central camera location, and up to four lanes in case of a side location.

When mounting the Traffic Detector cameras, follow these recommendations:

1. Mount the cameras at a height of 8 to 20 m.

Note. Optimum camera height is 12 m.

2. Mount the cameras not farther than 3 m from the road edge.

6.2.2.1 Spatial orientation of the surveillance camera

The camera operates properly if its viewing zone contains not less than 25 m of road length, and the road in the image is as close to vertical as possible. Fig. 6.2-3 shows the road image if the camera is mounted at the recommended location. Fig. 6.2-4 shows the maximum allowable deviation of the road image from the vertical line (30 degrees).

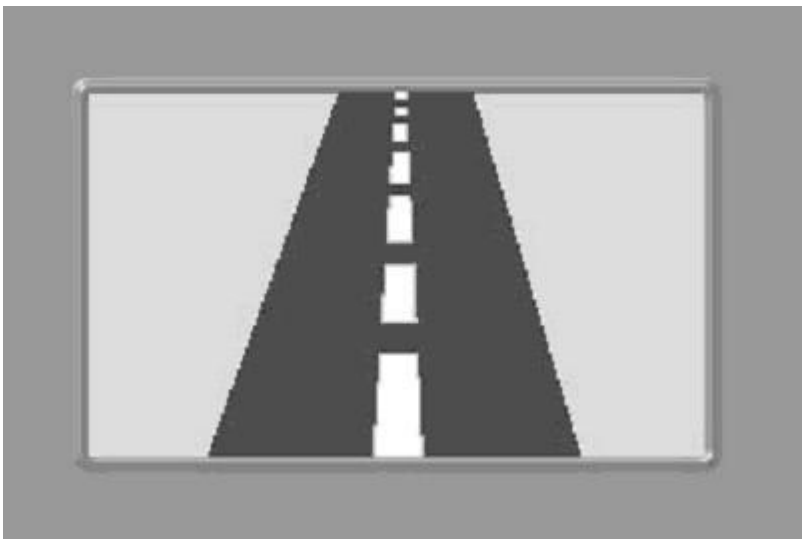

Fig. 6.2-3 The road image in case of recommended camera location

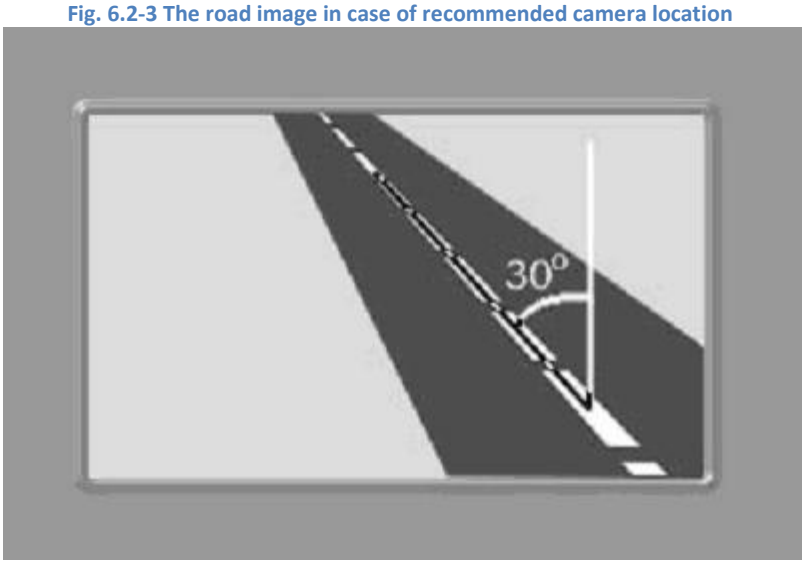

Fig. 6.2-4 Road image deviates from the vertical line at the maximum allowable angle

The camera mount should have two degrees of freedom, which allows it to ajust its orientation in the directions shown in Fig. 6.2-5.

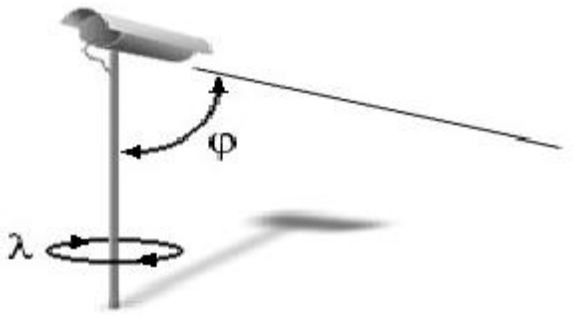

Fig. 6.2-5 Camera degrees of freedom

The camera can be tilted and rotated during its mounting and setup.

6.2.3 Speed-trap mounting and setup

The speed-traps should be mounted and set up according to their documentation.

Note. If the Radar software module is used together with the Traffic Detector module, the speed-trap capture zone should be right next to the capture area of the loop detector of the Traffic Detector module in the direction of traffic movement.

6.3 Installation of the Auto-Intellect software package

This section contains the step-by-step description of Auto-Intellect installation on the server.

Step 1. Insert the Auto-Intellect installation CD into the CD-ROM drive and open it in a separate window.

The window will show the list of files and folders. To start the installation process run the setup.exe file by left mouse button double-click. The file is located in the root folder of the installation CD. Follow the directions of the installation wizard.

Step 2. Welcome dialog box of installation appears with «Welcome to the AUTO Intellect v.4.8.1.15 Setup Wizard» message. To continue the installation process click “Next” (see Fig. 6.3-1)

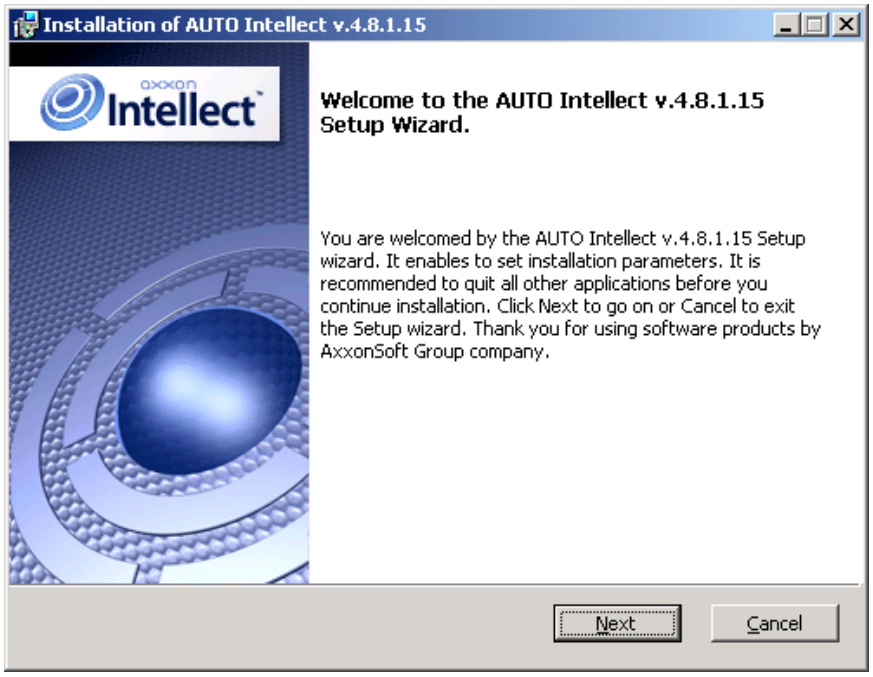

Fig. 6.3-1 Startup dialog box of program installation

Step 3. Accept or reject the License Agreement on Auto-Intellect usage. Read the agreement conditions and confirm you accept them by selecting the “I accept the terms of the License agreement” radio-button. Click “Next” to continue. If you do not accept the terms, quit the installation process (see Fig. 6.3-2)

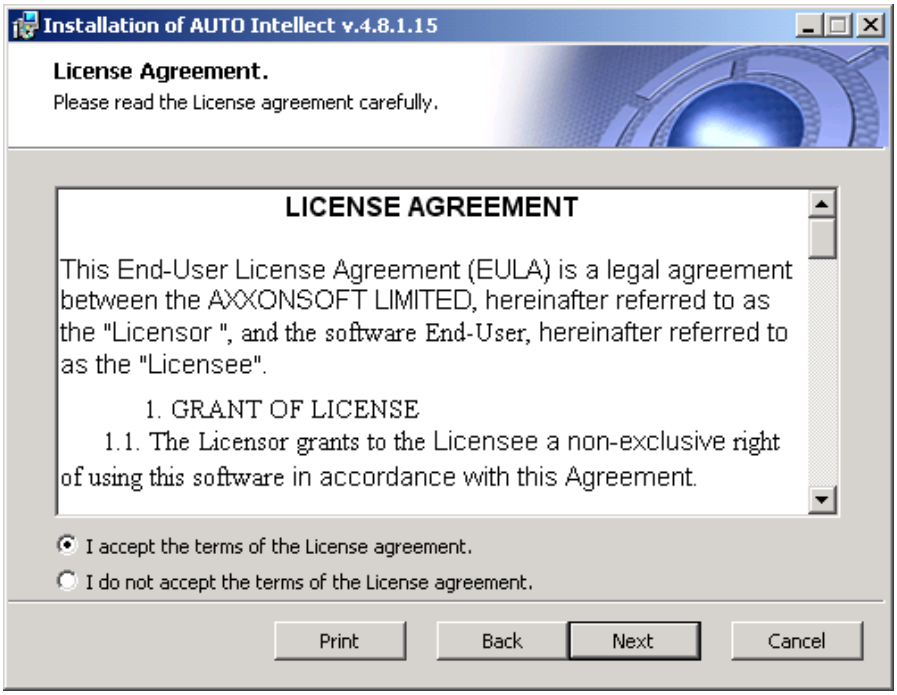

Fig. 6.3-2 License Agreement dialog box

Note. To print the agreement click "Print".

Step 4. Now database MS SQL Server should be selected and authorization parameters while connecting should be stated (see Fig. 6.3-3)

Select an SQL server, using the "Database Server" dropdown list.

Set the autorization parameters, that wll be used by Intellect PC while connecting to SQL-server. Means of autorization, realized in dialog window are given in Table 6.3-1.

To save all changes and continue the installation process click "Next" (see Fig. 6.3-3)

Table 6.3-1 Authentication means

Authentication means	**«Checking Windows authenticity»**	**«Checking SQL- server authenticity with the user of next use name and password» (is recommended)**
Usage	SQL-server from Intellect PC distributive (or from the distributive of the external vendor) and Intellect PC are installed on the same computer	SQL-server from Intellect PC distributive and Intellect PC are installed on the same computer.Meanwhile connection to SQL-server with the set user name (login) and password may be performed through TCP/IP net from any remote computer.
	SQL-server and Intellect PC are installed on different computers conncted through TCP/IP net that are in the same net domain. Meanwhile in OS Windows on the computer with installed MS SQL-	SQL-server from Intellect PC distributive and Intellect PC are installed on different computers, connected through TCP/IP net. Meanwhile the user name

Authentication means	«Checking Windows authenticity»	«Checking SQL- server authenticity with the user of next use name and password» (is recommended)
	server there should be created an account for currently authorized user on the computer, where PC Intellect is being installed.	(login) and password should correspond to user name (login) and password, used for access to SQL-server.
	Full-function SQL-server (is addditionaly installed) and Intellect PC is installed on different computers, conncted through TCP/IP net that are in the same net domain. Meanwhile on the remote SQL-sever there should be created an account for currently authorized user on the computer, where PC Intellect is being installed.	Full-function SQL-server (is installed additionally) and Intellect PC are installed on the same or different computers that are conncted through TCP/IP net. Meanwhile the user name (login) and password should correspond to the user name (login) and password, used for access to SQL-server.

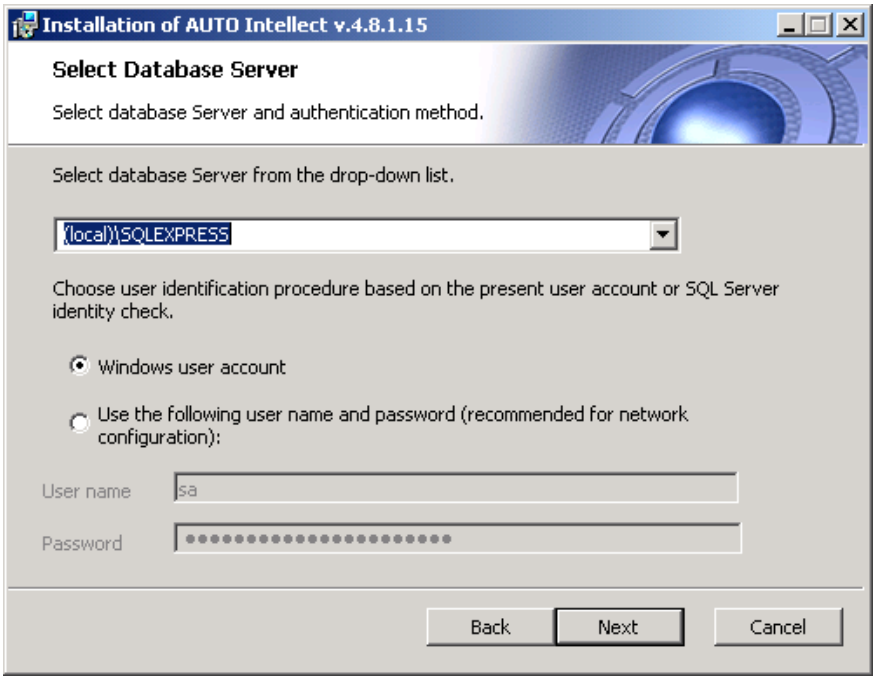

Fig. 6.3-3 Dialog box to select a database server

Note. While using the distributed architecture of video surveillance system you should indicate the login and password to connect to remote video SQL-server. Select «Checking SQL- server authenticity with the use of next user name and password». The choice of this authentication mean allows to provide stable operation of Auto Intellect PC modules with remote resources. The description of Intellect software package configuration while using the distributed architecture of digital video surveillance system is given in «Operator's guide» reference manual.

Step 5. In “Ready to install” diakog box click “Install” to continue the installation process (see Fig. 6.3-4)

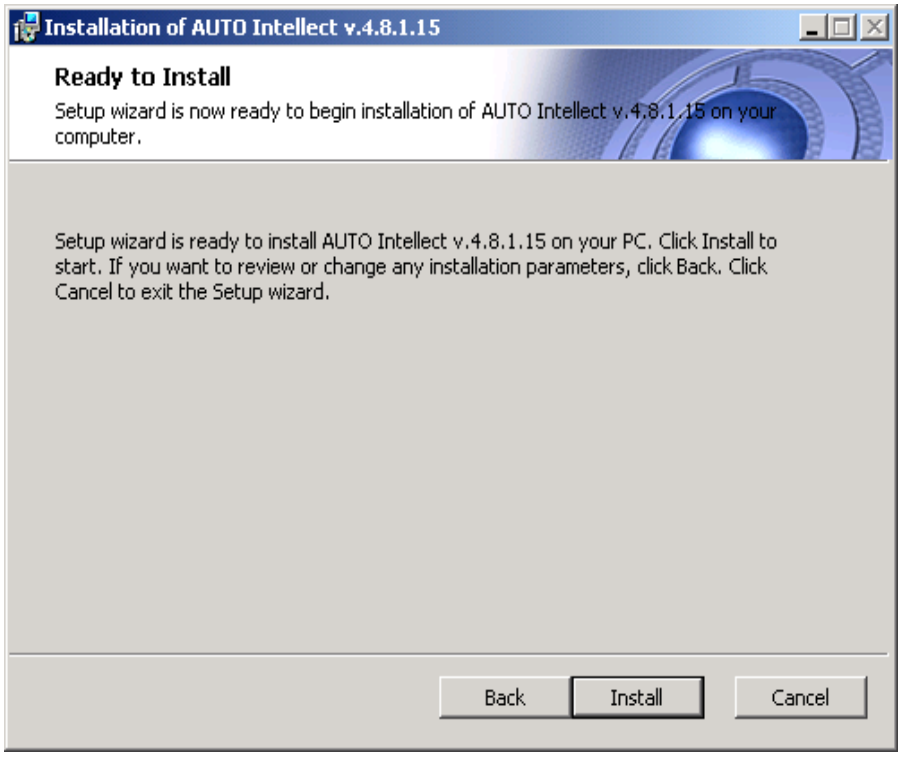

Fig. 6.3-4 Ready to install dialog box

Step 6. The files of Auto Intellect PC are copied to hard drive of your computer (see Fig. 6.3-5)

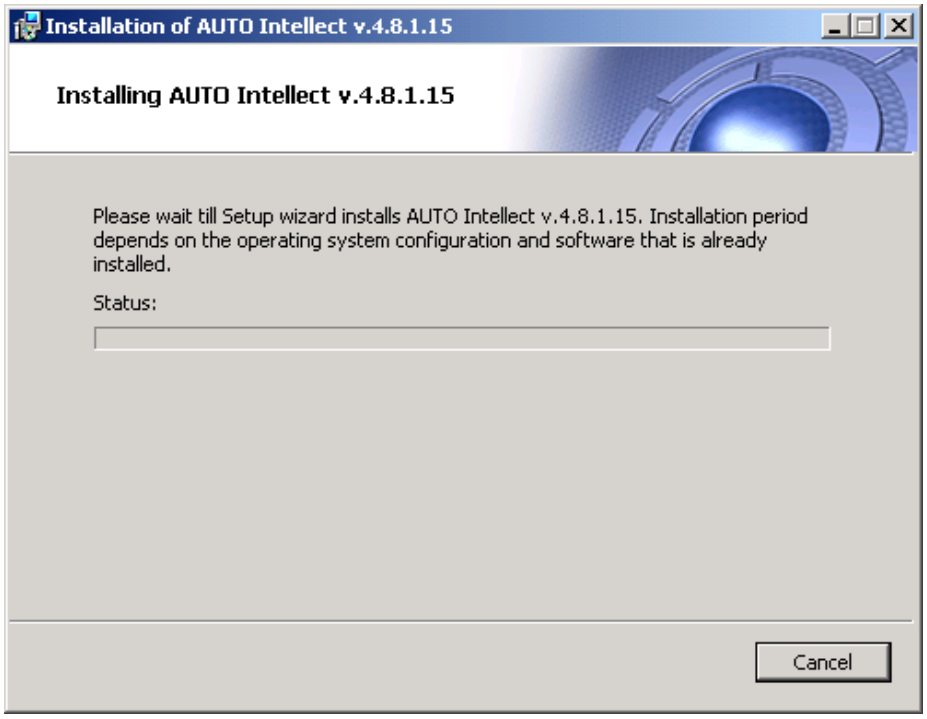

Fig. 6.3-5 Installing dialog box

At this stage you should wait until the end of file copying and subsequent installing box updating.

Step 7. After all software components are installed on your hard drive, the wizard will inform you about the installation completion. Click “Finish” (see Fig. 6.3-6)

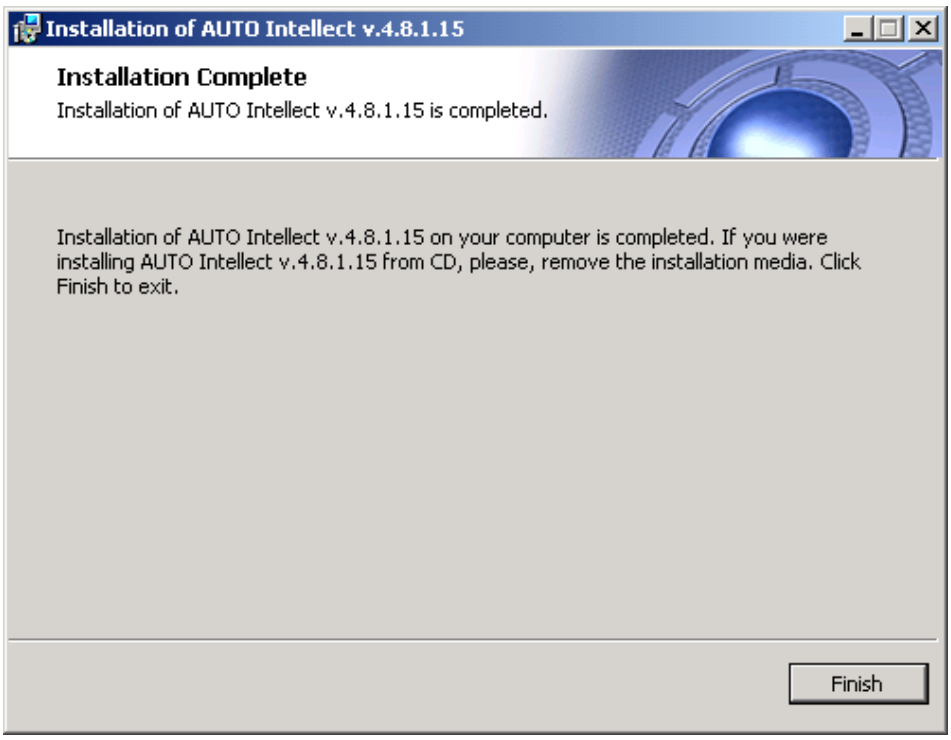

Fig. 6.3-6 Installation complete dialog box

Step 8. As a result a dialog box which warns that you must restart your system for the configuration changes to take effect. To restart your system automatically click Yes (see Fig. 6.3-7).

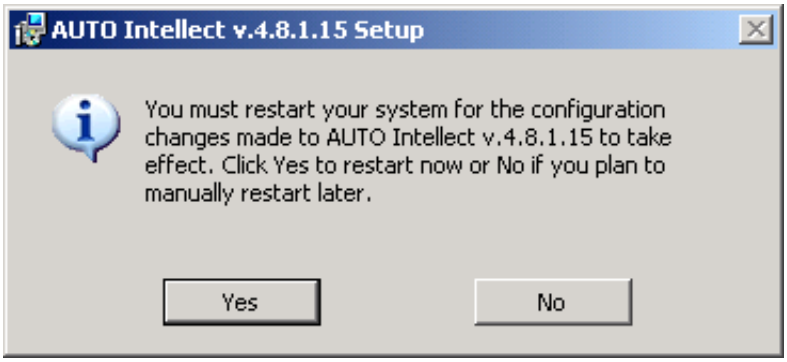

Fig. 6.3-7 Auto Intellect v.4.8.1.15 installation dialog box

Note. To restart your system manually click No.

Auto Intellect installation is completed.

6.4 Repairing the Auto-Intellect software package

The repair mode is used if Auto-Intellect software components need to be re-installed.

To start the repair process, launch the installation process from the installation CD without removing the previous version of Auto-Intellect.

Note. For correct repair of the Auto-Intellect software, please close all other programs on the computer before starting the repair process.

Step 1. Insert the Auto-Intellect installation disk into the CD-ROM drive and open it in a separate window.

Run the setup.exe file by left mouse button double-click to start the repair process. It is located in the root folder of the installation CD. Double-click it. Follow the wizard prompts.

Step 2. At this stage of installation you should choose operation to execute with Auto Intellect. To select repair mode set “Repair” check box and click “Next” (see Fig. 6.4-1)

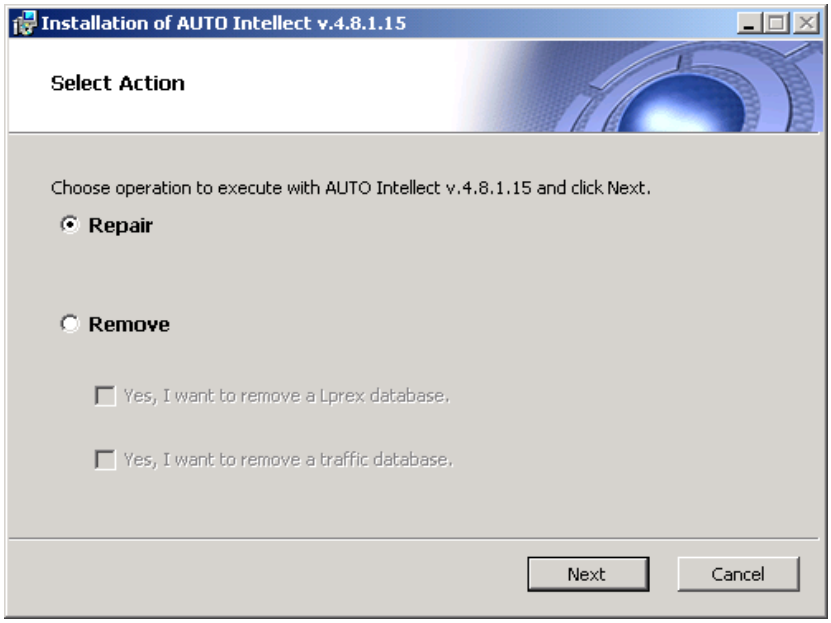

Fig. 6.4-1 The re-installation option selection dialog box

Step 3. At this stage the wizard checks for the installed components and copies the required files from the Auto-Intellect installation CD to the hard drive in the hidden mode. After the copy process is finished, the wizard will inform that Auto Intellect repair is completed. Click “Finish” (see)

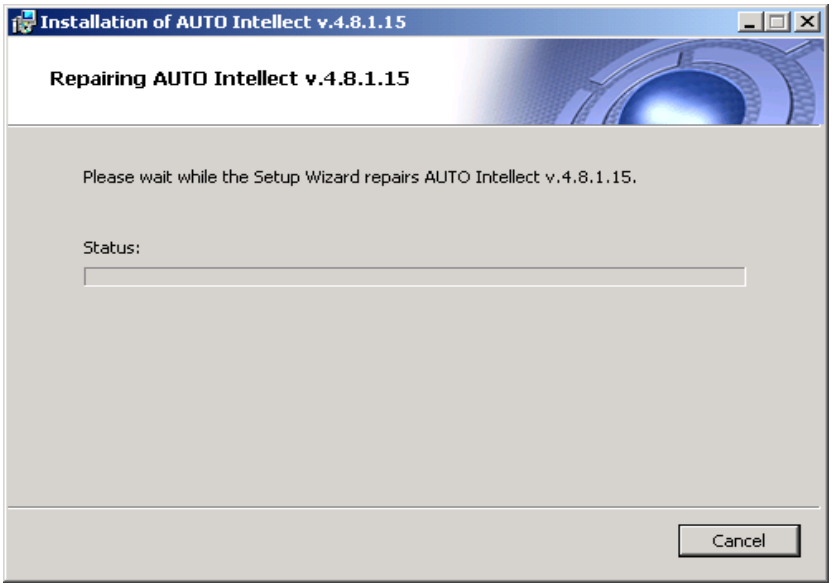

Fig. 6.4-2 Repair dialog box

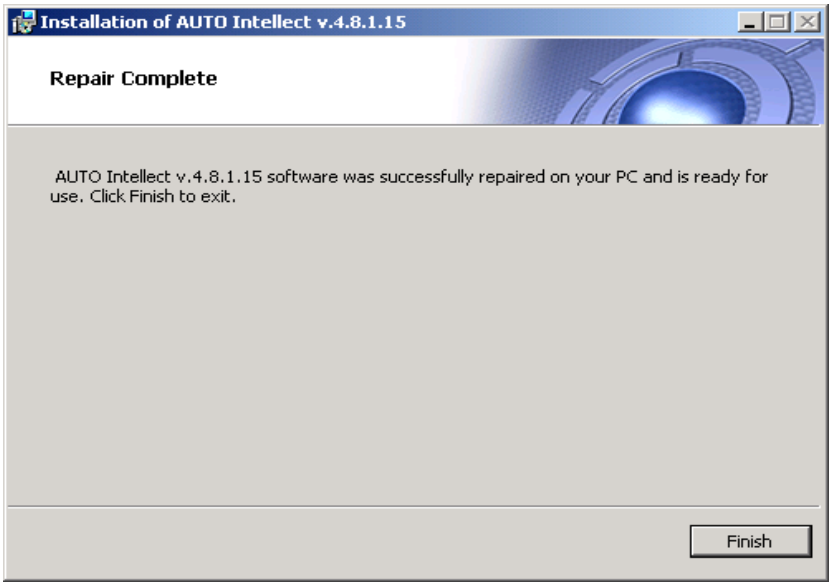

Fig. 6.4-3 Repair completion dialog window

Step 4. As a result a dialog box which warns that you must restart your system for the configuration changes to take effect. To restart your system automatically click Yes (see Fig. 6.4-4).

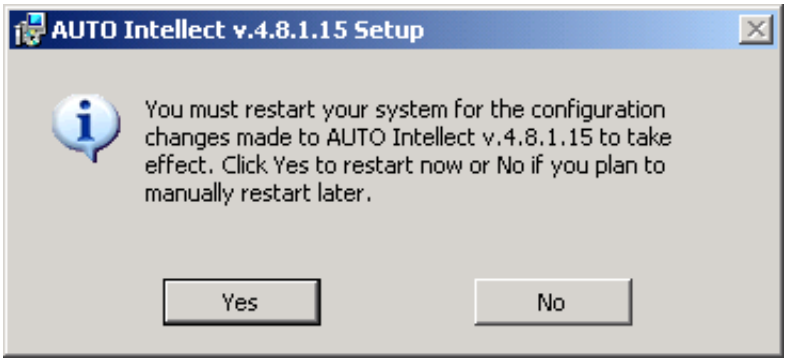

Fig. 6.4-4 Auto Intellect v.4.8.1.15 installation dialog box

Note. To restart your system manually click No.

Repairing the Auto-Intellect software complex is completed.

6.5 Removing the Auto-Intellect software from the computer

The repair mode is used if Auto-Intellect software components need to be re-installed.

To start the repair process, launch the installation process from the installation CD without removing the previous version of Auto-Intellect.

Note. For correct repair of the Auto-Intellect software, please close all other programs on the computer before starting the repair process.

Step 1. Insert the Auto-Intellect installation disk into the CD-ROM drive and open it in a separate window. The list of files and folders appears.

Run the setup.exe file by left mouse button double-click to start the repair process. It is located in the root folder of the installation CD. Double-click it. Follow the wizard prompts.

Step 2. At this stage of installation you should choose operation to execute with Auto Intellect. To select remove mode set “Remove” check box and click “Next” (seeFig. 6.5-1)

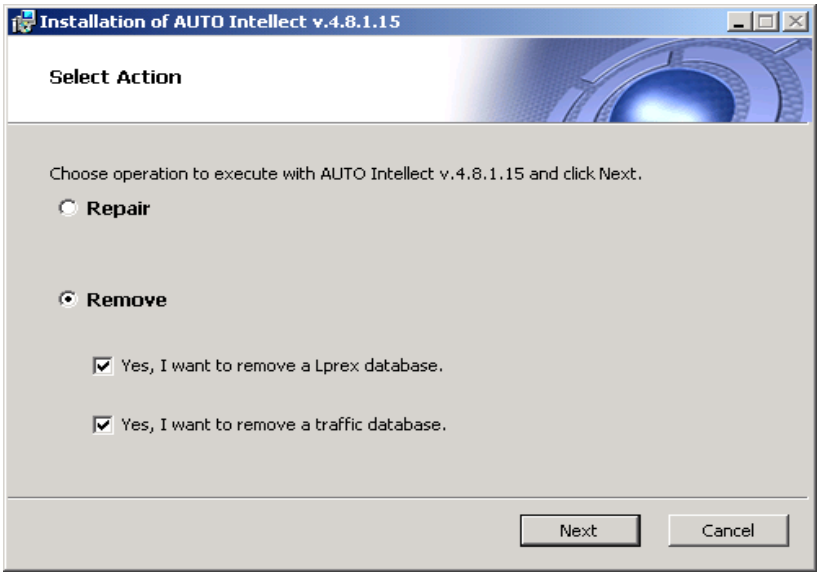

Fig. 6.5-1 The re-installation option selection dialog box

Note 1. To delete the License Plate Recognizer database, check the "Yes, I want to remove a Lprex database" checkbox.

Note 2. To delete the Traffic database, check the "Yes, I want to remove a traffic database" checkbox.

Step 3. Wait until the removal is complete. Click "Finish" (see Fig. 6.5-2, Fig. 6.5-3)

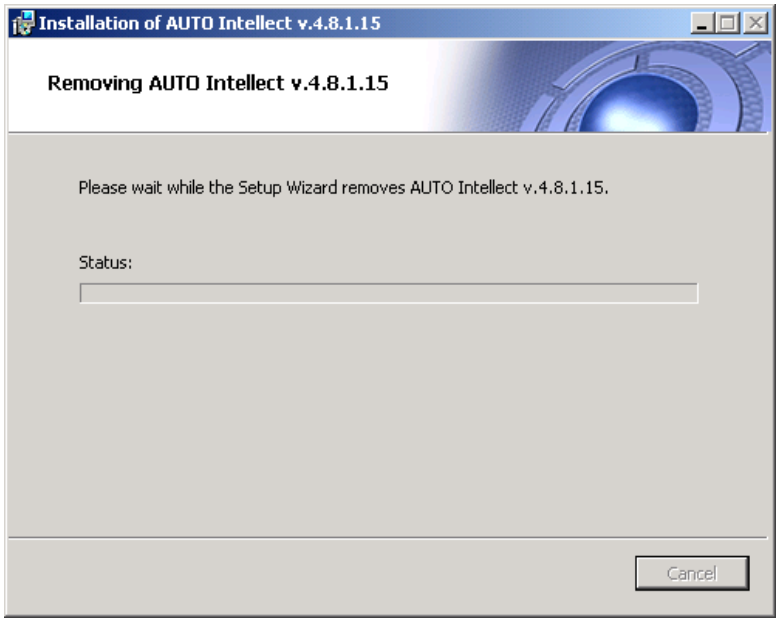

Fig. 6.5-2 Removing Auto Intellect dialog box

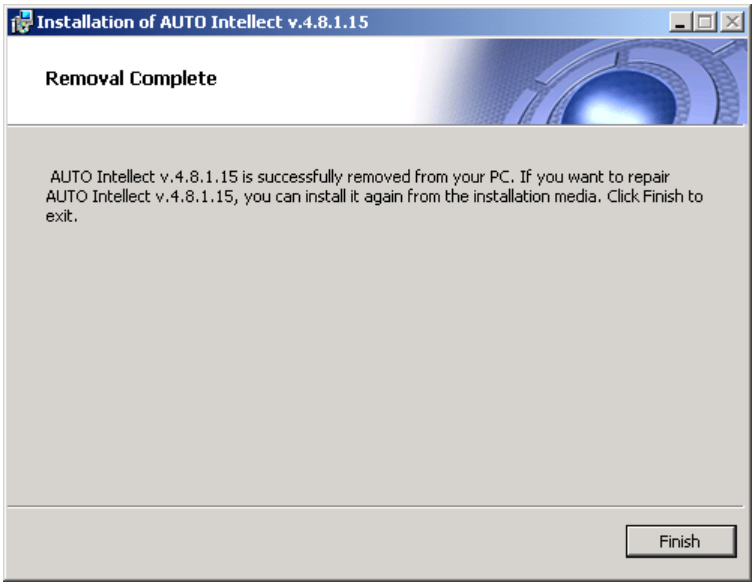

Fig. 6.5-3 Auto-Intellect software removal complete

Removing the Auto-Intellect software is completed.

7 Configurating of the Auto-Intellect software package and setting its components up

7.1 The configuration and setup procedure of the Auto-Intellect software package

The Auto-Intellect software configuration is performed on the basis of Intellect software platform. Necessary system objects for video subsystem performing are considered to have already been configured and set up (see «Video subsystem set up» in the reference manual «Intellect software package: Administrator's guide (Installation and Configuration Manual)).

The second stage in configuring the Auto-Intellect software is to create and set up system objects, necessary for processing the received video in order to identify plates, speed and type of the vehicle in the video surveillance area and also to create databases for storing the received information.

One of the following modules is used to identify vehicle plates:

1. «Auto-Uragan3.3.5.18»;
2. «Arena module»;
3. «CARMEN -Auto»;
4. «CARMEN -parking»;
5. «ACCR».

Note. While identifying the plates by «CARMEN-Auto» module the CPU load is:

1. *10 % for Quad Core i5 750 @ 2,7GHz;*
2. *30% for Athlon X2 5600+ @ 2.81GHz;*
3. *30% for Core 2 Duo 6320 @ 1,86GHz.*

These values exceed similar indexes 30 times more in case of using the Auto-Uragan3.3.5.18 module.

Attention! With the growing number of CARMEN-Auto identifiers on the Auto-Intellect server the rate of video processing by every identifier goes down, that results in lesser percent of the identified characters.

The rate of video processing by CARMEN-Auto can also depend on the model, resolution, color and other camera's parameters.

The program module Traffic detector is used for identifying the type of the vehicle. The Radar module is designed for identifying the speed of the vehicle.

If the Arena module is used and the Auto-Intellect software should be set up, create and set up the following objects:

1. LPR channel (should be only created, not set up);
2. «Arena module»;
3. Vehicle tracer.

If the Auto-Uragan3.3.5.18, Carmen-auto, CARMEN-parking or ACCR modules are used and the Auto-Intellect software should be set up, create and set up the following objects:

1. LPR channel;

Note. LPR channel object is designed for creating the multipurpose settings of the Auto-Uragan3.3.5.18, Carmen-auto, CARMEN-parking and ACCR modules.

2. The Auto-Uragan3.3.5.18, Carmen-auto, CARMEN-parking and ACCR modules dependent on the program module, used for identifying the plates;

Note. These objects are used for activating the similarly-named program modules.

3. Radar module (If LPR channel is used simultaneously with Radar module);
4. Vehicle tracer (If LPR channel is used simultaneously with Vehicle tracer program module);
5. External Plates database (If LPR channel is used simultaneously with external Plates database);
6. Vehicle tracer.

To set up Auto- Intellect PC, when Vehicle tracer is used, the following system objects should be created and set up:

1. Traffic Detector;
2. Monitoring server.

To set up the subsystem, gathering information about vehicle streams , the following system objects should be created and set up:

1. Traffic Detector;
2. Vehicle processor.

7.2 Setting up the LPR channel

LPR channel is used for identifying the plates of vehicles, moving within visibility range of cameras, set above the roadway.

7.2.1 Set up procedure

To set up the LPR channel do the following:

1. activate the program module, used for identifying the plates («Auto-Uragan3.3.5.18 », «Arena», «Carmen-auto», «CARMEN-parking» or «ACCR») by creating the corresponding object on the basis of LPR channel object;
2. select cameras for operation with the LPR channel;

Note. This step and further operations are performed on the LPR channel settings panel, on the basis of which the program module is activated.

Note! In case when Arena program module is used, the parent object LPR channel should not be set up.

3. setting up the video recording parameters;
4. setting up the recording and displaying video frames with a vehicle;
5. selecting the LPR country-emitter (only for, Auto-Uragan3.3.5.18 module);
6. selecting the plates identifying mode (rapid/slow) (only for CARMEN-Auto module);
7. setting up the processing of LPR symbol-digit information (only for Auto-Uragan3.3.5.18 module);
8. setting up the joint operation of LPR channel and the Intellect PC Traffic detector;
9. setting up the databases;
10. setting up the joint operation of LPR channel and Radar program module;
11. setting up the joint operation of LPR channel and Vehicle detector module;
12. setting up the LPR search area border;
13. selecting the vehicle direction for identifying the plates);

14. setting up the LPR channel (only for Auto-Uragan3.3.5.18 module);
15. setting up the frames processing.

7.2.2 Activating the program module, used for identifying the plates

7.2.2.1 General information

Activate one of the following program modules for identifying the plates:

1. Auto-Uragan3.3.5.18;
2. Arena;
3. CARMEN-Auto;
4. CARMEN-Parking
5. ACCR.

For activating the program module one should create one name object on the basis of the LPR channel (Fig. 7.2-1).

Note. After creating Arena module, CARMEN-Parking, Auto-Uragan3.3.5.18 module objects they have to be set up. ACCR and CARMEN-Auto module objects do not have to be set up.

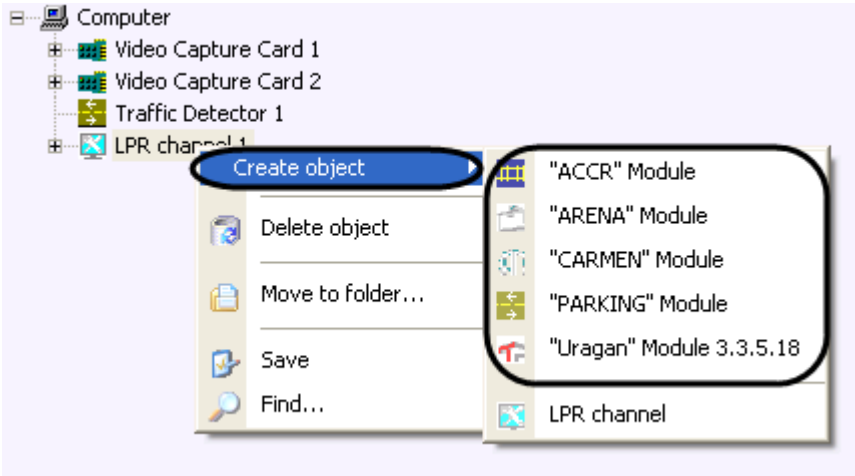

Fig. 7.2-1 Activating the program module, used for identifying the plates

Attention! Only one CARMEN-parking module can be activated on one Server. Choose one of the variants while system configuration with several CARMEN-Parking program modules:
1. Activate one CARMEN-Parking program module at a time on several Servers (electronic protection key for each module is necessary).
2. Activate the requied quantity of CARMEN-Auto program modules on one computer.

7.2.2.2 Setting up the Arena module

Program module Arena provides interaction of velocimeter and Arena photofixation (Arena integrated circuit) and Auto-Intellect PC.

Arena integrated circuit is a monobloc unit containing inside the following devices:

1. radar;
2. camera;
3. computer with installed and set up ftp-server;
4. data storage;
5. devices, providing Arena integrated circuit workability

Note. Detailed information about Arena integrated circuit is given in official reference manual.

Auto –Intellect server requires photos with a stated period of time from Arena integrated circuit. In case when the Auto-Intellect server and Arena integrated circuit are disconnected and then the

connection is restored, the photos made during the connection loss will be downloaded from the ftp-server.

Note. In case of Arena's Web-interface incorrect close the Auto-intellect complex stops receiving events.

To set up the Arena program module, the following data about the Arena integrated circuit are necessary:

1. IP-address of the Arena computer with installed and set up ftp-server;
2. Port for connection to the ftp-server;
3. User name and password for connecting to the ftp-server.

Setting up Arena program module is performed in the following way:

1. Go to the Hardware tab in the system setting dialog window (Fig. 7.2-2, 1).
2. Select the Arena object, corresponding to the set up Arena program module on the Hardware tab (Fig. 7.2-2, 2). The settings panel of the selected object will open on the right side of the window.

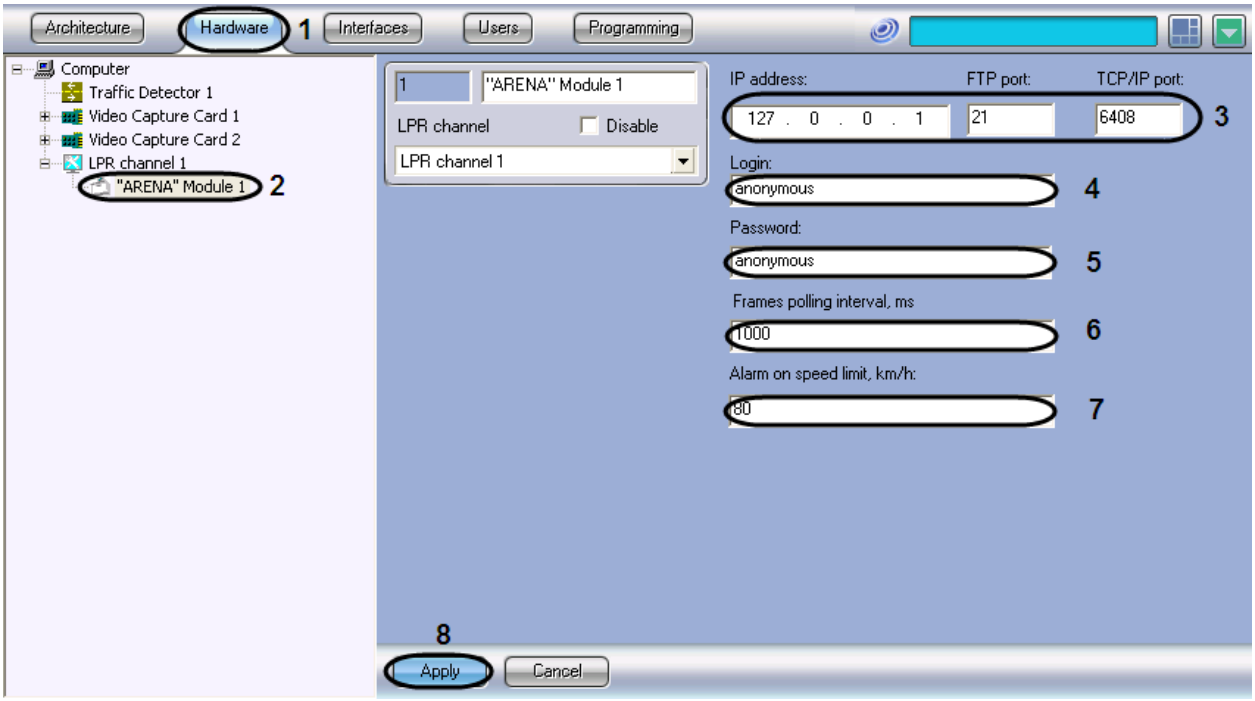

Fig. 7.2-2 Setting up the Arena module

3. In the field «IP address» enter the IP-address of the Arena computer with installed ftp-server (Fig. 7.2-2, 3).
4. In the field «Port» enter the port for connection to the ftp-server (Fig. 7.2-2, 3). Port 21 is used by default.
5. In the Login and Password fields enter the user name and password for connection to this ftp-server (Fig. 7.2-2, 4-5).
6. In the field Frames polling interval (ms) enter the time between two one by one requires Of Auto-Intellect PC for downloading the photos from the Arena integrated circuit (Fig. 7.2-2, 6).
7. In the field Alarm on speed limit enter the maximum available vehicle speed in km/h (Fig. 7.2-2, 7). In case, when the vehicle moves at a speed above the maximum available vehicle speed, the system generates the report about the excessive speed.
8. Click Apply (Fig. 7.2-2, 8).

Setting up the Arena module is completed.

7.2.2.3 Setting up the Auto-Uragan 3.3.5.18 module

Settin up the Auto-Uragan 3.3.5.18 program module is done in the following way:

1. Go to the Hardware tab in the system setting dialog window (Fig. 7.2-3, 1).

2. In the objects tree on the Hardware tab select the Auto-Uragan 3.3.5.18 object, corresponding to the set Auto-Uragan 3.3.5.18 program module (Fig. 7.2-3, 2). The settings panel of the selected object will open on the right side of the window.

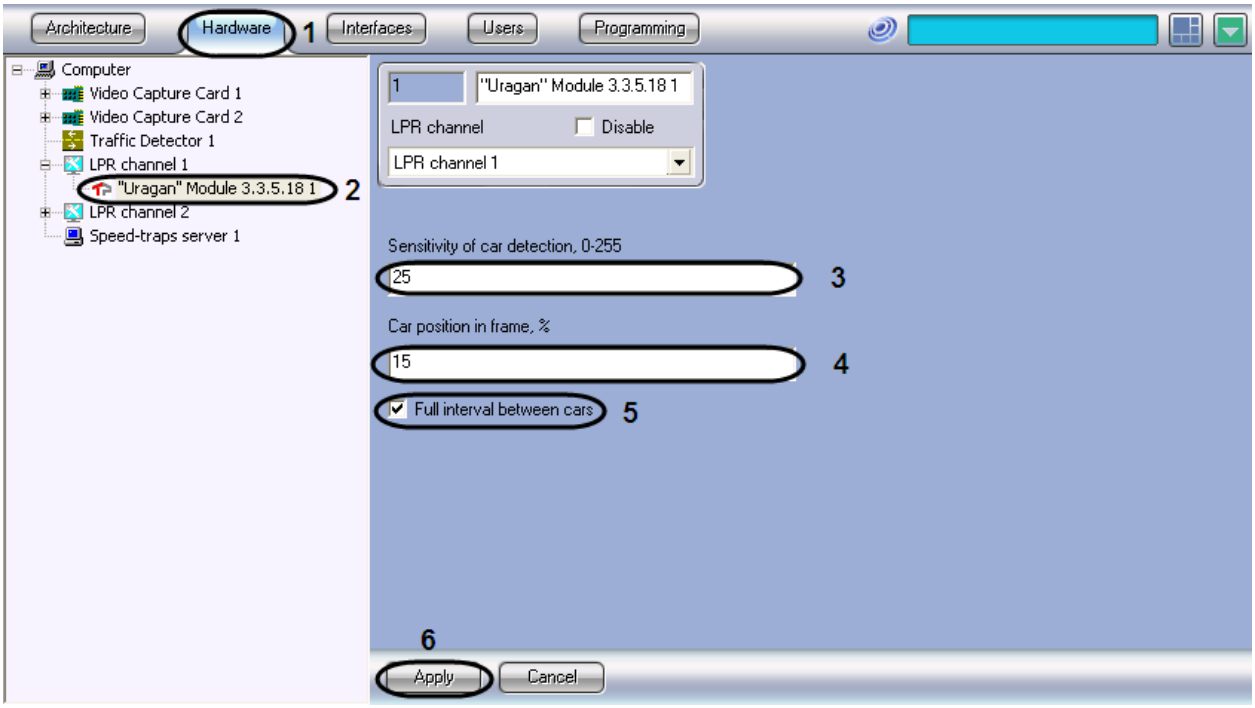

Fig. 7.2-3 Settin up the Auto-Uragan 3.3.5.18 program module

3. In the sensitivity of car detection field (0-255) enter the sensitivity value which characterizes the contrast detector's sensitivity of car's image (Fig. 7.2-3, 3).
4. In the field Car position in frame (0-100) %») enter the value in percent,showing the position of displayed video with a car between the moments of car's appearing and disappearing from the frame (Fig. 7.2-3, 4).
5. Set the checkbox Full interval between cars in case if the recognizer is to be in a waiting state with motion absence in the whole frame (Fig. 7.2-3, 5).
6. Click Apply to save the changes (Fig. 7.2-3, 6).

Settin up the Auto-Uragan 3.3.5.18 program module is completed.

7.2.2.4 Setting up the CARMEN-parking module

Settin up the CARMEN-parking program module is done in the following way:

1. Go to the Hardware tab in the system setting dialog window (Fig. 7.2-4, 1).

2. In the objects tree on the Hardware tab select the CARMEN-parking object, corresponding to the set CARMEN-parking program module (Fig. 7.2-4, 2). The settings panel of the selected object will open on the right side of the window.

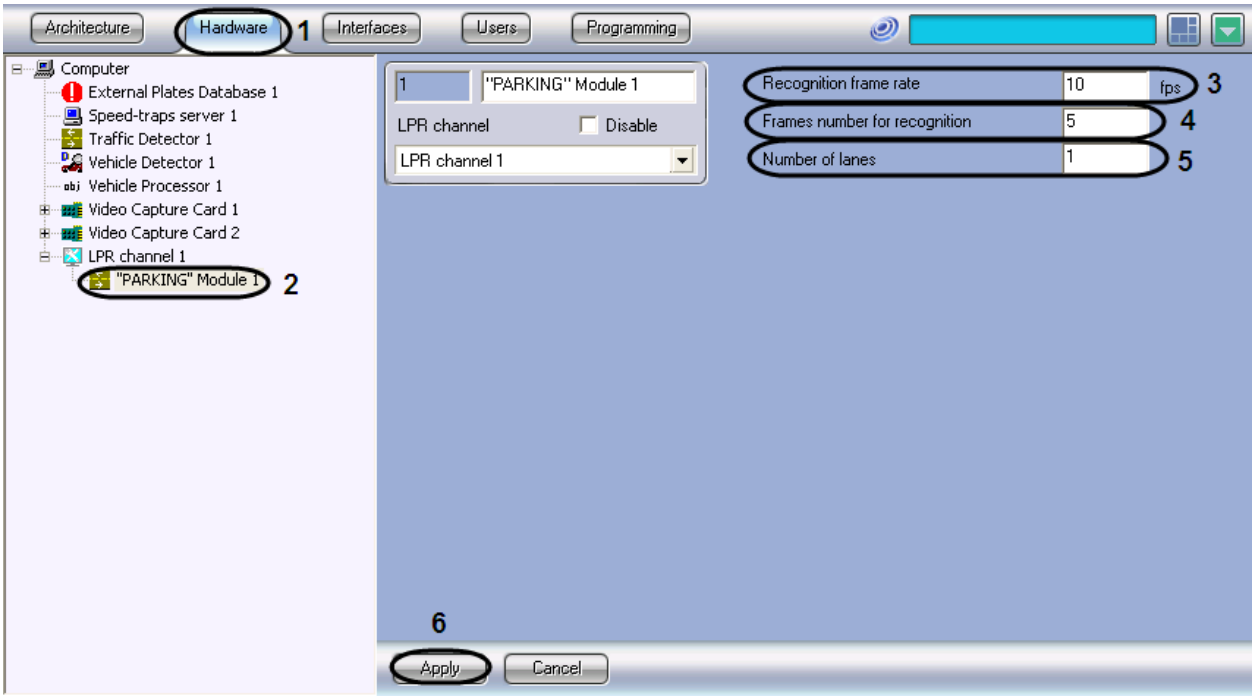

Fig. 7.2-4 Setting up the CARMEN-parking program module

3. In the field Recording frame rate enter the value of recording frame rate per second (Fig. 7.2-4, 3).
4. Enter the value in the field Frames number for recognition (Fig. 7.2-4, 4).
5. Enter the value in the field Number of lanes (Fig. 7.2-4, 5).
6. Click Apply to save the changes (Fig. 7.2-4, 6).

Setting up the CARMEN-parking program module is completed.

7.2.3 Selecting the cameras to work with the LPR channel

To set up the LPR channel, specify the main camera for LP number recognition, and an additional synchronous camera, if necessary.

The main recognition camera is directed at the driving lane. The additional camera covers the same area as the main camera, but it can be mounted in another place. The two cameras can be controlled synchronously using scripts or macros.

Example. Gas filling station. The main camera is directed at the incoming lane and recognizes the LP numbers of approaching cars. The additional synchronous camera is mounted at the side of the lane and monitors the fuelling process.

To select the cameras, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. Select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18, CARMEN-parking or CARMEN-Auto module, in the objects tree on the Hardware tab (see. «Program module activation, used for Plates identification»). The settings panel of the selected object will open on the right side of the window (Fig. 7.2-5).

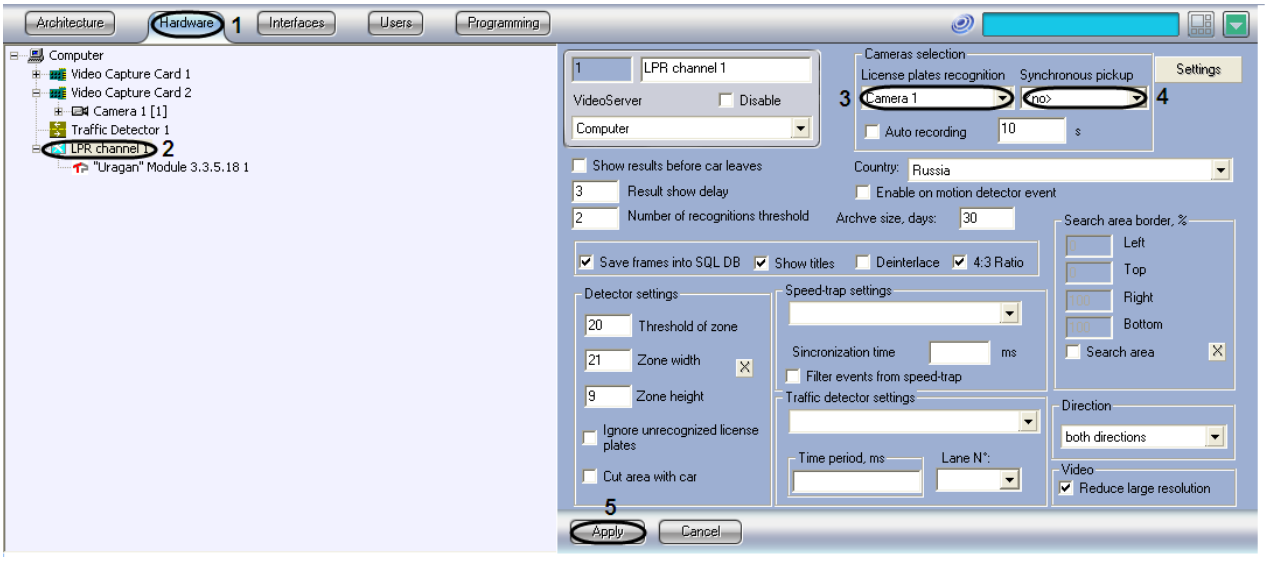

Fig. 7.2-5 Selecting the cameras objects for cooperative work with the LPR channel

3. Select a Camera object in the Camera for LP numbers drop-down list (main camera for LP number recognition).
4. Select a Camera object in the Synchronous camera drop-down list (additional synchronous camera).
5. Click the Apply button.

The camera selection is completed.

7.2.4 Setting up the video recording parameters

The Uragan module can be set to record the video image received by the camera. If this function is enabled, the recording starts automatically when the LPR channel recognizes an LP number. The duration of the recording can also be specified.

Note. In case of heavy traffic, when subsequent LP numbers are registered in a time period smaller than that specified, the video signal is recorded continuously.

To enable automatic recording functionality and to specify the recording duration, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. Select the LPR channel, corresponding to the activated program module, in the objects tree on the Hardware tab (see. «Program module activation, used for Plates identification», see Fig. 7.2-6, 2). The settings panel of the selected object will open on the right side of the window.

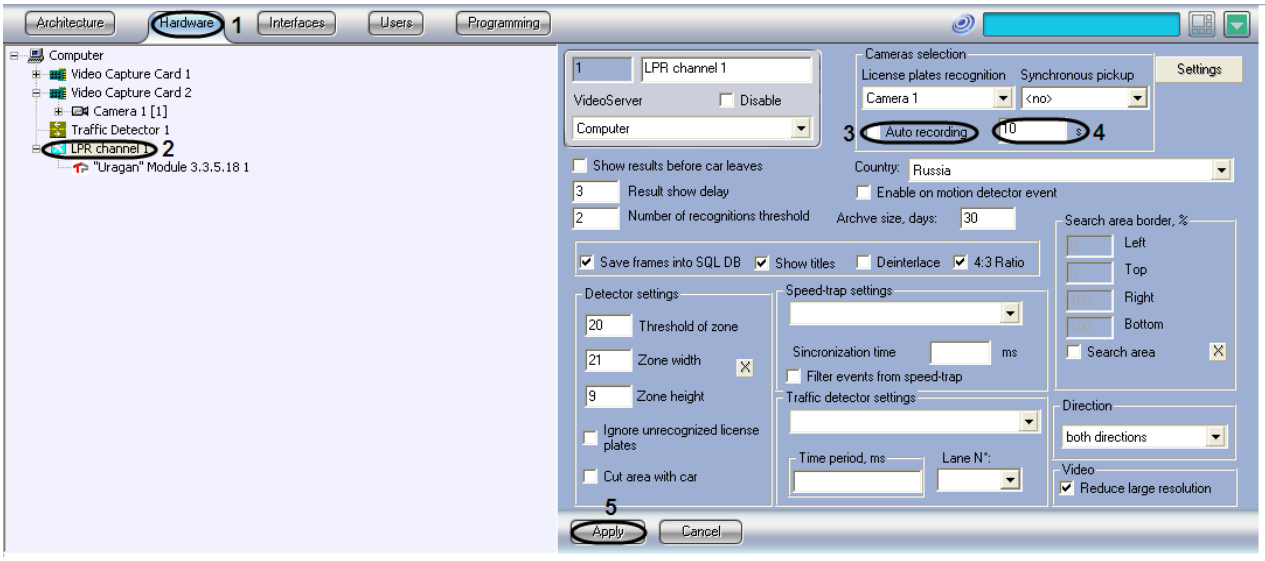

Fig. 7.2-6 Setting up the parameters of automatic video recording

3. Check the Auto record checkbox to enable recording the video upon recognizing an LP number.
4. In the field next to the checkbox, specify for how many seconds the video should be recorded after LP number recognition.

Note. Zero (0) in this field means that the recording starts at the moment of LP recognition and continues indefinitely.

5. Click Apply.

The auto recording setup is complete.

7.2.5 Setting up the saving and displaying of the LP numbers

When the LPR channel recognizes an LP number, it registers this event in its database (by default, LPR). The Uragan module can be set to save the photo image of the vehicle whose LP number has been recognized, to the SQL database.

Note. These settings are given only when Auto-Uragan3.3.5.18, CARMEN-Parking, CARMEN-Auto or ACCR modules are used.

Note. If saving vehicle photos to the SQL database is enabled, the SQL database grows very quickly in size, which considerably increases the CPU load.

Auto-Intellect allows overlaying the symbols of the recognized LP number over the vehicle image saved to the SQL database.

If this function is enabled, the LP number titles are overlaid onto the video image while viewing the full information about the vehicle with the recognized LP number (see Viewing Full Information about the Vehicle with Recognized LP Number section in the Auto-Intellect Software Package. Operator's Guide document).

To set up the saving and displaying of the LP numbers do the following:

1. In the System Settings dialog window, open the Hardware tab (Fig. 7.2-7, 1).
2. Select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18, CARMEN-parking, CARMEN-Auto or ACCR module, in the objects tree on the Hardware tab (see. «Program module activation, used for Plates identification», Fig. 7.2-7, 2).The settings panel of the selected object will open on the right side of the window.

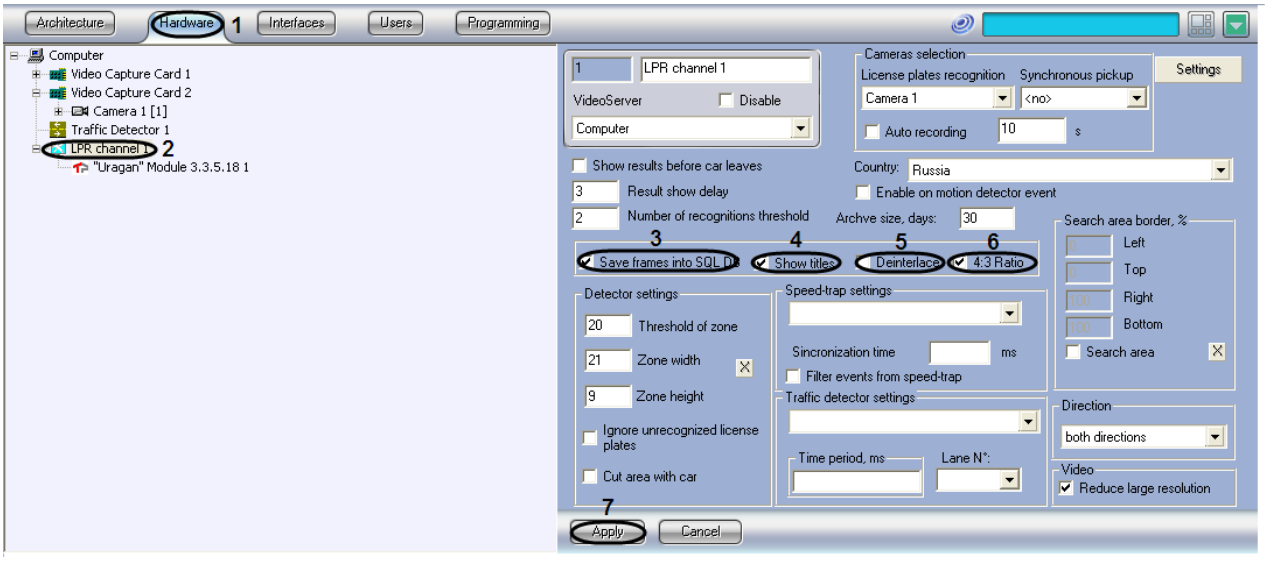

Fig. 7.2-7 Enabling the saving of LP number to SQL DB

3. Check the Save frames into SQL DB checkbox to enable the function of saving the frame with a vehicle, which number has been recognized, to SQL DB.
4. Check the Show titles checkbox to enable the function of interlacing while forming the report about the recognized number.

5. In case, when a video is received in full resolution check the Deinterlace checkbox for deinterlacing of the frame with a vehicle.
6. In case, when there should be displayed a frame with ratio 4:3 in the report about the recognized number, check the 4:3 Ratio checkbox.
7. Click Apply.

Setting the saving and displaying of the LP numbers is complete.

7.2.6 Setting up the frame sign parameters

If the frame sign recording to the LP numbers database is activated, digital sign will be automatically assigned to every recorded LP number.

There is a possibility to change digital sign parameters.

Note. This setting is actual only if the Uragan program module is used.

To set up the parameters of digital frame sign do the following:

1. In the System Settings dialog window, open the Hardware tab (Fig. 7.2-8, 1).
2. Select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18 module, in the objects tree on the Hardware tab (see. «Program module activation, used for Plates identification»).The settings panel of the selected object will open on the right side of the window Fig. 7.2-8, 2).

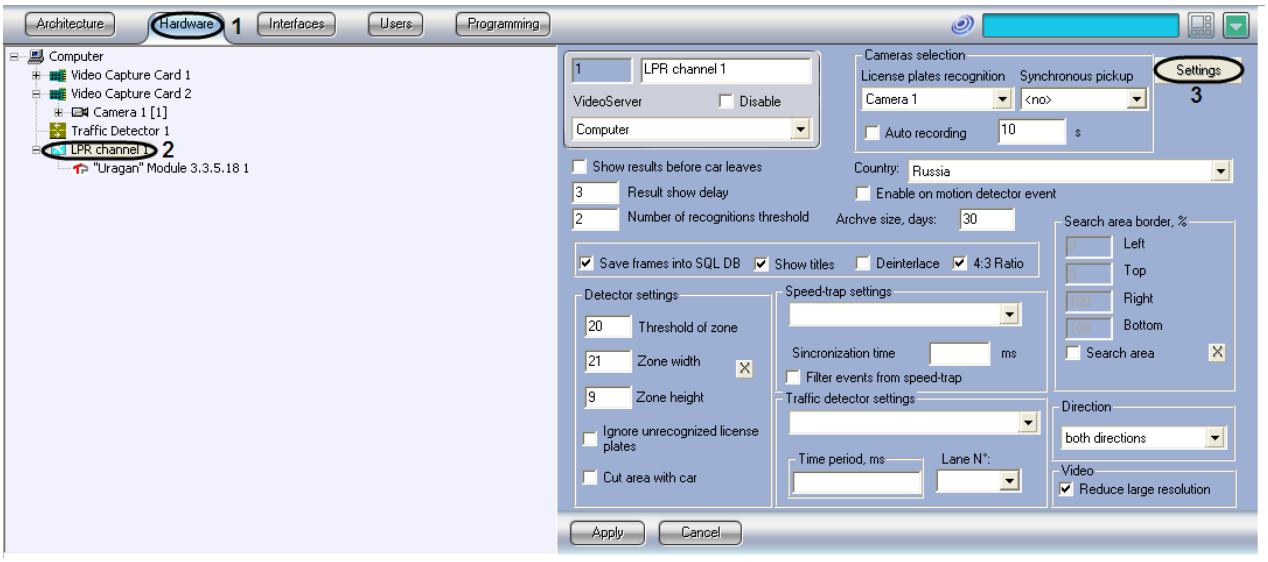

Fig. 7.2-8 Access to frame sign parameters

3. Click Settings button (Fig. 7.2-8, 3).
4. Frame sign parameters dialog window will be displayed in result.
5. Add one or several camera installation and speed detector parameters together with LPR channel to a frame sign. Put a tick in the Enabled checkboxes for necessary parameters in the Speed detector installation group and then enter in the field or select the values of corresponding parameters from the list (Fig. 7.2-9,Table 7.2-1).

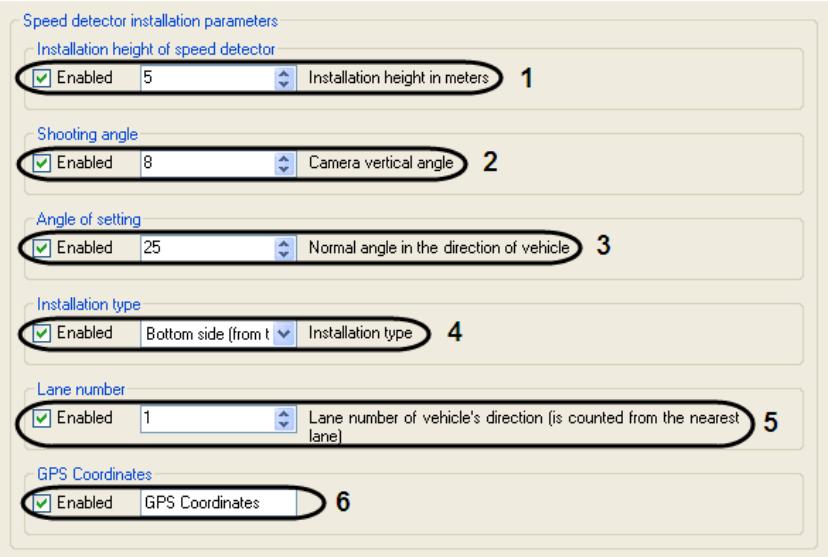

Fig. 7.2-9 Adding the camera's installation and speed detector parameters to the frame sign

Table 7.2-1 Camera's installation and speed detector parameters

№	Parameter	Parameter description
1	Installation height of speed detector	Speed detector installation height in meters.
2	Shooting angle	Angle, made by an camera's objective optical axis and camera's vertical support, in degrees.
3	Angle of setting	Projection to the horizontal plate of the angle, made by speed detector's normal line and vehicle direction trajectory, in degrees
4	Installation type	Installation type of speed detector
5	Lane number	Lane number, controlled by speed detector
6	GPS Coordinates	GPS coordinates of speed detector

6. Add one or several speed detector parameters to the frame sign. Put a tick in the Enabled checkboxes for necessary parameters in the Information about speed detector group and then enter in the field or select the values of corresponding parameters from the list (Fig. 7.2-10,Table 7.2-2).

Fig. 7.2-10 Adding the information about speed detector

Table 7.2-2 Speed detector parameters

№	Parameter	Parameter description
1	Vehicle's serial number	Vehicle's serial number of speed detector
2	Vehicle's name	Speed detector's name
3	Manufacturer identifier	Speed detector's manufacturer identifier
4	Inspection expiring	Date in format «YYYY.MM.DD»,till which speed detector's metrological check is valid
5	Number of inspection certificate	Number of inspection certificate about the last speed detector's metrological check
6	Authority, who has performed the inspection	Authority, who has performed the last speed detector's metrological check
7	Inspection date	Date in format «YYYY.MM.DD» of the last speed detector's metrological check

7. Add one or several speed detector parameters to the frame sign. Put a tick in the Enabled checkboxes for necessary parameters in the Information about speed detector site and then enter in the field or select the values of corresponding parameters from the list (Fig. 7.2-11,Table 7.2-3).

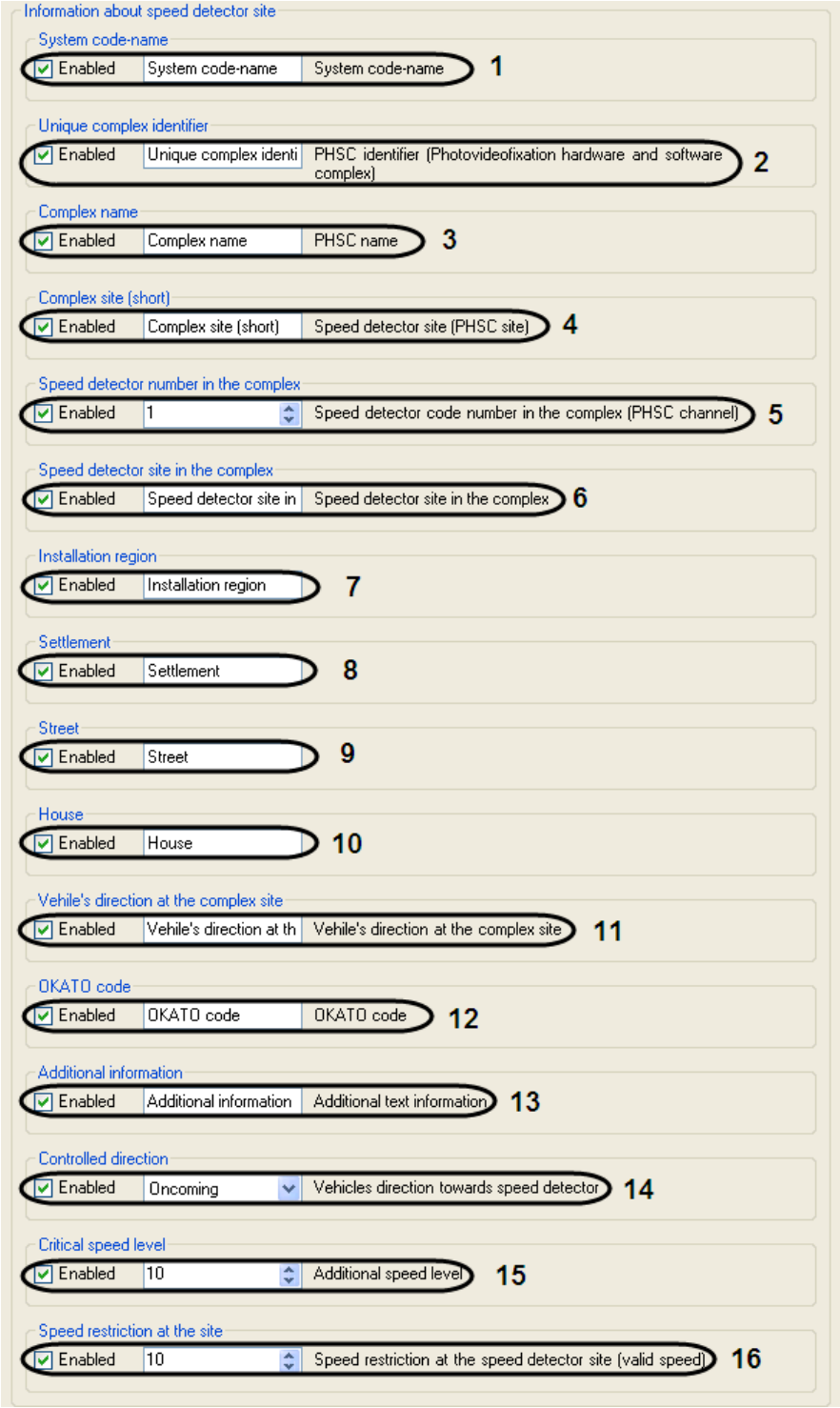

Fig. 7.2-11 Adding information about speed detector site

Table 7.2-3 Speed detector site parameters

№	Parameter	Parameter description
1	System code-name	Photo-video fixation system code-name which contains functioning speed detector
2	Unique complex identifier	Unique complex identifier
3	Complex name	Complex name
4	Complex site(short)	Short description of complex site
5	Speed detector number in the complex	Speed detector number in the complex (channel number)
6	Speed detector site in the complex	Description of speed detector site in the complex

№	Parameter	Parameter description
7	Installation region	Region where speed detector is installed
8	Settlement	Settlement where speed detector is installed
9	Street	Street where speed detector is installed
10	House	House near which speed detector is installed
11	Vehicle's direction at the complex site	Vehicle's direction at the complex site
12	OKATO code	Speed detector site code in All-Russian classifier of administrative territorial division
13	Additional information	Additional information about speed detector
14	Controlled direction	Vehicle's direction in respect of speed detector that controls it
15	Critical speed level	Vehicle's speed that is considered to be critical(for example, alarm is being generated in the process)
16	Speed restriction at the site	Allowed vehicle' speed at the road side , controlled by the speed detector

8. Click OK to save the changes and close Frame sign parameters window (Fig. 7.2-12).

Note. Click «  *» button to close the window without applied changes (Fig. 7.2-12).*

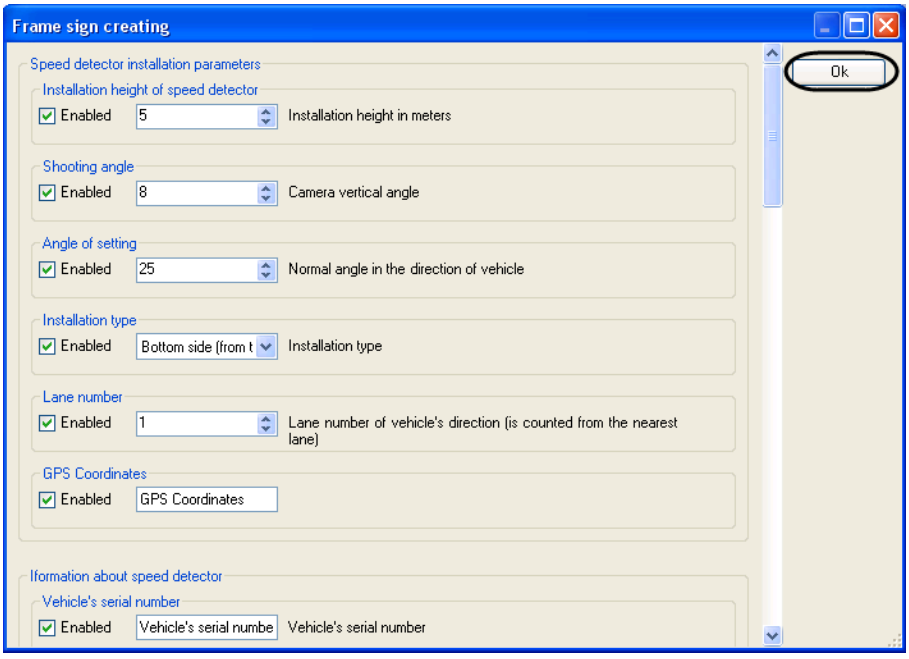

Fig. 7.2-12 Saving the changes in the dialog window Frame sign parameters

Setting up the digital frame sign is completed.

7.2.7 Selecting the emitter-country of vehicles' LP numbers that are to be identified by Auto-Uragan3.3.5.18 module

LPR channel with active Auto-Uragan3.3.5.18 module identifies vehicles' license plates of the following countries:

1. Austria;
2. Argentina;
3. Belgium;
4. Bulgaria;

5. Brazil;
6. Great Britain;
7. Germany;
8. Holland;
9. Greece;
10. Israel;
11. Ireland;
12. Spain;
13. Italy;
14. Canada;
15. Cuba;
16. Morocco;
17. Poland;
18. Russia;
19. CIS countries;
20. The USA;
21. Singapore;
22. Slovakia;
23. Taiwan;
24. Turkey;
25. Uruguay;
26. Croatia.

While setting the LPR channel with Auto-Uragan3.3.5.18 active module it is necessary to state a specific country to be able to identify the plates belonging to that country. This setting specifies the format of the license plates to be used in the recognition process.

Note. The plates of the selected country will be recognized with maximum probability. The plates which do not fit the plate format of the selected country will still be recognized, although with lesser probability.

To select the country, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree on the left side of the Hardware tab, select the Uragan LPR Recognition object representing the Auto-Uragan3.3.5.18 module. The settings panel of the selected object will open on the right side of the window (see section “Activation of program module, used for LP numbers’ identification” Fig. 7.2-13).

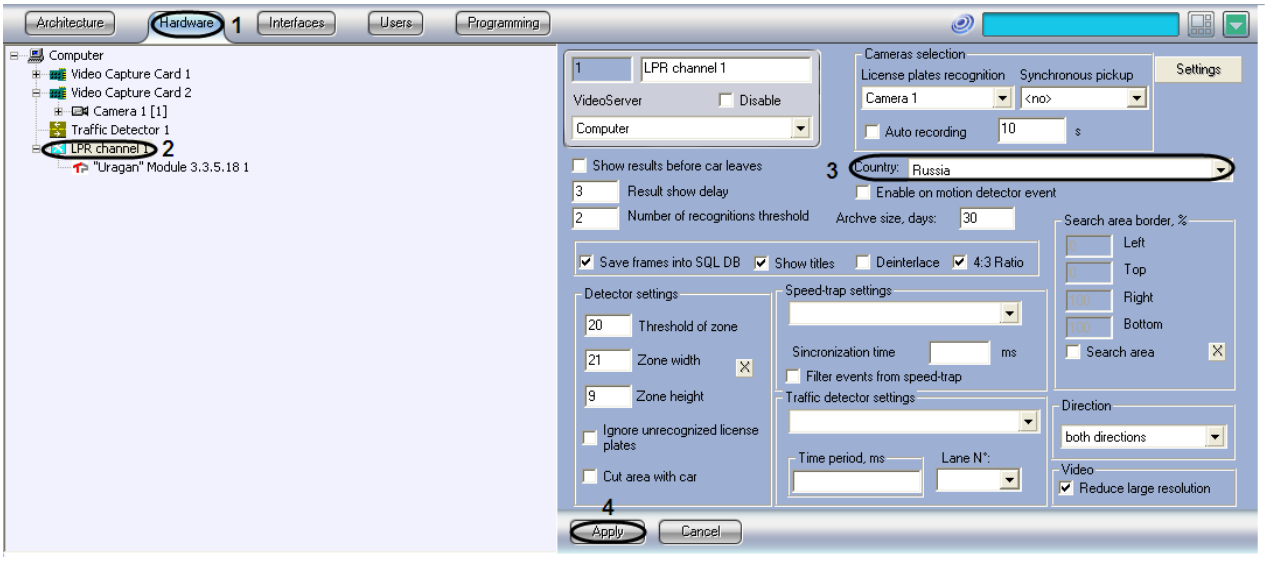

Fig. 7.2-13 Selecting the emitter-state

3. Select the country in the Country drop-down list.

Note 1. To select a state, that is a part of CIS countries or Baltic States, select "CIS" value.

Note 2. If the «CARMEN-Auto» module is activated, Country list is used for selecting the plates identifying mode: slow or rapid.

4. Click Apply (Fig. 7.2-13, 4).

The selection of emitter-state is completed.

In case when the required country is the part of CIS countries or Baltic States it is necessary to confirm that the string group, corresponding to this state in the configuration file of Auto-Uragan3.3.5.18 identifier, is not commented. (Table 7.2-4). If necessary string group should be decommented (Table 7.2-4). The configuration file is named country.cfg and is located in the folder «<Auto-Intellect installation directory>\Modules\ Auto_uragan \Data\».

Note 1. String groups, corresponding to CIS countries and Baltic States, are generated into «Mixing» section in the configuration file *(Fig. 7.2-14).*

Note 2. To decomment a string the symbol «#» in the beginning of the string should necessary be deleted. (Table 7.2-4).

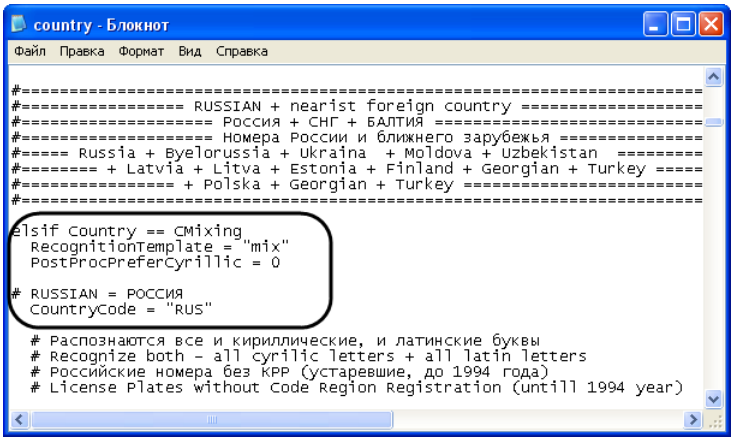

Fig. 7.2-14 «Mixing» section

Table 7.2-4 Editing country.cfg file for CIS countries and Baltic States (exemplified by Latvia)

Commented string group	Decommented string group

# LATVIA = ЛАТВИЯ 	
CountryCode = "LVA"
#==== Use first symbols "#" for "turn off" unnecessary
	# LATVIA = ЛАТВИЯ
	CountryCode = "LVA"
	#==== Use first symbols "#" for "turn off" unnecessary

types after it ====== # pp # white [{hi,cs:$latvia+}CC{hi}DDDD] # Civil N1 (4 digits): "DE 4567" # white [{hi,cs:$latvia+}CC{hi}DDD] # Civil N2 (3 digits): "DE 456" # white [{hi,cs:$latvia+}CC{hi}DD] # Civil N3 (2 digits): "DE 45" # red [{cs:"C"}C{cs:"D"}C{hi}DDDD] # Diplomat: "CD - 1510" # red [{cs:"C"}C{cs:"C"}C{hi}DDDD] # Diplomat: "CC - 1510" # endpp	types after it ====== pp white [{hi,cs:$latvia+}CC{hi}DDDD] # Civil N1 (4 digits): "DE 4567" white [{hi,cs:$latvia+}CC{hi}DDD] # Civil N2 (3 digits): "DE 456" white [{hi,cs:$latvia+}CC{hi}DD] # Civil N3 (2 digits): "DE 45" red [{cs:"C"}C{cs:"D"}C{hi}DDDD] # Diplomat: "CD - 1510" red [{cs:"C"}C{cs:"C"}C{hi}DDDD] # Diplomat: "CC - 1510" endpp

7.2.8 Selecting the LP numbers' identification mode

7.2.8.1 General data

If the Auto-Uragan or CARMEN-Auto module is activated, there is a possibility to select the LP numbers' identification mode (Table 7.2-5).

Table 7.2-5 LP numbers' identification modes

Module	Identification mode	Vehicle's speed	Recommended video fps	Mode selection
Auto-Uragan	Slow	Up to 10 km/h	From 4 fps	By hardware - with the use of Guardant key
	Rapid	Up to 150 km/h	From 25 fps	
CARMEN-Auto	Slow	Up to 10 km/h	From 4 fps	By software – on parent object's settings panel «LPR channel»
	Rapid	Up to 250 km/h	From 25 fps	

The selection of rapid or slow LP numbers' identification mode is firstly caused by allowed speed on the road section, controlled by the identifier.

7.2.8.2 Selecting the plates' identifying mode by the CARMEN-Auto module

To select the plates' identifying mode by «CARMEN-Auto» module do the following:

1. In the System Settings dialog window, open the Hardware tab (Fig. 7.3-6, 1).

2. Select the LPR channel, corresponding to the activated CARMEN-Auto program module in the objects tree on the Hardware tab (see. «Program module activation, used for Plates identification»).The settings panel of the selected object will open on the right side of the window (Fig. 7.3-6, 2).

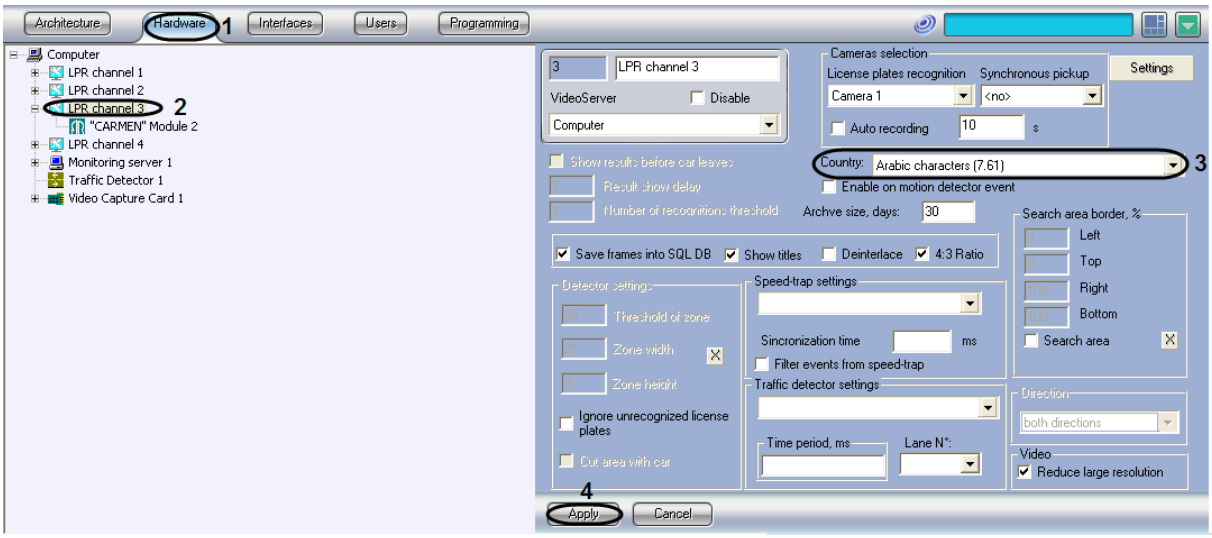

Fig. 7.2-15 Selecting the plates' identifying mode by «CARMEN-Auto» module

3. Select one of the following value from the Country list(Fig. 7.3-6, 3):

3.1. «Arabic characters» (7.61)» - for recognizing and identifying the plate's type, corresponding to Arabic countries.
3.2. «Latin characters» (7.62) » - for recognizing and identifying the plate's type, corresponding to all European countries, including Russia.
3.3. «Common characters» (7.62) » - for recognizing all the Latin characters of the plates (for example, relevant to such counties as Argentina, India, Africa and Singapour). The country recognition function is not used.
3.4. «Common characters – rapid (7.62) » - for recognizing all the Latin characters of the plates in a rapid mode (for example, relevant to such counties as Argentina, India, Africa and Singapour). This value is a rapid variant of «Common characters (7.62) », but it is more sensitive to the quality of the image. Recommended to use only in optimal conditions as the recognition rate may decrease with a bad quality of the image.
3.5. «Common characters – optimized (7.68)» - updated version «Common characters (7.62)», is used for the most precise and rapid recognizing all the Latin characters of the plates.

Note 1. The counties recognition functional is realized in the Auto-Intellect PC only for «Auto-Uragan 3.3.5.18» and «CARMEN-Auto» modules.
Note 2. The counties recognition functional for the «CARMEN-Auto» module is realized only when the values Latin characters (7.62)» or Arabic characters are selected (7.61)».

4. Click Apply (Fig. 7.3-6, 4).

Selecting the plates' identifying mode by «CARMEN-Auto» module is completed.

7.2.9 Setting up the LP number handling parameters

The LP numbers of passing vehicles are automatically identified and subsequently shown in the LPR Channel. On default the identified number is displayed after the vehicle leaves the camera viewing zone.

Note. Is set only when Uragan software module is used.

The Uragan module can be set to recognize and show the LP number before the vehicle leaves the camera viewing zone.

If the LP number should be shown before the vehicle leaves the viewing zone, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree on the left side of the Hardware tab, select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18 module in the objects tree on the Hardware tab (see. «Program module activation, used for Plates identification»).The settings panel of the selected object will open on the right side of the window.

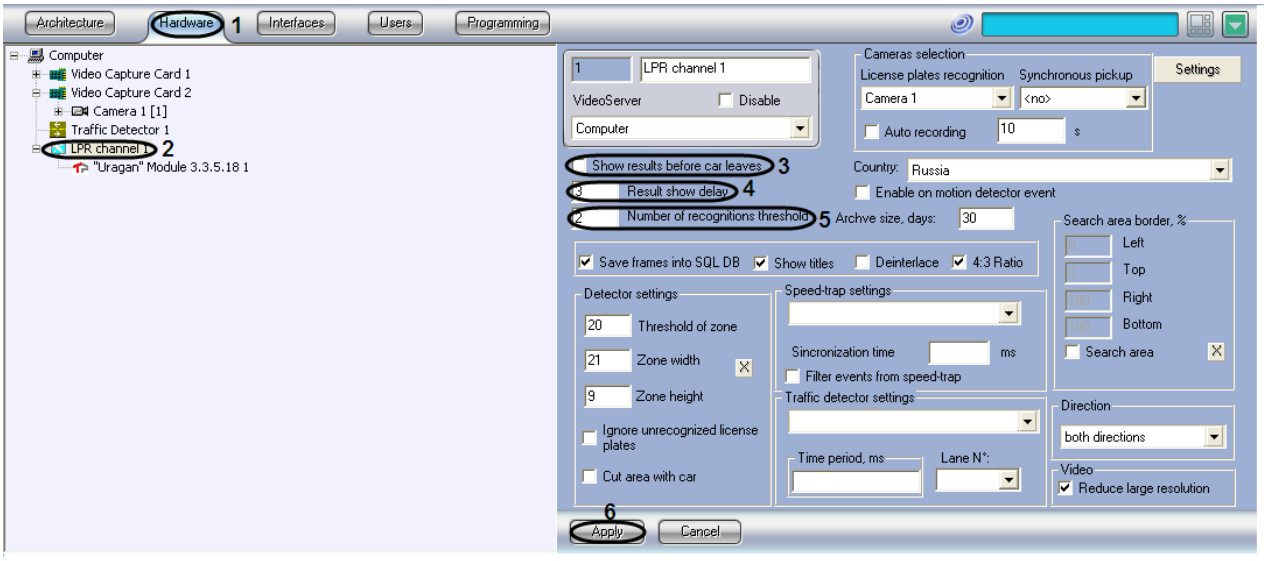

Fig. 7.2-16 Selection of LP number handling parameters

3. Check the Show results before car leaves checkbox. The recognized LP number will be shown before the car actually leaves the viewing zone (more precisely, before the license plate leaves the recognition zone). If the checkbox is unchecked, the result is shown only after the car leaves the zone.
4. Enter the value in the Results display delay field. If this field is set, the results will be shown in the specified number of seconds after the first recognition of the LP number.

Note. This parameter is enabled if the Show results before car leaves checkbox is checked.

5. Enter the value in the Number of recognitions threshold field. If this field is set, the result will be shown after the specified number of reliable recognitions are received. The reliable recognitions counter accumulates and is not cleared in case of temporary zone loss or false recognitions.

Note. This parameter is enabled if the Show results before car leaves checkbox is checked.

6. Click Apply.

Note. If both fields (Results display delay and Number of recognitions threshold) are set, the results will be shown upon the event that occurs first (either the time delay elapses, or the number of recognitions is reached).

The LP number recognition handling setup is completed.

7.2.10 Setting the joint operation of the LPR channel and the motion detector of the Intellect platform

The LPR channel can operate together with the main motion detector of the Intellect platform. This helps decrease the CPU load.

Note. This setting is given only when Auto-Uragan3.3.5.18, CARMEN-Parking, CARMEN-Auto or ACCR program module is used.

If the LPR channel works in conjunction with the Intellect main motion detector, it scans the video image for LP numbers when the motion detector is in an alarmed state, i.e. some motion is detected in the camera viewing zone.

When the main motion detector is not alarmed, the LPR channel does not scan the video image to find and recognize the LP numbers.

To enable joint operation of the LPR channel and the Intellect motion detector, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree on the left side of the Hardware tab, select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18, CARMEN-Parking, CARMEN-Auto or ACCr program module in the objects tree on the Hardware tab (see. «Program module activation, used for Plates

identification», Fig. 7.2-17, 2).The settings panel of the selected object will open on the right side of the window.

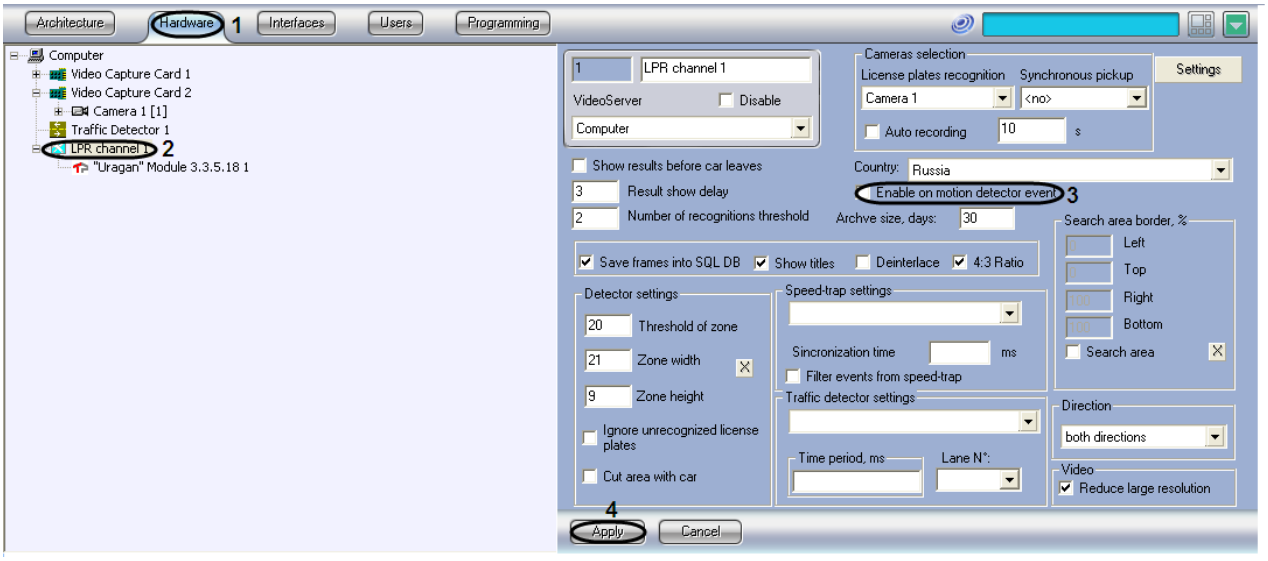

Fig. 7.2-17Setting the LPR channel and the Intellect motion detector

3. Check the Enable on motion detector event checkbox.
4. Click Apply.

The joint operation of the LPR channel and Intellect is now completed.

7.2.11 Setting up the database

All events received by Auto-Intellect from Uragan are saved in the SQL database. The database may become too large with time, which increases the CPU load. To limit the database size, the storage period of the events in the database should be specified. This defines the archive depth.

Note. If the specified archive depth is smaller than it has been before, the database will reduce gradually.

To set up the archive depth, do the following.

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree of the Hardware tab, select the LPR channel, corresponding to the activated program module (see. «Program module activation, used for Plates identification», Fig. 7.2-18, 2).The settings panel of the selected object will open on the right side of the window.

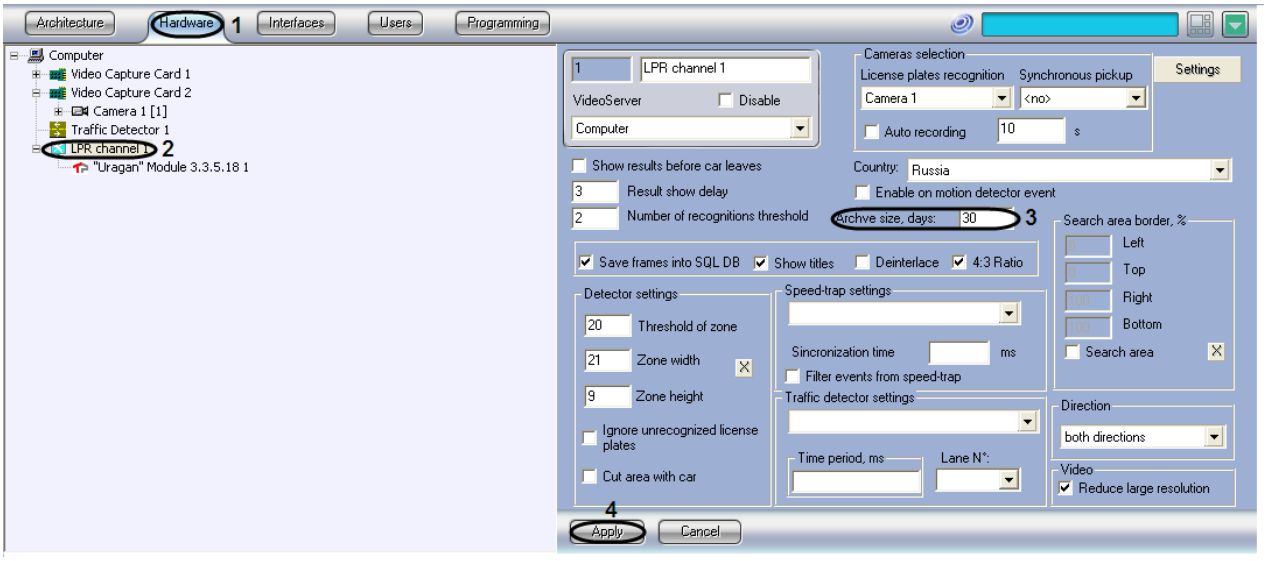

Fig. 7.2-18 Setting the Archive depth in DB

3. In the Archive (days) field, enter the archive depth in days.
4. Click Apply.

The archive depth is set.

7.2.12 Joint operation of the LPR channel and Radar modules

The Uragan module can operate together with the LPR channel.

When LPR channel and Radar modules operate together, Radar determines the speed of the vehicle whose LP number is recognized by the LPR channel.

To set up the joint operation of the LPR channel and Radar, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree on the left side of the Hardware tab, select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18, CARMEN-parking or CARMEN-Auto program module in the objects tree on the Hardware tab (see. «Program module activation, used for Plates identification»).The settings panel of the selected object will open on the right side of the window (Fig. 7.2-19).

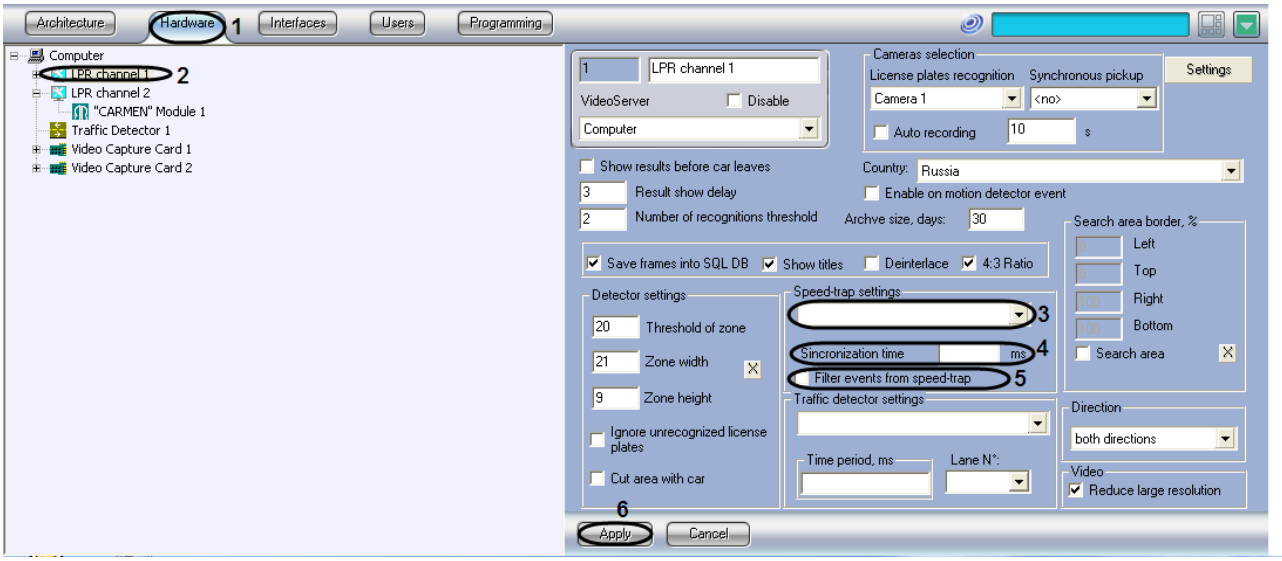

Fig. 7.2-19 Setting up the Joint operation of LPR channel and Radar modules

3. In the Speed-trap setup drop-down list, select the Speed-trap object representing the speed-trap device directed at the same lane as the LPR channel camera.
4. In the Synchronization time field, enter the time period in milliseconds that it takes the vehicle to drive from the spot of speed detection by the Radar speed-trap to the viewing zone of the LPR channel recognition camera.

Note. Synchronization time is needed to synchronize the operation of the Radar and the LPR channel.

5. Check the Filter events from speed-trap checkbox, if necessary. If the checkbox is checked only the first detected speed value is registered, while other values are ignored until the delay expires or until the LP number is recognized.
6. Click Apply.

The joint operation of the LPR channel and Radar modules is complete.

7.2.13 Setting up the joint operation of the LPR channel and Traffic Detector modules

In the Auto-Intellect software package, the LPR channel module can operate jointly with the Traffic Detector module.

If the LPR channel and Traffic Detector modules work together, each vehicle whose LP number is recognized by the LPR channel is assigned the vehicle type detected by the Traffic Detector module. The vehicle type is displayed on the screen and saved to the LPR channel database.

The vehicles can be filtered by type. This allows displaying the information on a specified vehicle type only.

To set up joint operation of the LPR channel and Traffic Detector modules, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree on the left side of the Hardware tab, select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18, CARMEN-parking or CARMEN-Auto program module in the objects tree on the Hardware tab (see. «Program module activation, used for Plates identification»).The settings panel of the selected object will open on the right side of the window (Fig. 7.2-20).

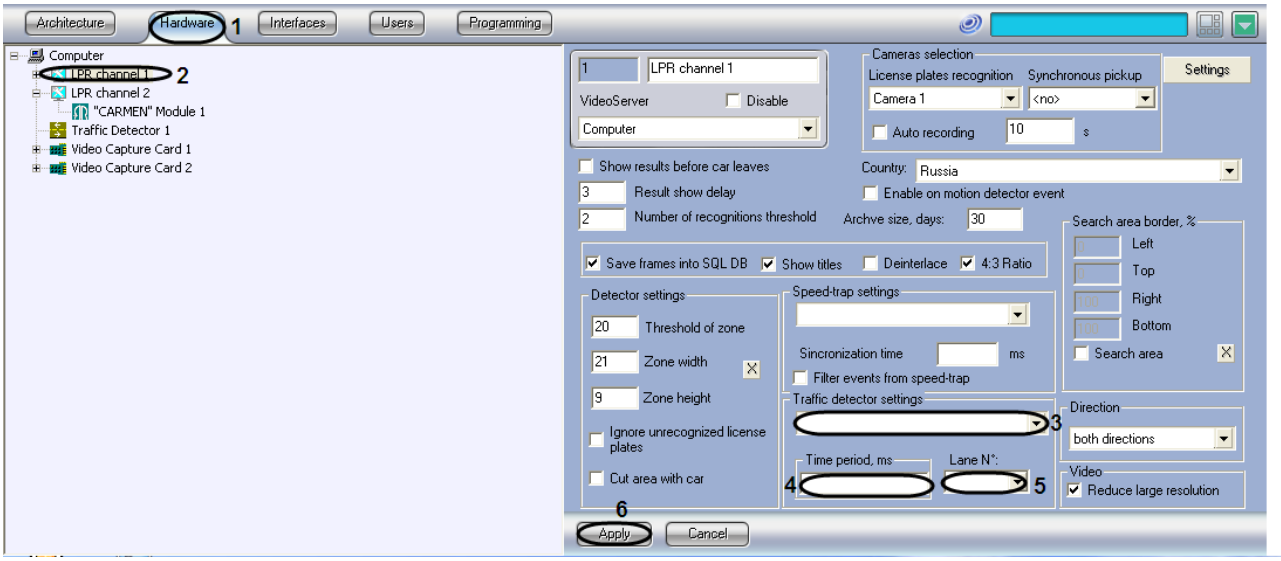

Fig. 7.2-20Setting up the joint operation of the LPR channel and Traffic Detector modules

3. In the Traffic Detector settings drop-down list, select the Traffic Detector object representing the detector directed at the same lane as the LPR channel camera.
4. In the Time period field, enter the time period in milliseconds that it takes the vehicle to drive from the spot of vehicle parameters detection by the detector to the viewing zone of the LPR channel recognition camera.

Note. This parameter is needed to synchronize the operation of the Traffic Detector and Uragan modules.

5. In the Lane drop-down list, select the lane which the LPR channel recognition camera is directed at. The list contains the lanes selected for the Traffic Detector module (see the Traffic Detector Module Setup section).
6. Click Apply.

The setup of the LPR channel and Traffic Detector joint operation is complete.

7.2.14 Setting the LP number search area boarder

By default, the LPR channel scans the whole video image received from the camera for the LP number. To decrease the CPU load, a smaller area where the LP should be searched for, can be specified.

Note. This setting is given only when Auto-Uragan3.3.5.18, CARMEN-Parking or CARMEN-Auto or ACCR program module is used.

Note. If the LP search area boarder is specified, only the license plates that completely fit into the area will be recognized.

The search area borders can be specified using one of two methods:

1. Manual entry of the area coordinates;
2. Pointing at the borders on the video image using the mouse.

To manually enter the exact coordinates of the search area boarders, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree of the Hardware tab, select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18, CARMEN-parking, CARMEN-Auto or ACCR program module (see. «Program module activation, used for Plates identification», Fig. 7.2-21, 2).The settings panel of the selected object will open on the right side of the window.

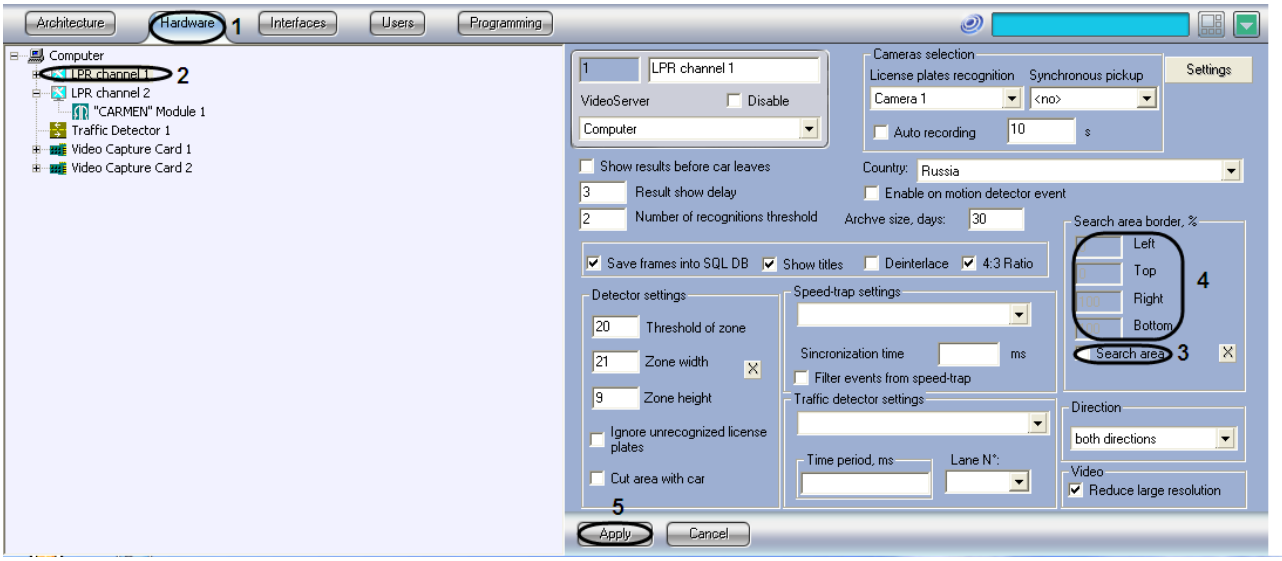

Fig. 7.2-21 Setting the exact borders of the LP number search area boarder

3. Check the Search area boarder checkbox.
4. In the Left, Top, Right, and Bottom fields, enter the coordinates of the corresponding search area boundaries, as a percentage of the full frame size.
5. Click Apply.

To specify the search area borders using the mouse, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree of the Hardware tab, select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18, CARMEN-Parking, CARMEN-Auto or ACCR program module (see. «Program module activation, used for Plates identification», Fig. 7.2-22, 2).The settings panel of the selected object will open on the right side of the window.

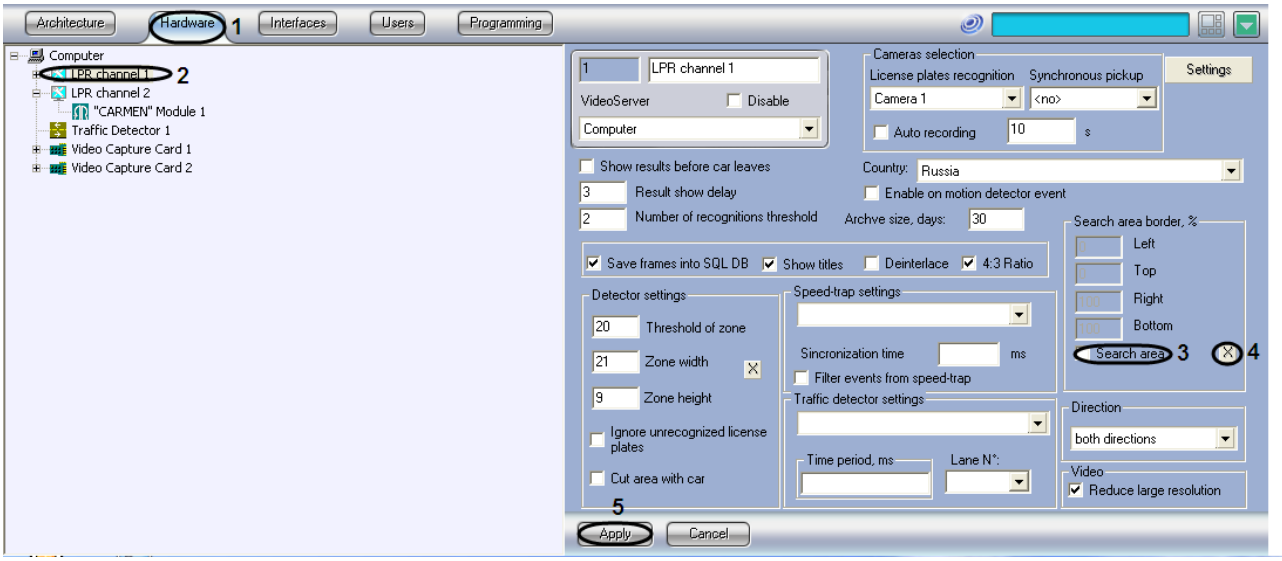

Fig. 7.2-22 Setting the search area borders of the LP number

3. Check the Search area checkbox.

4. Click the button to open the Search area borders window. The window Search area borders displays the video image from the camera set in the LPR channel settings.

To define the search area, do the following (Fig. 7.2-23):

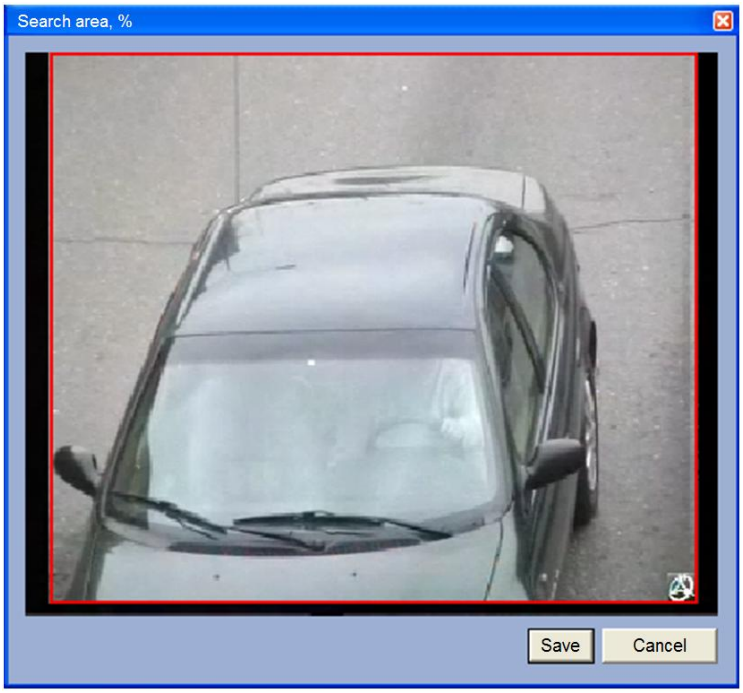

Fig. 7.2-23 Search area borders setup

4.1. Click and hold the mouse button in the video image at one of the corners of the supposed search area;
4.2. Keep the mouse button pressed and drag the mouse across the supposed search area to the opposite corner;
4.3. Release the mouse button.
4.4. Click the Save button to save the selected area, or the Cancel button to clear the selection. The Search area border window will be closed.
5. Click Apply.

Note. The search area should not contain the titles in the image for correct recognition of the LP numbers.

The LP search area boarder is now set up.

7.2.15 Selecting the traffic direction for LP number recognition

By default, the LPR channel recognizes the LP numbers of all vehicles passing the camera viewing zone: i.e. moving toward the camera and away from the camera. The module can be set to recognize and save the LP numbers of the vehicles moving in one direction only.

To select the movement direction for the vehicles to be recognized, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree on the left side of the Hardware tab, select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18 program module in the objects tree on the Hardware tab (see. «Program module activation, used for Plates identification»). The settings panel of the selected object will open on the right side of the window (Fig. 7.2-24).

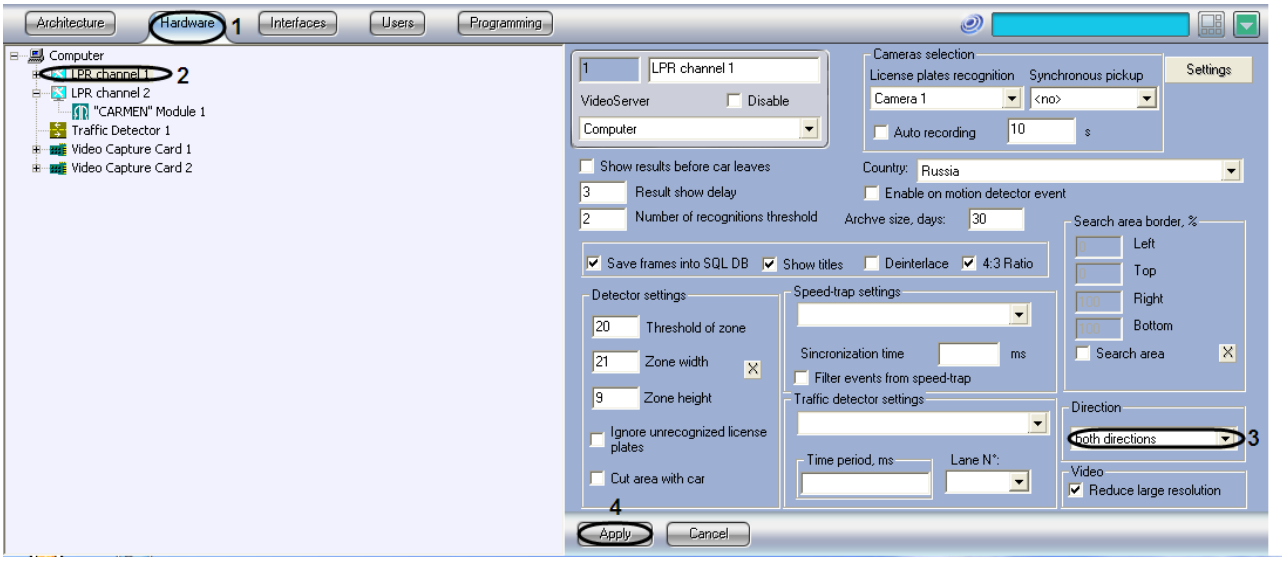

Fig. 7.2-24 Selecting the movement direction of the vehicles to be recognized

3. In the Direction drop-down list, select the required item.
4. Click Apply.

The vehicle movement direction is now selected.

7.2.16 Setting up the LPR channel detector

The main parameters, forming the operation of LPR channel detector are the following:

1. Sensitivity – sets the detector's sensitivity (the more parameter's value the more sensitivity);
2. Zone width– random zone width, within which LP number is being searched (is set in percent of the general frame);
3. Zone height – random zone height, within which LP number is being searched (is set in percent of the general frame).

Note. These settings are set only with the use of Auto-Uragan 3.3.5.18 program module.

To set up the detector parameters, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree on the left side of the Hardware tab, select the Uragan LPR Recognition object representing the Auto-Uragan3.3.5.18 software module. The settings panel of the selected object will open on the right side of the window (Fig. 7.2-25).

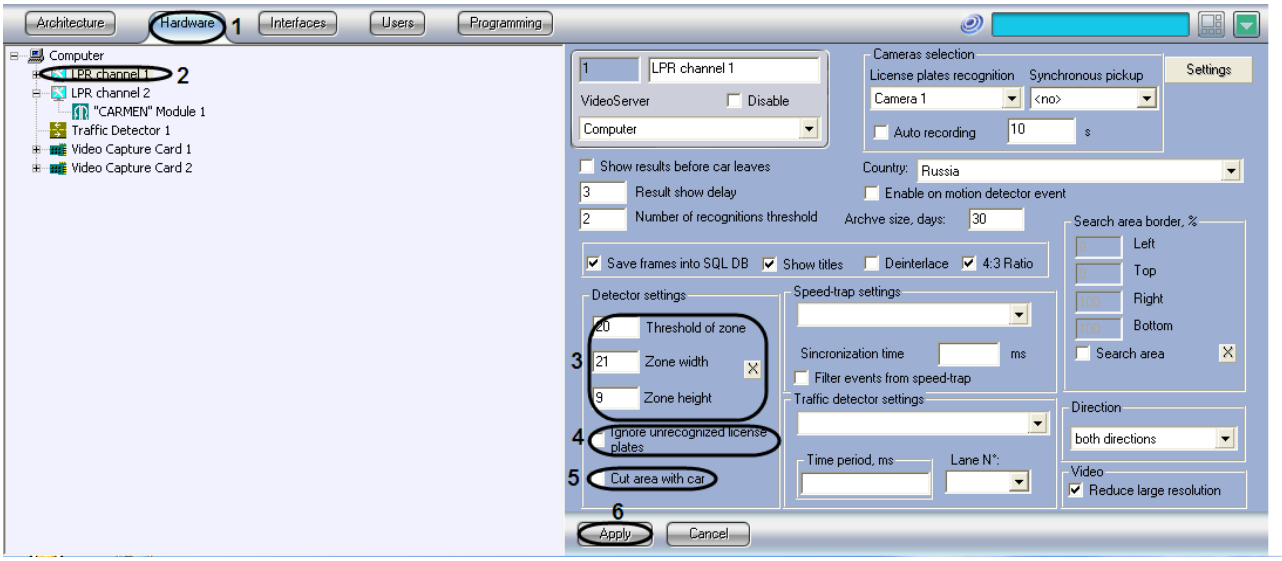

Fig. 7.2-25 Detector setup

3. Enter the value in the Sensitivity field.
4. Set the Zone width and Zone height parameters:

4.1. Click the «x» button next to the parameters. Interactive interface of setting up the zone parameters (Fig. 7.2-26) showing the image from the corresponding camera will download.

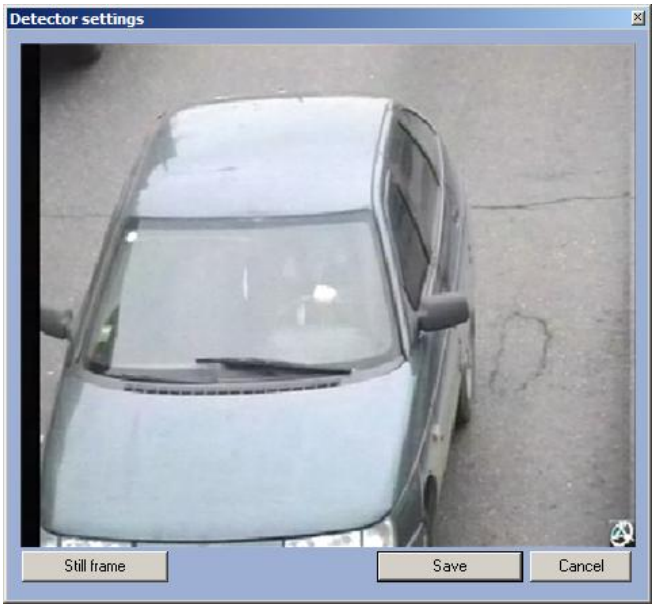

Fig. 7.2-26 Interface of detector setting window (Live Video mode)

4.2. At the appropriate moment, click the Still frame button and then hold the mouse while dragging it across the required area and click Save button (Fig. 7.2-27).

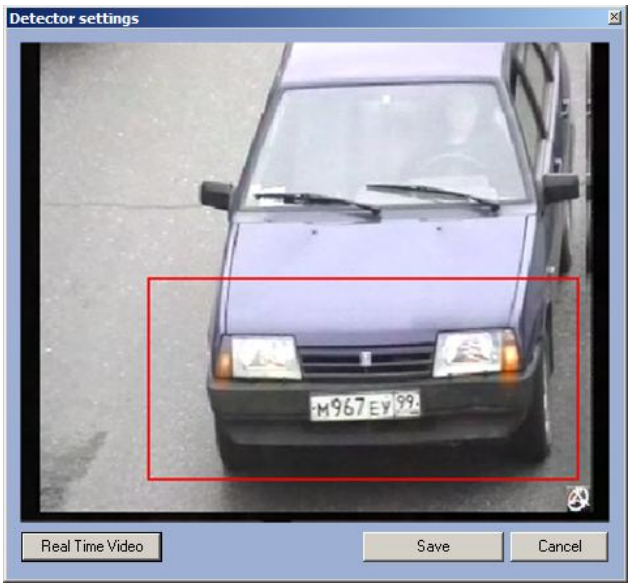

Fig. 7.2-27 Interface of detector settings (Still Frame mode)

Note. You can select the zone in the Real Time Video mode as well (see the "The Traffic Monitor setup procedure" section).

Results of setting the parameters will be automatically entered in the Zone width and Zone height fields.

5. If necessary set the checkbox Ignore unrecognized license plates(Fig. 7.2-25,4)

Note. You can set unrecognized license plates ignoring when using CARMEN-Parking, CARMEN-Auto and ACCR program modules.

6. If necessary set the checkbox Cut area with car (Fig. 7.2-25,5).
   Note1. Setting up the frame with a car cut is used only in case of working with megapixel video surveillance cameras.
   Note2. Setting up the frame with a car cut is available also with the use of CARMEN-parking program module.
7. Click Apply button.

The LPR channel settings are now completed.

7.2.17 Frame processing setup

By default, when the Reduce large resolution checkbox is checked, the LPR channel processes the frames in the following way:

1. If the frame resolution is smaller than the LPR channel requires, it is up-scaled to the required size.
2. If the frame resolution is larger than the LPR channel requires, it is down-scaled to the required size.

Note. While using full resolution, the Reduce large resolution checkbox should be necessary checked, otherwise unwanted «rake» effect may be observed.

If the Reduce large resolution checkbox is unchecked, the frames are processed in the following way:

1. If the frame resolution is smaller than the LPR channel requires, it is up-scaled to the required size.
2. If the frame resolution is larger than the LPR channel requires, it is processed as it is (with no down-scaling).

Note. Frame processing setup is given only when Auto-Uragan3.3.5.18, CARMEN-Parking, CARMEN-Auto or ACCR program module is used.

To set the frame processing, do the following:

1. In the System Settings dialog window, open the Hardware tab.
2. In the object tree of the Hardware tab, select the LPR channel, corresponding to the activated Auto-Uragan3.3.5.18, CARMEN-parking, CARMEN-Auto or ACCR program module (see. «Program module activation, used for Plates identification», Fig. 7.2-28, 2).The settings panel of the selected object will open on the right side of the window.

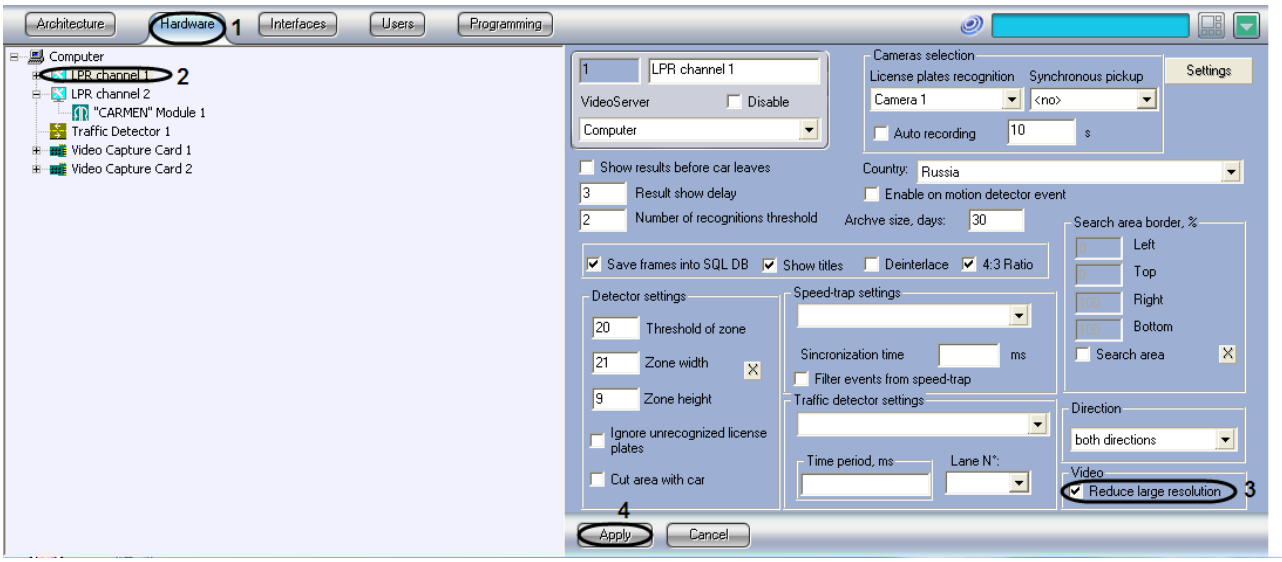

Fig. 7.2-28 Frame processing setup

3. Check or uncheck the Reduce large resolution checkbox.
4. Click Apply.

The frame processing setup is now complete.

Note. We recommend to always check the Reduce large resolution checkbox in order to decrease the CPU load.

7.2.18 Setting up the red light passing module

For the red light passing module operation program module for identifying the plates and that is being set up is required (see «Activating the program module, used for identifying the plates» section).

The red light passing object is created on the basis of LPR channel object (see Fig. 7.2-29).

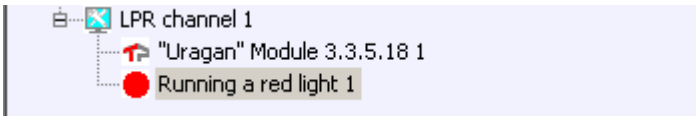

Fig. 7.2-29 The red light passing object creation

To set the red light passing module, do the following:

1. Go to Red light passing setting tab (see Fig. 7.2-30).

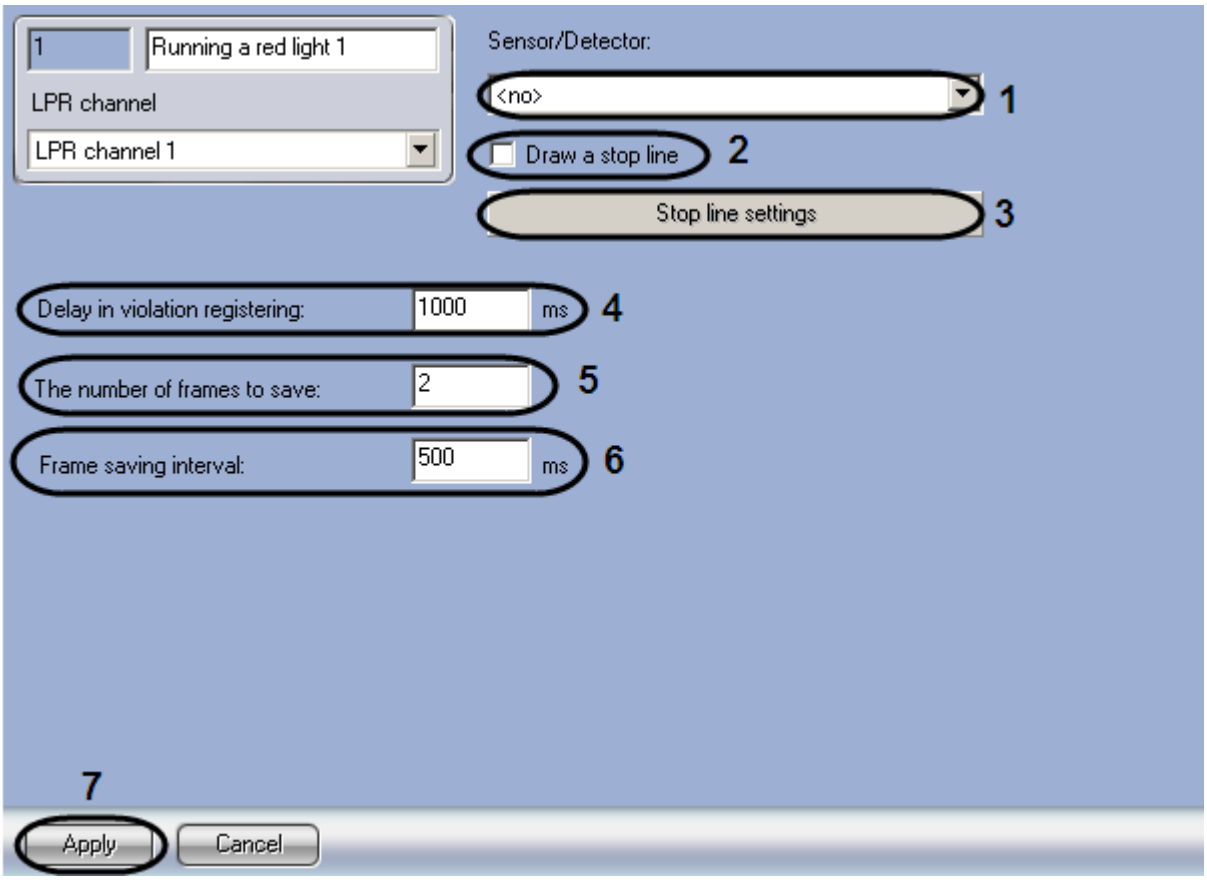

Fig. 7.2-30 Setting up the red light passing module

2. In «Sensor/Detector» dropdown list select «Sensor» object (see Intellect software package: Administator's guide) by signal of wich the light of traffic light is detected (see Fig. 7.2-30, 1).
3. Set the «Draw a stop line» checkbox if it's necessary to overlay a stop line before the traffic light (see Fig. 7.2-30, 2).
4. Set up the stop line displaying.
    4.1. Click «Stop line settings» (see Fig. 7.2-30, 3). The window of the same name opens (see Fig. 7.2-31).

Fig. 7.2-31 Frame selection

4.2. Click «Stop video» to set the stop line (see Fig. 7.2-31). As the result the frame on which it's necessary to set the stop line, is displayed (see Fig. 7.2-32).

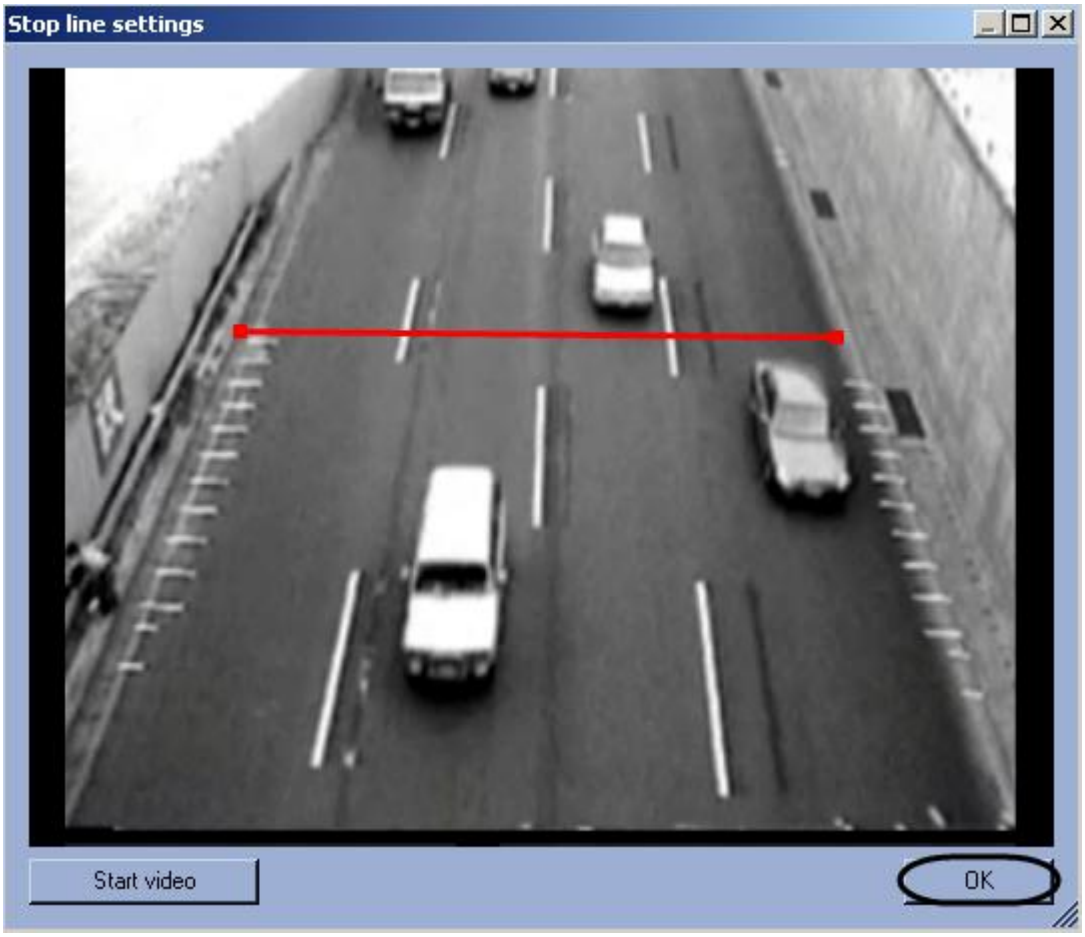

Fig. 7.2-32 Stop line setting

4.3. Set the stop line. To set the stop line, click the road edge in the image, press the left mouse button, drag the cursor to another edge of the road in the video frame (see Fig. 7.2-32).

4.4. Click OK (see Fig. 7.2-32).

5. Enter time (in milliseconds) that determines the time interval between vehichle red light passing fixation and alarm signal in the «Delay in violation registrating» field (see Fig. 7.2-30, 4).
6. Enter the number of frames that will be saved in database in the «The number of frames to save» field (seeFig. 7.2-30, 5).
7. Enter time (in milliseconds) that determines the time interval of frames for saving in the «Frame saving interval» field (see Fig. 7.2-30, 6).

Attention! For correct operation of synchronized frames recording set the checkbox in "Automatic recording" on "LPR channel"object setting panel and set value of time that is bigger than the product of "Number of frames for saving"and "Interval of frame saving" parameter points.

8. To save the changings click Apply (see Fig. 7.2-30, 7).
   The red light passing module setup is complete.

7.3 The Radar software module setup

The Radar software module is designed for the installation and setup of speed-trap devices in the system.

The connection and operation settings of the speed-trap device should be specified, as well as the vehicle speed detection parameters.

7.3.1 The Radar setup procedure

To set up a speed-trap device in Auto-Intellect, the Speed-trap server system object should be created and set up.

The Speed-trap server object setup includes the following steps:

1. Set up the connection between the speed-trap device and the Auto-Intellect software package.
2. Select a camera for the joint operation of the Radar and Auto-Uragan 3.3.5.18 or CARMEN-Auto modules.
3. Specify the speed limit.
4. Setting the permitted vehicle speed for displaying in the report concerning the recognized number.
5. Select the speed-trap device model and settings.
6. Select the vehicle movement direction relative to the speed-trap, needed to determine the vehicle speed.
7. Specify the distance between the speed-trap and the vehicle position at the moment of speed detection.
8. Set up additional parameters related to joint operation of the speed-trap device and the Radar module.
9. Specify the minimum vehicle speed to be detected by the speed-trap.

These steps are described in more detail in the following sections.

7.3.2 Setting up the speed-trap connection to the server

Speed-traps are connected to the server via the COM port. Any number of speed-trap devices can be connected to Auto-Intellect, depending on customer needs.

Specialized protocol is used for data exchange with the speed-traps via the COM port. Each speed-trap uses its individual protocol for data exchange.

Several COM ports should be set up one by one. Each speed-trap device is represented by a separate Speed-trap server object created and set up in the Hardware tab of the System Settings window.

To set up a COM port for speed-trap connection, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-1).

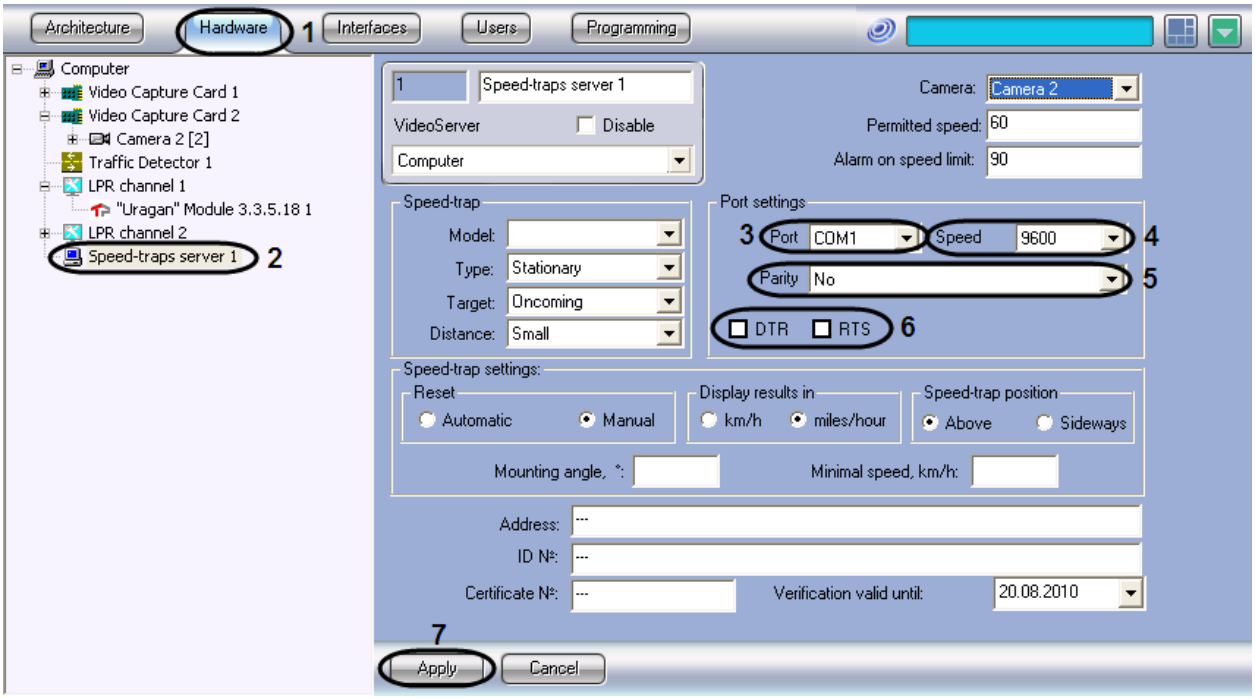

Fig. 7.3-1 The Speed-trap server object settings panel

3. In the Port drop-down list, select the COM port to connect the speed-trap to.
4. Change the data exchange rate in the Speed field, if necessary.

Note 1. The data exchange rate is set by the device manufacturer. The specified value should match the rate set by the manufacturer.

Note 2. If you need to change the COM port settings, make the same changes to the COM port settings in Windows (see the Intellect Software Package. The Administrator's Guide document).

5. Change the parity control mode in the Parity field, if necessary.
6. If you use a passive speed-trap device (with no independent power source), enable the device power supply via the DTR and RTS pins of the COM port by checking the DTR and RTS checkboxes.
7. Click Apply to save all changes.

The speed-trap is now connected to the server.

7.3.3 Selecting the camera for Radar and Speed-traps server joint operation

Set the camera, used for work with Speed-traps server in the Radar modeule settings panel for Radar and Uragan joint operation.These settings are used for Radar module and Speed-traps server sincronisation.

To select the camera, workings with Speed-traps server do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-2).

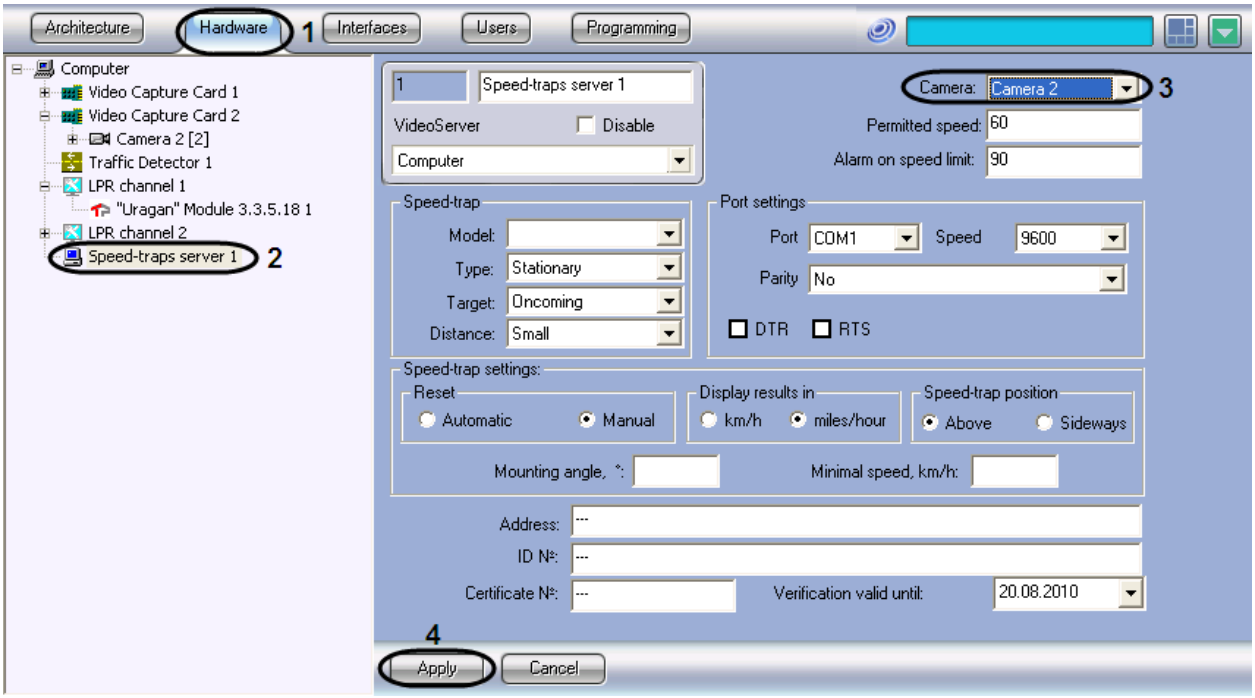

Fig. 7.3-2 The Speed-trap server object settings panel

3. In the Camera drop-down list, select the Camera object, corresponding to the camera, set for Radar and Speed-traps server joint operation.
4. Click Apply to save all changes.

Now the camera selecting for Radar and Speed-trap server joint operation is completed.

7.3.4 Setting up the maximum allowed vehicle speed

The maximum allowed driving speed can be set up for the Radar software module. If a vehicle exceeds the specified speed limit, the system generates a speeding event.

To set the speed limit, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-3).

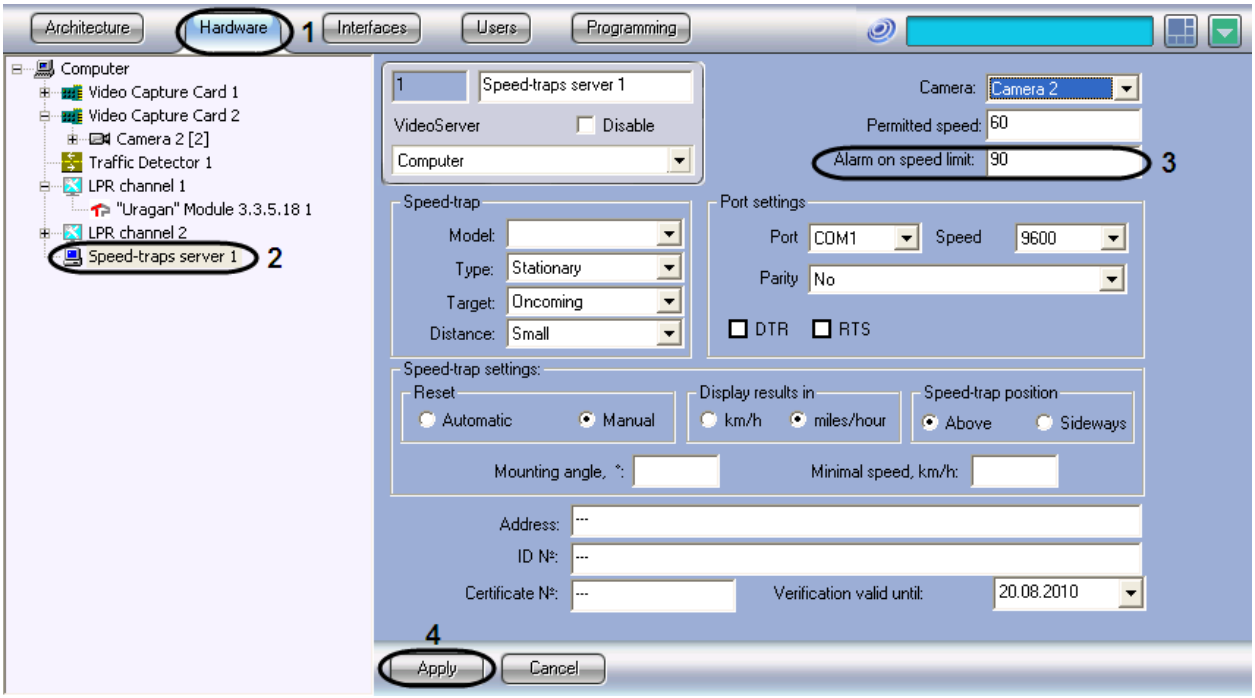

Fig. 7.3-3 Speed limit setup

3. In the Alarm on speed limit field, enter the maximum allowed driving speed.
4. Click Apply.

The speed limit is now set up.

7.3.5 Setting up the permitted vehicle speed

There is possibility to set the permitted vehicle speed for displaying in the report concerning the recognized number.

For setting the permitted speed do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (Fig.7.5-4 1).

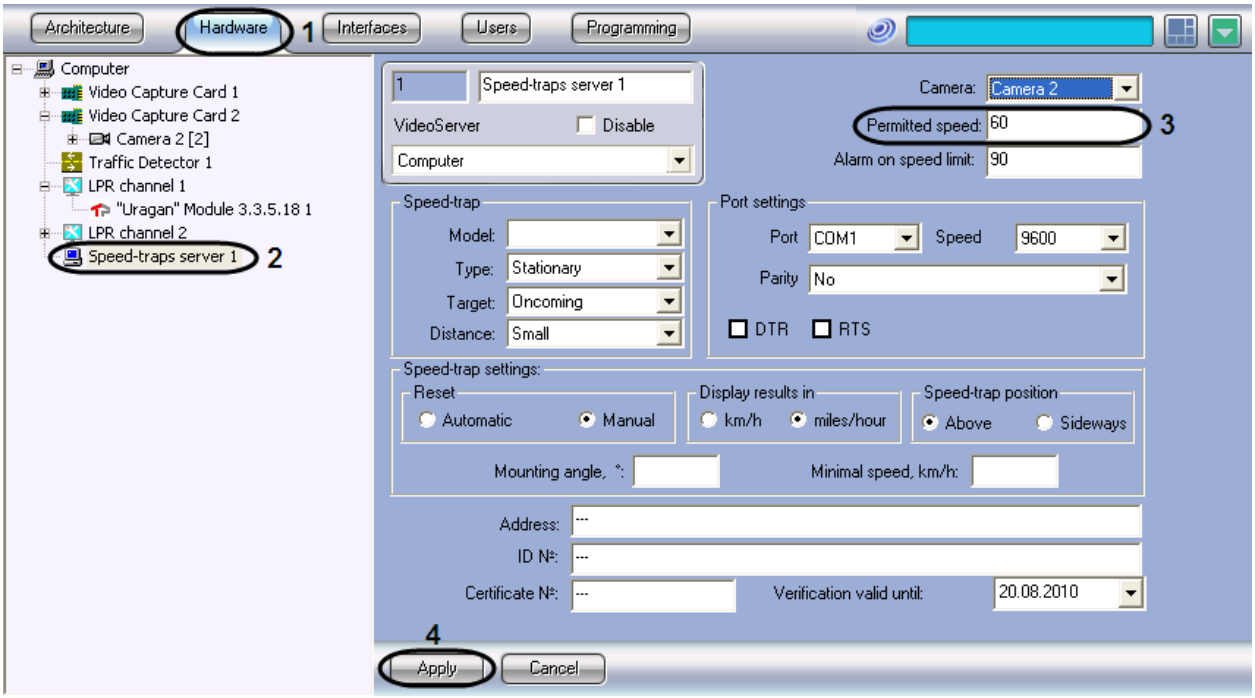

Fig.7.5-4 1 Permitted speed setup

3. Enter the permitted vehicle speed that has to be displayed in the recognized number report in the Permitted speed field. The parameter is given in km/h(Fig.7.5-4 1,3).
4. Click Apply (Fig.7.5-4 1, 4).
   The permitted speed is now set up.

7.3.6 Selecting the speed-trap model

The Auto-Intellect software package supports a wide range of speed-trap devices. The Speed-trap server object is used to select the device type to be connected.

To select the speed-trap model, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-4).

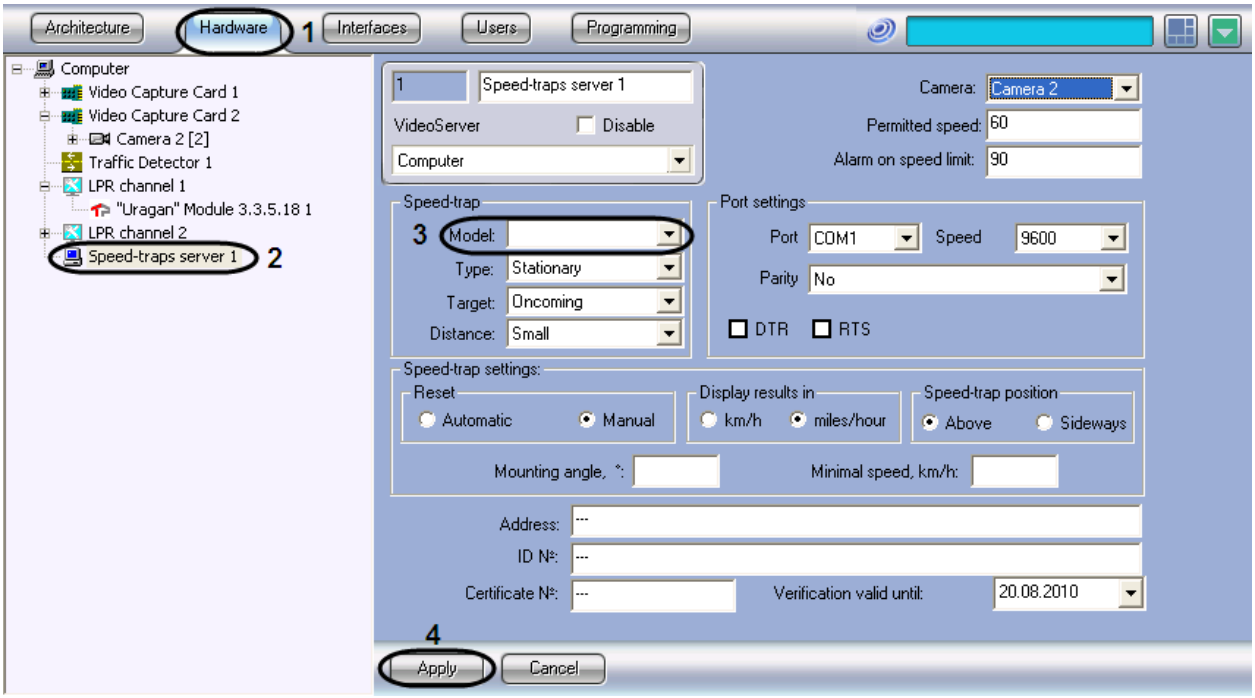

Fig. 7.3-4 Selecting the speed-trap type

3. Select the device in the Model drop-down list which contains all supported device types.
4. Click Apply.

The device type selection is now complete.

7.3.7 Selecting the speed-trap usage option

Auto-Intellect allows using the speed-traps mounted in a static position or on moving vehicles.

To select the speed-trap usage option, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-5).

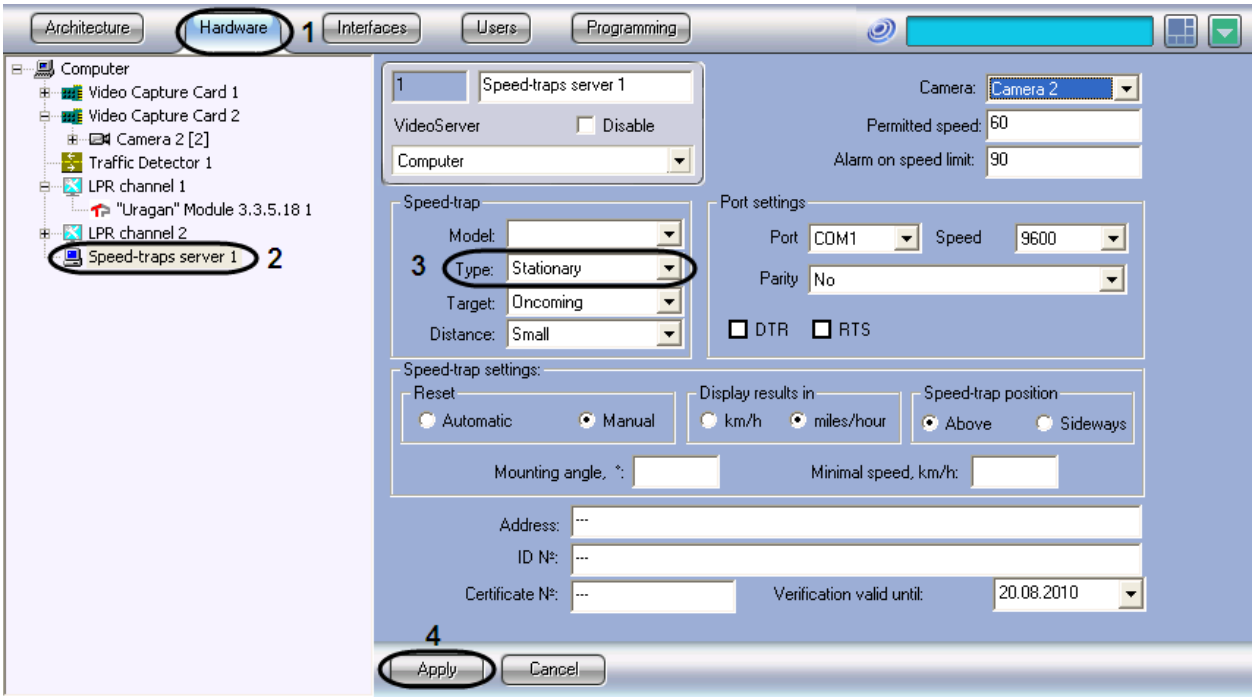

Fig. 7.3-5 Selecting the speed-trap usage option

3. Select the usage option in the Option field. Select Stationary if the speed-trap is mounted on a static foundation, or Moving if the speed-trap is mounted on a moving vehicle.
4. Click Apply.

The usage option is now set.

7.3.8 Selecting the vehicle movement direction

Select the movement direction of the vehicles to detect their speed – toward or away from the speed-trap.

To select the vehicle movement direction, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-6).

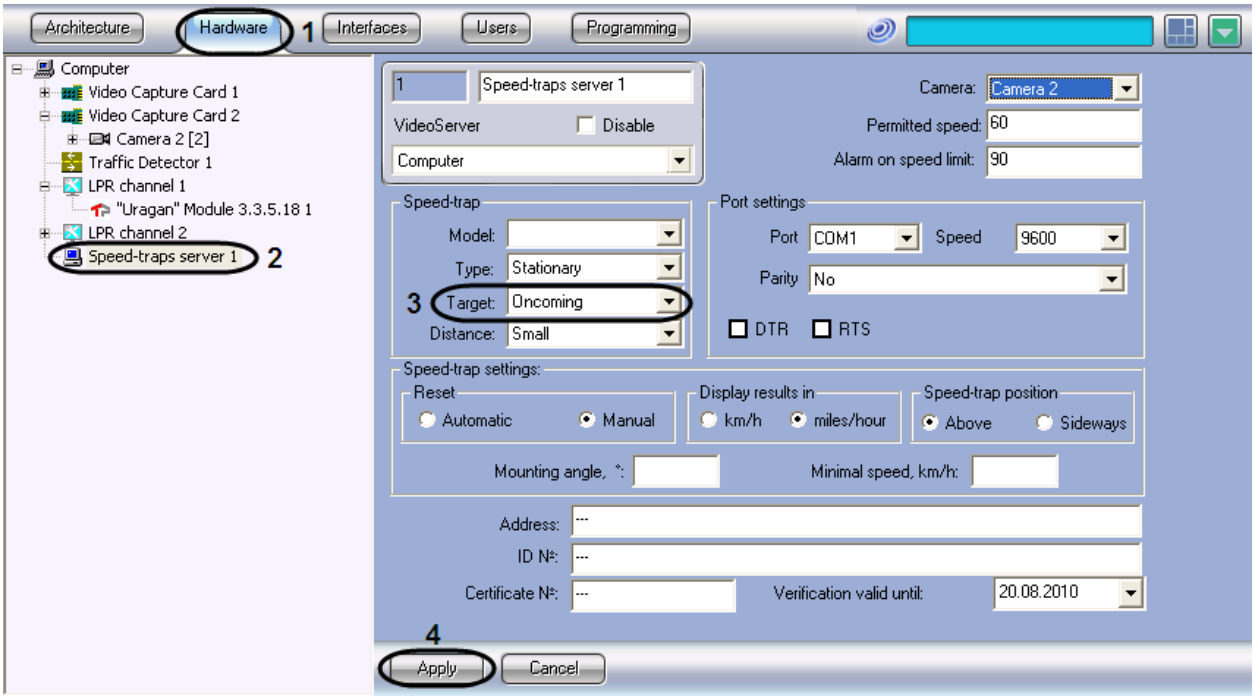

Fig. 7.3-6 Selecting the vehicle movement direction relative to the speed-trap

3. In the Target drop-down list, select the vehicle movement direction.

Select Oncoming to make the speed-trap detect the speed of the oncoming traffic.

Select Passing to make the speed-trap detect the speed of passing traffic.

Select Automatically to make the speed-trap automatically select the movement direction.

4. Click Apply.

The vehicle movement direction is now selected.

7.3.9 Selecting the distance range for vehicle speed determination

The Auto-Uragan 3.3.5.18 or CARMEN-Auto setup requires setting up one of the distance range meanings (Short, Medium, Long) between the Radar module and the position of the vehicles whose speed is detected (place at traffic lane).

Note 1. Physical distance between the Radar module and speed detection distance of a speed-trap is specified in its technical documentation.

Note 2. The distance setting in the Radar module should be chosen empirically.

To select the speed detection distance, do the following:

1. Open the Hardware tab in the System Settings window.

2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-7).

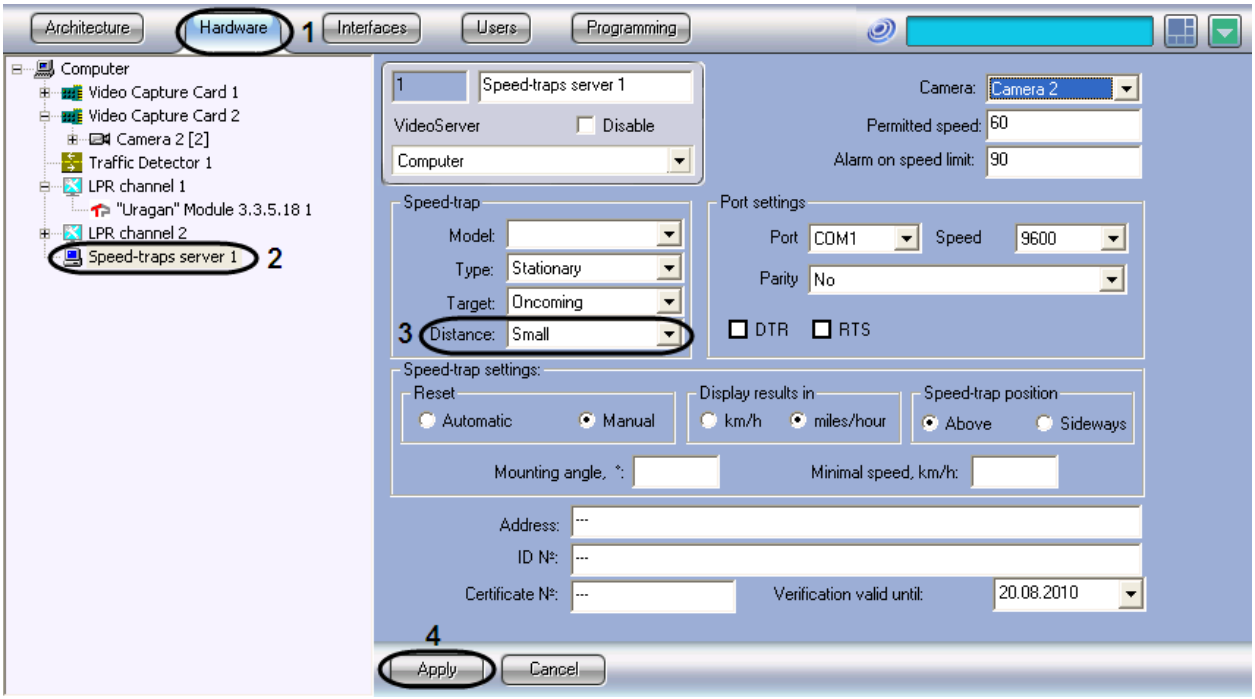

Fig. 7.3-7 Selecting the vehicle speed detection distance

3. In the Distance drop-down list, select the appropriate distance option.

Note. This parameter is selected empirically.

4. Click Apply.

The speed detection distance range is now selected.

7.3.10 Resetting the speed-trap reset mode after the vehicle speed detection

After the speed-trap has detected the speed of a vehicle, it should be reset to enter the standby mode to wait for the next vehicle. Depending on the speed-trap device, it can be reset either automatically, or manually.

Note. The reset mode of the speed-trap is specified in the documentation for the device.

To set the speed-trap reset mode, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-8).

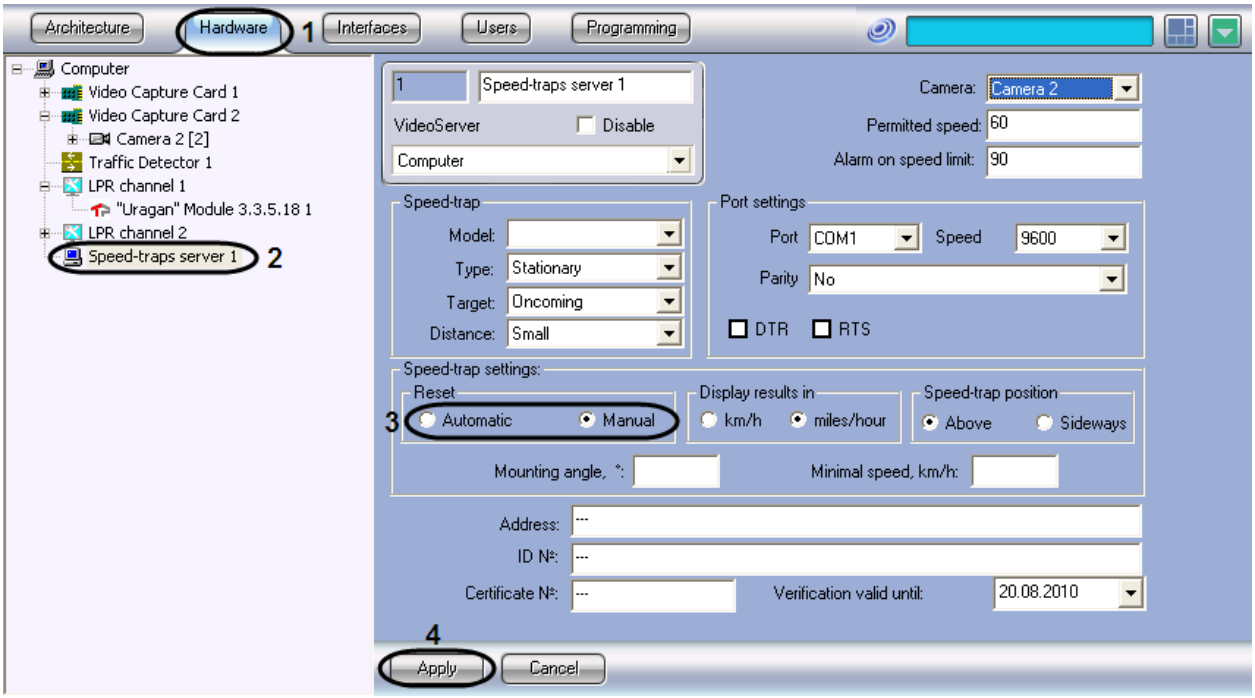

Fig. 7.3-8 Selecting the speed-trap reset option

3. In the Reset section, select Automatic if the speed-trap resets automatically.

In the Reset section, select Manual if the speed-trap requires manual reset.

Note. Depending on the speed-trap model, the system may ignore this option if it is not applicable to that particular speed-trap model (see the speed-trap documentation).

4. Click Apply.

The speed-trap reset option is now set.

7.3.11 Setting up the speed unit to be used for display

The speed-trap can be set to send the speed value in kilometers per hour or in miles per hour.

To select the speed unit used for sending the data to Auto-Intellect, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-9).

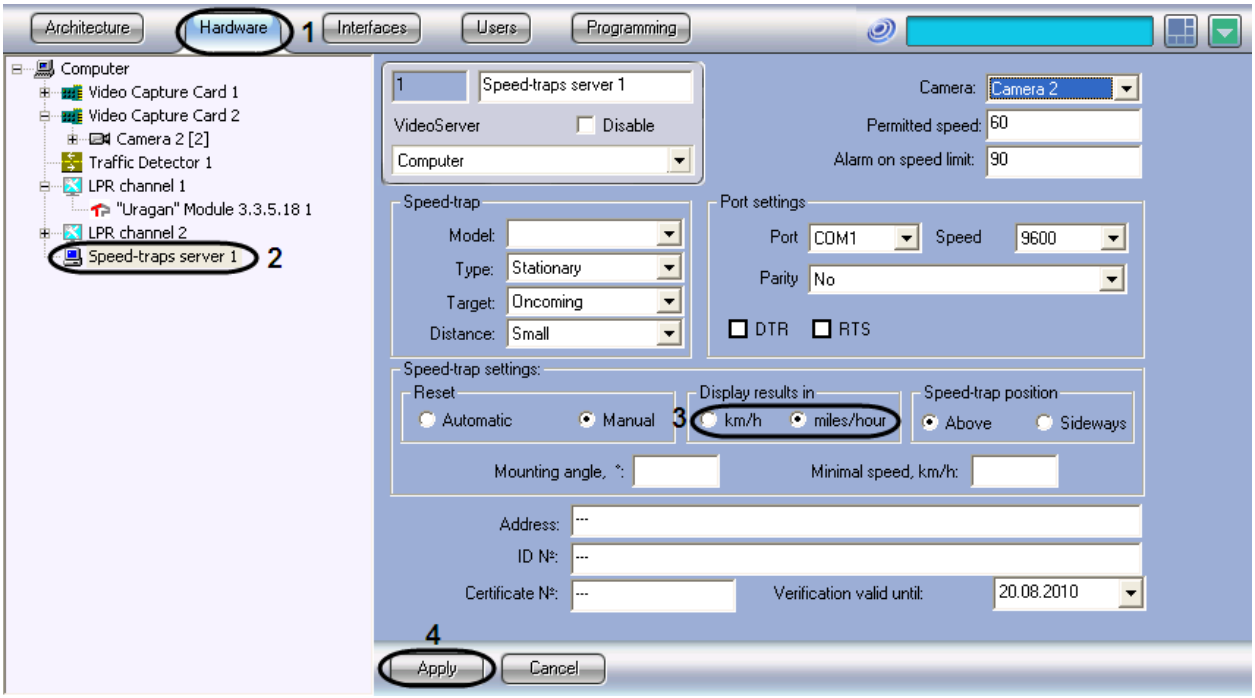

Fig. 7.3-9 Selecting the speed unit

3. In the Speed unit section, select the unit to be used for sending the speed value to Auto-Intellect.

Note. Depending on the speed-trap model, the system may ignore this option if it is not applicable to that particular speed-trap model (see the speed-trap documentation).

4. Click Apply.

The speed unit setup is complete.

7.3.12 Selecting the speed-trap position relative to the lane

Speed-traps are installed according to the instructions outlined in their technical documentation. The position of a speed-trap relative to the driving lane should be specified at Radar setup.

Note. The speed-trap mounting position is described in the documentation for the speed-trap.

To select the speed-trap mounting position, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-10).

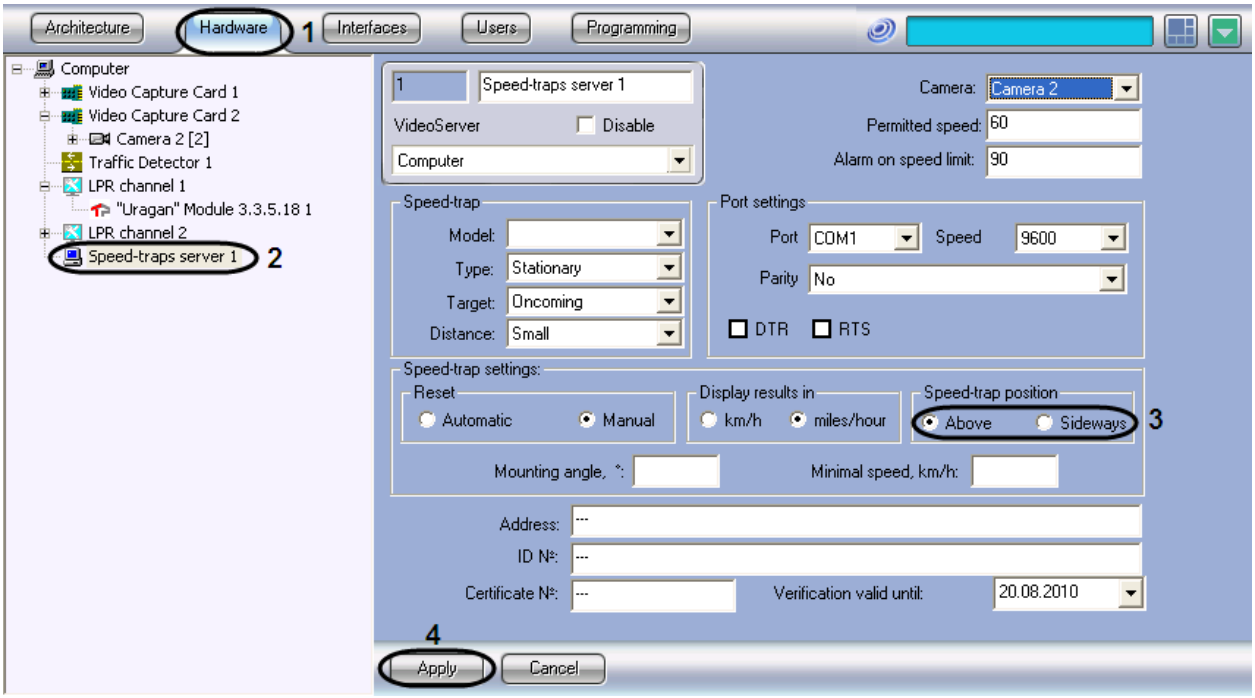

Fig. 7.3-10 Selecting the mounting position of the speed-trap

3. In the Speed-trap position section, select the Above radio-button if the speed-trap is mounted above the driving lane.

Select the Sideways radio-button if the speed-trap is mounted at the side of the lane.

Note. Depending on the speed-trap model, the system may ignore this option if it is not applicable to that particular speed-trap model (see the speed-trap documentation).

4. Click Apply.

The speed-trap mounting position setup is now complete.

7.3.13 Setting the mounting angle of the speed-trap

Certain rules should be observed while mounting the speed-trap over the lane, for example, the device should be mounted at a certain angle to the road surface (see the speed-trap documentation). This angle should be specified in the Radar module settings.

To set the mounting angle of the speed-trap, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-11).

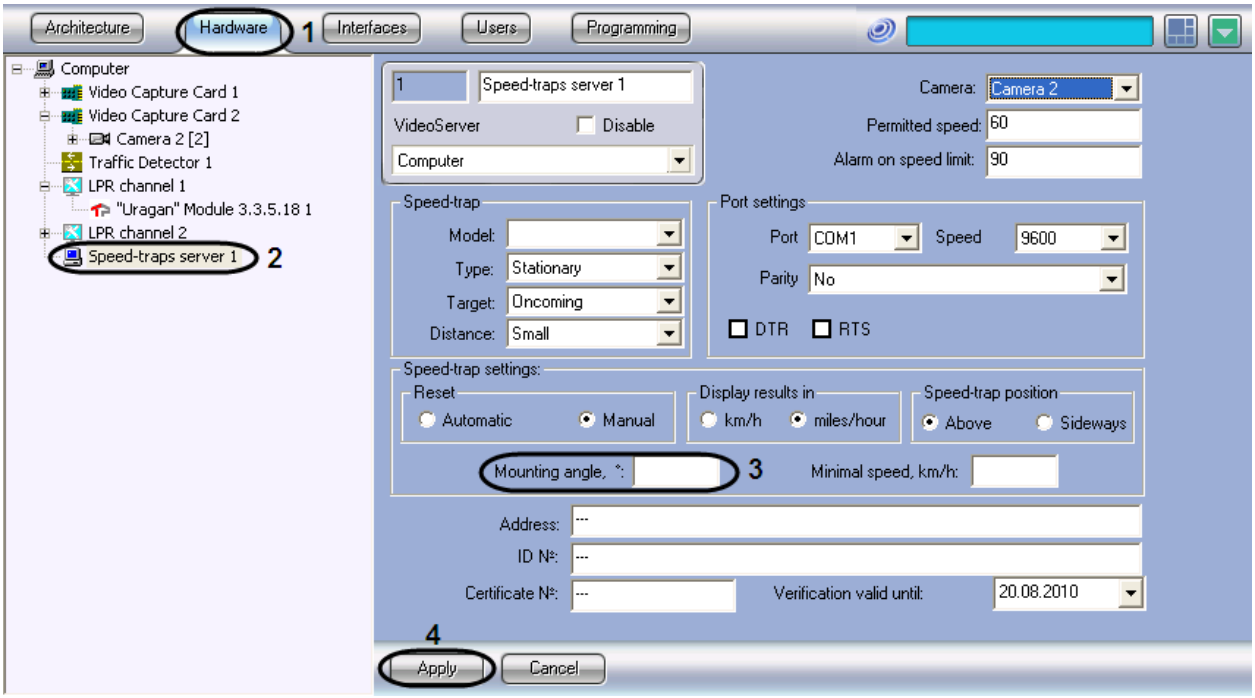

Fig. 7.3-11 Setting the speed-trap mounting angle

3. Enter the value of Radar device angle over the lane in the Mounting angle field.

Note. Depending on the speed-trap model, the system may ignore this option if it is not applicable to that particular speed-trap model (see the speed-trap documentation).

4. Click Apply.

The speed-trap mounting angle is now set.

7.3.14 Setting the minimum vehicle speed to be detected by the speed-trap

The Radar module setup requires entering the minimum speed of the vehicles to be detected by the speed-trap. The speed-trap will not detect the speed of the vehicles moving slower than the specified speed.

To enter the minimum detectable speed, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Speed-trap server object representing the Radar module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.3-12).

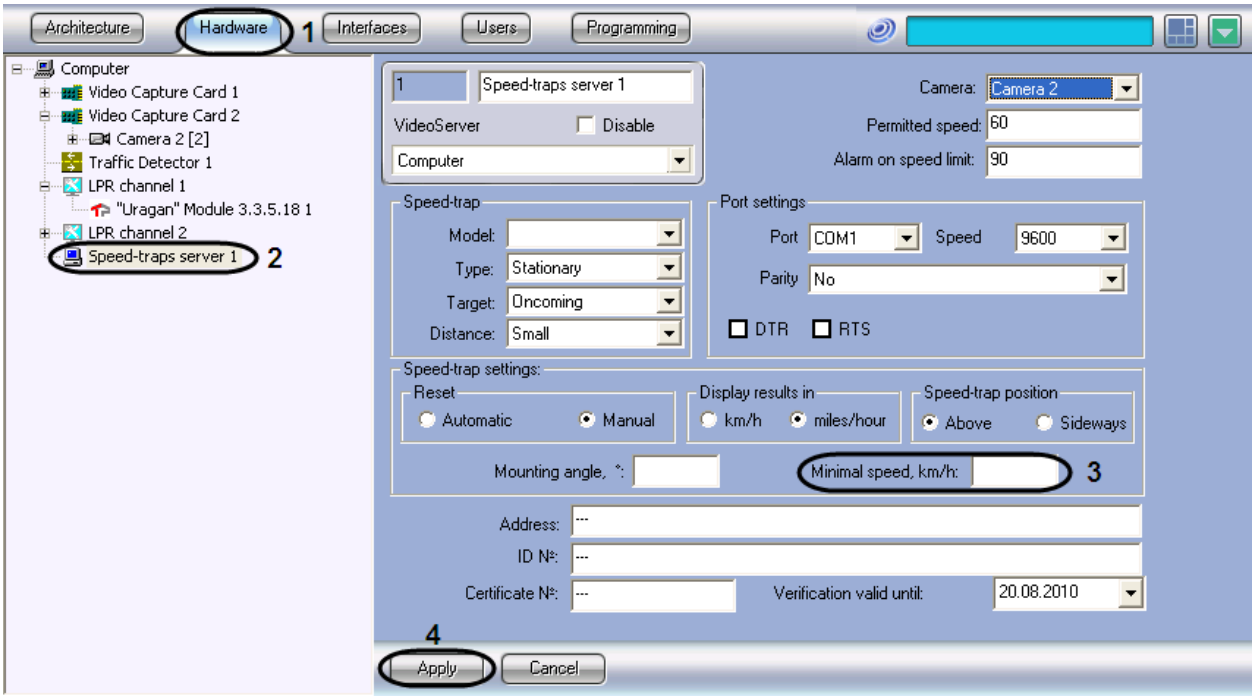

Fig. 7.3-12 Setting the minimum detectable vehicle speed

3. Enter the minimal vehicle speed, identified by the Radar device, in the Minimal speed km/h field.
4. Click Apply.

The minimum detectable speed is now set.

7.3.15 Setting the data concerning Radar device for displaying in the report about the recognized number

It is possible to set the data concerning Radar device for displaying in the report about the recognized number.

To set the data concerning Radar device do the following:

1. In the system settings dialog box go to Hardware tab (see Fig. 7.3-13, 1)
2. In the object tree of the Hardware tab select the Speed-traps server object representing the Radar module to be set up (see Fig. 7.3-13, 2). The settings panel of the selected object will open on the right side of the window

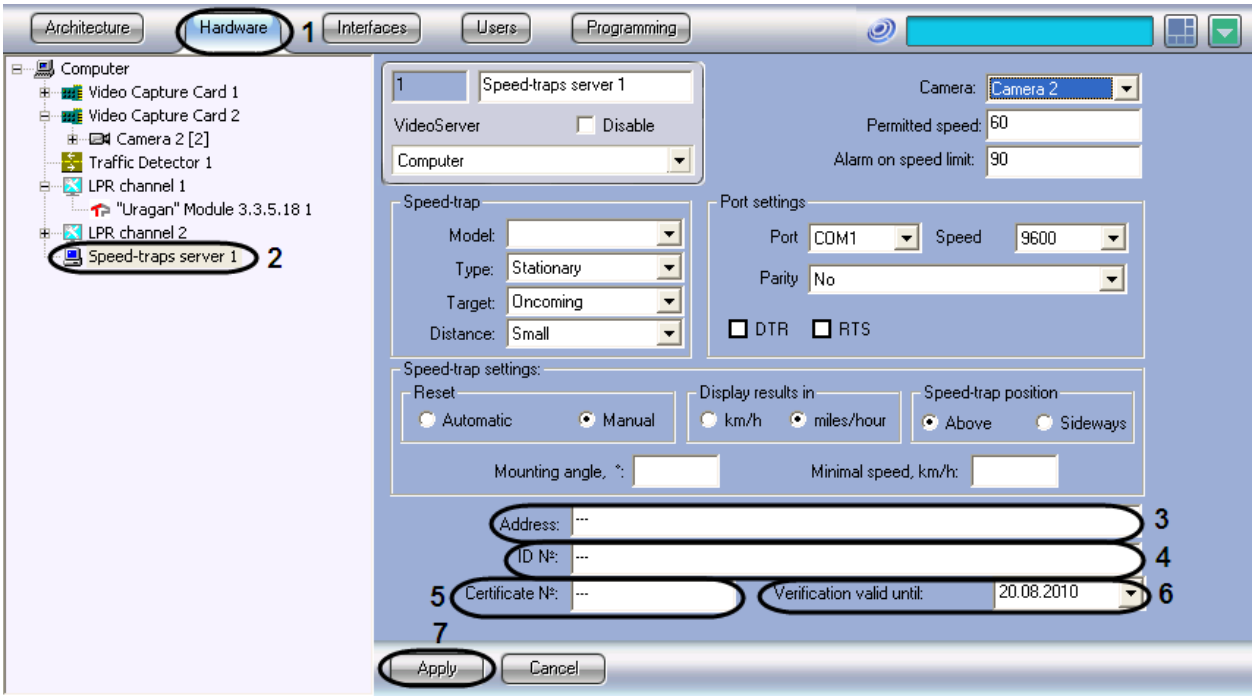

Fig. 7.3-13 Setting the data concerning Radar device for displaying in the report about the recognized number

3. Enter the location of Radar device in the field Address (see Fig. 7.3-13, 3).
4. Enter the factory ID of Radar device in the field ID № (see Fig. 7.3-13, 4).
5. Enter the certificate number, that corresponds to Radar device in the field Certificate № (see Fig. 7.3-13, 5).
6. Select date, until that verification of Radar device is valid, from the Verification valid unit dropdown list (see Fig. 7.3-13, 6).
7. Click Apply (see Fig. 7.3-13, 7).

Setting the data concerning Radar device for displaying in the report about the recognized number is completed.

7.4 The Traffic Detector software module setup

The Traffic Detector software module is designed for detecting the overall characteristics of the traffic and the driving parameters of individual vehicles.

Note. The Traffic Detector module operates correctly if the video signal is fed at a rate of 25 frames per second for each Traffic Detector object with no frame skipping. If the video is received at a slower rate, the vehicle type and moving parameters may be determined with errors. Total CPU load for the whole system should not exceed 80%.

7.4.1 Traffic Detector setup procedure

Before starting Uragan setup, create and set up the video subsystem objects in the Intellect platform: Video Capture Card and Camera. For the object setup procedure, see the Intellect Software Package. The Administrator's Guide document.

Create and set up the Radar software module, if necessary.

To set up the Traffic Detector module, use the following procedure:

1. Select the camera to be used by the Traffic Detector.
2. Specify the time depth of the database archive.
3. Specify the time period for statistics update.
4. Set the road markings.

5. Import or export the road markings file.
6. Set the parameters for joint operation of the Traffic Detector and the Radar modules, if the latter is used.
7. Specify the criteria for detecting the traffic jam start and end.
8. Specify the names for traffic movement directions.
9. Specify the limitations for some traffic characteristics.
10. Select the events to be generated by the system from the list of all available events.

The following sections describe the setup in more detail.

7.4.2 Selecting the camera to be used by the Traffic Detector

To set up Traffic Detector, select the camera to send the video image to the module. The selected Camera object should represent the video camera directed at the driving lanes. This object should be created and set up beforehand in the Intellect package (see the Intellect Software Package. The Administrator's Guide for the details of the Camera object setup).

To select the camera for Traffic Detector, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-1).

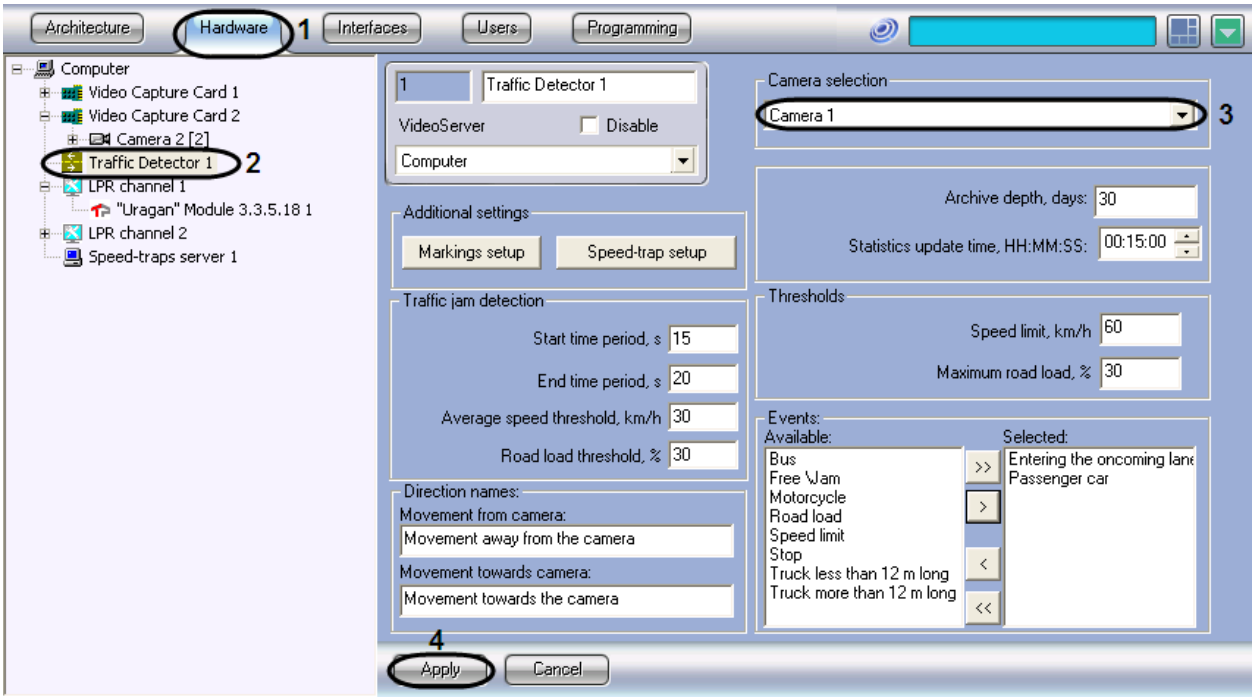

Fig. 7.4-1 Selecting the Camera object to be used with Traffic Detector

3. In the Camera drop-down list, select a Camera object.
4. Click Apply.

The camera is now linked to the Traffic Detector.

7.4.3 Setting up the database archive depth

All events that Auto-Intellect receives from Traffic Detector are saved in the SQL database. The database may soon become of considerable size which increases the CPU load. To limit the database size, the events storage period can be set up for the database. This is called the archive depth.

To set up the archive depth, do the following:

1. Open the Hardware tab in the System Settings window.

2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-2).

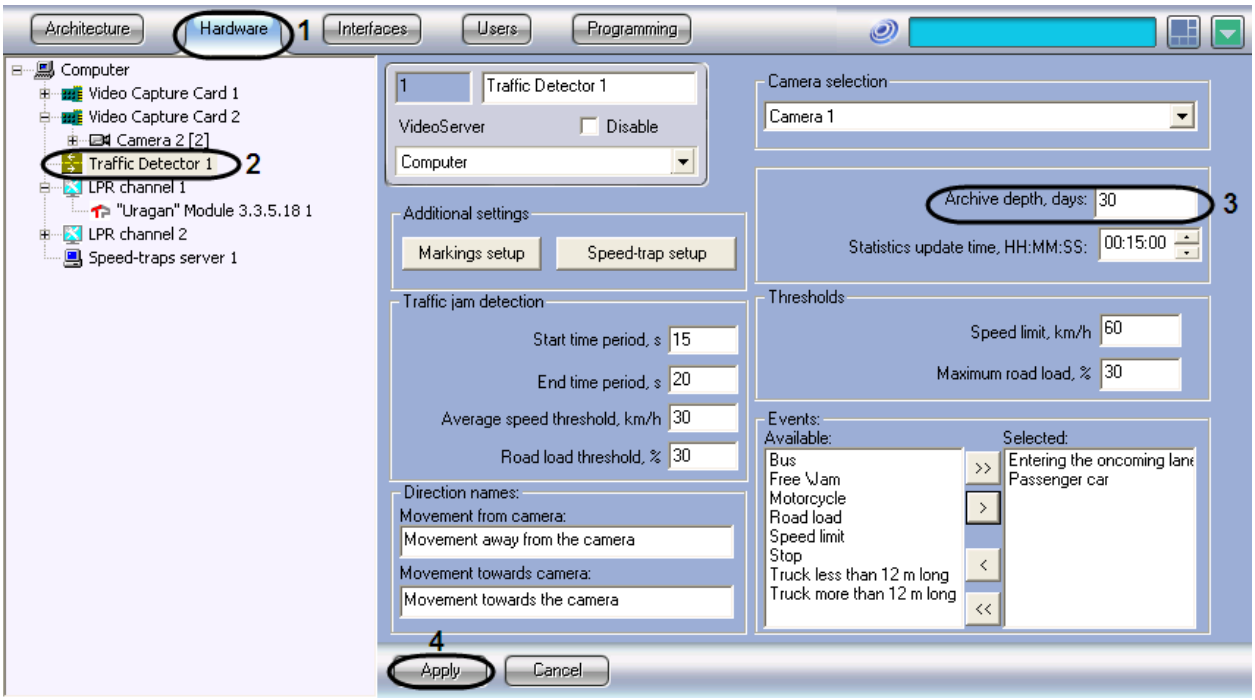

Fig. 7.4-2 Setting up the archive depth

3. In the Archive depth field, enter the number of days to store the events in the database.
4. Click Apply.

Archive depth is now set.

7.4.4 Setting up the statistics update period

Traffic Detector scans the video image and transfers current statistics data about the road situation. This data is updated at a certain period.

To specify the period of statistics update, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-3).

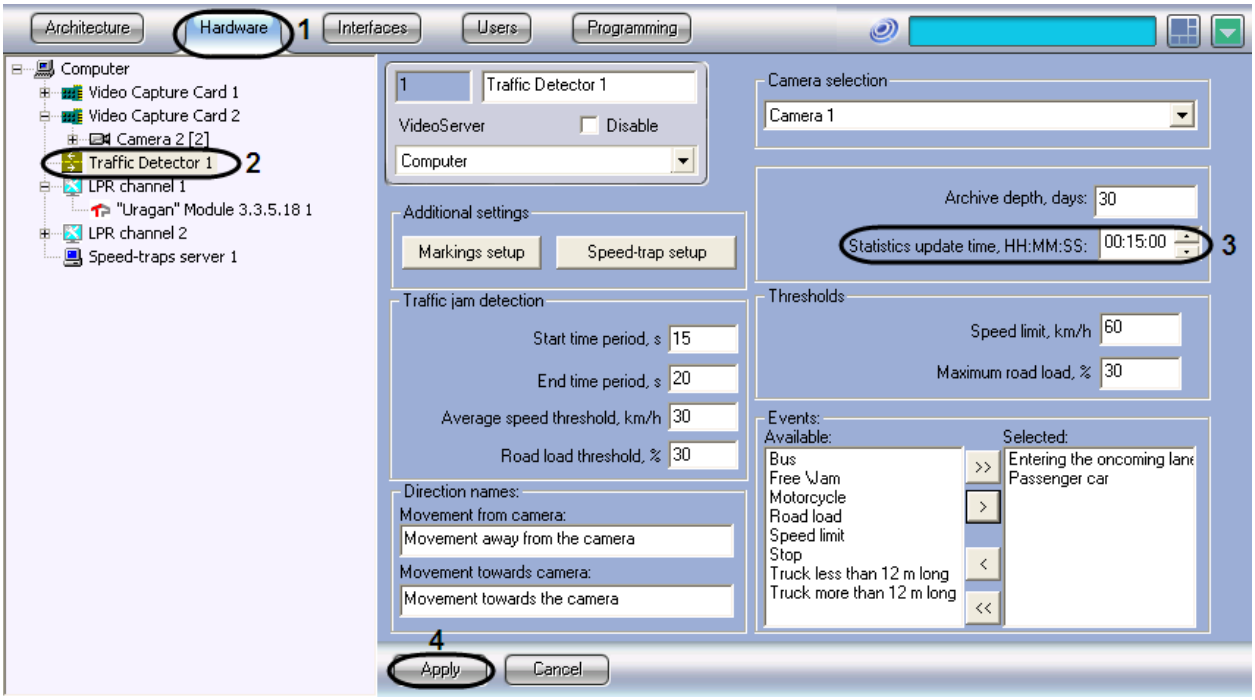

Fig. 7.4-3 Setting up the statistics update period

3. Enter the time value in the Statistics update period field in the following format: HH:MM:SS.
4. Click Apply (see Fig. 7.4-3).

The statistics update period is now set.

7.4.5 Setting up the road markings parameters

The road markings setup should be specified: number and location of the driving lanes and traffic directions.

To set up the markings parameters, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-4).

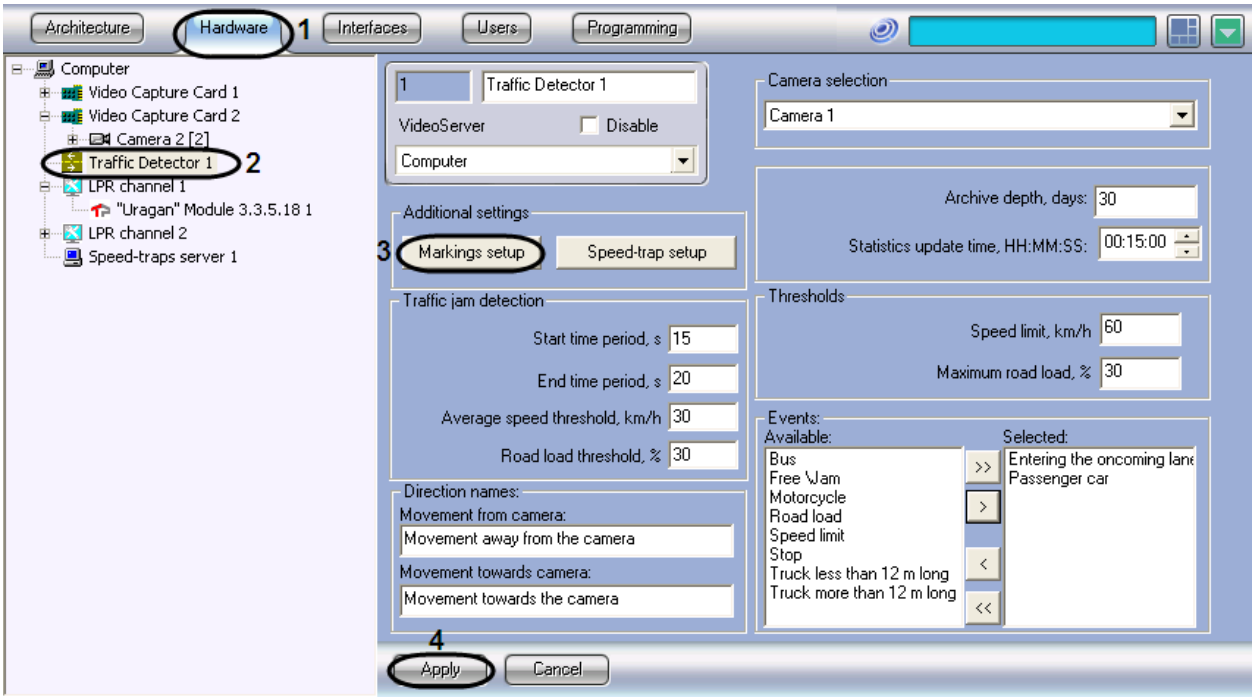

Fig. 7.4-4 Opening the markings setup window

3. Click the Markings setup button and select the Set markings item.

The Additional settings window opens.

4. In the Additional settings window, select the video frame to be used for markings setup.

To select the frame, click the Select frame button at the appropriate moment (see Fig. 7.4-5).

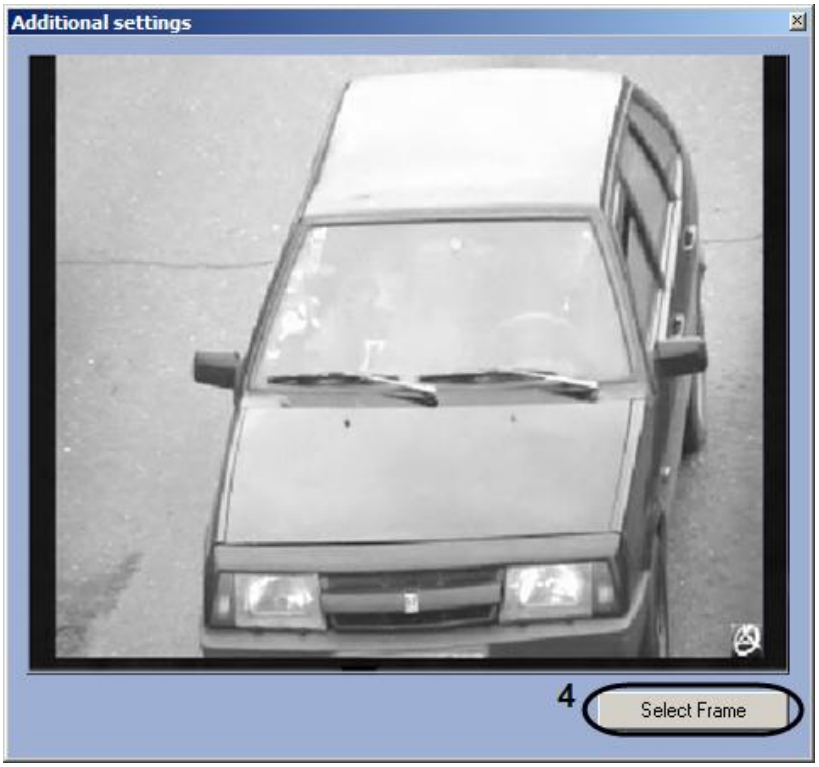

Fig. 7.4-5 Selecting the frame for markings setup

The Additional settings window closes and the Keypoints window opens.

5. In the Keypoints window, set the keypoints, signifying the markings (see Fig. 7.4-6).

Note. A keypoint is a small object or a marking easily identified in the image. The actual road markings can be used as key points. No more than two points should lie on a single straight line. The keypoints should be as far from each other as possible, although inside the camera viewing zone. The farther the keypoints are from each other, the more precise will be the setup. Measure and write down the coordinates of actual keypoints on the road relative to any origin. These will be the ground coordinates of the keypoints.

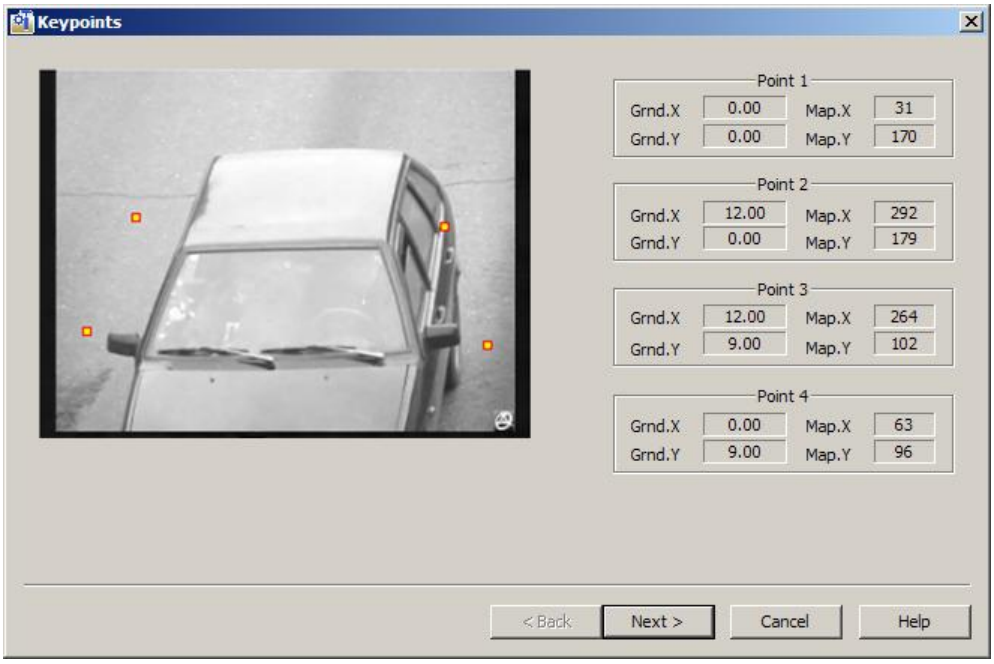

Fig. 7.4-6 Selecting the keypoints

At this stage you must specify four keypoints and their coordinates. By default keypoints are set automatically.

To change the keypoints and their coordinates do the following:

5.1. Remove from the screen the keypoint whose coordinates you want to change. This requires a point with the mouse and hold down the «Shift», press the left mouse button.

5.2. Click the position for a keypoint in the video frame and press the left mouse button.

5.3. In the zoom window that opens, mark the keypoint and enter the ground coordinates in the X and Y fields (see Fig. 7.4-7).

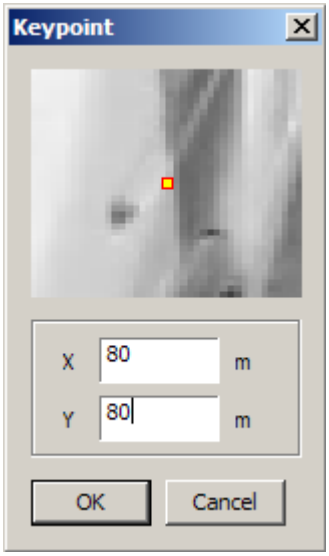

Fig. 7.4-7 Keypoint setup

5.4. Press the OK button (see Fig. 7.4-7).

6. To go to the following step of setting press the Next button (see Fig. 7.4-6).

7. The Road marking window opens. This window allows setting the road edges, number of lanes and the driving directions (see Fig. 7.4-8).

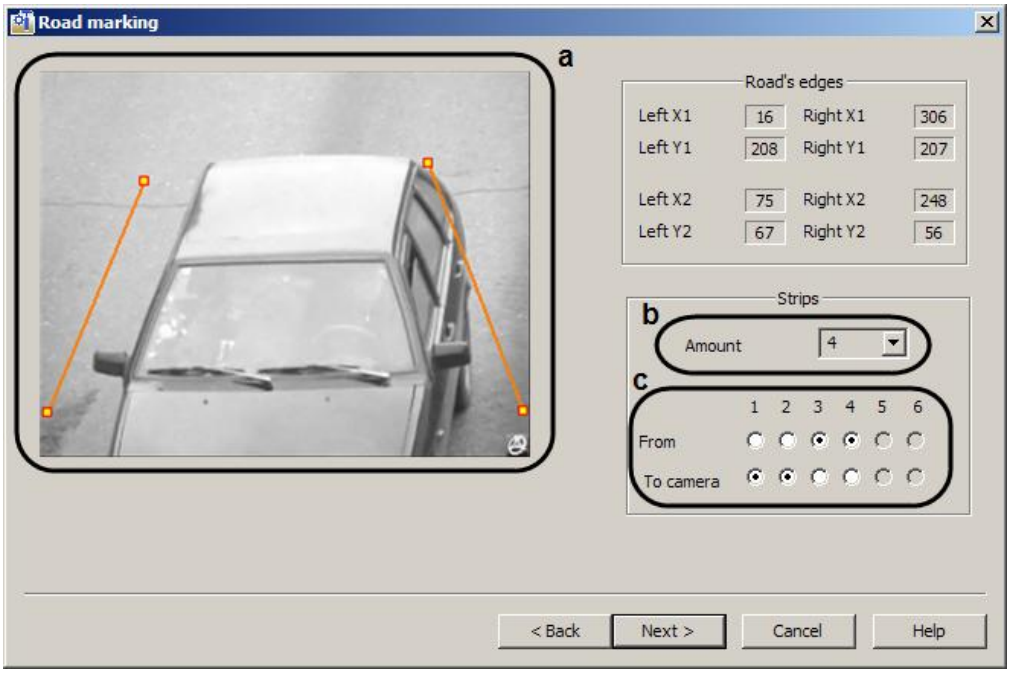

Fig. 7.4-8 Markings setup

By default the road marking is set automatically.

To set the markings, do the following:

7.1 To remove the road edge, Shift-click one of its endpoints by pressing the left mouse button. (see Fig. 7.4-8, a).

7.2 To set the road edge, click the road edge in the image, press the left mouse button, drag the cursor to another edge of the road in the video frame, release the button (see Fig. 7.4-8, a).

7.3 Set the number of driving lanes (see Fig. 7.4-8, b).

7.4 Set the driving direction for each lane (see Fig. 7.4-8, c).

8. The Marking result window opens.

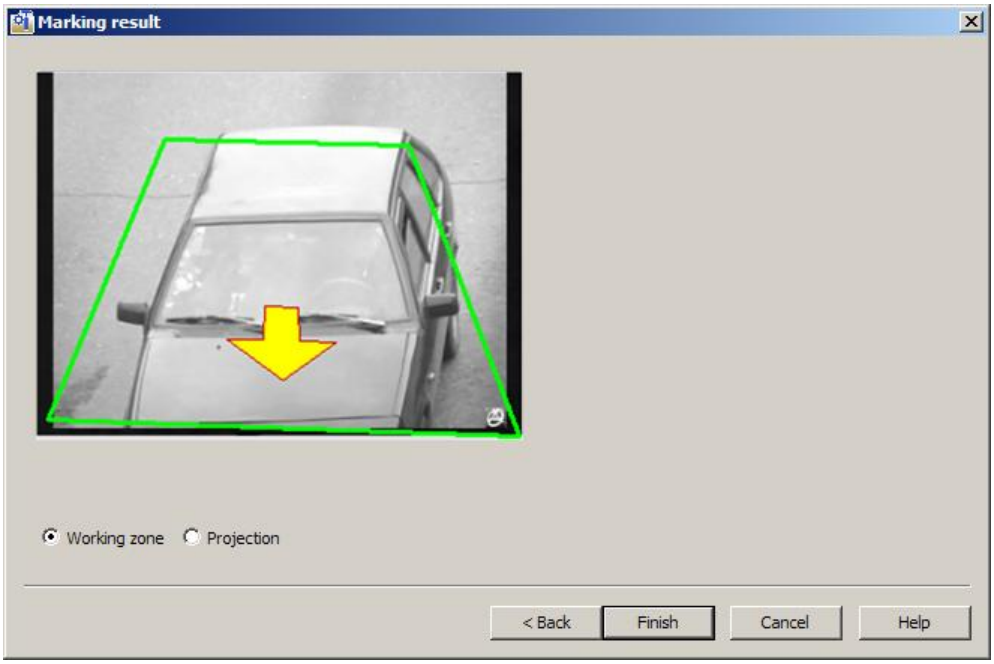

Fig. 7.4-9 Road markings result

The image with the road markings is displayed as the result of the setup.

Click the Finish button to complete the setup (see Fig. 7.4-9).

9. Click Apply (see Fig. 7.4-4).

10. As a result of these actions Marking result window opens (see Fig. 7.4-9).

The road markings are now set.

7.4.6 Importing the file with the markings parameters

Transport Detector allows importing the file that contains the parameters of the road markings.

To import the markings file, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-10).

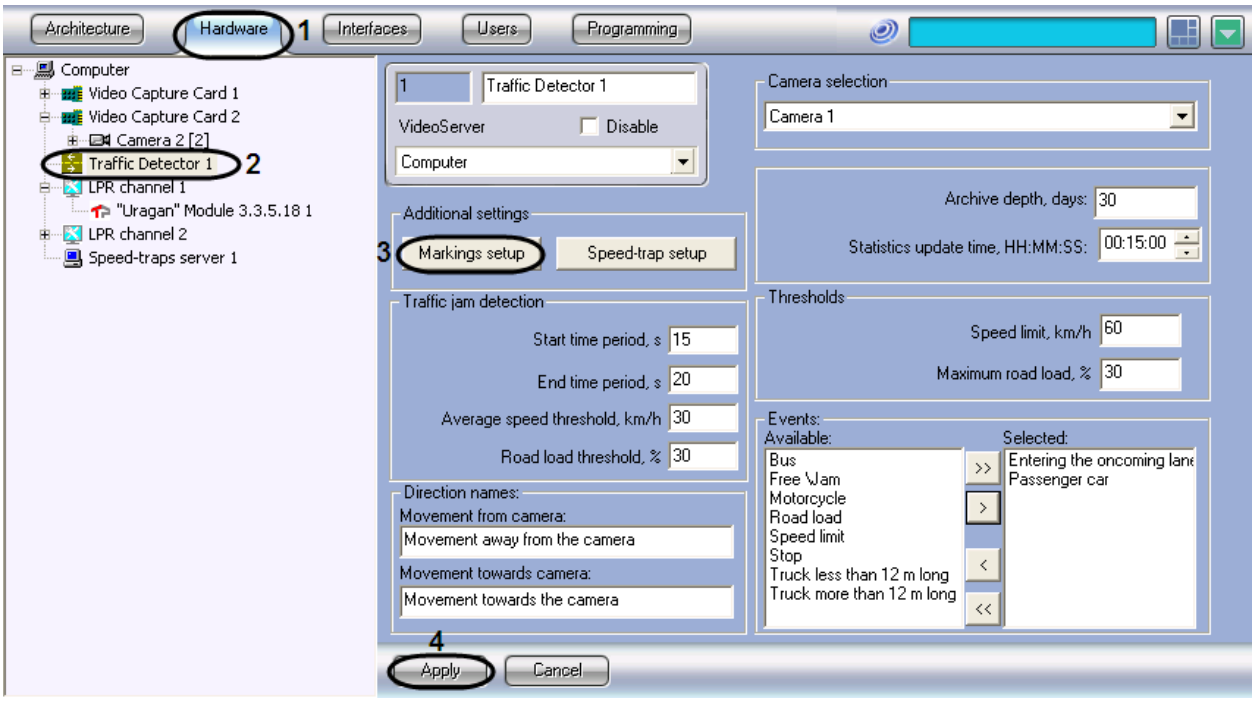

Fig. 7.4-10 Importing the markings file

3. Click the Markings setup button and select the Import markings item.
4. The standard file open window opens.

Select the markings file and click Open (see Fig. 7.4-11).

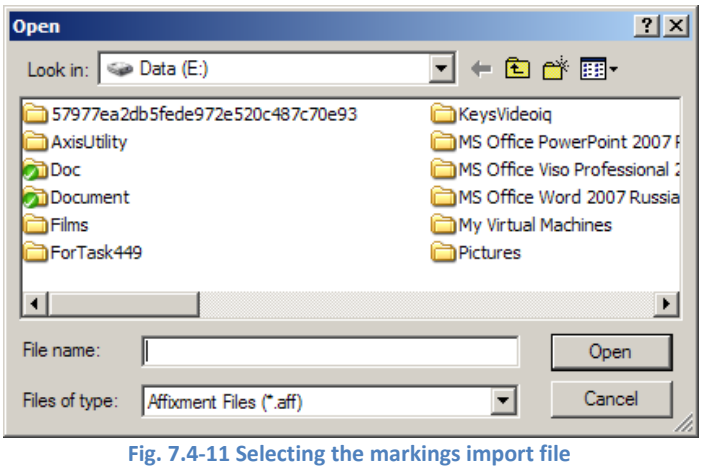

Fig. 7.4-11 Selecting the markings import file

5. Click Apply (see Fig. 7.4-10).

The markings file is now imported.

7.4.7 Exporting the markings parameters into a file

Transport Detector allows exporting the road markings parameters into a file.

To export the markings, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-12).

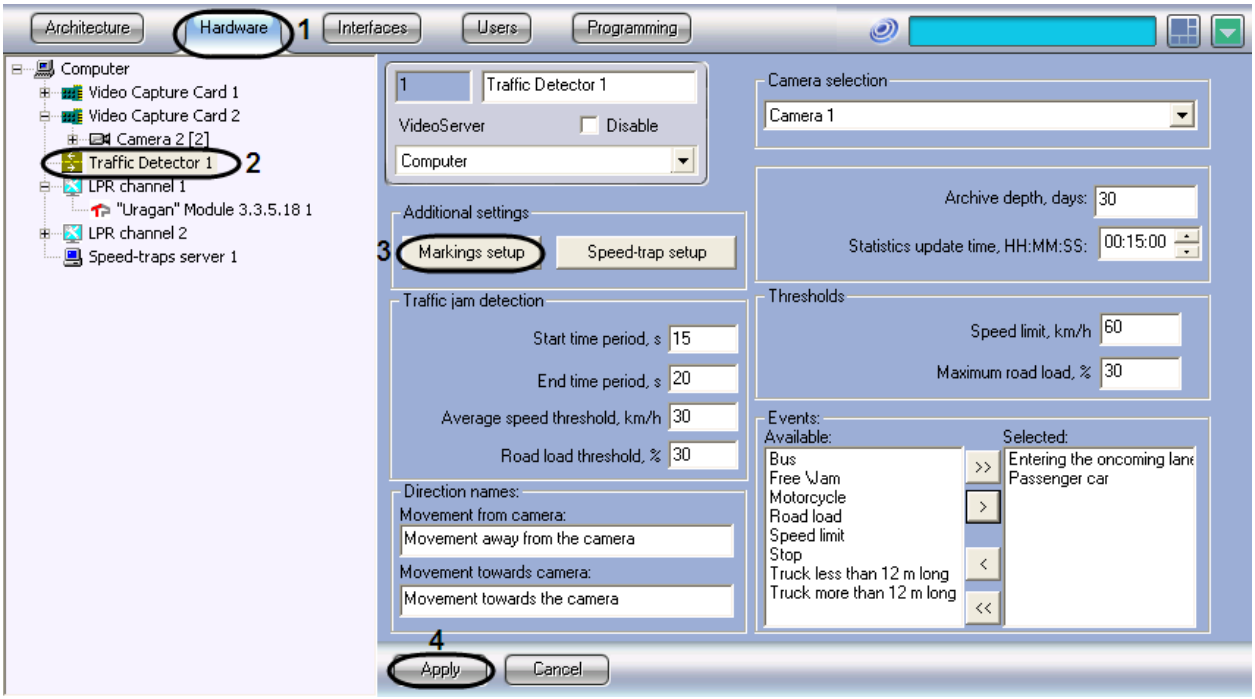

Fig. 7.4-12 Exporting the markings to the file

3. Click the Markings setup button and select the Markings export item.
4. The standard file saving window opens.

Select the folder, enter the file name to save the markings to and click Save (see Fig. 7.4-13).

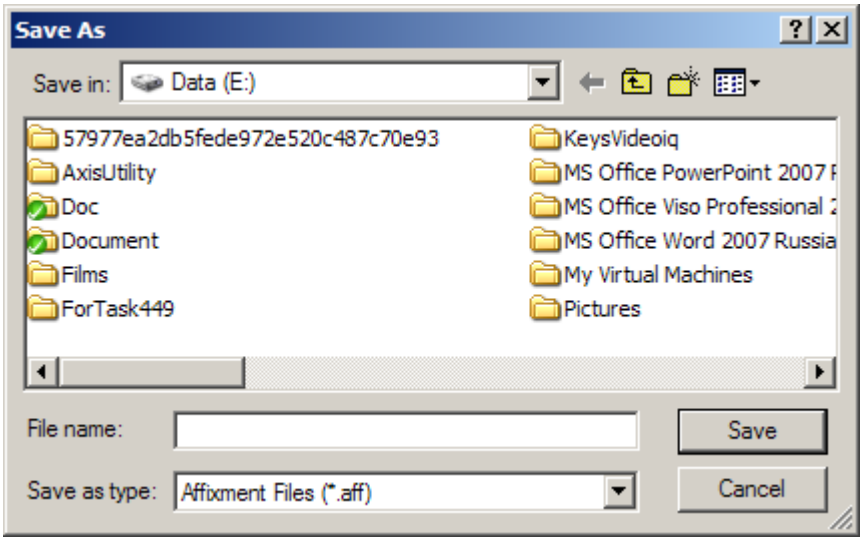

Fig. 7.4-13 Saving the markings file

5. Click Apply (see Fig. 7.4-12).

The markings file has been exported successfully.

7.4.8 Setting up the joint operation of Traffic Detector and Radar software modules

The Auto-Intellect software package allows the Traffic Detector and Radar modules to work together.

Note. By default, the vehicle speed is recognized based on the video image received from the camera, linked to the Traffic Detector module. When the Radar module is connected to the Traffic Detector, the speed-trap represented by the Radar module determines the speed of the vehicles moving along the corresponding lane.

The Radar module determines the speed of each vehicle in the specified lane recognized by the Traffic Detector.

To set up joint operation of Traffic Detector and Radar, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-14).

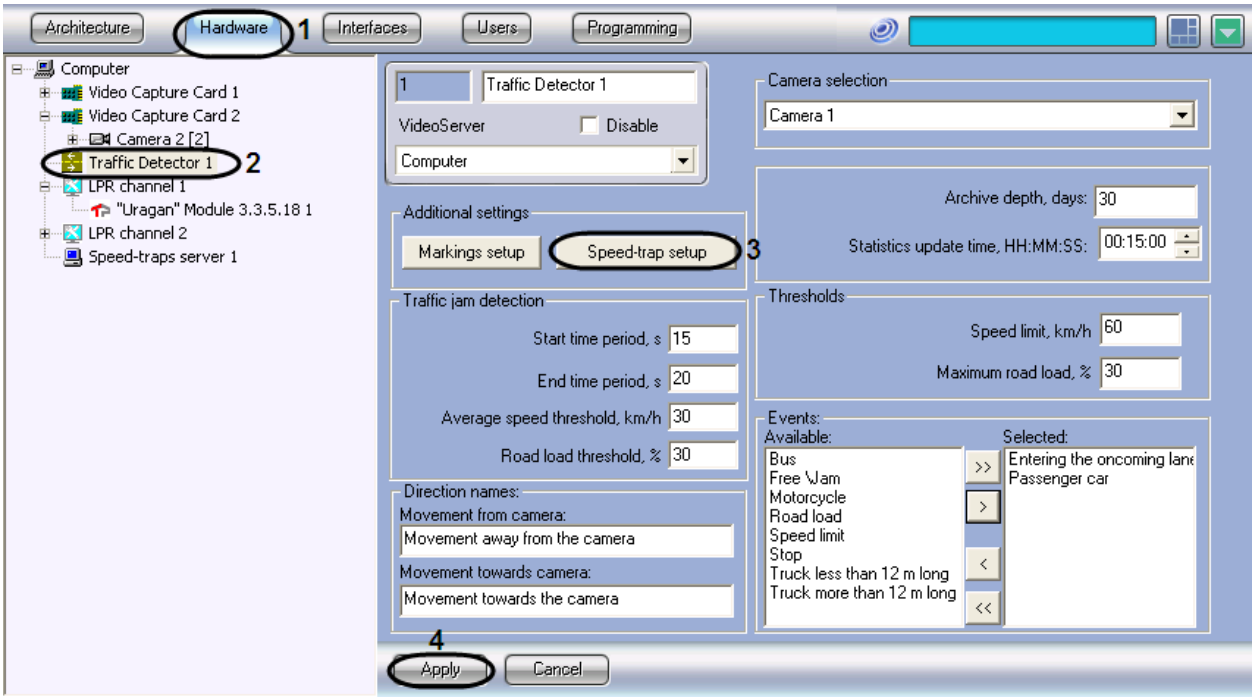

Fig. 7.4-14 Setting up the joint operation of Traffic Detector and Radar

3. Click the Speed-trap setup button.
4. The Speed-traps by lane window will open (see Fig. 7.4-15).

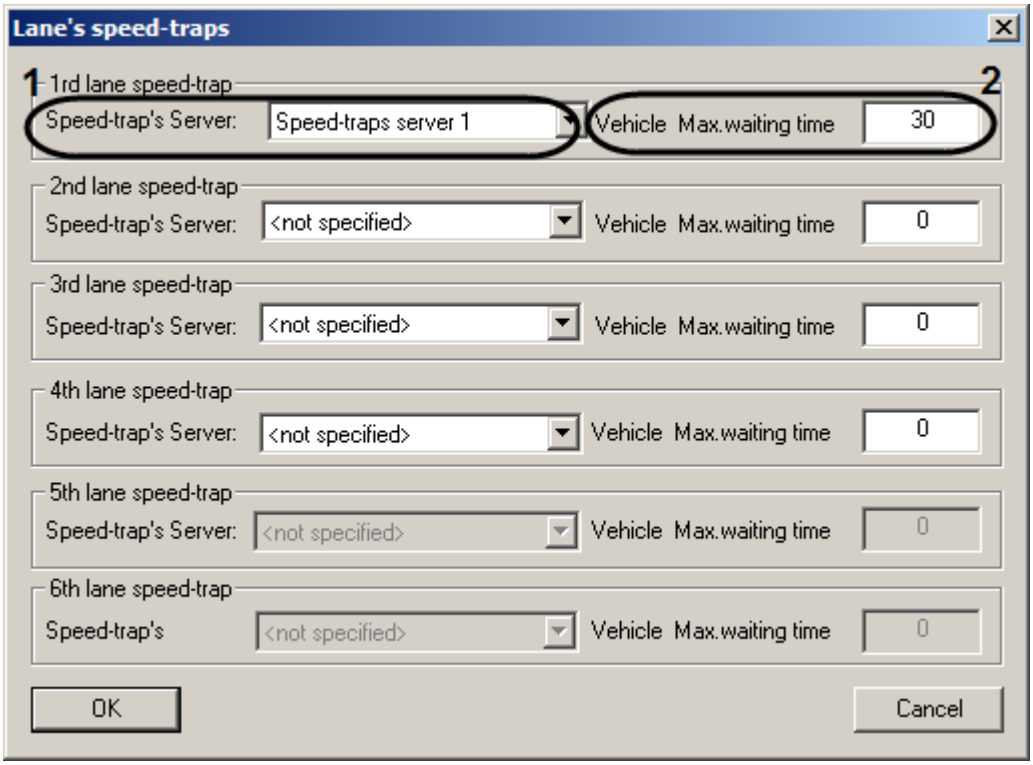

Fig. 7.4-15 Setting up the joint operation of Traffic Detector and Radar

In the Speed-traps by lane window, the synchronization parameters should be set for the lanes with the speed-traps. Do the following:

4.1. In the Speed-trap server drop-down list, select the Speed-trap server object representing the speed-trap device directed at the corresponding lane.

4.2. In the Max. vehicle waiting time field enter the number of milliseconds that it takes the vehicle to move from the speed detection area to the loop detector of the Traffic Detector module.

Note. This parameter is designed to synchronize the operation of the Radar and Traffic Detector modules.

4.3. Click OK.

5. Click Apply.

The Radar and Traffic Detector modules are now set for joint operation.

7.4.9 Setting up the jam start detection parameters

The Traffic Detector module is able to detect the emergence of traffic jams on the road. The module generates a specific event and, in certain cases, notifies the operator.

A jam is detected if the average traffic speed is lower than a certain value and the overall road load is higher than a certain value for a specified time period.

To set up the jam detection parameters, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-16).

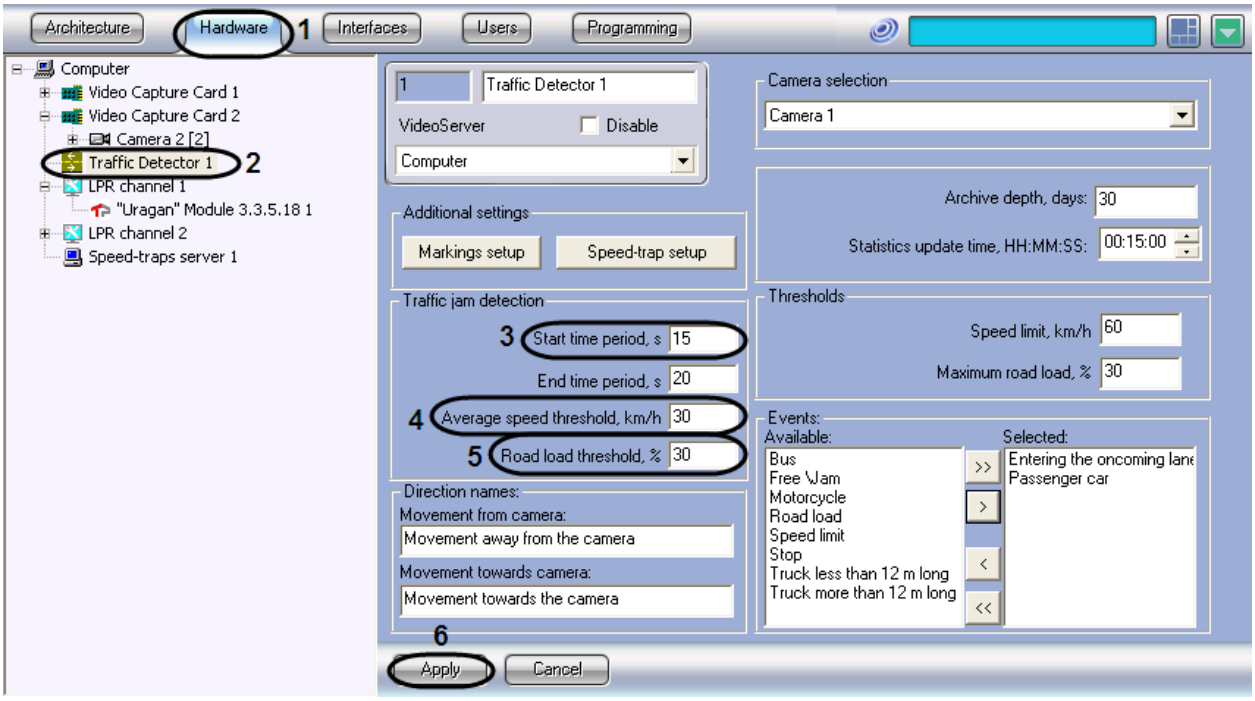

Fig. 7.4-16 Setting up the jam detection parameters

3. In the Start time period field, enter for how long (in seconds) the jam conditions must be satisfied for the start of the jam to be detected.
4. In the Average speed threshold field, enter the minimum average traffic speed which is still not considered to be a jam. When the average traffic speed remains lower than this value for a certain period of time, a traffic jam may be detected (if other conditions are satisfied).

The threshold is set in km/h.

5. In the Road load threshold field, enter the maximum road load (in percent) which is still not considered to be a jam. When the road load remains higher than this value for a certain period of time, a traffic jam may be detected (if other conditions are satisfied).

If the overall road load is lower than that specified, no traffic jam is detected.

Note. The road load parameter is calculated using the following formula: $Road\_load = \frac{T_0}{T} * 100\%$, *where* T_0 *is the total of the time periods when vehicles were present in the loop detector zone, and T is the time period set in the Statistics update time field.*

6. Click Apply.

The jam start detection parameters are now set.

7.4.10 Setting up the jam end detection parameters

The traffic jam event is considered to end when the average traffic speed is higher than a certain value, and the overall road load is lower than a certain value for a certain period of time.

To set the jam end detection parameters, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-17).

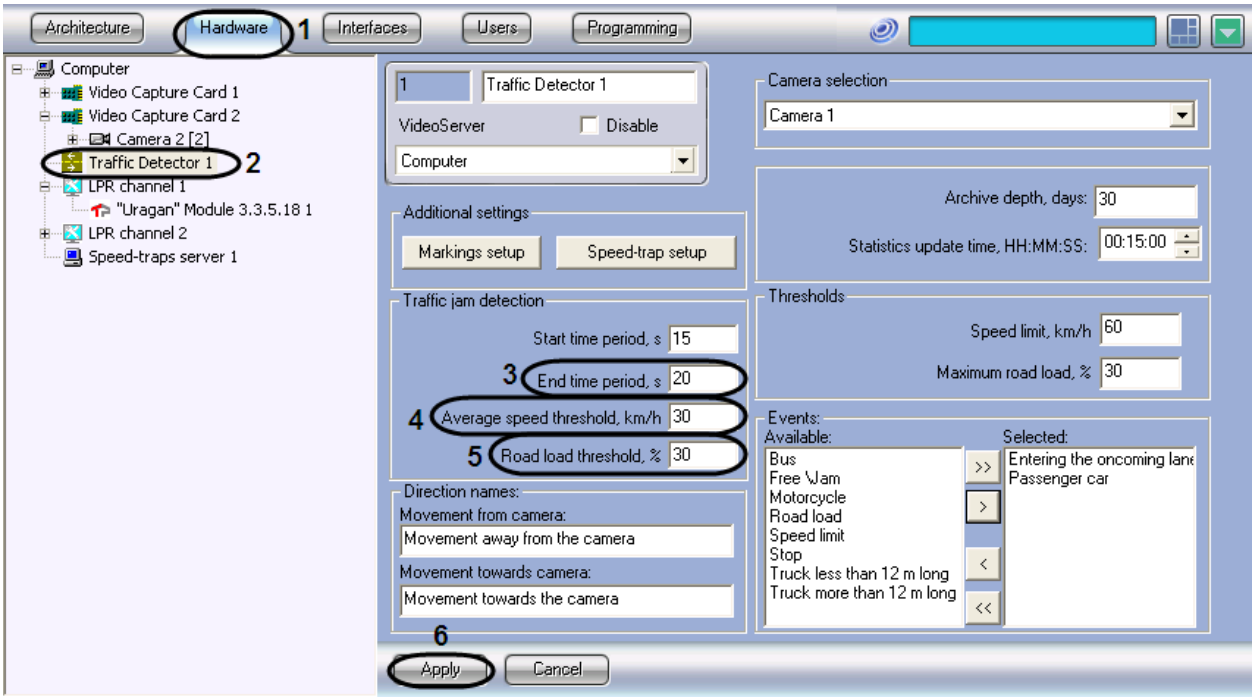

Fig. 7.4-17 Jam end parameters setup

3. In the End time period field, enter for how long (in seconds) the reverse jam conditions must be satisfied for the end of the jam to be detected.
4. In the Average speed threshold field, enter the maximum average traffic speed which is still considered to be a jam. When the average traffic speed remains higher than this value for a certain period of time, a traffic jam may be considered to have ended (if other conditions are satisfied).
5. The threshold is set in km/h.
6. In the Road load threshold field, enter the minimum road load (in percent) which is still considered to be a jam. When the road load remains lower than this value for a certain period of time, the traffic jam may be considered to have ended (if other conditions are satisfied).

Note. The road load parameter is calculated using the following formula: $Road\_load = \frac{T_0}{T} * 100\%$, *where* T_0 *is the total of the time periods when vehicles were present in the loop detector zone, and T is the time period set in the Statistics update time field.*

7. Click Apply.

The jam end parameters are now set.

7.4.11 Setting the driving direction names to be shown in the Traffic Monitor window

The Traffic Detector software module is represented by the Traffic Monitor interface window (see the Traffic Monitor window setup section). The Traffic Monitor window can be set up to display traffic driving parameters in the video image. The names for the traffic moving directions to be displayed can be specified during the module setup.

To set the direction names, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-18).

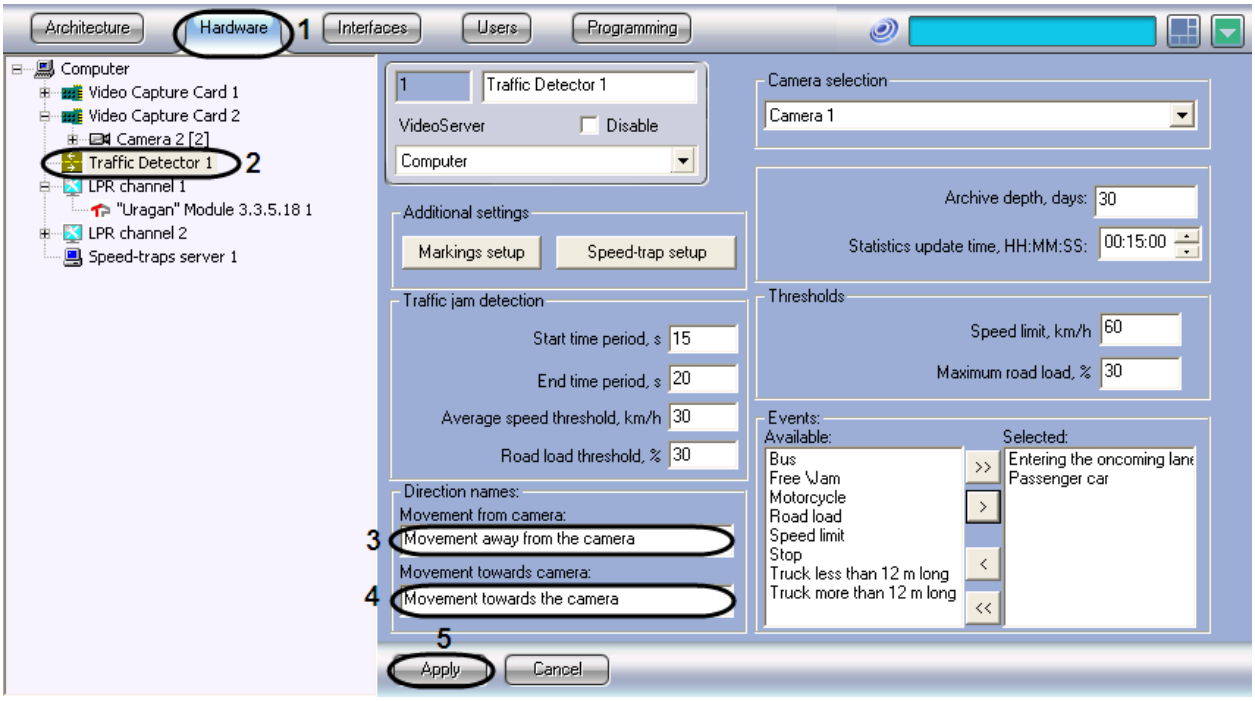

Fig. 7.4-18 The traffic direction names setup

3. In the Movement from camera field, enter the name of the direction to be shown in the Traffic Monitor window for the vehicles moving away from the camera.
4. In the Movement to camera field, enter the name of the direction to be shown in the Traffic Monitor window for the vehicles moving toward the camera.
5. Click Apply.

The traffic directions are now set.

7.4.12 Setting up the traffic limiting parameters

Certain limitations can be specified for the traffic during the Traffic Detector setup, i.e. the speed limit for individual vehicles and the maximum overall road load.

If any of these values exceeds the limit, it is highlighted in red color in the Traffic Monitor (see the Auto-Intellect Software Package. The Operator Guide document), and the alarm notification window can be set to open.

To specify the traffic limits, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-19).

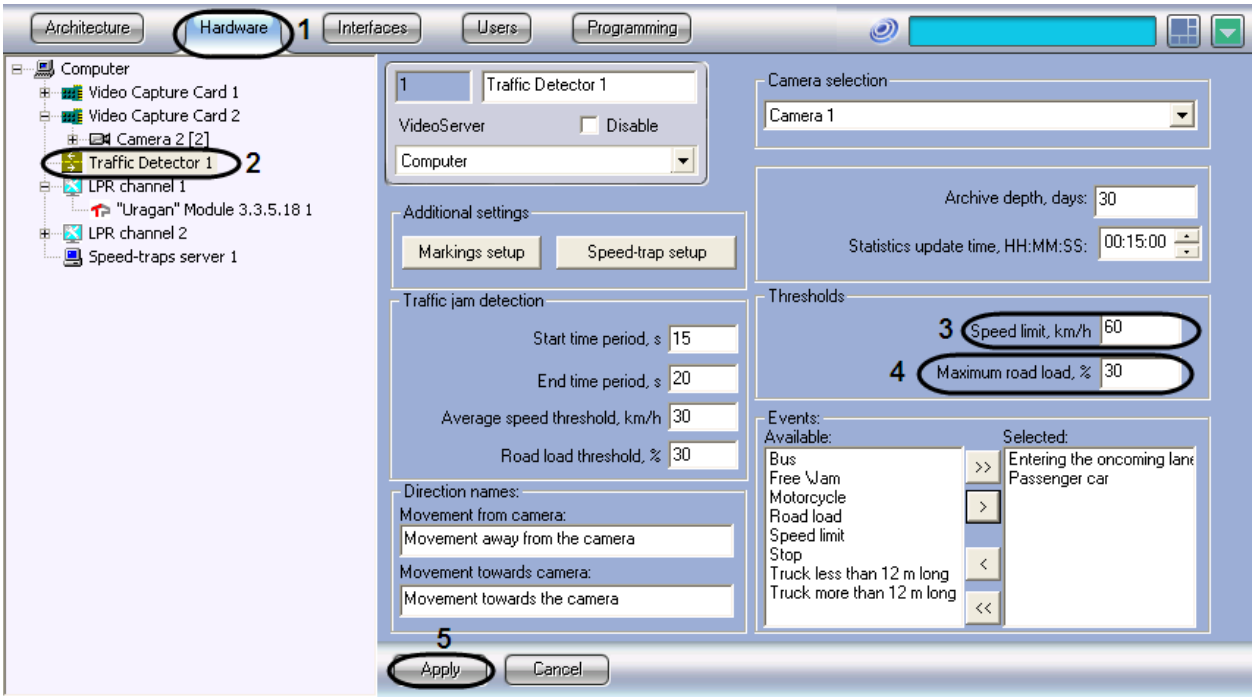

Fig. 7.4-19 Setting up the traffic limits

3. In the Speed limit field, enter the maximum allowed driving speed.
4. In the Road load threshold field, enter the maximum allowed road load.

Note. The road load parameter is calculated using the following formula: $Road\_load = \frac{T_0}{T} * 100\%$, *where T_0 is the total of the time periods when vehicles were present in the loop detector zone, and T is the time period set in the Statistics update time field.*

5. Click Apply.

The traffic limitations are now set.

7.4.13 Selecting the events to be saved to the database and to generate the notifications in the Traffic Monitor window

The Traffic Detector setup allows selecting the events generated by Auto-Intellect for this module to be saved into its database (dt.mdb).

Note. The selected events will be used to notify the operator in the Alarm window (see the "The Traffic Monitor setup procedure" section).

To select the events to be generated, do the following:

1. Open the Hardware tab in the System Settings window.
2. In the object tree on the left side of the Hardware tab, select the Traffic Detector object representing the Traffic Detector module to be set up. The settings panel of the selected object will open on the right side of the window (see Fig. 7.4-20).

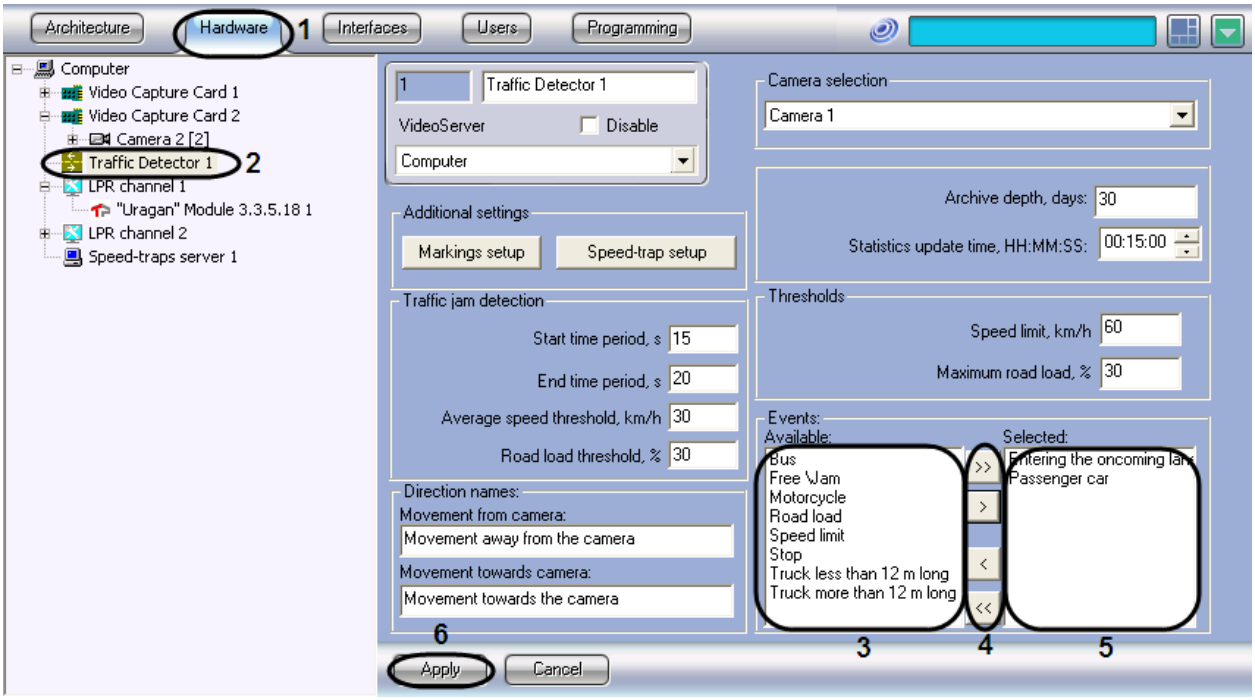

Fig. 7.4-20 Selecting the events to be generated from the list of all available events

3. In the All events list, select the events to be generated by the system.
4. Click the right arrow button to move the selected events to the Generated events list.

Click the right double arrow to move all events to the Generated events list.

Click the left arrow to remove the selected events, or the left double arrow to remove all events from the Generated events list.

5. The Generated events list shows the events to be generated by the system.
6. Click Apply.

The events to be generated and used for notification are now selected.

7.5 Connecting and setting up of the external LP number database

The External Plates Database module can be connected to Auto-Intellect for searching the recognized license plate numbers.

Note. An example of external database may be exemplified by search database.

Search results of recognized numbers in the external database are displayed in the interface window «LP recognition ».

Auto-Intellect supports databases in the following formats:

1. SQL Server;
2. Access;
3. FoxPro;
4. Oracle.

7.5.1 External database connection and setup procedure

To setup the External Plates Database object do the following steps:

1. connect the external plates database;
2. set the names to the table's columns , that contain vehicle numbers, for displaying in the interface module «Vehicle recognition module»;
3. select search numbers method in the external database;

4. set the number of displayed numbers, found in the external database in case when the search was made for a number component or license-plate number;
5. set the SQL- query in case, when the plate search is performed by SQL-query.

7.5.2 Connecting the external database

To connect the external database, do the following:

1. Open the Hardware tab in the System Settings window (see Fig. 7.5-1, 1).
2. Select the External Plates Database object in the object tree (see Fig. 7.5-1, 2).
3. Click the Connection setup button to open the Connection setup window (see Fig. 7.5-1).

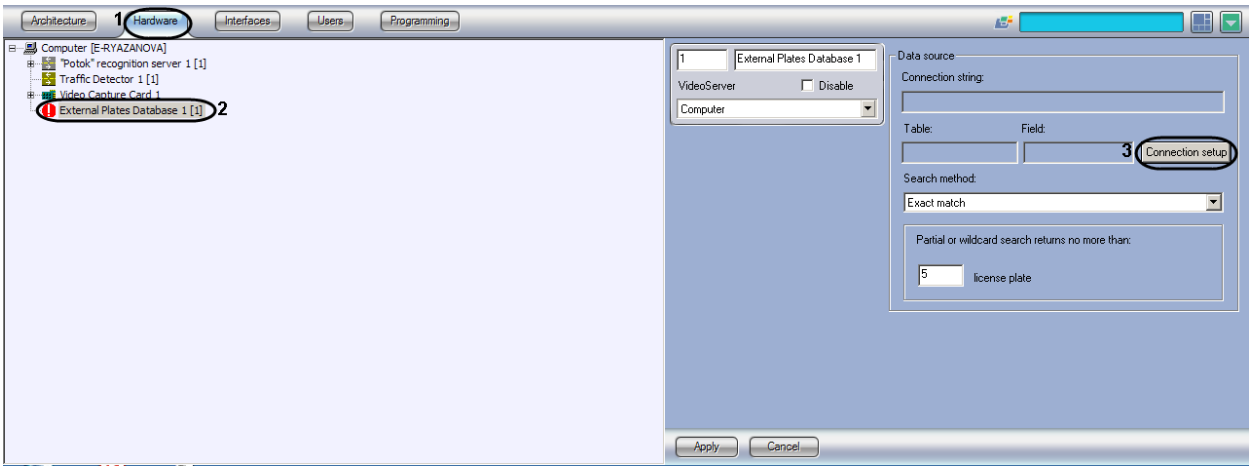

Fig. 7.5-1 External Plates Database connection. Connection setup window

4. Click the Setup button in the appeared window (Fig. 7.5-2, 1).

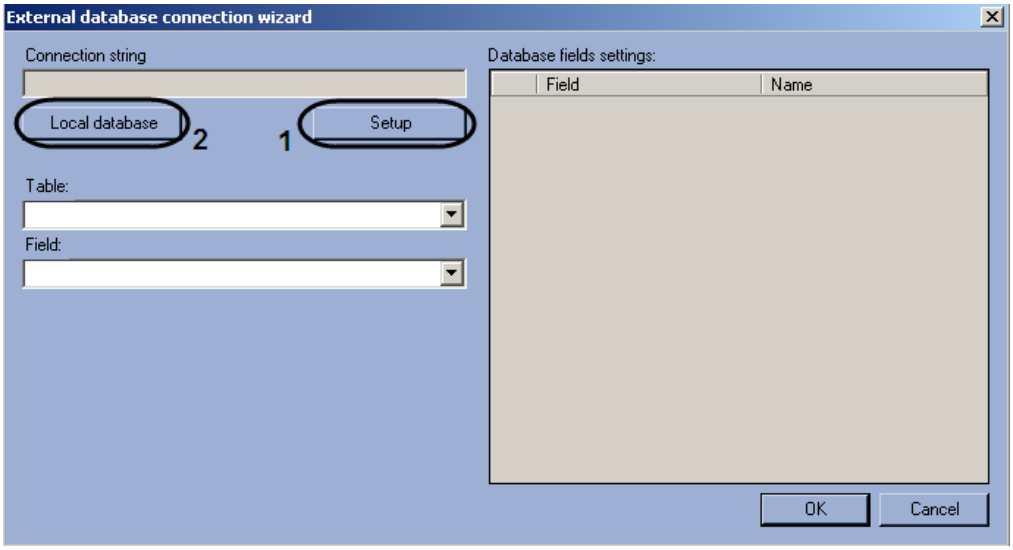

Fig. 7.5-2 External DB connection wizard

Note1. If the Auto-Intellect PC database shold be used as the external database click Local database (see. Fig. 7.5-2, 2) and go on to step 6.

Note2. If the external database is the Auto-Intellect PC database then you can add numbers with the help of «VehiclePlateSearch» program.(see «Forming the Active tracking database» in the reference manual «Auto Intellect software package: Operator's guide»).

5. The standard dialog window of database selection «Data link properties »will be displayed in result. Database selection process in the window «Data link properties» depends on the format of the connected database:

5.1 SQL Server and Access. Detailed description of database selection in the stated formats is given in the section «Database connection» of the «Intellect PC: Administrator guide» document.

5.2 FoxPro. Microsoft OLE DB for Visual FoxPro or other OLE DB provider should be used to connect to external database of the stated format.

5.3 Oracle. Connection to the external database of the stated format is done in the following way:

Note! To connect the Oracle database meet the following conditions:

1. ***On the PC with the Auto-Intellect server there installed the Oracle client.***
2. ***Oracle client is connected to Oracle database (Listener component is set up).***

Note. Detailed information about Oracle databases is given in the official reference manuals concerning this software.

5.3.1 On the Provider tab of Data link properties dialog window select the value «Microsoft OLE DB Provider for Oracle» or «Oracle Provider for OLE DB» (Fig. 7.5-3).

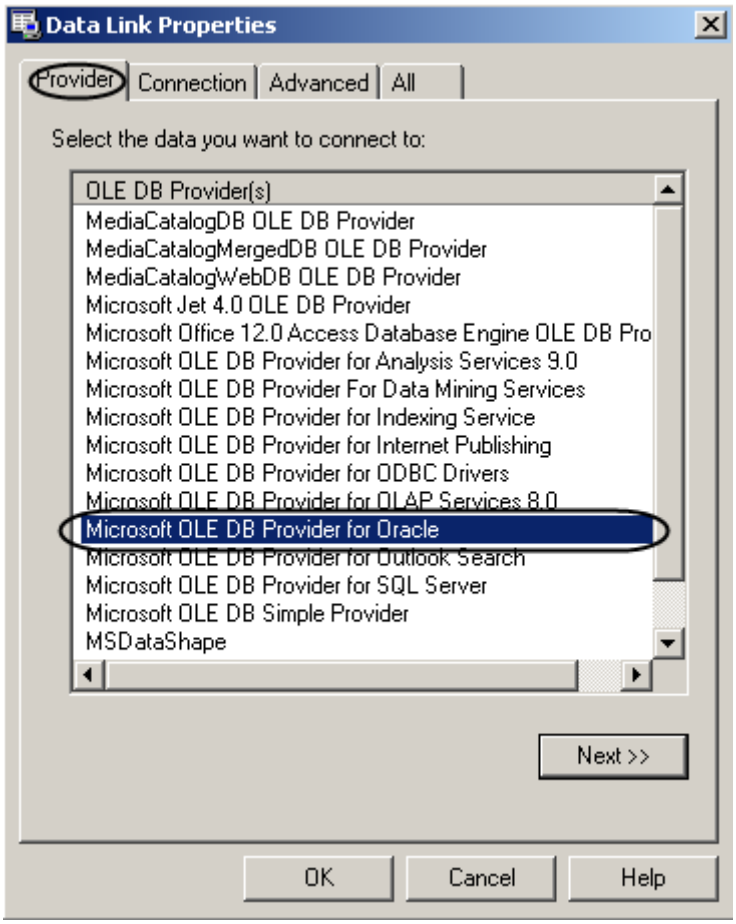

Fig. 7.5-3 Selecting the provider for Oracle database

5.3.2 Go to the tab Connection and click Next (Fig. 7.5-4).

5.3.3 Enter the server name and of Oracle database to which the local client Oracle is connected in the field «Use data source name» (Fig. 7.5-4, 1)

Note. Oracle database name is entered upon its installation.

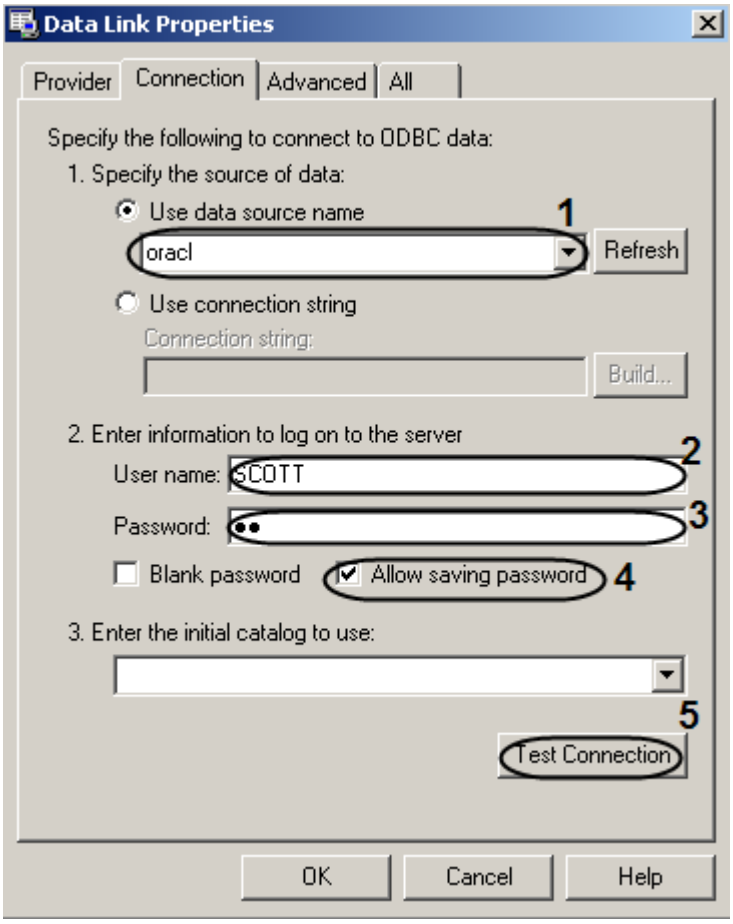

Fig. 7.5-4 Oracle database connection

5.3.4. In the fields «User name» (Fig. 7.5-4, 2) and «Password» (Fig. 7.5-4, 3) enter the user name and password to connect to the Oracle database server.

5.3.5. Set the checkbox «Allow saving password» (Fig. 7.5-4, 4).

*Note. To check the connection to the Oracle database server click the button Test Connection (*Fig. *7.5-5, 5). If test connection succeeded the message window would be displayed. To close the message window it is necessary to click «OK» (Fig. 7.5-5).*

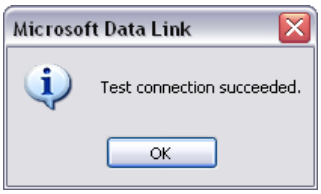

Fig. 7.5-5 Test connection succeeded.

5.3.6. To complete the connection to external Oracle database click «OK».

6. After selecting the database (see step 5) in the window «External DB connection wizard» there will be displayed connection string with the selected database (Fig. 7.5-6, 1).

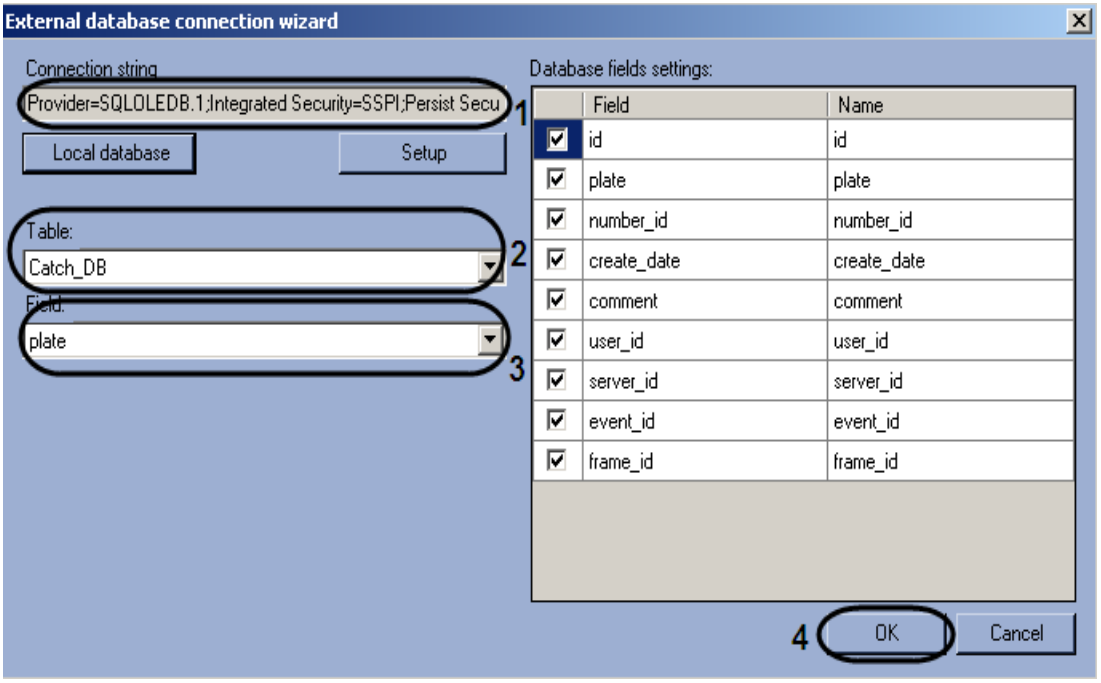

Fig. 7.5-6 Column selection with vehicle plates

7. In the list «Table» (Fig. 7.5-6, 2) the names of tables in the selected database are displayed. Select the table, containing vehicle plates from the list.
8. In the list «Field» (Fig. 7.5-6, 3) the names of columns on the selected table are displayed. Select from this list the column with vehicle plates.
9. Click «OK» (Fig. 7.5-6, 4) to save, change or close the External DB connection wizard dialog window.

*Note. To quit the external DB connection wizard without saving the changes click «Cancel» (*Fig. 7.5-6*).*

10. The fields Connecting string, table, Field on the External plates database settings panel will be filled in result of performing the operation (Fig. 7.5-7, 1) .

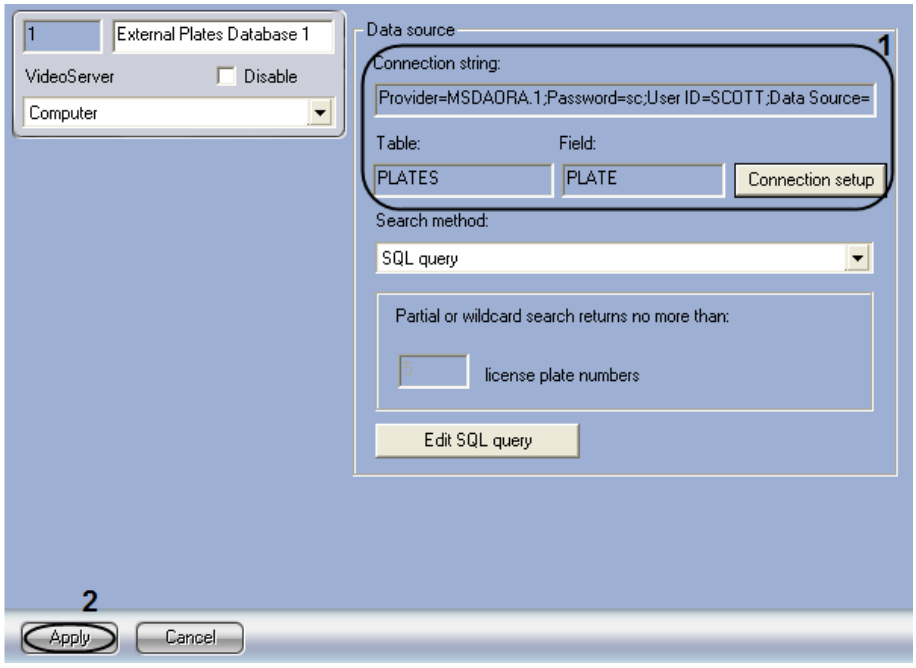

Fig. 7.5-7 External Plates dadabase parameters

11. Click«Apply» (Fig. 7.5-7, 2).

External Plates database connection is completed.

7.5.3 Introducing names to table's columns containing vehicle plates

There is a possibility to assign tables, containing plates and names to be displayed in the interface window Vehicle tracer, to the columns. Table's columns will be displayed in the window with search successful results of the identified number in the External Plates Database.

Note. All table's columns, containing plates, are displayed, while using the search methods «Register», «Partial search», «Wildcard search» (see section« Plates search method selection in the external database»). Possibility to select columns to be displayed in the interface window Vehicle tracer is available while using the search method «SQL-query» (see Setting the SQL-query for searching in the External Plates Database).

To assign names to table's columns, containing vehicle plates, it is necessary to do the following:

1. Go to Hardware tab of system settings dialog window (Fig. 7.7-2).
2. Select the External Plates Database in the objects tree (Fig. 7.5-8, 2).

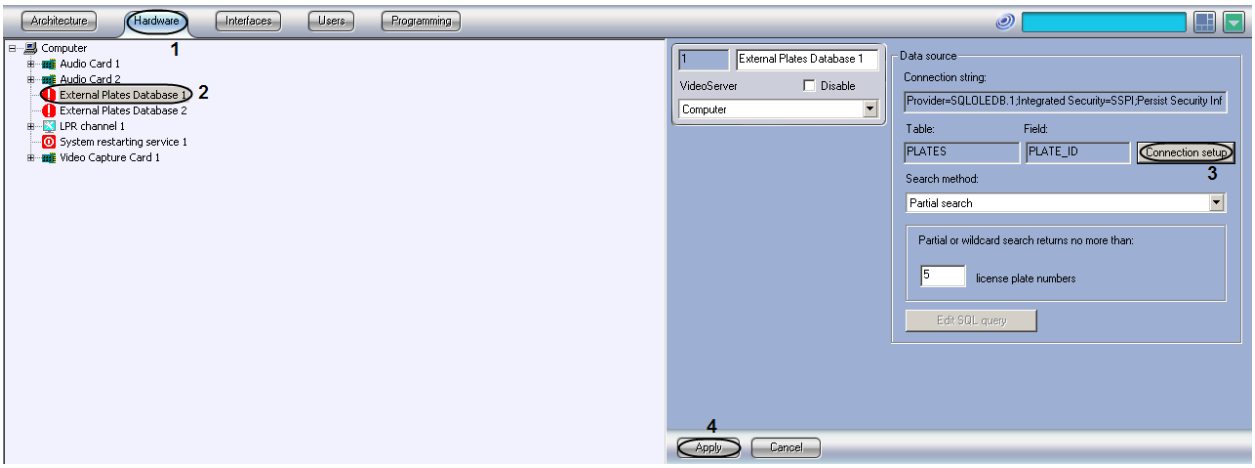

Fig. 7.5-8 Assigning names to table's columns, containing vehicle plates

3. Press the Connection settings button (Fig. 7.5-8, 3).
4. External DB connection wizard will be displayed in result (Fig. 7.5-9).

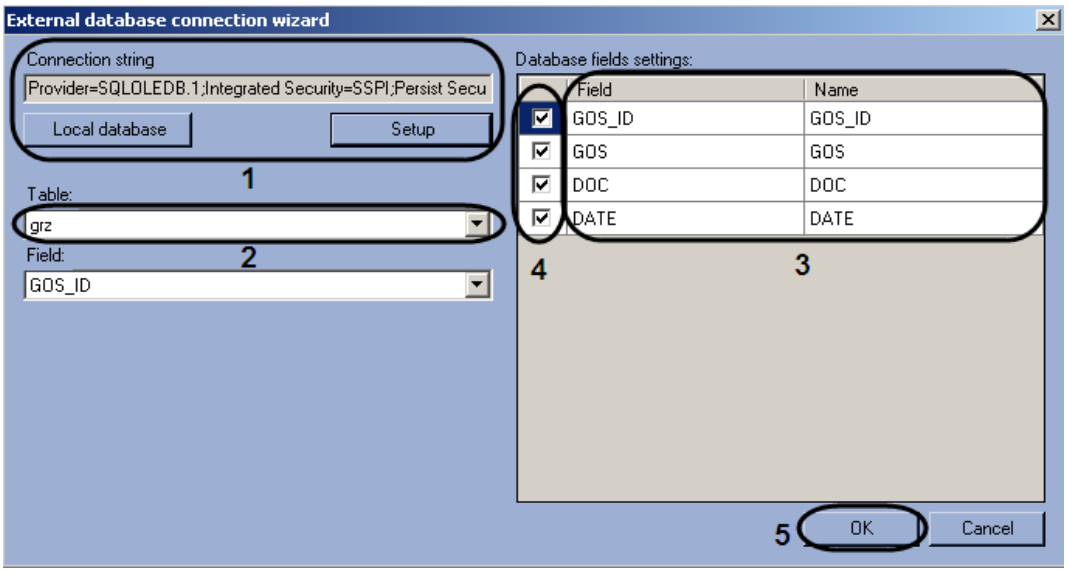

Fig. 7.5-9 Processing the table DB fields settings

5. Set the connection string to the External DB (Fig. 7.5-9, 1), then select from the table list the table, containing vehicle plates (Fig. 7.5-9, 2) (see steps 5-7 in the section External DB connection).
6. A list of columns in the selected table will be displayed in the table «DB fields settings» in result (Fig. 7.5-9, 3).
7. Enter the corresponding to column names that will be displayed in the interface window Vehicle tracer in the column Name » (Fig. 7.5-9, 3).
8. Select check boxes opposite the lines fields of which should be displayed in Vechicle detection module interface (Fig. 7.5-9, 4).
9. Click OK to save the applied changes and closing the dialog window External DB connection wizard (Fig. 7.5-9, 5).

Note. Click cancel to close the window External DB connection wizard without saving the changes (Fig. 7.5-9).

10. Click Apply (Fig. 7.5-8, 4).

Assigning names to table's columns, containing vehicle plates is completed.

7.5.4 Plates search method selection in the external plates database

Plates auto search in the External DB is performed by one of the following methods (Table 7.5-1).

Table 7.5-1 Plates auto search in the external DB

Search method	Method description	Search results displaying
Register	The same sequence of characters in the column with vehicle plates must correspond to a sequence of characters, corresponding to the identified vehicle plate.	In the window «Vehicle tracer» there are displayed table's columns, containing vehicle plates
Partial search	At least one sequence of characters, that is partially or in full present in the plate in the external BD must correspond to identified vehicle plate.	
Wildcard search	At least one of the plates, stored at external DB, must correspond to identified vehicle plate. Wildcards are recorded to the external BD preliminary together with vehicle plates. Wildcards in the DB are recorded according to Transact-SQL rules. Wildcards may contain usual characters and wildcards (Table 7.5-2) in the required combination.	
SQL-query	SQL-query is designed for extracting the required data from the table, containing plate's numbers and also from bound tables. SQL-query is used for more flexible setting up the Auto-Intellect PC (example of such SQL-query is given in 7.5.6 part of the manual, Fig. 7.5-13)	In the window «Plates ID number »there are displayed table's columns of the external DB, stated in the SQL-query

Table 7.5-2 Wildcards Transact-SQL

Wildcard	Wildcard description	Example of search results
%	Any string containing 0 and above characters in length	Plates, containing elements 'a', '385' and '78', divided by any number of characters, for example 'AO38578', 'a385мк78' correspond to the wildcard 'a%385%78'
_ (underlining)	Any single character	Plates, containing a sequence of 4 characters , the first of which is '2' and the last is '5' correspond to the wildcard '2__5', for example 'A256577', '2115ОК43'
[]	Any single character , containing ([a-e]) in the range or ([абвгде]) in the set	Plates, containing a sequence of 4 characters correspond to the wildcard '[е-м][2-5]53' . The sequence ends in '53',the first character belongs to the range е-м, the second one belongs to the range 2-5, for example 'к453мн02', 'м253вт63'
[^]	Any single character , that is not contained in the range	Plates, containing a sequence of 4 characters correspond to the wildcard '[^е-м]499'. The sequence ends in '499', the first

Wildcard	Wildcard description	Example of search results
	([^a-e]) or in the set ([^абвгде])	character does not belong to the range е-м, for example ‘в499вк57’, ‘н499578’

Note.You can add numbers’ templets through “Active tracking” database(see. «Forming the Active tracking database” part in «Auto Intellect Software Package: Operator’s Guide»), or through DB editor (see. official reference manual on required editor).

To select the search method of the identified plates in the external DB, do the following:

1. Go to Hardware tab of system settings dialog window (Fig. 7.5-10, 1).
2. Select the External Plates Database in the objects tree (Fig. 7.5-10, 2).

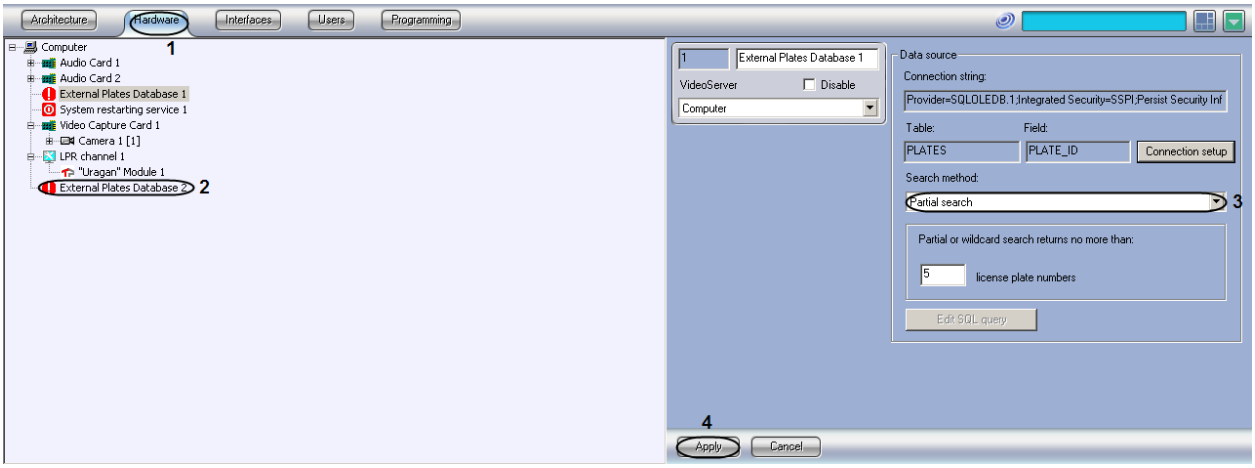

Fig. 7.5-10 Selecting the search method of the identified plates in the external DB

3. Select the required search method of the identified plates in the external DB (
4. Table 7.5-2)from the list Search method (Fig. 7.5-10, 3)
5. Click Apply (Fig. 7.5-10, 4).

Selecting the search method of the identified plates in the external DB is completed.

7.5.5 Setting up the number of search results to be displayed

The External Plates Database module should be set to return a certain amount of LP numbers found in the database. This amount of numbers will be returned in case of partial search or wildcard search methods. This parameter is required for a more flexible setup of Auto-Intellect using the internal programming tools.

For setting the plates number to be returned while searching via a wildcard or a number’s part, do the following:

1. Go to Hardware tab of system settings dialog window (Fig. 7.5-11, 1).
2. Select the External Plates Database in the objects tree (Fig. 7.5-11, 2).

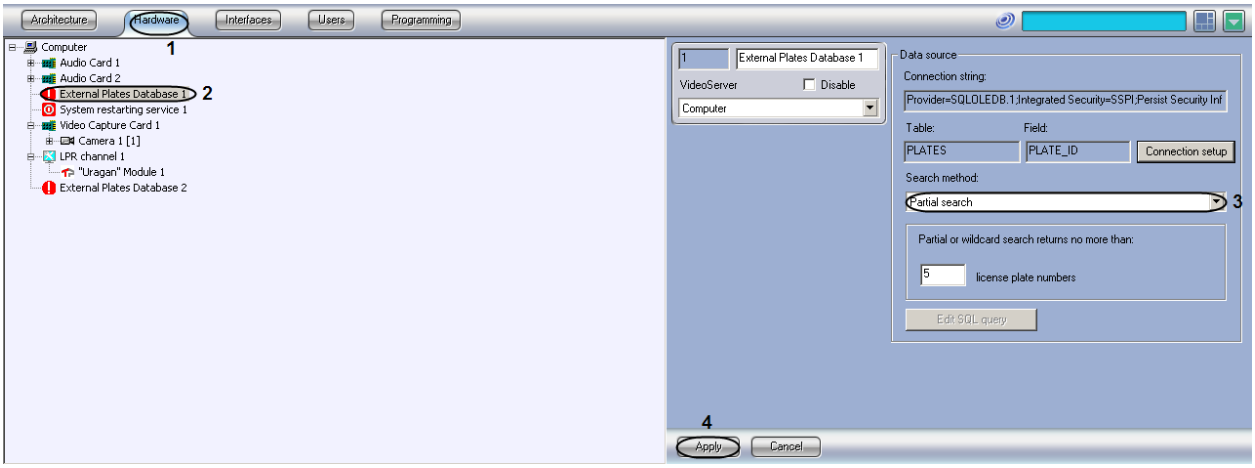

Fig. 7.5-11 Selecting the search method "Partial search" or "Wildcards search"

3. Select the value "Partial search" or "Wildcards search" from the list Search method (Fig. 7.5-11, 3).
4. Enter the maximum plates number to be returned while searching via a wildcard or a number's part in the external DB in the field «Partial or wildcard search returns no more than» (Fig. 7.5-11, 4).
5. Click Apply (Fig. 7.5-11, 5).

Setting the plates number to be returned while searching via a wildcard or a number's part is completed.

7.5.6 Setting up SQL-query for plates search in the external database

There is a possibility to set SQL-query for extracting the required data from the table, containing plates and bound tables. The set SQL-query will be used while searching the plates in the external DB if the SQL-query search method is selected (see section Selecting the plates search method in the external DB

To set the SQL-query do the following:

1. Go to Hardware tab of system settings dialog window (Fig. 7.5-12, 1).
2. Select the External Plates Database in the objects tree (Fig. 7.5-12, 2).

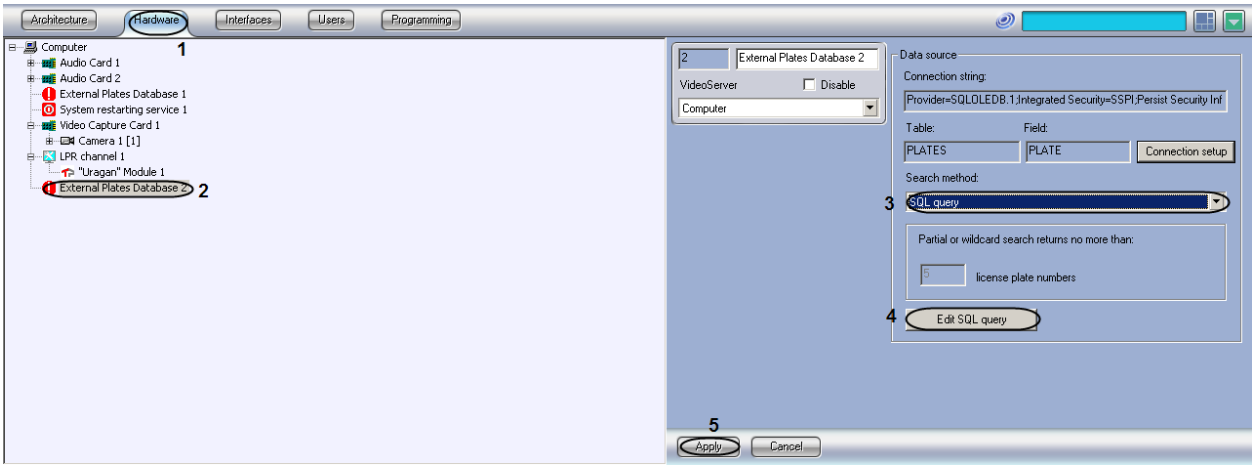

Fig. 7.5-12 Selecting the SQL-query set up

3. Select the value "SQL-query" from the list Search method (Fig. 7.5-12, 3).
4. Click the button Edit AQL-query (Fig. 7.5-12, 4).
5. A dialog window « SQL- query settings» will be displayed in result (Fig. 7.5-13).

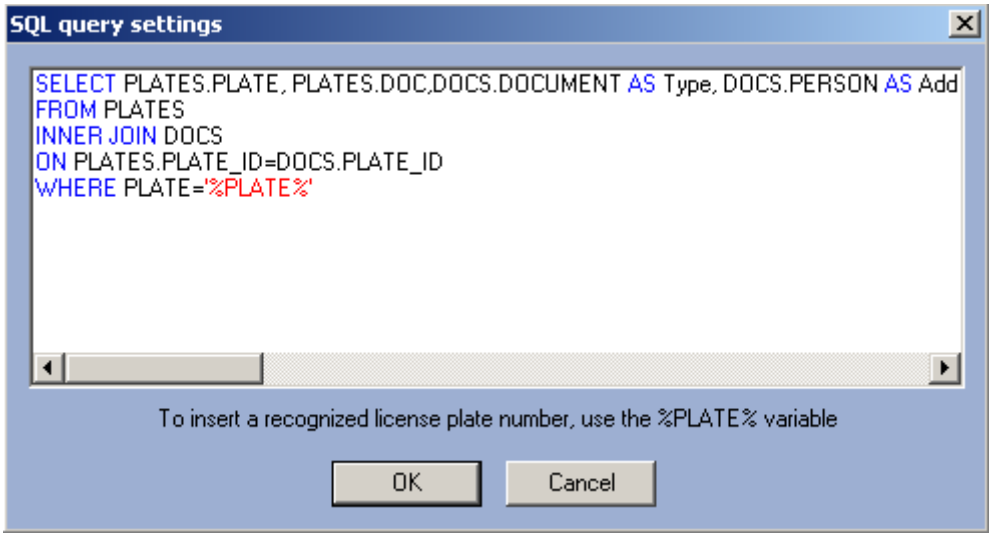

Fig. 7.5-13 SQL- query settings

6. Enter SQL-query to extract (SELECT) the required data from the table, containing plates and bound tables. To replace the identified plate use the variable %PLATE%.

Note 1. Detailed information concerning setting the SQL-queries is given in the corresponding reference manual.

Note 2. SQL-query, given for example(Fig. 7.5-13),returns the required columns (Table 7.5-3)from the external DB (Fig. 7.5-14) if the plate in this DB coincide with the identified number.

Table 7.5-3 Example of extracting the data from external DB

Table	Table's column	Column's contain	Is returned in result of SQL-query
NOMERS	GOS_ID	Primary keys of NOMERS' table recordings	No
	GOS	Plates	Yes
	DOC	Documents' keys, on the basis of which the plates have been recorded to the DB	Yes
	DATE	Dates, of entering the plates to DB	No
DOCS	DOC_ID	Primary keys of DOCS' table recordings	No
	DOCUMENT	Document types, on the basis of which the plates have been recorded to the DB	Yes
	PERSON	Persons, who entered the plates to the DB	Yes
	GOS_ID	External keys of DOCS' table recordings, used for connection to the NOMERS table	No

Fig. 7.5-14 Example of SQL-query search method results

7. To save the changes and close the dialog window « SQL-query settings» click Ok (Fig. 7.5-13).

Note. Click Cancel to close the dialog window « SQL-query settings» without saving the changes.

8. Click Apply (Fig. 7.5-12, 5).

Setting up the SQL-query is completed.

7.6 Traffic data gathering subsystem setup

Correct operation of Traffic data gathering subsystem is provided by two modules 'interaction:

1. «Vehicle detector»;
2. «Vehicle processor».

7.6.1 Traffic data gathering subsystem setup procedure

The Traffic data gathering subsystem setup includes the following steps:

1. Set up the «Vehicle detector»;
2. Set up the «Vehicle processor».

7.6.2 The Vehicle detector setup

7.6.2.1 The Vehicle detector module setup procedure

The Vehicle detector module setup is performed on the Vehicle detector object settings panel. This object is created on the basis of Computer object of the Hardware tab in the system setup dialog window (Fig. 7.6-1).

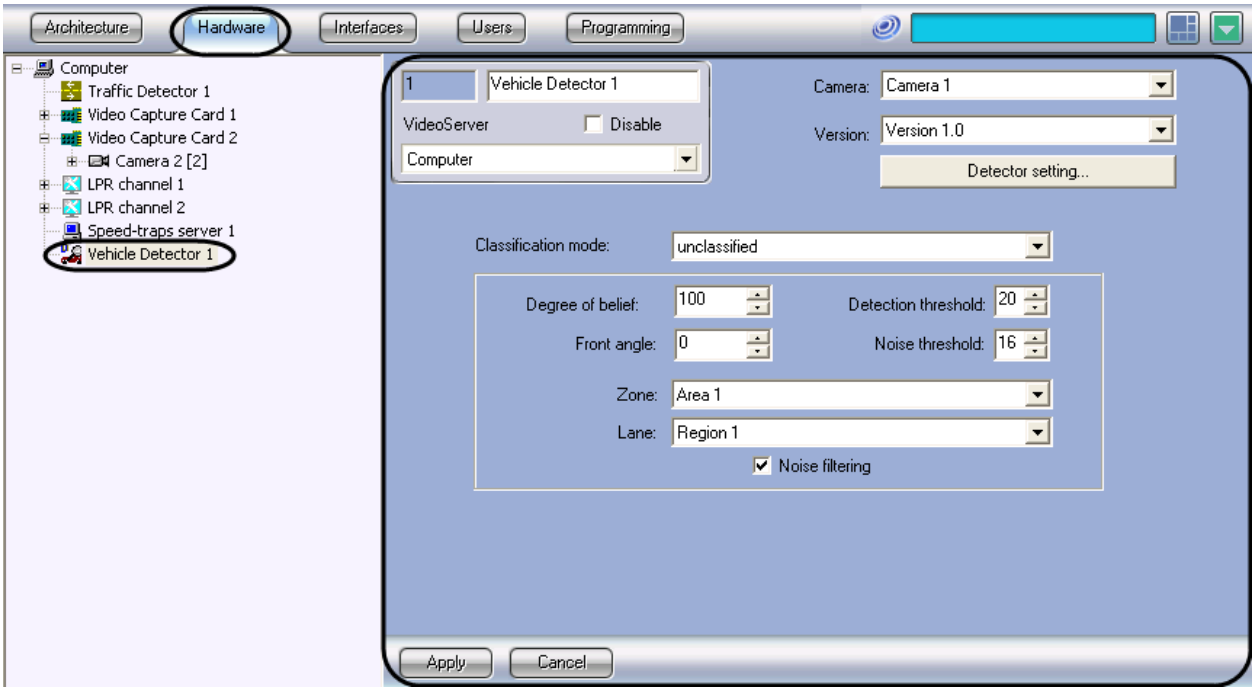

Fig. 7.6-1 The Vehicle detector object

The Vehicle detector module setup includes the following steps:

1. Set the parameters of the Vehicle detector;
2. Setup the detection zone;
3. Set the detection's variables;
4. Set the data concerning the Vehicle detector.

7.6.2.2 Setting up the Vehicle detector parameters

Setting up the Vehicle detector parameters is done in the following way:

1. Go to the Vehicle detector object settings panel (Fig. 7.6-2)

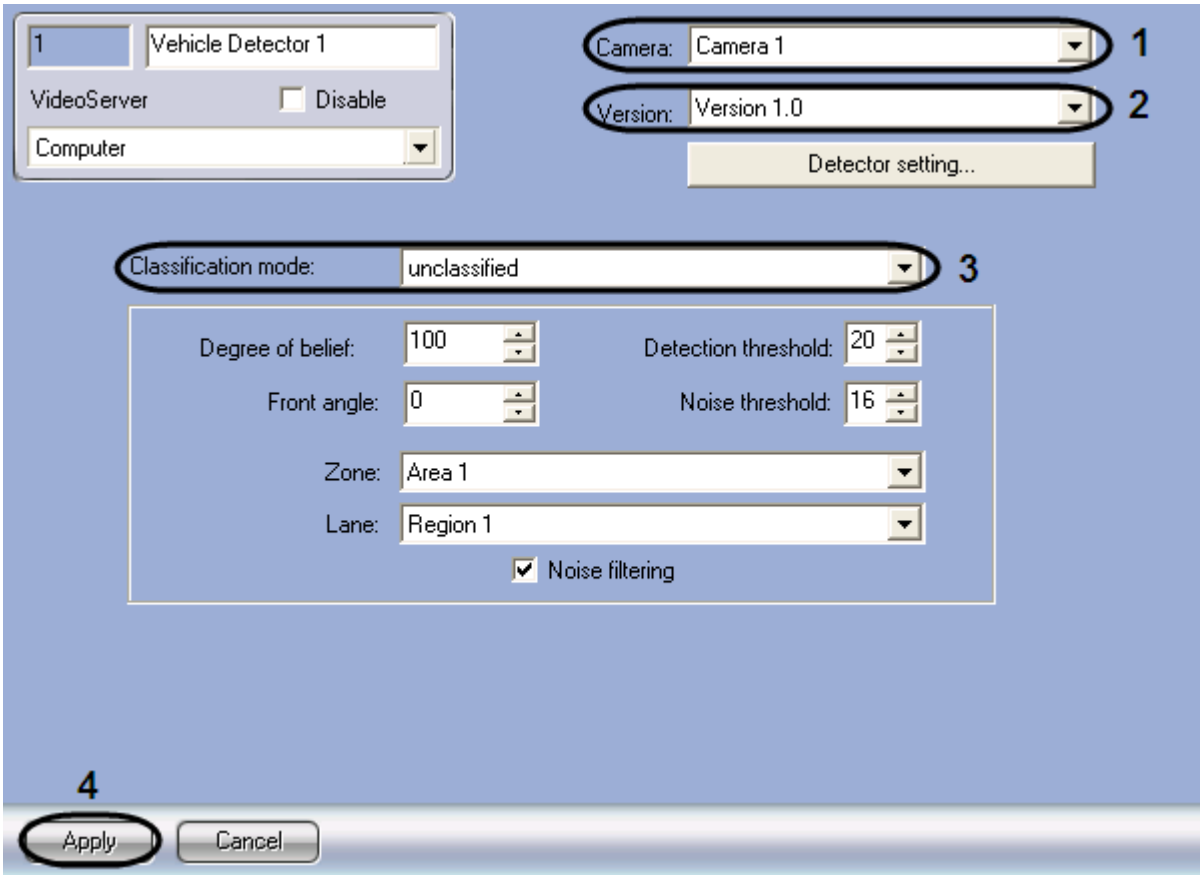

Fig. 7.6-2Setting up the Vehicle detector parameters

2. From the Camera dropdown list select the Camera object, corresponding to the camera of the Vehicle detector (Fig. 7.6-2, 1)

Note. Detailed information concerning the installation of cameras for traffic data gathering subsystem is given in the section « Assembling and installation of cameras for the Vehicle detector program module.

3. From the Version dropdown list select the required detector's version(Fig. 7.6-2, 2)

Note. Different versions detectors are optimized for performing the different tasks. At the moment of writing the documentation only version 1.0. is available.

4. From the Classification mode dropdown list select the required classification mode of detected vehicles for storing the information to the Vehicle processor database (Fig. 7.6-2, 3)

Note. At the moment of writing the documentation the classification can be performed only by length. This classification setup is made on the Vehicle processor object settings panel. (see section «Vehicle's classification setup by length»).

5. To save the applied changes click Apply (Fig. 7.6-2, 4)

Setting up the Vehicle detector parameters is completed.

7.6.2.3 Setting up the detection zone

Setting up the detection zone is performed by setting the following parameters:

1. Zone positioning;
2. Zone direction;
3. Zone size.

Note! Vehicle detector is optimized for detecting the zones of 6 meters in length and 2 meters in width.

Setting up the detection zone is performed in the video frame with the help of a graphic tool.

If the zone is setup approximately, to scale the zone in the frame one should use a road marking or nearby objects (curbing, hatches etc.).

Note. In this case area's topographic parameters should be preliminary determined.

For zone's length accurate setup one should use cones, paint or other ways of the road marking .The distance between marks along the line should be 6 meters and zone's length should be correspondingly setup.

Note! Value of systematic errors depends on the value of zone's length errors.

Zone's width and its cross position in respect of the line's center can be varied to diminish the effect of the traffic cross overlap, moving by the next lines.

To provide the detector's algorithm efficient operation the zone size in the frame must occupy from 2 to 20 percent of the frame's area. If possible the detection zones have to be in that part of the frame, where the scale is greater (it is usually in the bottom).

Detection zone's direction must coincide with the traffic motion.

Setting up the detection zone is done in the following way:

1. Go to the Vehicle detector object settings panel (Fig. 7.6-3)

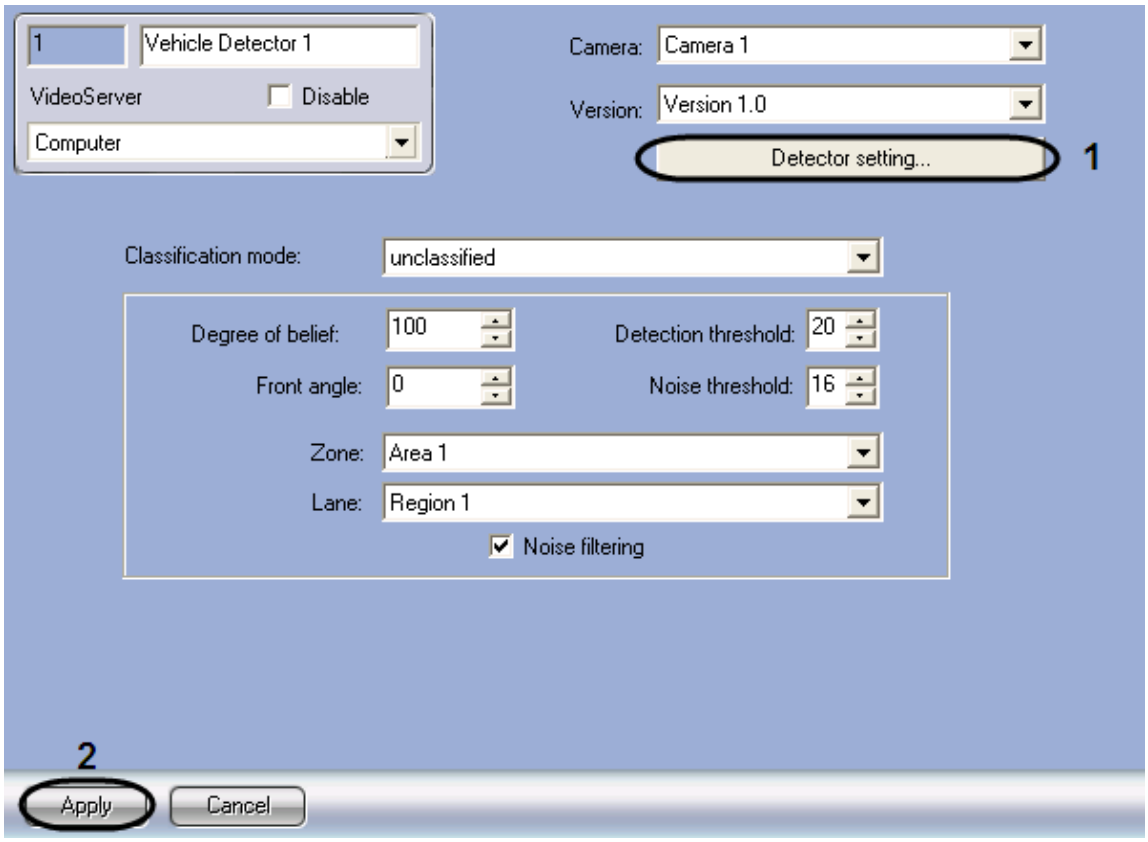

Fig. 7.6-3 Setting up the detection zone

2. Click the Detector setting to set up the detector zone's positioning (Fig. 7.6-3, 1)
3. Frame selection dialog window will open in result (Fig. 7.6-4)

Fig. 7.6-4 Frame selection for setting up the detection zone

4. Click Select frame to select a video frame (Fig. 7.6-4)
5. Zone positioning setting dialog window will open in result (Fig. 7.6-5)

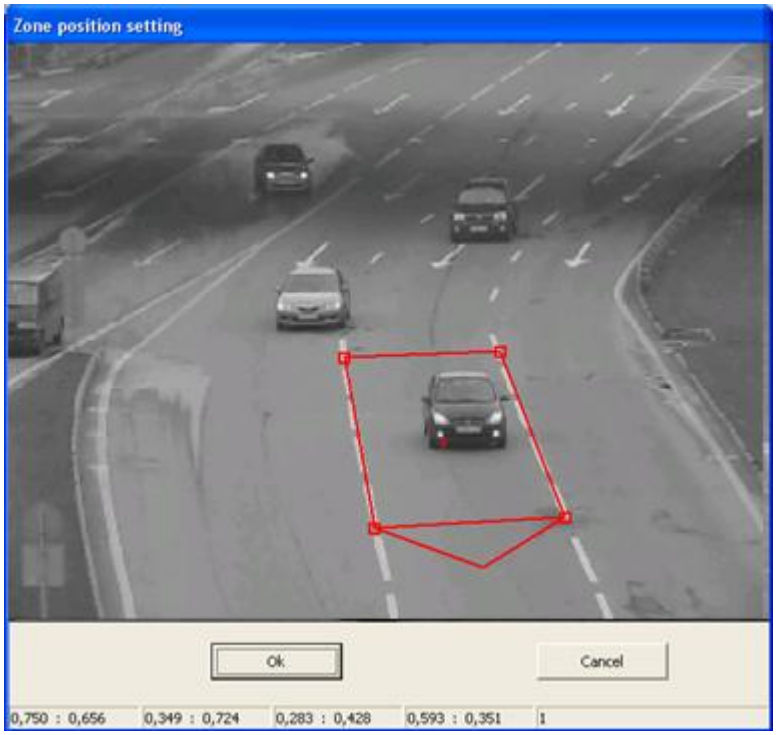

Fig. 7.6-5 Zone positioning setup

6. Using the keyboard and a mouse set the zone detection parameters (Table 7.6-1).

Table 7.6-1 keys for setting the zone positioning parameters

Key	Function	Note
Left mouse key	Transferring the zone's node point holding the pressed left mouse button	The node point is selected in the frame by a rectangle
Mouse	Rotating the detection zone around its center	Mouse cursor should be within the

Key	Function	Note
scrolling		detection zone
Mouse scrolling + Alt	Step-by-step rotating the detection zone around its center	Mouse cursor should be within the detection zone
Mouse scrolling + Ctrl	Zone scaling	Mouse cursor should be within the detection zone
Mouse scrolling + Shift	Graded, in accordance with the sides of detection zone, change of its direction	Mouse cursor should be within the detection zone

Note. To set up the detection zone one has to use road's reference points with familiar topographic parameters.

7. Click OK to save the changes and close the dialog window Zone position setting (Fig. 7.6-5)
8. Click Apply to save the changes(Fig. 7.6-3, 2)

Zone position setup is completed.

7.6.2.4 Setting up the detection variables

Setting up the detection variables is done in the following way:

1. Go to the Vehicle detector object settings panel (Fig. 7.6-6)

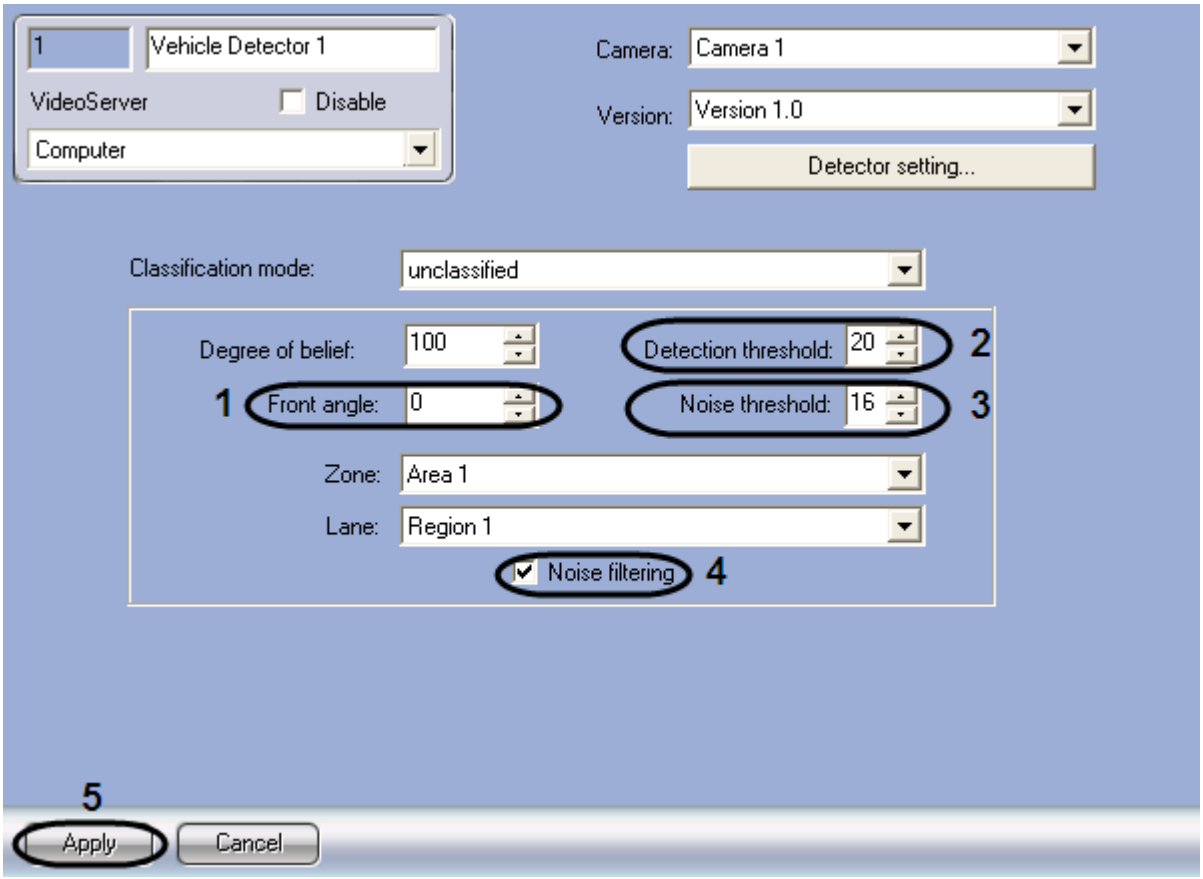

Fig. 7.6-6 Setting up the detection variables

2. Enter the camera's front angle in respect of the vehicle (Fig. 7.6-6, 1)

Note1. This angle is a projection to a vertical angle plane, parallel to the road, formed by a vertical camera's mount and optical axis of the camera's objective.

Note 2. Camera's front angle is one of the arguments while calculating the vehicle's speed and mustn't exceed 45°.

3. Enter the value of detector's sensitivity threshold, that leads to detector's triggering if exceeded in the field Detection threshold (Fig. 7.6-6, 2). Sensitivity threshold is set in sensitivity conventional units. This value is selected in an experimental way for every detector (from 15 to 30)

Note. The sensitivity threshold should be selected so, that the possibility of both false triggering and vehicle's passing could be minimal.

4. Enter the value of detector's noise threshold in the dropdown list Threshold noise (Fig. 7.6-6, 3). This value should always be 10% - 30% less than the sensitivity threshold.

Note. For detection threshold parameter it is recommended to install the value 20, for noise threshold - 16.

5. For enabling the vehicle detection algorithm with extremely noisy video signal set the checkbox Noise filtering (Fig. 7.6-6, 4)

Note. Enabling this setting leads to greater CPU load of the Auto-Intellect server.

Setting the detection variables is completed.

7.6.2.5 Setting up the vehicle's detector data

Setting the data about vehicle's detector is done in the following way:

1. Go to the Vehicle detector object settings panel (Fig. 7.6-7)

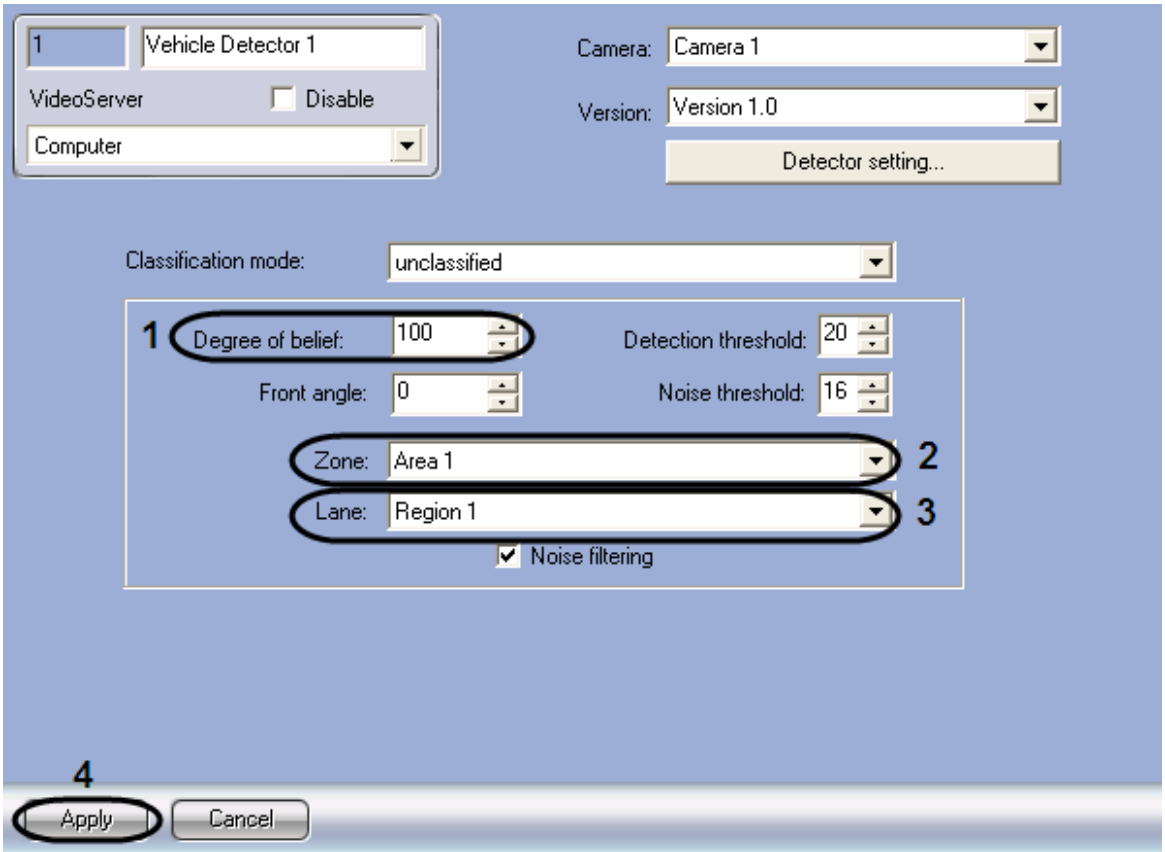

Fig. 7.6-7 Setting the data about vehicle's detector

2. Enter the belief level to the vehicle's detector in the field Degree of belief (Fig. 7.6-7, 1)

Note. This parameter is a descriptive one and doesn't influence the detection of vehicle's parameters.

3. Select the object name Zone or Area from the dropdown list Zone, corresponding to the territory where the detector's camera is located (Fig. 7.6-7, 2)
4. Select the object name Region from the dropdown list Lane , corresponding to the road line processed by detector (Fig. 7.6-7, 3)

Note. Zone and Lane parameters are used while building the traffic reports (see the document Reports subsystem: Operation and setup reference book).

5. Click Apply to save the changes (Fig. 7.6-7, 4)

Setting up the traffic data is completed.

7.6.3 Setting up the Vehicle Processor module

7.6.3.1 Vehicle processor setup procedure

The Vehicle processor object setup is performed on the Vehicle processor object settings panel. This object is created on the basis of Computer object of the Hardware tab in the system setup dialog window (Fig. 7.6-8).

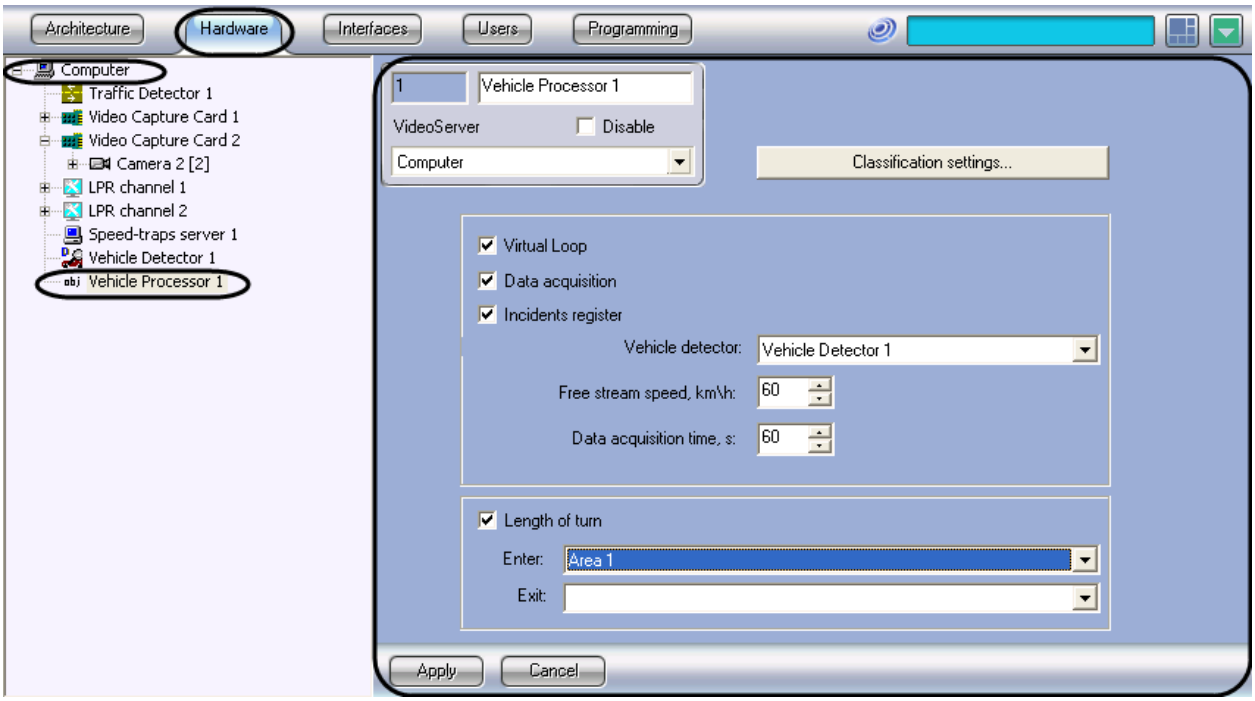

Fig. 7.6-8 The Vehicle processor object

The Vehicle processor module setup procedure:

1. Set up Vehicle processor and Vehicle detector modules interaction;
2. Select Vehicle processor module's operation;
3. Set the speed of the free stream;
4. Setup the vehicle's classification according to the length, if in the Vehicle detector settings there is selected Only vehicle's length classification type.

7.6.3.2 Setting up the Vehicle processor and Vehicle detector modules interaction

Setting up the Vehicle processor and Vehicle detector modules interaction is done in the following way:

1. Go to the object Vehicle's processor settings panel (Fig. 7.6-9)

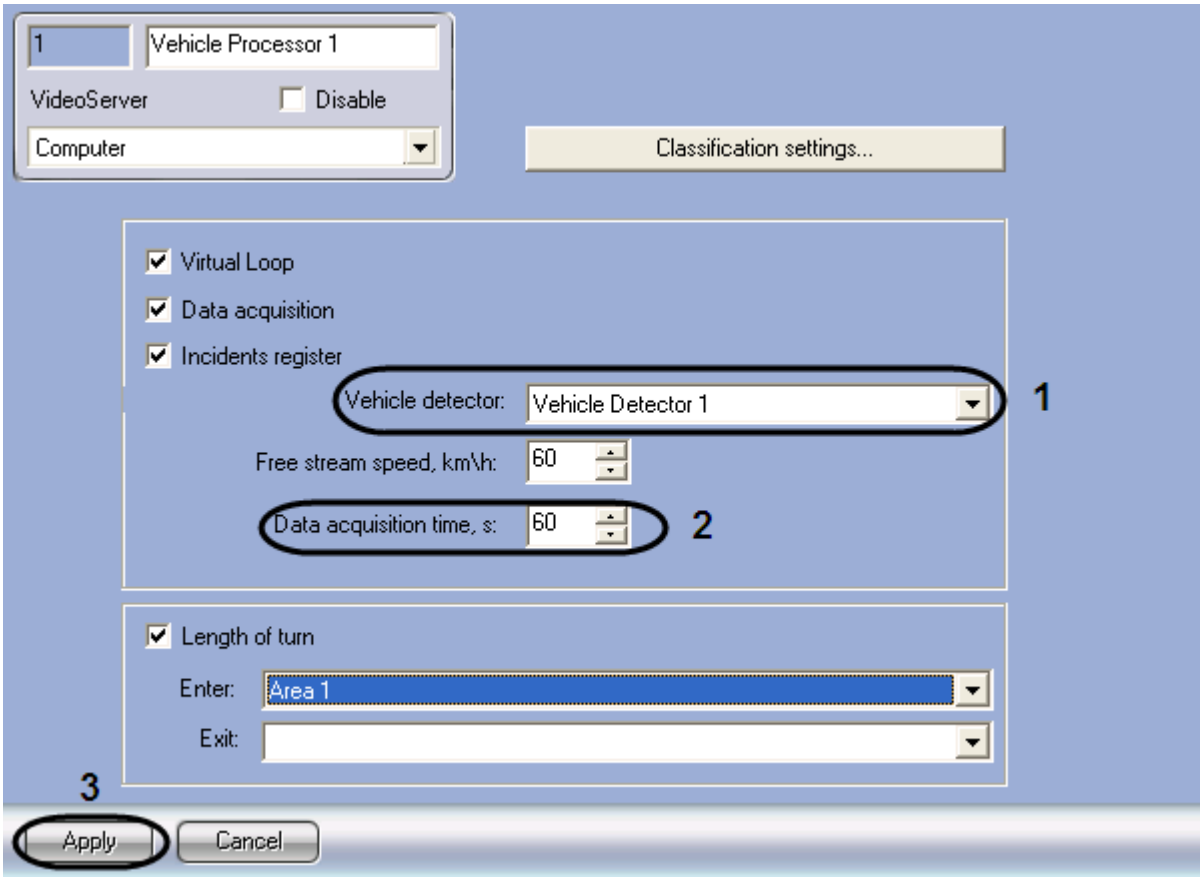

Fig. 7.6-9Setting up the Vehicle processor and Vehicle detector modules interaction

2. From the dropdown list Vehicle detector select the name of a single named object, corresponding to the required program module (Fig. 7.6-9, 1)
3. In the field with a list Data acquisition time, sec enter the time period, during which the Vehicle processor receives messages from the Vehicle detector and makes the averaging of traffic characteristics (Fig. 7.6-9, 2). Upon the expiry of this period the data is stored to the Vehicle processor database.
4. Click Apply to save the changes (Fig. 7.6-9, 3)

Setting up the Vehicle processor and Vehicle detector modules interaction is completed.

7.6.3.3 Selecting the Vehicle processor operation mode

Selecting the Vehicle processor operation mode is done in the following way:

1. Go to the Vehicle processor settings panel (Fig. 7.6-10)

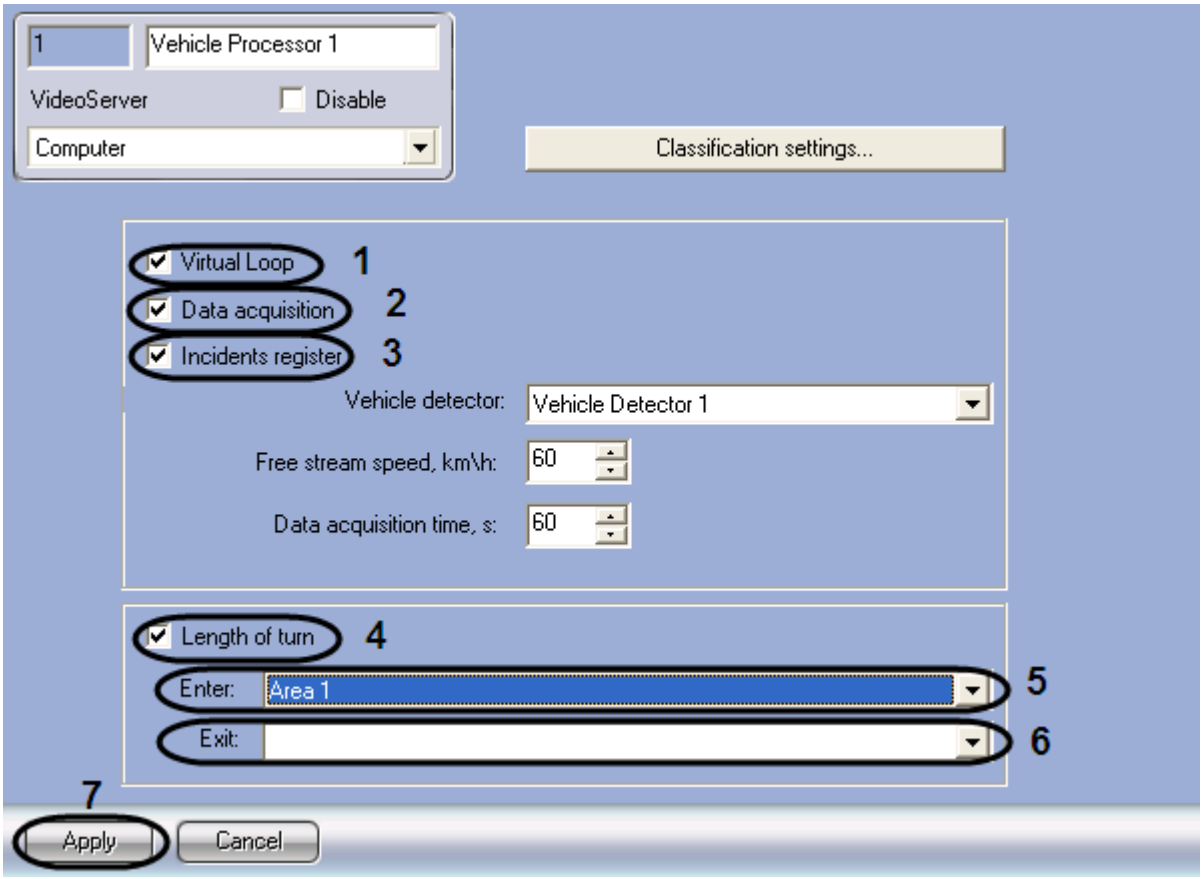

Fig. 7.6-10 Selecting the Vehicle processor operation mode

2. To enable the mode of imitating the virtual loop set the checkbox Virtual loop (Fig. 7.6-10, 1). The result of this module operation is retranslating the events of vehicles passing in and out from the detection zone, registered by Vehicle detector module. On default the events are retranslated without storing in the Vehicle processor database. To enable storing the events to the database, one should perform step 3.
3. To enable the mode of gathering and storing vehicles information to the Vehicle processor database set the checkbox Data acquisition (Fig. 7.6-10, 2)
4. To enable the fixation mode and storing the incidents in the vehicle to the Vehicle processor database set the checkbox Incidents register (Fig. 7.6-10, 3)

Note. At the moment of writing the documentation only the Meeting of traffic incidents are fixed.

5. To enable the mode of vehicles turn's length calculation set the checkbox Length of turn. The result of this mode operation is the events registrations with data concerning the length of vehicles' turn. On default events are registered without storing in the Vehicle processor database (Fig. 7.6-10, 4). To enable storing the events to the database, one should perform step 3.
6. From the dropdown list Enter select the Area object, corresponding to the entrance area to the detection zone where the Length of turn is calculated (Fig. 7.6-10, 5)
7. From the dropdown list Exit select the Area object, corresponding to the exit area from the detection zone where the Length of turn is calculated) (Fig. 7.6-10, 6)
8. Click Apply to save the changes (Fig. 7.6-10, 7)

Selecting the Vehicle processor operation mode is completed.

7.6.3.4 Setting up the free stream speed

The constant Free stream speed characterizes the detected road area and stores to the database if for the time of data acquisition no vehicle has been registered.

Setting up the free stream speed is done in the following way:

1. Go to the Vehicle processor settings panel (Fig. 7.6-11)

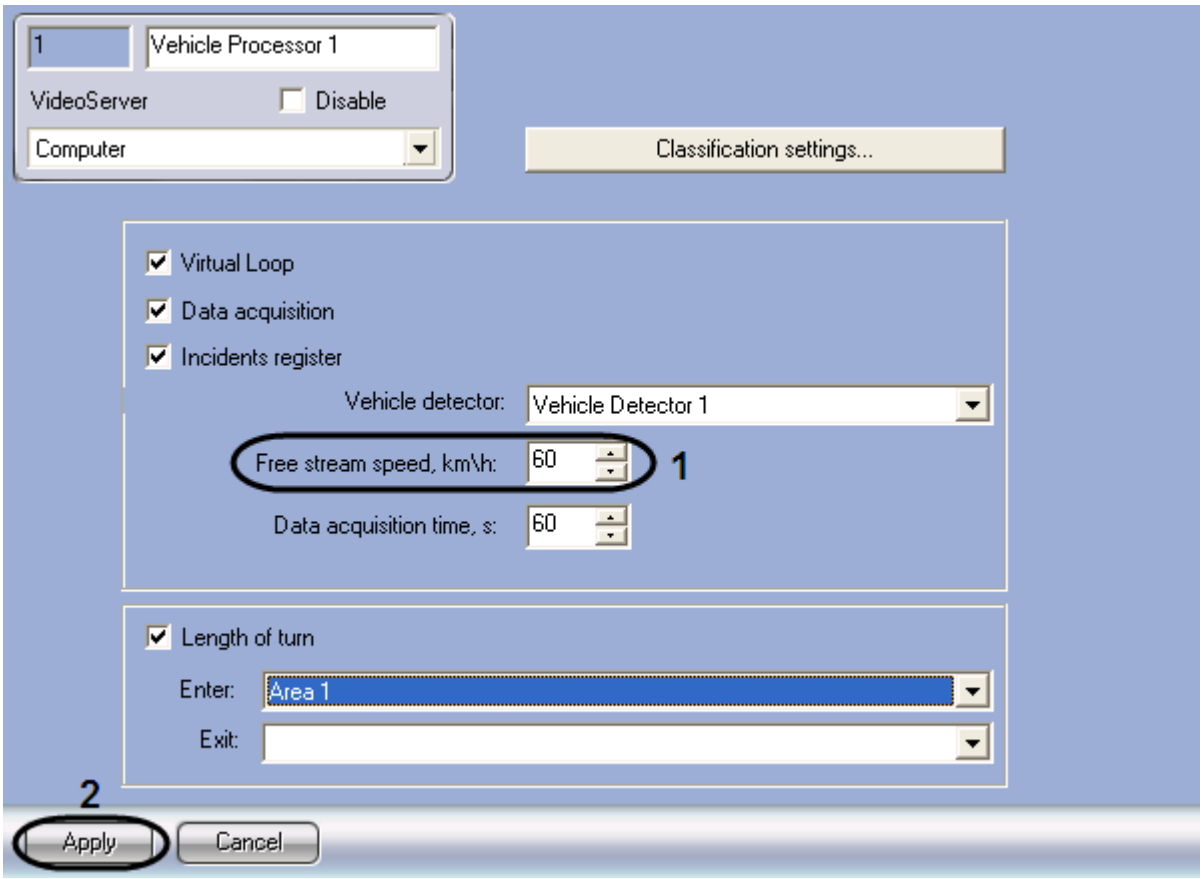

Fig. 7.6-11 Setting up the free stream speed

2. In the field with a list Free stream speed enter the speed in km/h of a free stream speed in the detection zone (Fig. 7.6-11, 1)
3. Click Apply to save the changes (Fig. 7.6-11, 2)

Setting up the free stream speed is completed.

7.6.3.5 Setting up the vehicles according to the length

If in the module settings there was selected Only vehicles' length in the classification type (see section «Setting up the Vehicle detector parameters»), the type of detected vehicle (a car, a bus, etc.) will be automatically detected by its length. Data about the detected objects types will be entered in the Vehicle processor database.

There is a possibility to setup the classification of vehicles according to its length.

To setup the classification of vehicles according to its length follow the procedure:

1. Go to the Vehicle processor settings panel (Fig. 7.6-12).

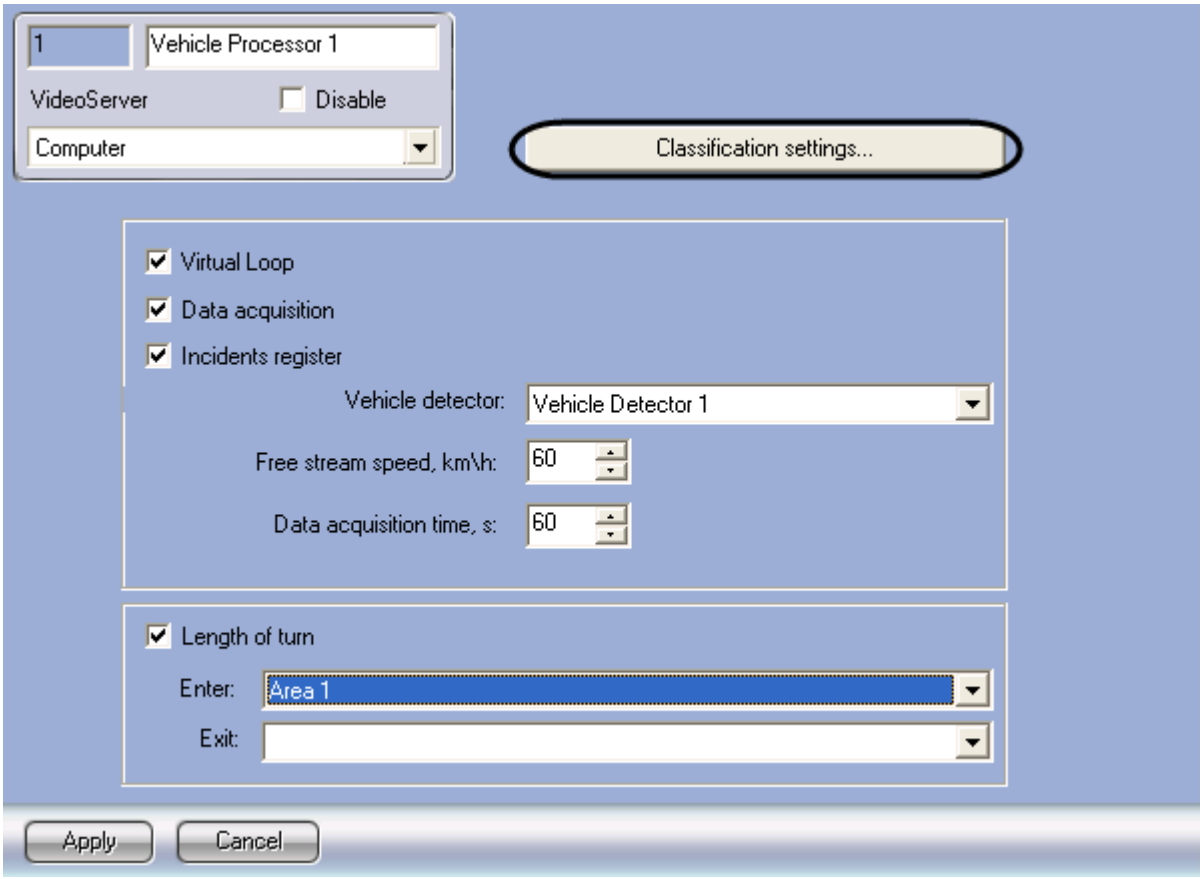

Fig. 7.6-12 Access to Classification settings

2. Click the Clarify settings button (Fig. 7.6-12).
3. ClassificationSetupForm will be displayed in result (Fig. 7.6-13).

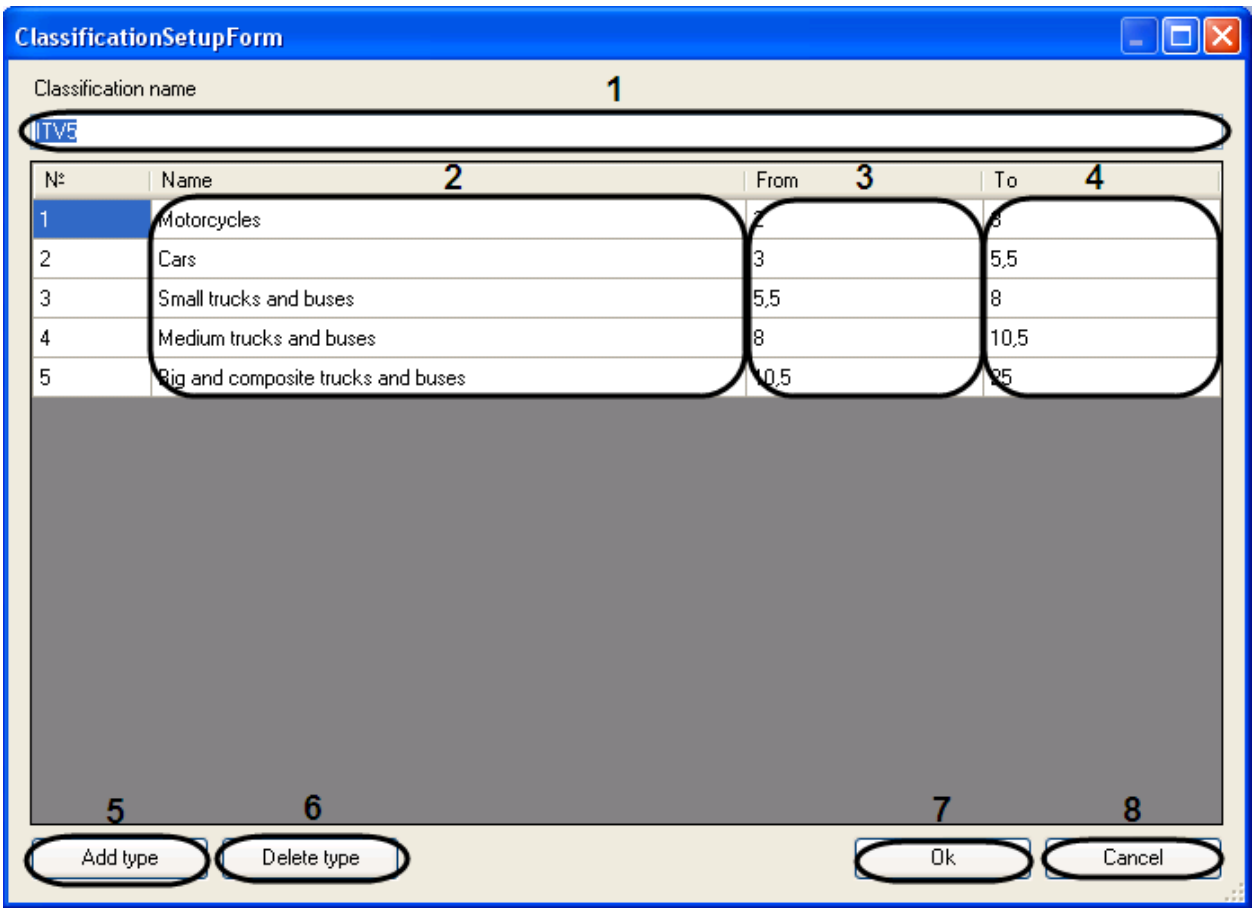

Fig. 7.6-13 Setting up the classification of vehicles according to its length

4. In the Classification name field (Fig. 7.6-13, 1) enter the name of vehicle classification that is being setup.
5. To edit the types of vehicles do the following:
    5.1. In the column type's name (Fig. 7.6-13, 2) enter the required vehicles types 'names.
    5.2. In the columns From and To (Fig. 7.6-13, 3-4) set the length ranges of vehicles, relating to the corresponding types. The values of range boundaries are entered in meters. The type of detected vehicle will be determined on the basis of this vehicle's length fitting one of the ranges.

Note! For every pair of vehicles types the length ranges should not intersect.

6. To add a new type of the vehicle to the classification click the button Add type (Fig. 7.6-13, 5) and in the appeared string perform steps 5.1-5.2.
7. To delete a vehicle type from the classification select a string, corresponding to the required type and then click Delete type button (Fig. 7.6-13, 6).
8. Click Ok to save the changes ad close the Setting up the classification of vehicles according to its length dialog window (Fig. 7.6-13, 7).

Note. To close the dialog window without saving the changes click Cancel button (Fig. 7.6-13, 8).

Setting up the vehicle classification according to its length is completed.

7.7 The Traffic Monitor interface object setup

7.7.1 The Traffic Monitor setup procedure

The Traffic Monitor object setup includes the following steps:

1. Open the Interfaces tab in the System Settings window;
2. Select the Traffic Monitor object in the object tree;
3. Edit the parameter value;
4. Click Apply to save the changes.

7.7.2 Setting up the position of the Traffic Monitor window

The Traffic Monitor position in the screen is specified using the coordinates of its upper left corner, its width and height, and the possibility to move the window around the screen using the mouse.

To set the Traffic Monitor window position, do the following:

1. Open the Interfaces tab in the System Settings window (see Fig. 7.7-1, 1).
2. Select the Traffic Monitor object in the object tree (see Fig. 7.7-1, 2).
3. By default, the Traffic Monitor window is located in the middle of the screen, with the following upper left corner coordinates: X = 10, Y = 10. To change its position, enter the coordinates in the X and Y fields, as a percentage of the screen width and height, respectively (see Fig. 7.7-1, 3).
4. By default, the Traffic Monitor window takes 64% screen space (80% of the width and height of the screen). To change the window size, enter the values in the W and H fields, as a percentage of the screen width and height, respectively (see Fig. 7.7-1, 4).

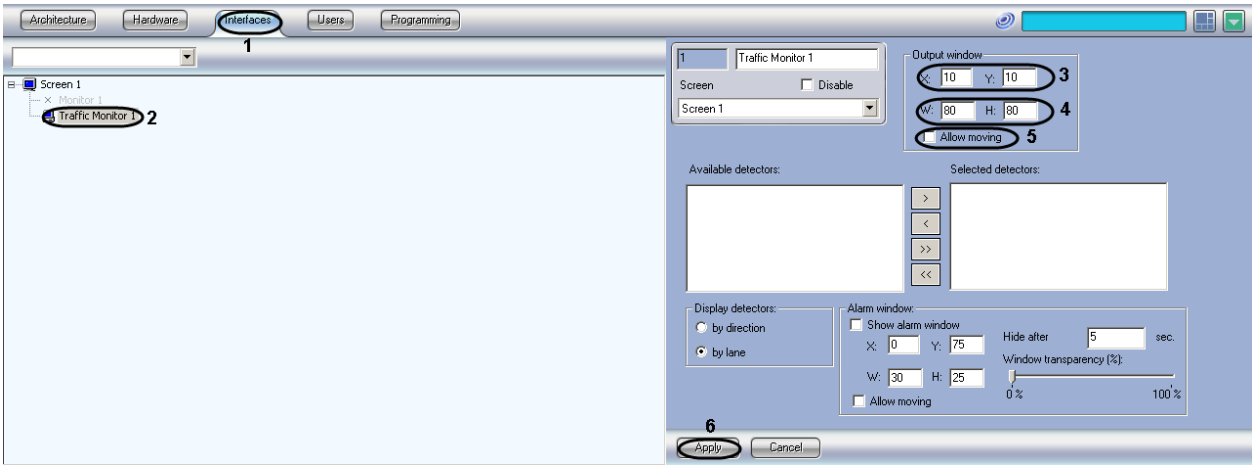

Fig. 7.7-1 Setting up the Traffic Monitor window position

5. By default, the Traffic Monitor window cannot be freely moved around the screen. To allow free movement of the window, check the Allow moving checkbox (see Fig. 7.7-1, 5).
6. Click Apply (see Fig. 7.7-1, 6).

The Traffic Monitor window position and dimensions are now set.

7.7.3 Selecting the traffic detectors to be connected to the Traffic Monitor object

To select the traffic detectors, do the following:

1. Open the Interfaces tab in the System Settings window (see Fig. 7.7-2, 1).
2. Select the Traffic Monitor object in the object tree (see Fig. 7.7-2, 2).
3. Select an item in the Available detectors list (see Fig. 7.7-2, 3).
4. Click the  button to move the selected item to the Selected detectors list (see Fig. 7.7-2, 4-5).

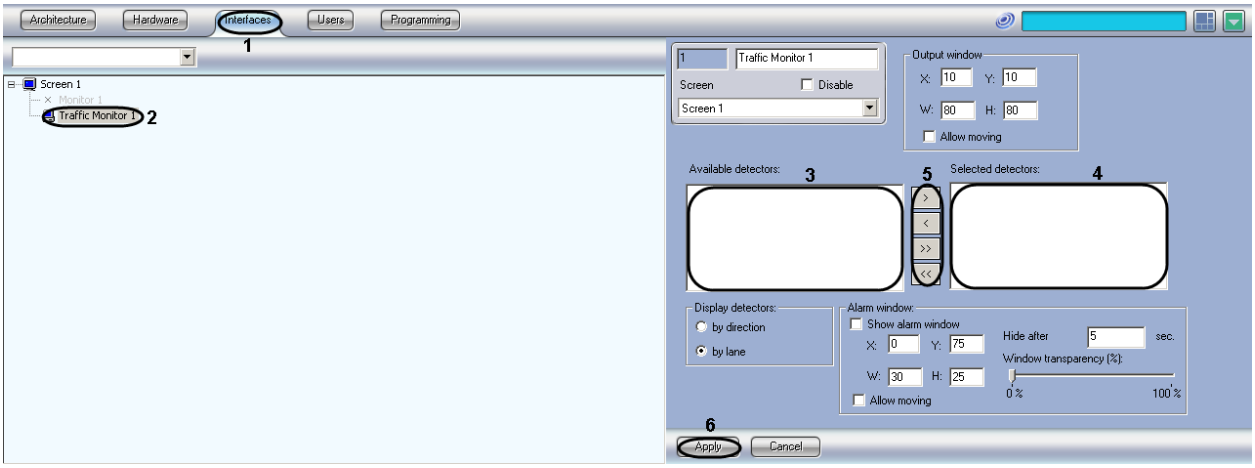

Fig. 7.7-2 Selecting the detectors

5. Click Apply to save the changes (see Fig. 7.7-2, 5).

The traffic detectors are now selected.

7.7.4 Setting up the traffic information display option

To select the traffic information display option, do the following:

1. Open the Interfaces tab in the System Settings window (see Fig. 7.7-3, 1).
2. Select the Traffic Monitor object in the object tree (see Fig. 7.7-3, 2).
3. Select one of the radio-buttons in the Display detectors group - by direction, or by lane (see Fig. 7.7-3, 3).

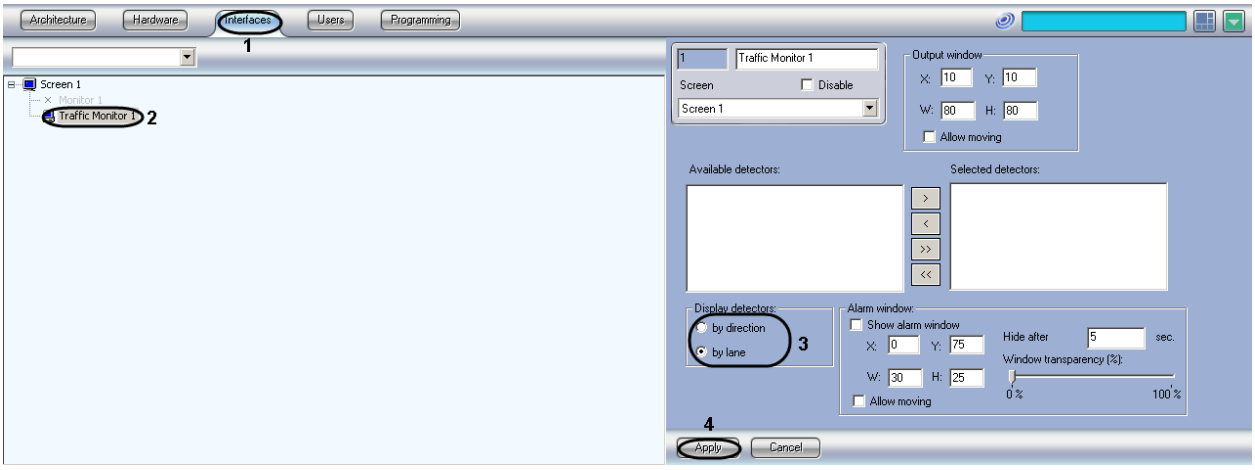

Fig. 7.7-3 Selecting the information about vehicle's direction display option

4. Click Apply to save the settings (see Fig. 7.7-3, 4).

The information display option is now selected.

7.8 The Vehicle tracer interface module

7.8.1 The Vehicle tracer setup procedure

Setting up the Vehicle tracer is performed on ht settings panel of the similarly-named object. The object is created on the basis of Screen object in the interfaces tab of the System settings dialog window (Fig. 7.8-1).

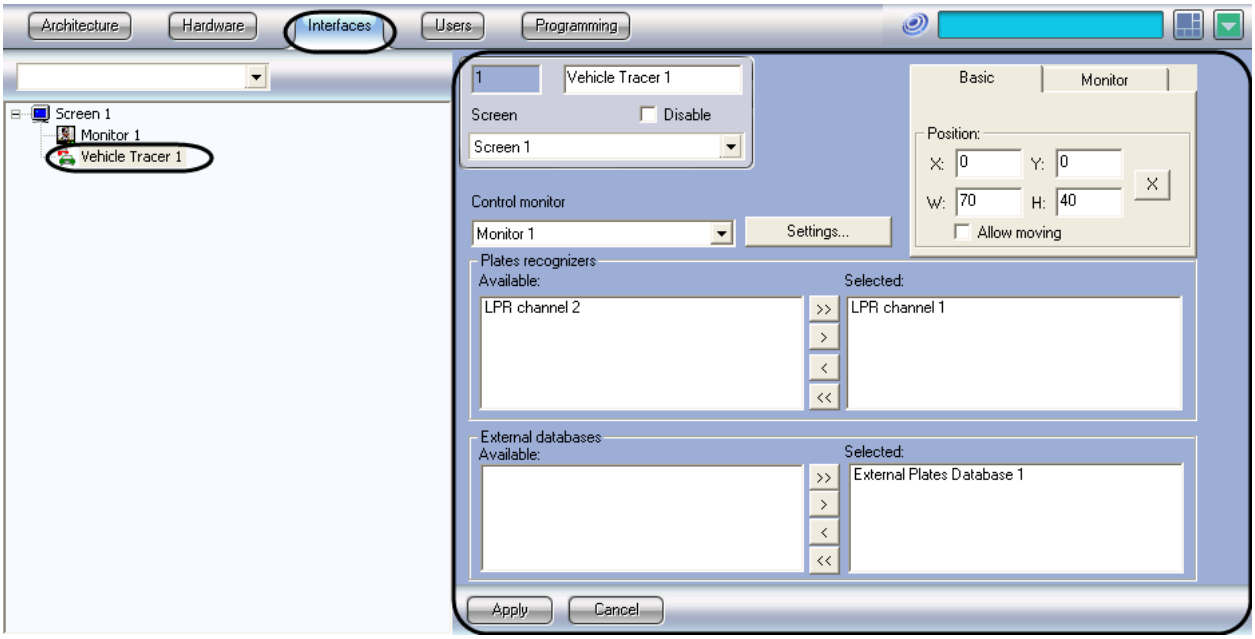

Fig. 7.8-1 The Vehicle tracer object

Setting up the Vehicle tracer interface window is used in the following name:

1. Set up the Vehicle tracer window position on the screen.
2. Select the plates recognizers servers to be displayed in the Vehicle tracer window
3. Select the External Plates Databases to analyze the identified plates.
4. Set up the interface of the Vehicle tracer window.
5. Set up the voice notification with overspeeding and/or identifying the plate in the external plates database.
6. Select the Monitor interface object for displaying the video archive from the camera, identifying the plates.

7.8.2 Setting up the Vehicle tracer window position on the screen

The Vehicle tracer interface window includes the following components:

1. «On-line monitor» – is designed for displaying the data about the indentified plates, processing the alarm;
2. «Events monitor» –displays a video frame with a vehicle, which plate is being identified at the moment, and also a speed and a number.

Note1. The events monitor component is optional.

Note2. For operator's sufficient work avoid reciprocal Vehicle tracer window's elements interaction.

7.8.2.1 Setting up the Active monitor component position

Setting up the Vehicle tracer component position is done in the following way:

1. Go to the Vehicle tracer settings panel (Fig. 7.8-2).

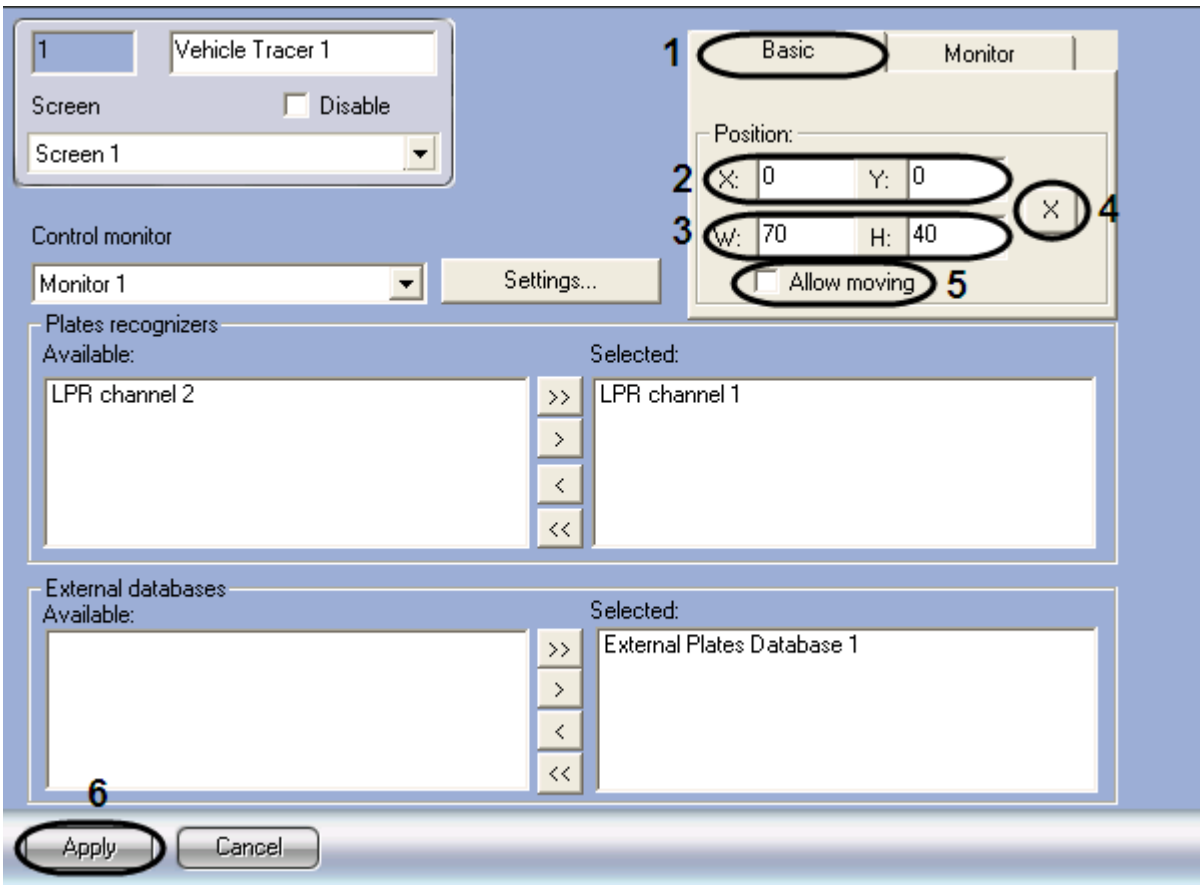

Fig. 7.8-2 Setting up the Vehicle tracer component position

2. Go to the Basic tab (Fig. 7.8-2, 1).
3. Set the coordinates of the left upper corner of the Vehicle tracer interface component: field «X» (horizontal indent from the left border of the computer's screen) and «Y» (vertical indent from the upper border of the computer's screen) (Fig. 7.8-2, 2). Coordinates are set in percentage in according to screen's size horizontally and vertically respectively.
4. Set the sizes of the Vehicle tracer interface component: field«W» (component's width) and«H» (component's height) (Fig. 7.8-2, 3). Coordinates are set in percentage in according to screen's size horizontally and vertically respectively.

Note 1. Minimum sizes of the Vehicle tracer window are 70% horizontally («W») and 39% vertically («H»).

Note 2. To set the coordinates and sizes of the Vehicle tracer component in a convenient way it is recommended to use the visual method of setting up the coordinates (Fig. 7.8-3). Click «  *»button for this (Fig. 7.8-2, 4) and, using the mouse, set the required size and position of the test window and then click «OK» (Fig. 7.8-3). Coordinates of the test window are automatically calculated and copied to the fields «X», «Y», «W» and «H».*

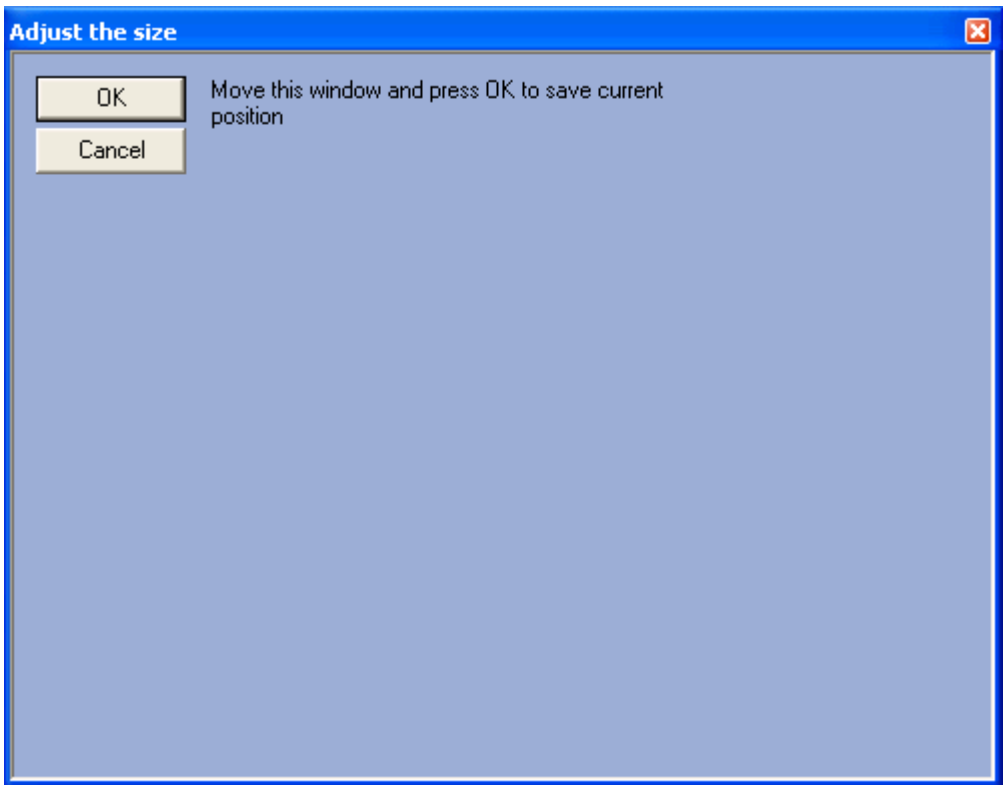

Fig. 7.8-3 Visual method of setting up the coordinates

5. In case, if the Vehicle tracer component has to be moved, set the checkbox Allow moving (Fig. 7.8-2, 5).
6. Click Apply to save the changes (Fig. 7.8-2, 6).

Setting up the Vehicle tracer component position is completed.

7.8.2.2 Setting up the Events monitor component position

Setting up the Events monitor component position is done in the following way:

1. Go to the Vehicle tracer settings panel (Fig. 7.8-4).

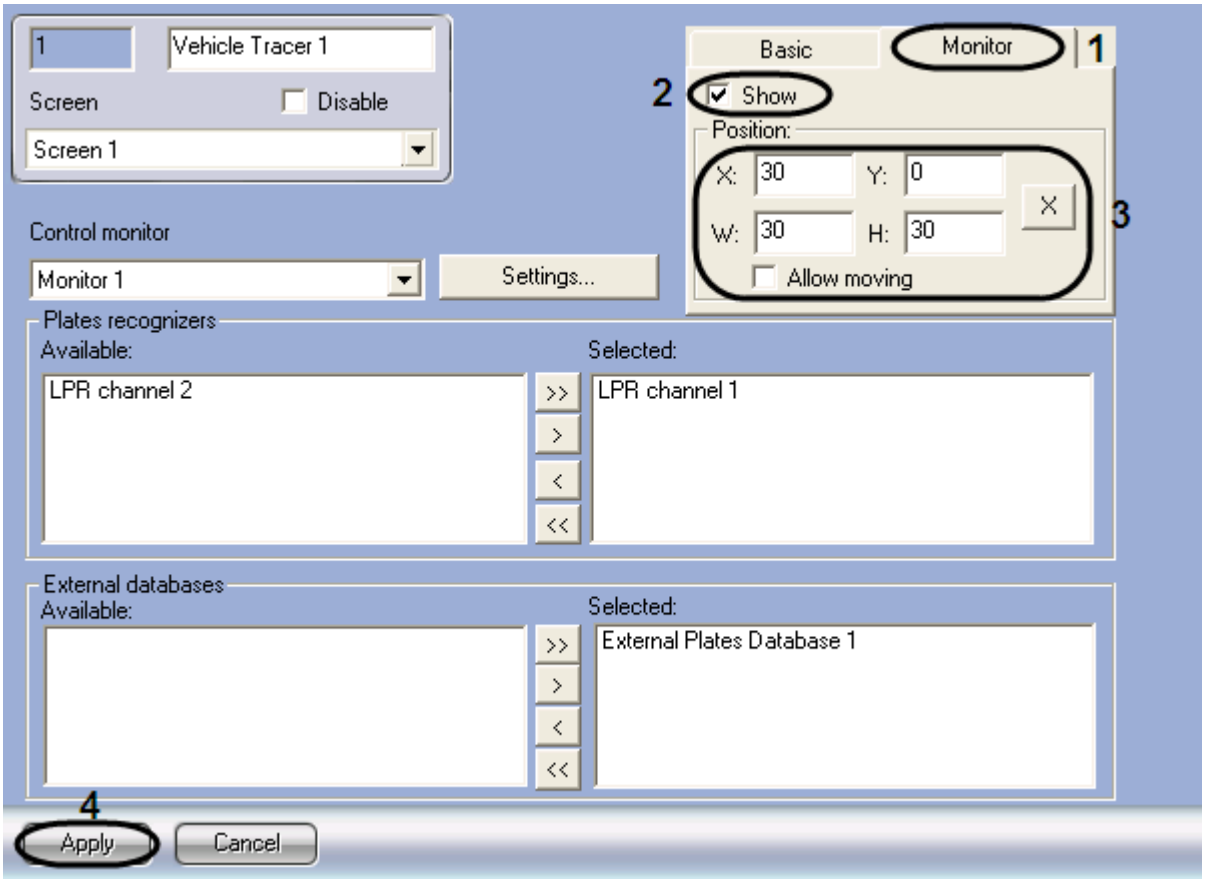

Fig. 7.8-4 Setting up the Events monitor component position

2. Go to the Monitor tab (Fig. 7.8-4, 1).
3. To display the Events monitor component set the Show checkbox (Fig. 7.8-4, 2). Settings of the Events monitor component position will be activated in result.
4. Set the coordinates and sizes of the Events monitor in a similar way as with the component Active monitor (Fig. 7.8-4, 3, steps 3-5 in the section « Setting up the Active monitor component position Setting up the Active monitor component position).

Note. Restrictions to the width and height of the Events monitor component do not interlace.

5. Click Apply to save the applied changes (Fig. 7.8-4, 4).
   Setting up the Events monitor component position is completed.

7.8.3 LP recognizers servers selection

LP recognition servers selection to be displayed in the Vehicle tracer interface window is done in the following way:

1. Go to the Vehicle tracer settings panel (Fig. 7.8-5).

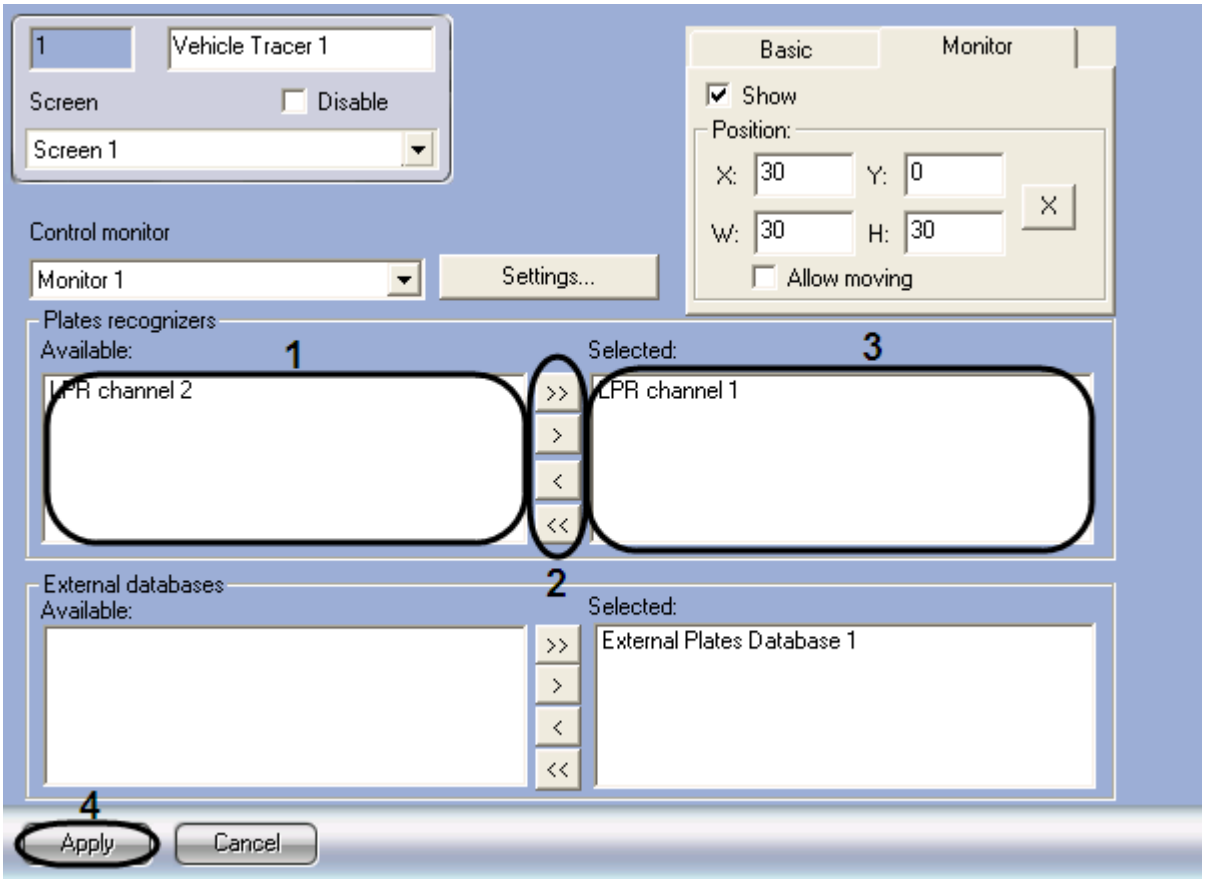

Fig. 7.8-5 LP recognizers servers selection

2. Select the required LP recognition servers from the list Available of the Plates recognizers group (Fig. 7.8-5, 1).
3. Move the selected LP recognizers servers to the list Selected of the Plates recognizers group, clicking the « > » button (or « >> » button for moving all the LP recognizers servers from the list) (Fig. 7.8-5, 2-3).

Note. Buttons « < » and « << » are designed for handling the actions, i.e. for moving the selected or all the LP recognizers servers from the Selected list to the Available list (Fig. 7.8-5, 2).

4. Click Apply to save the applied changes (Fig. 7.8-5, 4).

LP recognition servers selection to be displayed in the Vehicle tracer interface window is completed.

7.8.4 Selecting the External Plates Database

Selecting the External Plates Database to analyze the identified plate's window is done in the following way:

1. Go to the Vehicle tracer settings panel (Fig. 7.8-6).

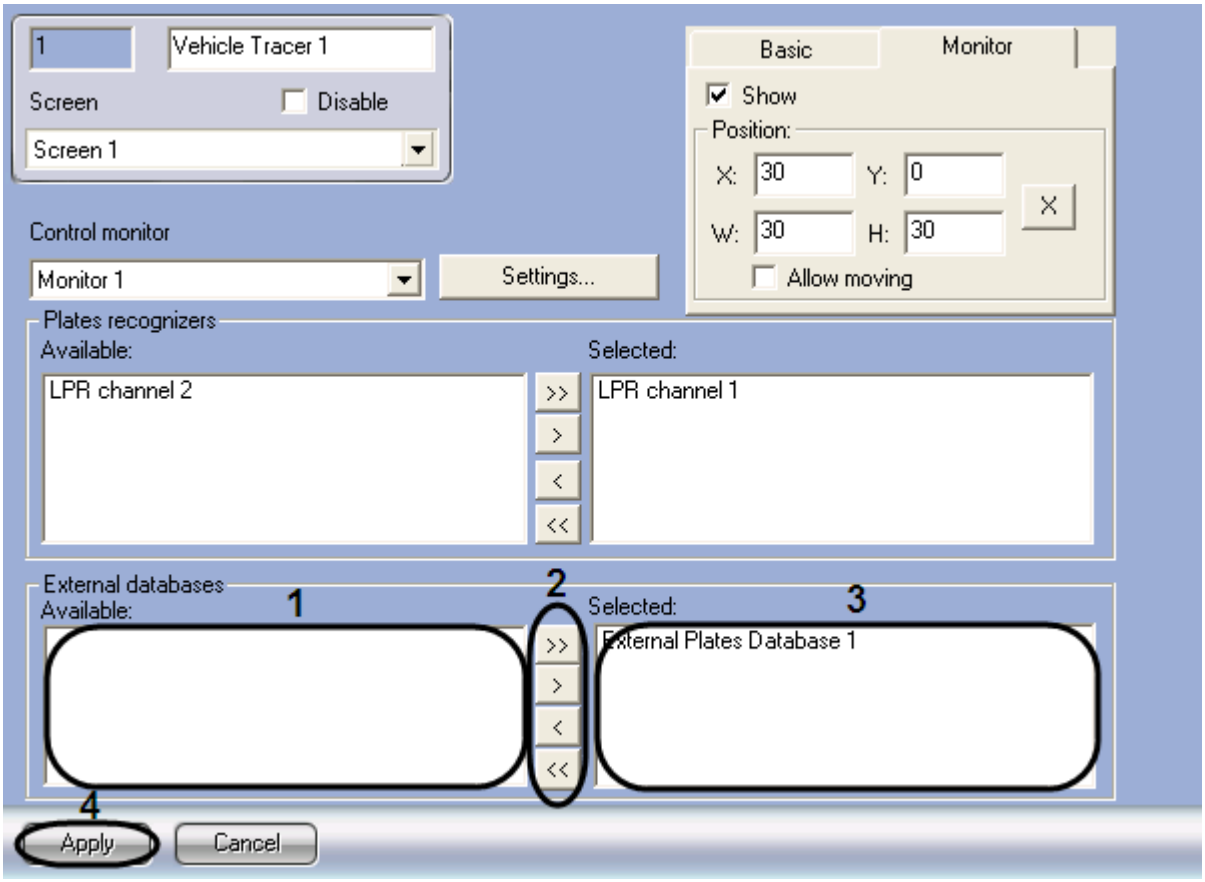

Fig. 7.8-6 Selecting the External Plates Database

2. Select the required External Plates databases from the list Available of the Plates recognizers group (Fig. 7.8-6, 1).
3. Move the selected external databases to the list Selected of the External databases group, clicking the « > » button (or « >> » button for moving all the external databases from the list) (Fig. 7.8-6, 2-3).

*Note. Buttons « < » and « << » are designed for handling the actions, i.e. for moving the selected or all the external databases from the Selected list to the Available list» (*Fig. 7.8-6*, 2).*

4. Click Apply to save the applied changes (Fig. 7.8-6, 4).

Selecting the External Plates Database to analyze the identified plates is completed.

7.8.5 Setting up the Vehicle tracer interface window

To set up the Vehicle tracer interface window do the following:

1. Go to the Vehicle tracer settings panel (Fig. 7.8-7).

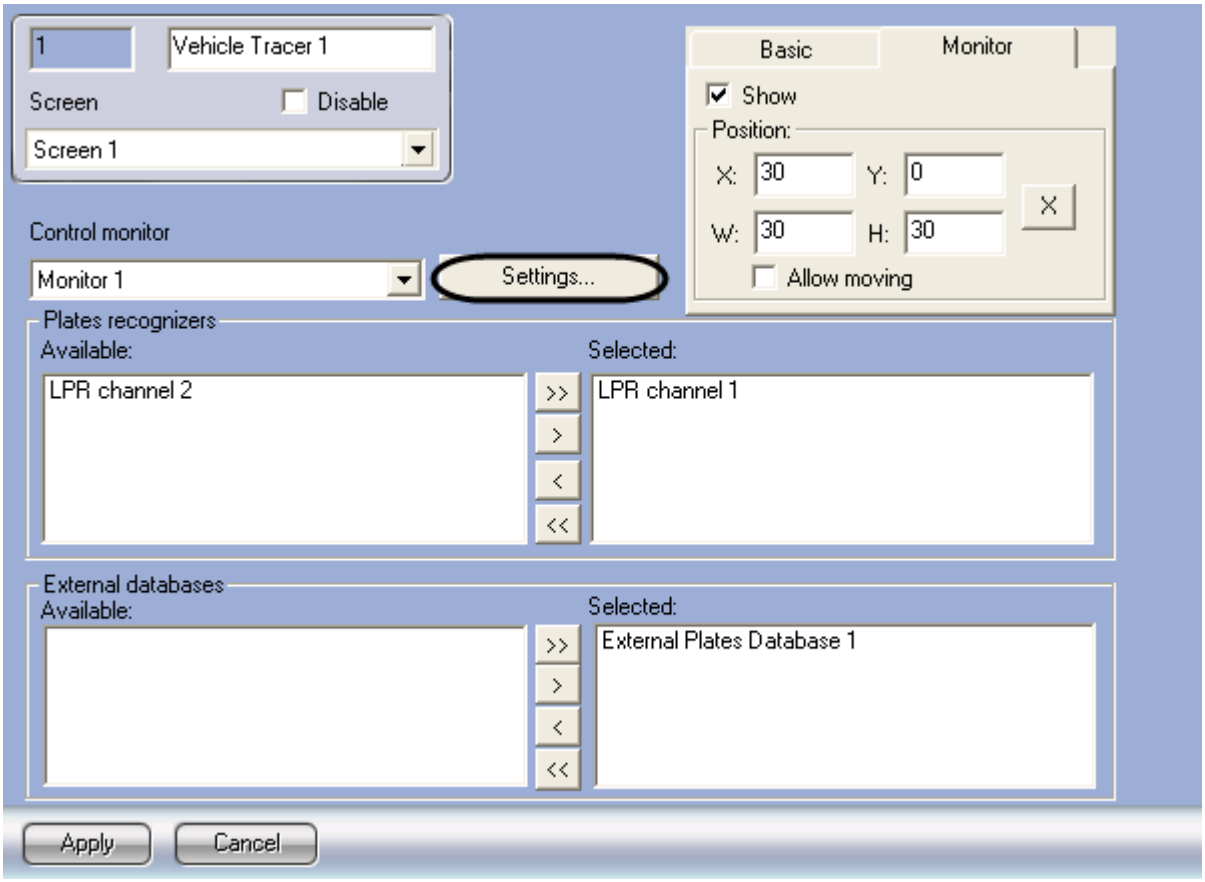

Fig. 7.8-7 Access to the interface settings of the Vehicle tracer

2. Click Settings button (Fig. 7.8-7). The Settings dialog window will open in result (Fig. 7.8-8).

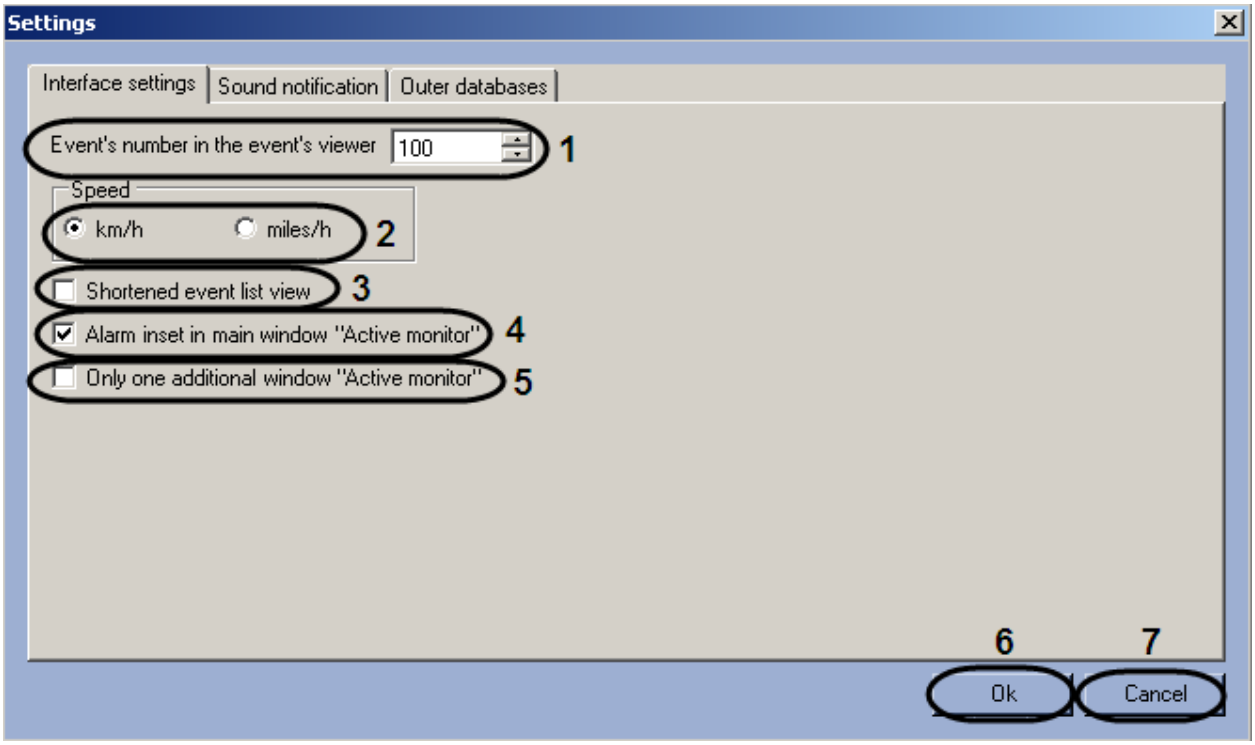

Fig. 7.8-8 The interface settings of the window Vehicle tracer

3. In the field Event's number in the protocol (Fig. 7.8-8, 1) enter the maximum number of events that may be displayed in every protocol of the Active monitor component. Updating the protocol, containing the maximum number of events, is performed in a loop: while adding a new event the earlier is deleted.

Note. The question is about two protocols (see the document «The Auto-Intellect program complex: Operator guide»):

1. *The protocol of identified vehicles, containing data about the identified vehicles;*
2. *The alarms protocol, containing data about the vehicles, for which alarms have been registered.*

4. Set the Speed switch (Fig. 7.8-8, 2) to the position, corresponding to the Vehicle's speed unit of measurement? That is to be displayed in the Vehicle tracer window (km/h or m/h).
5. On default in the ON-line monitor's events protocol there are displayed the following data for every vehicle:
   5.1. Video frame;
   5.2. Identified plate;
   5.3. Speed;
   5.4. Plate's recognized;
   5.5. Date and time of receiving the data;
   5.6. Alarm's reason (only for alarms).

   In case if in the ON-line monitor's events protocol there should be displayed only identified number, name of plate's recognizer, and data and time of receiving the data for every event, set the checkbox Shortened event list view (Fig. 7.8-8, 3).
6. There is possibility to create additional Active monitor components (see the document «the Auto-Intellect program complex: Operator guide»). In case if the alarms protocol is displayed only in the main interface component On-line monitor, not in the additional ones, set the check box Alarm inset in main window Active monitor (Fig. 7.8-8, 4).
7. On default the number of active monitor additional displayed components is not restricted. In case if only one, last created active monitor component is required to be displayed, set the checkbox Only one additional window active monitor (Fig. 7.8-8, 5).
8. Click OK to save the changes and close the Settings dialog window » (Fig. 7.8-8, 6).

Note. Click Cancel to close the Settings dialog window without saving the changes (Fig. 7.9-1, 7).

The interface settings of the window Vehicle tracer are completed.

7.8.6 Setting up the voice notification while registering the alarms

There is possibility to set up the voice notification while registering the following alarms:

1. Vehicle's overspeeding;
2. Identifying the recognized plate in the external plate's database.

Setting up the voice notification while registering the alarms is done in the following way:

1. Go to the Vehicle tracer settings panel (Fig. 7.8-9).

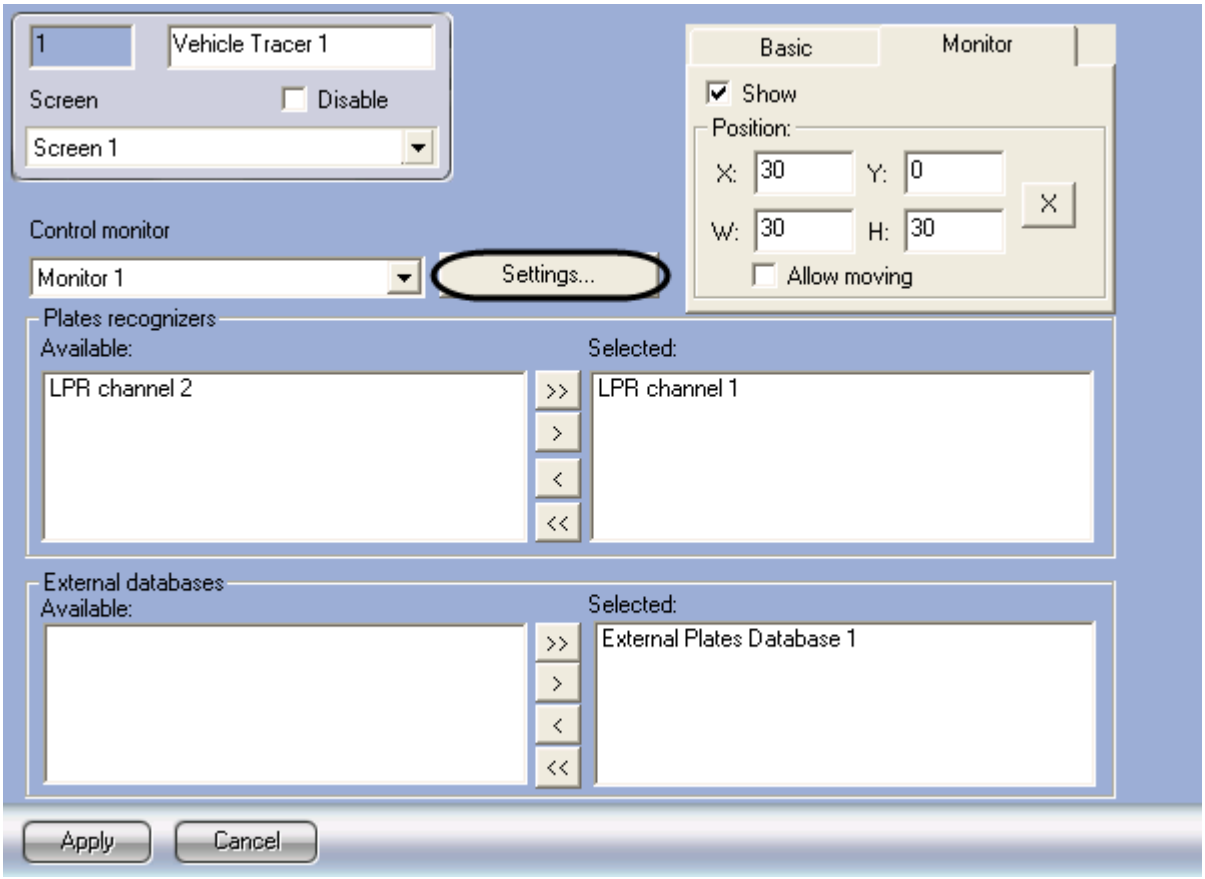

Fig. 7.8-9Access to the settings of voice notification while registering the alarms

2. Click Settings button (Fig. 7.8-9).
3. Go to the Sound notification tab in the opened dialog window (Fig. 7.8-10,1).

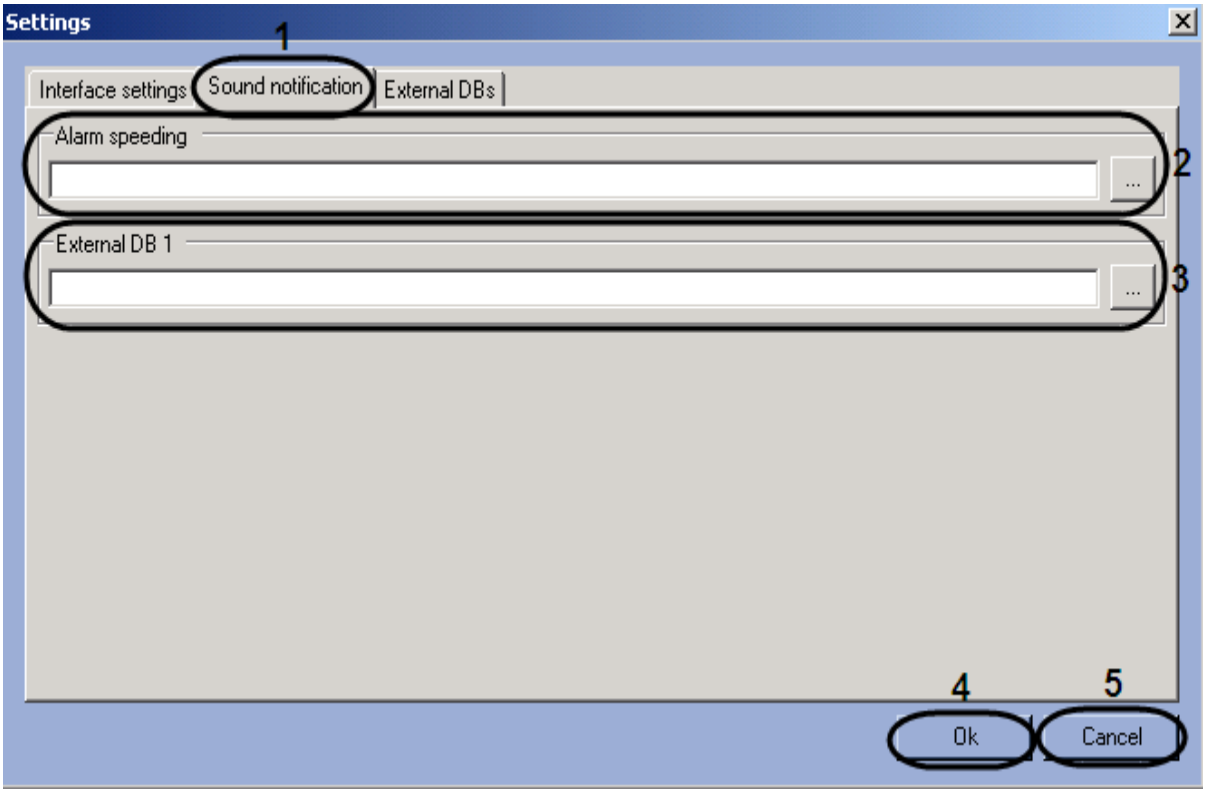

Fig. 7.8-10 Sound files selection

4. To set the sound notification with vehicle's overspeeding click « ... » button on the right of Alarm speed exceeded field (Fig. 7.8-10, 2). In the opened standard dialog window Open the required sound file and then click Open. In result the full path to the fill will be displayed in the field Alarm speed exceeded (Fig. 7.8-10, 2).
5. To set the sound notification while identifying the recognized number in the External Plates Database click t « ... » button on the right of the field, corresponding to the required database (Fig. 7.8-10, 3). In the Open standard dialog window select the required sound file and then click Open. In result the full path to the fill will be displayed in the corresponding field.

Note. The number and names of the fields correspond to the External databases, selected for analyzing the identified plates (see section «Selecting the external plate's database»).

6. Repeat step five for all the required external plates' databases.
7. Click OK to save the changes and close the Settings dialog window (Fig. 7.8-10, 4).

Note. Click Cancel to close the Settings dialog window (Fig. 7.8-10, 5).

Setting up the voice notification while registering the alarms is completed.

7.8.7 Selecting the external plate's databases as the Active tracking database

To select the external plate's databases as the Active tracking database do the following:

1. Go to Vehicle tracer settings panel (see).
2. Click Settings button (see).
3. Go to the Outer databases tab in the opened dialog window (see Fig. 7.8-11, 1).

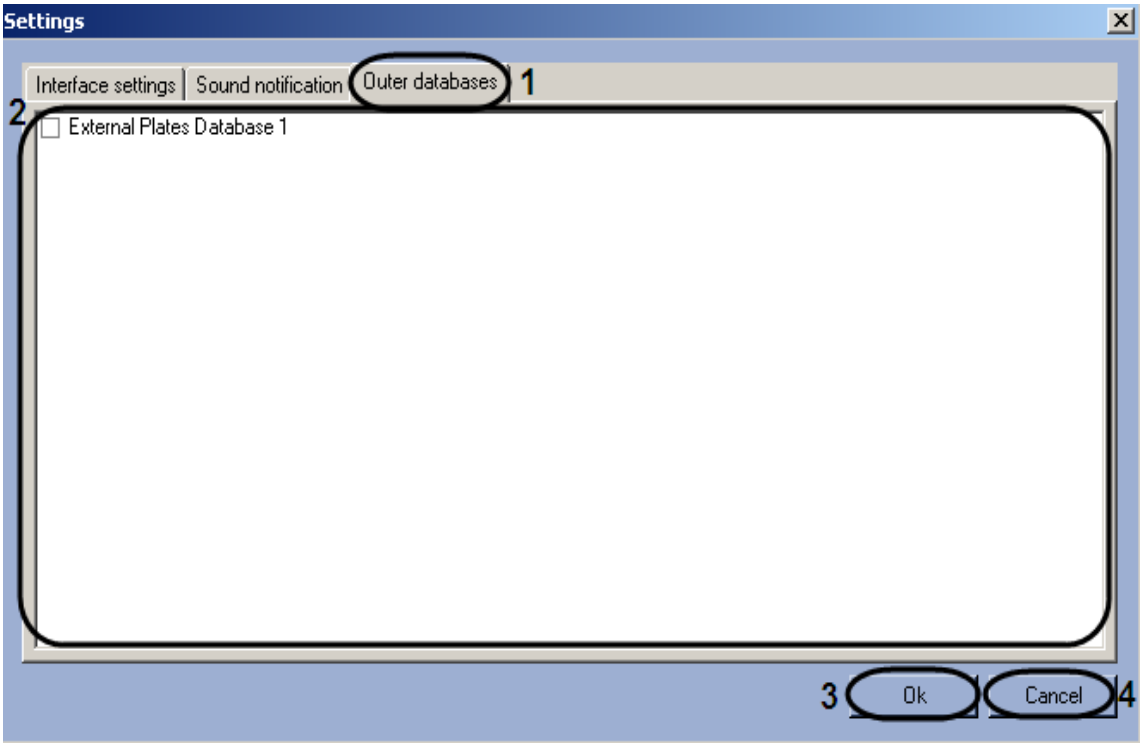

Fig. 7.8-11 Selecting the external plate's databases as the Active tracking database

4. Select check boxes opposite the external plates databases that shoul be used as the Active tracking databases (see Fig. 7.8-11, 2).
5. Click OK to save the changes and close the Settings dialog window (see Fig. 7.8-11, 3).

Note. Click Cancel to close the Settings dialog window without saving the changes (see Fig. 7.8-11, 4).

Selecting the external plate's databases as the Active tracking database is completed.

7.8.8 Selecting the Monitor object for playing back the video archive

There is possibility to give commands from the Vehicle tracer window to play back the video archive from the plate's recognition camera in the Monitor interface window.

Note! The Monitor and Vehicle tracer objects are to be created on the bases of one parent object the Screen.

To select the Monitor object to play back the video archive, do the following:

1. Go to the Vehicle tracer settings panel (Fig. 7.8-12).

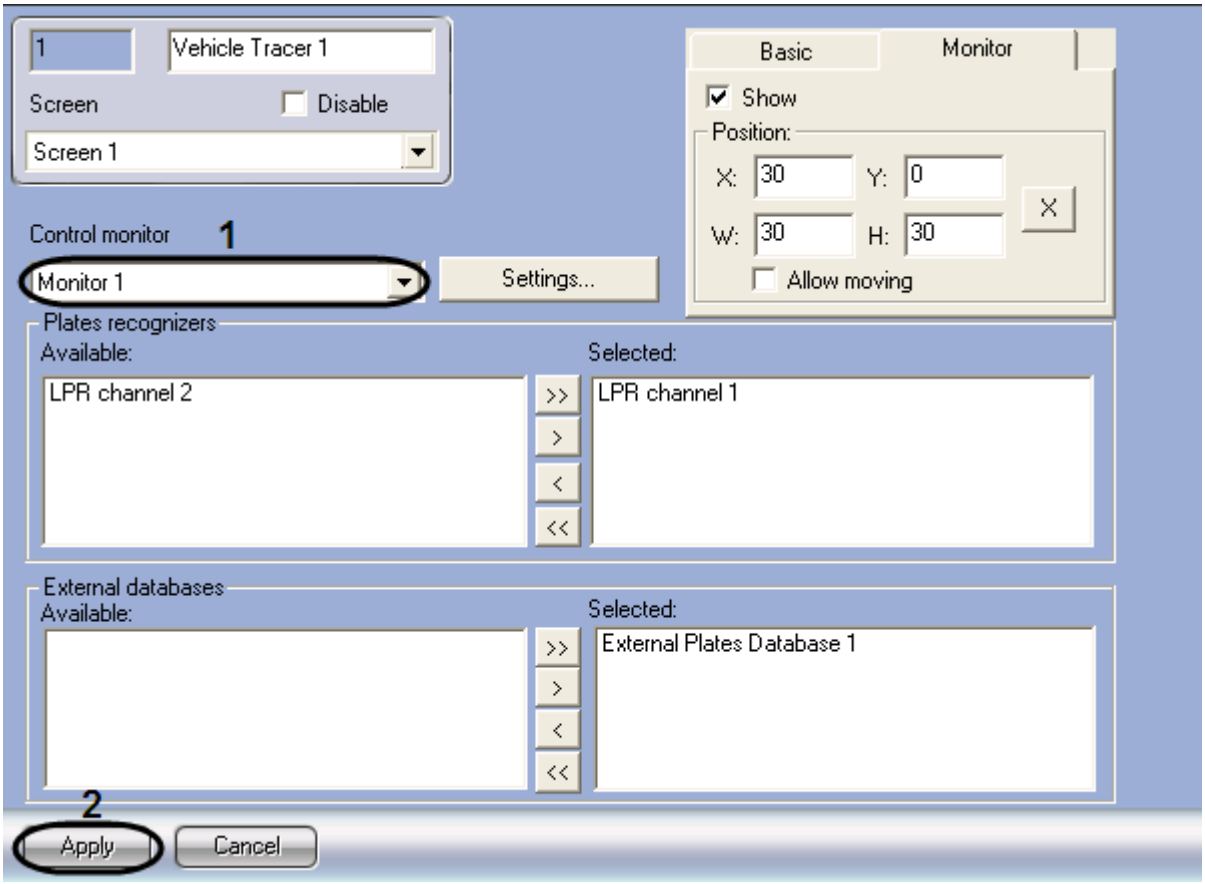

Fig. 7.8-12Selecting the Monitor object for playing back the video archive

2. From the Control monitor list (Fig. 7.8-12, 1) select the Monitor object, with the help of which video archive is required to be played back from the plate's recognition camera.
3. Click Apply (Fig. 7.8-12, 2).

Selecting the Monitor object for playing back the video archive is completed.

7.9 Vehicle terminal monitor

7.9.1 Setting up the Alarm window position

To set up the Alarm window position, do the following:

1. Open the Interfaces tab in the System Settings window (see Fig. 7.9-1, 1).
2. Select the Traffic Monitor object in the object tree (see Fig. 7.9-1, 2).
3. By default, the Alarm window is not displayed. To open the Alarm window, check the Show alarm window checkbox (see Fig. 7.9-1, 3).
4. To change the window position, enter the values in the X and Y fields (see Fig. 7.9-1, 4). The values must correspond to the coordinates of the upper left corner of the window as a percentage of the screen width and height, respectively.
5. To change the window size, enter its width in the W field and its height in the H field as a percentage of the screen dimensions (see Fig. 7.9-1, 5).
6. By default, the Alarm window cannot be moved around the screen. To enable window movement, check the Allow movement checkbox (see Fig. 7.9-1, 6).
7. In the Hide after field, enter the number of seconds that the window will be displayed until it is closed (see Fig. 7.9-1, 7).
8. Set the Alarm window transparency level using the Window transparency slider. By default, the Window transparency window is displayed opaque (minimum transparency). The transparency level increases (in percent) when the slider is moved to the right (see Fig. 7.9-1, 8).

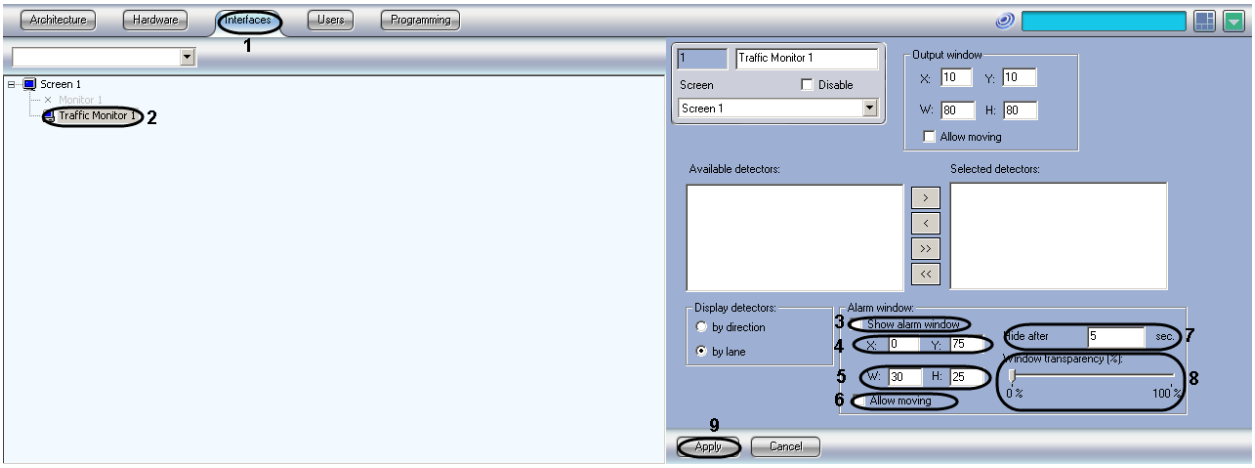

Fig. 7.9-1 Setting up the Alarm window position

9. Click Apply (see Fig. 7.9-1, 9).

The Alarm window position is now set.

Note. If the text in the Alarm window overlaps the images, enlarge the window (see step 5) to the size when the text and images are displayed correctly.

8 Appendix 1. Interface description

8.1 The LPR channel object settings panel

Fig. 8.1-1 shows the settings panel of the LPR channel interface object.

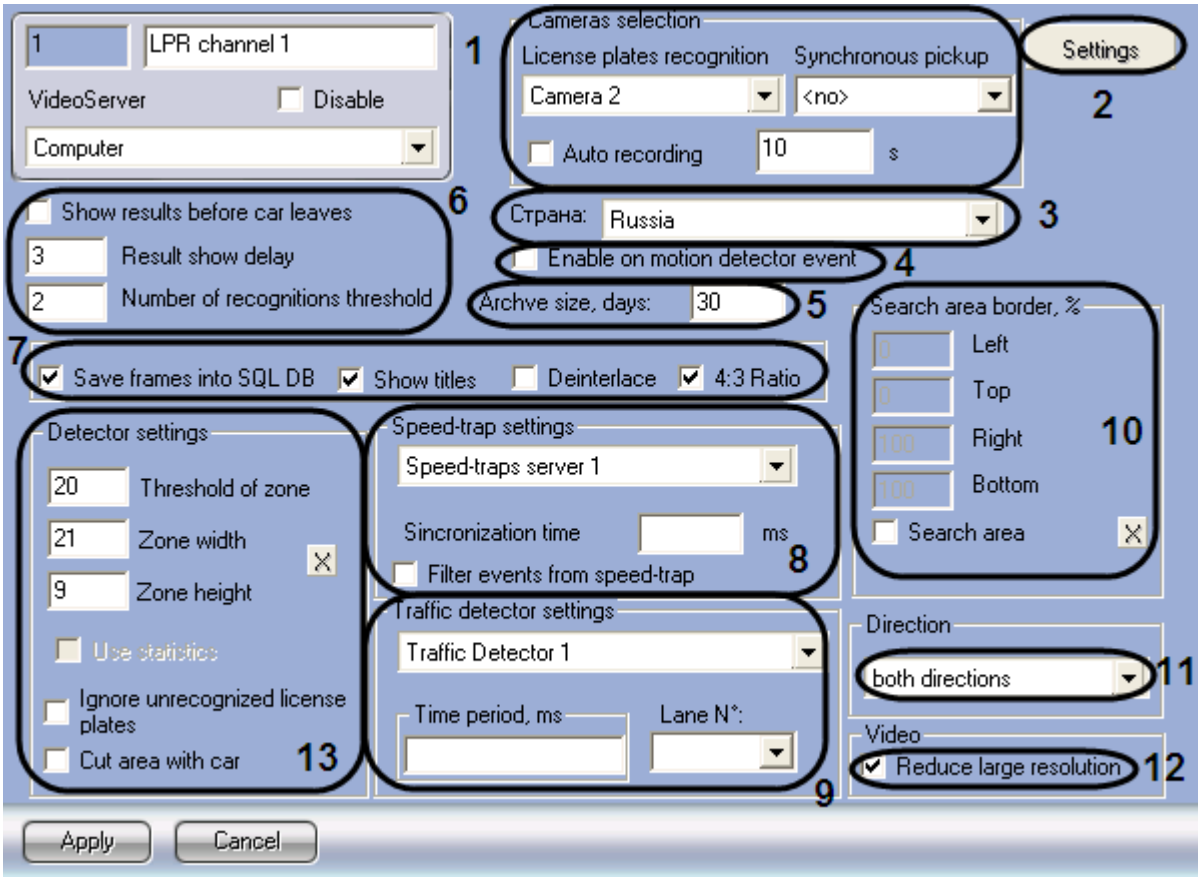

Fig. 8.1-1 Uragan settings panel with active Auto-Uragan3.3.5.18 module

Note! If the Arena program module is used, LPR channel parent object does not have to be set up.

Table 8.1-1shows the elements in the LPR channel settings panel.

Table 8.1-1

№	Parameter name	Field type	Description	Data type	Default value	Value range
Camera's selection group						
1	Camera for LP numbers	List	Main camera for license plate recognition	List of available cameras	Camera 1	Depending on the number of available Camera objects
	Synchronous camera	List	Additional camera operating together with the main camera	List of available cameras	None	Depending on the number of available Camera objects
	Auto recording	Checkbox	Enabling the automatic recording of the	Boolean	No	Yes – automatic recording enabled, No –

№	Parameter name	Field type	Description	Data type	Default value	Value range
			recognized LP numbers			automatic recording disabled
	Auto recording length	Text field	Auto recording duration	Seconds	10	0 - 1000
Without group						
2	Settings (is used with enabled Carmen-Auto and Carmen-parking module)	Click the button	Access to frame sign settings	-	-	-
3	Country	List	For « Auto-Uragan 3.3.5.18» software modules			
			Selection of emitter-country that issued the license plate	List of available LP templates	Russia	Depending on the number of available LP templates
			For «CARMEN-Parking» modules			
			Selecting the emitter-state of the plate	A list of available templates of the plate	Russia, Europe, Latin countires	Russia, Europe, Latin countires
			For «CARMEN-Auto» modules			
			Selection of the LP numbers recognition mode	List of available LP numbers recognition modes	Arabic characters (7.61)	«Arabic characters» (7.61)» - for recognizing and identifying the plate's type, corresponding to Arabic countries. «Latin characters» (7.62) » - for recognizing and identifying the plate's type, corresponding to all European countries,

№	Parameter name	Field type	Description	Data type	Default value	Value range
						including Russia. «Common characters» (7.62) » - for recognizing all the Latin characters of the plates (for example, relevant to such counties as Argentina, India, Africa and Singapore). The country recognition function is not used. «Common characters – rapid (7.62) » - for recognizing all the Latin characters of the plates in a rapid mode (for example, relevant to such counties as Argentina, India, Africa and Singapore). This value is a rapid variant of «Common characters (7.62) », but it is more sensitive to the quality of the image. Recommended to use only in optimal conditions as the recognition rate may decrease with a bad quality of the image. «Common characters – optimized (7.68)» -

№	Parameter name	Field type	Description	Data type	Default value	Value range
						updated version «Common characters (7.62)», is used for the most precise and rapid recognizing all the Latin characters of the plates.
4	Enable on motion detector event	Checkbox	Starting auto recording on receiving an event from the motion detector	Boolean	No	Yes – auto recording starts on motion detector event No – auto recording does not start on motion detector event
5	Archive size	Text field	Database archive depth	Days	30	0 - 10000
6	Show results before car leaves (is used with enabled Carmen-Auto and Carmen-parking module)	Checkbox	Enabling the results to be displayed before the car leaves the viewing zone	Boolean	Yes	Yes – the result is displayed before the car leaves No – the result is displayed after the car leaves
	Results display delay (is not used with enabled Carmen-Auto and Carmen-parking module)	Text field	The time delay between the first recognition of the LP number and displaying the results	Seconds	3	0 - 100
	Number of recognitions threshold (is not used with enabled Carmen-Auto and Carmen-parking	Text field	The number of reliable recognitions to give the result	Number	2	0 - 1000

№	Parameter name	Field type	Description	Data type	Default value	Value range
	module)					
7	Save frames into SQL DB	Checkbox	Saving video frames of vehicle's recognized number into SQL DB	Logical type	No	Yes – the frame with a vehicle is saved into the database No – the frame with a vehicle is not saved into the database
	Show titles	Checkbox	Enabling the LP number titles overlaid with the video image while making report about the recognized number	Logical type	No	Yes – titles overlay enabled No – titles overlay disabled
	Deinterlace	Checkbox	Enables deinterlacing of video frame with a vehicle when the image is received in full resolution	Logical type	No	Yes - deinterlacing of video frame with a vehicle is implemented No– deinterlacing of video frame with a vehicle is not implemented
	4:3 Ratio	Checkbox	Set the ratio 4:3 of video frame's weight and height while making report about the recognized number	Logical type	No	Yes – vide frame with a vehicle is displayed in ratio 4:3 No – initial ratio of the frame while making report about the recognized number is not changed
Radar settings group						
8	Speed-trap setup	List	Selecting the speed-trap to work together with Uragan	List of available Speed-trap server objects	Not specified	Depending on the number of available Speed-trap server objects

№	Parameter name	Field type	Description	Data type	Default value	Value range
	Delay	Text field	The time it takes the car to move from the point of speed detection to the viewing zone of the camera	Milliseconds	Not specified	0 - 20000
	Filter events from speed-trap	Checkbox	Enables saving the first speed detected only	Boolean	No	Yes – only the first detected speed value is used, others are ignored until the delay expires or the number is recognized No – all speed values are used
Traffic detector setup group						
9	Server for work with DT settings	List	Selecting the traffic detector to work together with Uragan	List of available Traffic Detector objects	Not specified	Depending on the number of available Traffic Detector objects
	Transport detector settings (Time period)	Text field	The time it takes the car to move from the point of detection by the traffic detector to the viewing zone of the Uragan recognition camera	Milliseconds	Not specified	0-20000
	Transport detector settings (Lane)	List	The road lane the traffic detector is directed at	The list of the lanes set for Traffic Detector	Not specified	6
«Search area border, %» group						
10	Search area, left	Text field	Left edge of the LP number search area	Percentage of the window width	0	0 - 100
	Search area, top	Text field	Top edge of the LP number search area	Percentage of the window width	0	0 - 100

№	Parameter name	Field type	Description	Data type	Default value	Value range
	Search area, right	Text field	Right edge of the LP number search area	Percentage of the window width	100	0 - 100
	Search area, bottom	Text field	Bottom edge of the LP number search area	Percentage of the window width	100	0 - 100
	Search area(search area)	Checkbox	Enabling the use of the LP number search area boundaries	Boolean	No	Yes – the search area is enabled No – the search area is disabled
	X	Button	Setting the search area using the mouse	-	-	-
Direction group						
11	Direction Is not used with activated module «Carmen-Auto» and «Carmen-Parking» and «Auto-URAGAN 3.3.3.18»	List	Setting the traffic direction to detect the LP numbers	List of directions	Both directions	Both directions To camera From camera
Video group						
12	Handle the frame	Checkbox	Frame handling setup	Boolean	Yes	Yes – the lesser frame is stretched, the bigger one is cut off No– the lesser frame is stretched, the bigger one is handled without changes
Detector settings group						
13	Sensitivity Is not used with activated module «Carmen-Auto» and «Carmen-	Text field	Detecting zone sensitivity	Number	20	Unlimited (20 to 60 recommended)

№	Parameter name	Field type	Description	Data type	Default value	Value range
	Parking»					
	Zone width Is not used with activated module «Carmen-Auto» and «Carmen-Parking»	Text field	License plate search area width	Percentage of frame width	21	Unlimited
	Zone height Is not used with activated module «Carmen-Auto» and «Carmen-Parking»	Text field	License plate search area height	Percentage of frame height	9	Unlimited
	X Is not used with activated module «Carmen-Auto» and «Carmen-Parking»	Button	Traffic detector setup window opens	-	-	-
	Use statistics Is not used with activated module «Carmen-Auto» and «Carmen-Parking» and «Auto-URAGAN 3.3.5.18»	Checkbox	Set the statistics result formation about all saved data	Boolean	No	Yes – final result is formed about all saved data No-only the last different result is saved and handled
	Ignore unrecognized license plates	Checkbox	Setting up the detection of unrecognized numbers	Boolean	No	Yes – unrecognized numbers are ignored No – unrecognized numbers are not ignored
	Cut frame with a car. Is not used	Checkbox	Set up the detection settings to the image with	Boolean	No	Yes- frame with a car is cut No– frame with

№	Parameter name	Field type	Description	Data type	Default value	Value range
	with activated module «Carmen-Auto» and «Carmen-Parking»		a car			a car is not cut

8.2 The Radar object settings panel

Fig. 8.2-1 shows the Radar object settings panel.

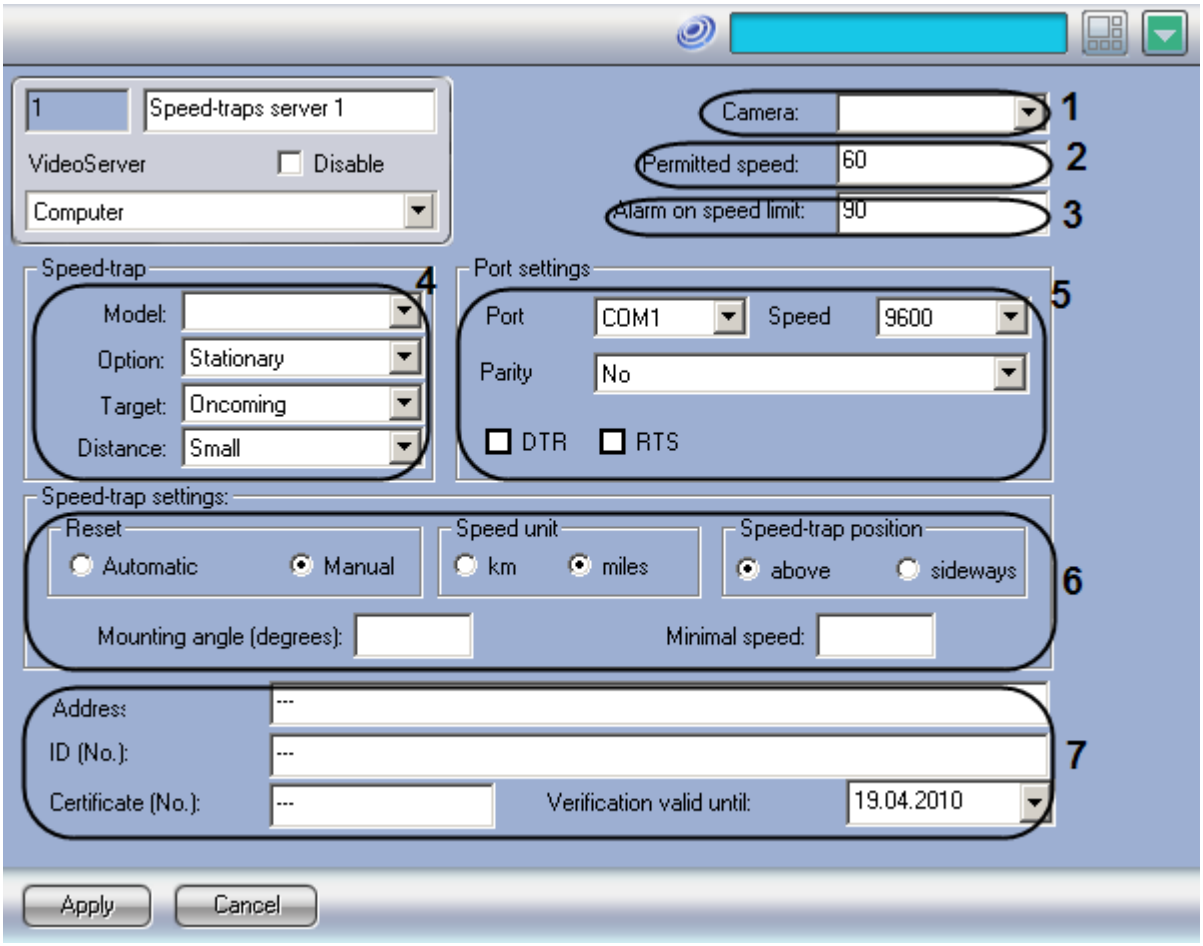

Fig. 8.2-1 The Radar object settings panel

Table 8.2-1shows the elements in the Radar settings panel.

Table 8.2-1

	Parameter name	Field type	Description	Data type	Default value	Value range
1	Camera	List	Selecting the camera to work together with the Auto-Uragan3.3.5.18 module	List of available Camera objects	Not specified	Depending on the number of available Camera objects
2	Alarm on	Text field	Entering the maximum	Km/h	0	Unlimited

	Parameter name	Field type	Description	Data type	Default value	Value range
	speed limit		allowed vehicle speed the exceeding of which leads to the alarm registration			
3	Permitted speed	Enter the value in the field	Entering the permitted vehicle speed on the controlled area for displaying in the report area for displaying in the report concerning the recognized number.	Km/h	-	Unlimited
4	Model	List	Selecting the speed-trap model	List of available speed-traps	Not specified	Iskra 1 Iskra 1B Iskra 1D Iskra 1KRIS Radis Rapira Rapira 2M Berkut Python Speed Gun
	Option	List	Selecting the speed-trap mounting option	List of mounting options	Stationary	Stationary – speed-trap is installed on a stationary object Moving – speed-trap is installed on a vehicle
	Target	List	Driving direction of the vehicle to be recognized	List of available directions	Oncoming	Oncoming – vehicles driving toward the speed-trap Passing – vehicles driving away from the speed-trap
	Distance	List	Setting an approximate distance between the speed-trap and the vehicles to be recognized	List of available distances	Small	Small Medium Large
5	Port	List	COM-port number	List of available COM-ports	COM1	Depending on the system configuration

	Parameter name	Field type	Description	Data type	Default value	Value range
	Speed	List	COM-port speed	List of available COM-port speeds	9600	Depending on the system configuration
	Parity	List	Parity control mode	List of parity control modes	No	Yes – enable parity control mode No – disable parity control mode
	DTR	Checkbox	Enabling power supply via the DTR pin	Boolean	No	Yes – DTR power supply enabled No – DTR power supply disabled
	RTS	Checkbox	Enabling power supply via the RTS pin	Boolean	No	Yes – DTR power supply enabled No – DTR power supply disabled
6	Reset	Radio-button	Selecting the speed-trap reset mode	Reset modes	Manual	Manual – manual speed-trap reset Automatic – automatic speed-trap reset
	Speed unit	Radio-button	Selecting the speed display unit	Names of speed units	Mph	Km/h – kilometers per hour Mph – miles per hour
	Speed-trap position	Radio-button	Speed-trap mounting position	Names of positions	Above	Above – speed-trap is installed above the road Sideways – speed-trap is installed at the side of the road
	Mounting angle (degrees)	Text field	The angle of the speed-trap installation in relation to the horizon	Degrees	Not specified	Unlimited
	Minimal speed	Text field	Minimum speed detectable by the radar	Km/h	Not specified	Unlimited
7	Address	Enter the value in	Set the address of Radar position	-	-	-

	Parameter name	Field type	Description	Data type	Default value	Value range
		the field				
	ID(№)	Enter the value in the field	Set the factory ID number of Radar device	-	-	Depends on the producer of the device
	Certificate(№)	Enter the value in the field	Set the number of the certificate, correspondidng to Radar device	Number	-	-
	Verification is valid until	Select from the listcalendar is used)	Set the date until which verification is valid	Date in format: dd, mm, yy	Current date	-

8.3 The Traffic Detector object settings panel

Fig. 8.3-1 shows the Traffic Detector object settings panel.

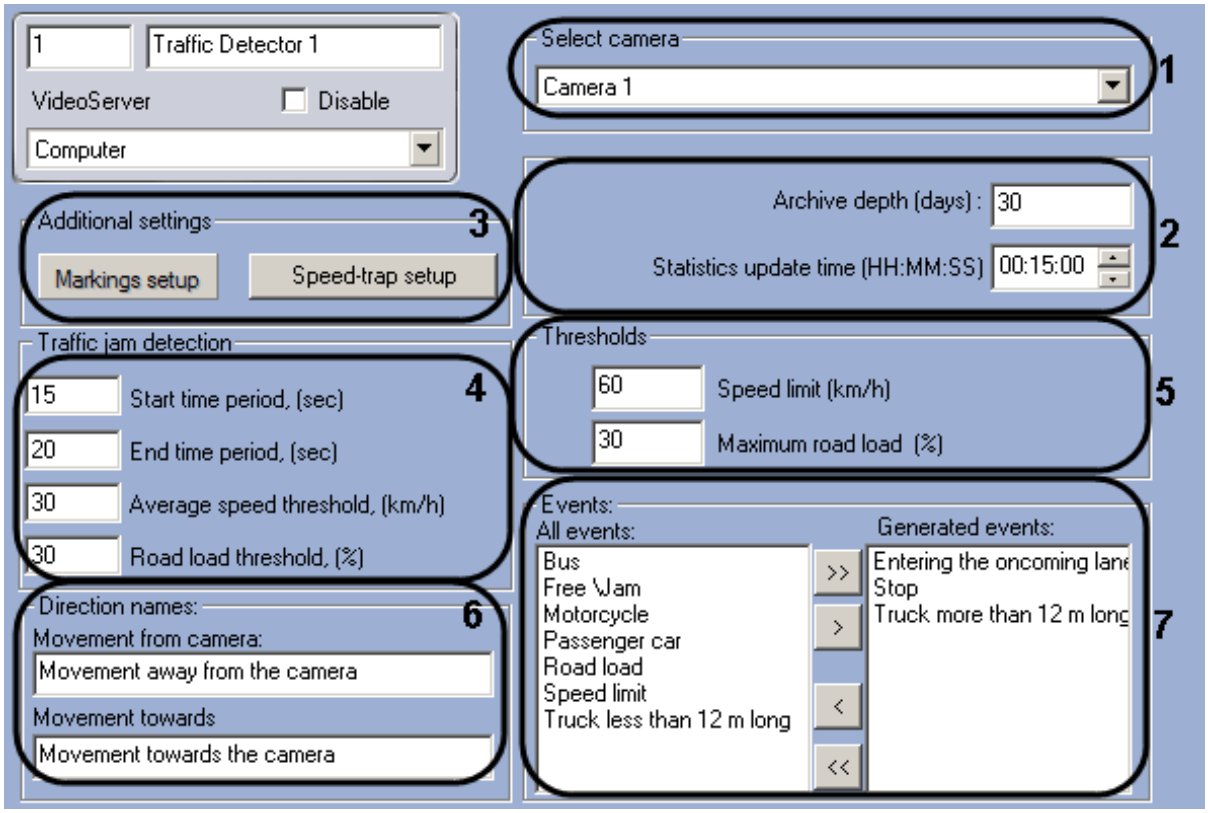

Fig. 8.3-1 The Traffic Detector settings panel

Table 8.3-1 describes the elements of the Traffic Detector object settings panel.

Table 8.3-1

	Parameter name	Field type	Description	Data type	Default value	Value range
1	Camera	List	Selecting the camera for Traffic Detector	List of available Camera	Not specified	Depending on the number of available Camera

	Parameter name	Field type	Description	Data type	Default value	Value range
				objects		objects
2	Archive size	Text field	Storage depth of the database archive	Days	30	1 - 60
	Statistics update time	Text field	The period of statistics update	HH:MM:SS	01:00:00	00:00:0 - 23:59:59
3	Markings setup	Button	Setting up the markings parameters	-	-	-
	Speed-trap setup	Button	Setting up of the Radar module to work together with Traffic Detector	-	-	-
4	Start time period	Text field	Setting up the time period to detect the start of the jam	Seconds	15	1 - 60
	End time period	Text field	Setting up the time period to detect the end of the jam	Seconds	20	1 - 60
	Average speed threshold	Text field	Setting up the speed threshold to detect a jam	Km/h	30	1 - 255
	Road load threshold	Text field	Setting up the road load threshold to detect a jam	Percent	30	1 - 100
5	Speed limit	Text field	Maximum allowed vehicle speed	Km/h	60	1 - 255
	Maximum road load	Text field	Setting up the maximum road load	Percent	No	1 - 100
6	Movement from camera	Text field	Setting the display text for movement away from the camera	Latin, Cyrillic and special symbols	Movement away from camera	Case-insensitive character string, 1 to 256 symbols
	Movement toward camera	Text field	Setting the display text for movement toward the camera	Latin, Cyrillic and special symbols	Movement toward camera	Case-insensitive character string, 1 to 256 symbols
7	All events	List	The list of all available events in Traffic Detector	List of events	All events	Depending on the number of available events
	Generated events	List	The list of events used in Traffic Detector	List of events	Not specified	Depending on the number of available events

	Parameter name	Field type	Description	Data type	Default value	Value range
	Add (>)	Button	Add selected events from the All Events field to the Generated Events list	-	-	-
	Add all (>>)	Button	Add all events from the All Events field to the Generated Events list	-	-	-
	Remove (<)	Button	Remove selected events from the Generated Events list	-	-	-
	Remove all (<<)	Button	Remove all events from the Generated Events list	-	-	-

8.4 The External Plates Database object settings panel

The External Plates Database object settings panel includes the following interface elements:

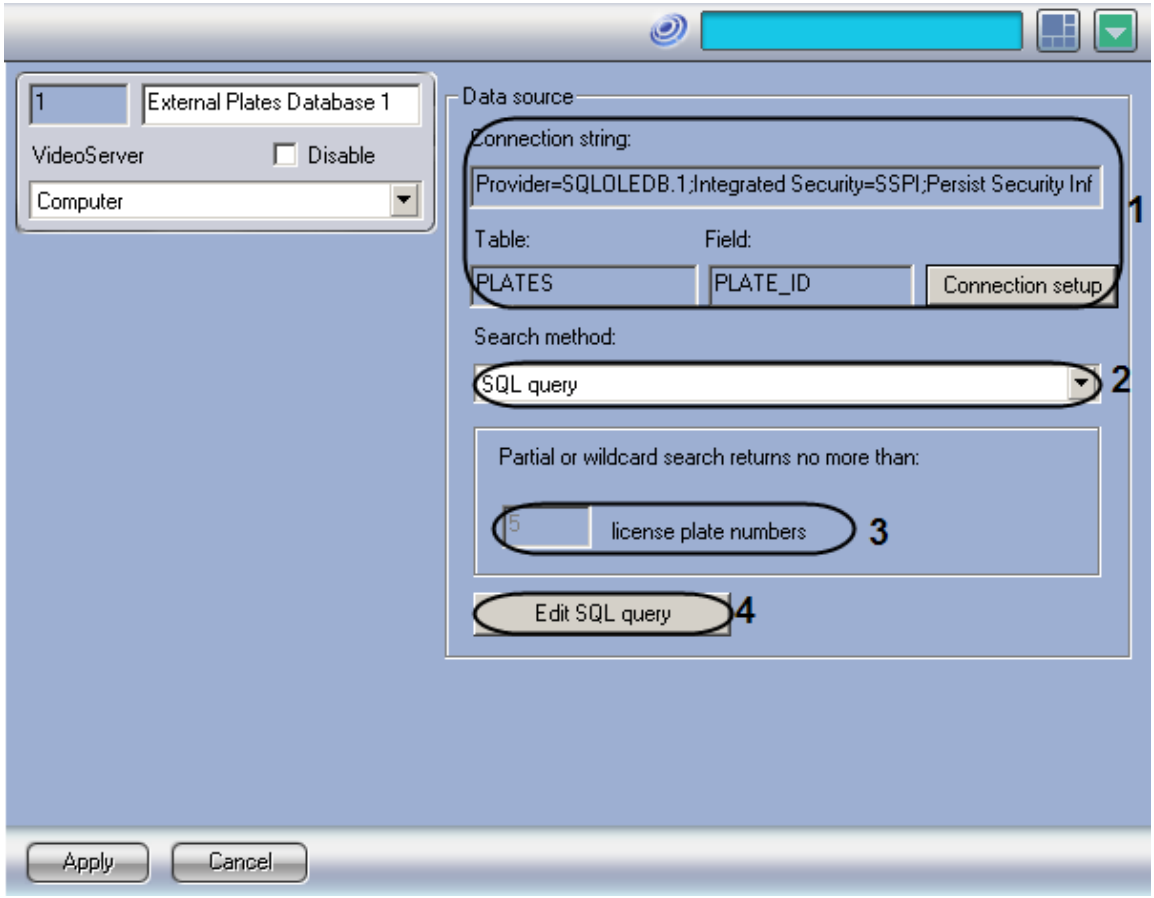

Fig. 8.4-1 The object settings panel «external Plates Database»

Table 8.4-1describes the elements of the External Plates Database object settings panel.

Table 8.4-1

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Text field «Connecting string»	Automatically, after setting up the connection	Connection string to the external database	Latin and special symbols	-	A sting, containing a sequence of characters (letters, digits, characters)non case-sensitive
	Text field «Table»	Automatically, after setting up the connection	Plates table name in the database	Latin and special symbols	-	A sting, containing a sequence of characters (letters, digits, characters)non case-sensitive
	Text field «Field»	Automatically, after setting up the connection	Plates table name in the database	Latin and special symbols	-	A sting, containing a sequence of characters (letters, digits, characters)non case-sensitive
	Button «Connection setup»	Press the button	Access to connection settings	-	-	-
2	Dropdown list «Search method »	Select the value from the list	Search method selection of identified number in the external database	A list of available search methods	exact fit	Partial search at plate's part– the found cites containing a key word in any position and order are returned Partial search at a wildcard– the found cites fitting the current wildcard are returned Exact fit– the found cites coinciding exactly with the key word are returned. SQL-query – the cites, detected by SQL-query are returned
3	Text field «Partial or wildcards search returns no more than»	Enter the value in the field	Setting the number of returned results while doing a partial search at plate's number or a wildcard	integer	5	1 - 1000
4	Button «Edit SQL-query»	Press the button	Access to SQL-query, used in the search method «SQL-query»	-	-	-

8.5 The Vehicle detector settings panel

The Vehicle detector object settings panel includes the following interface elements (Fig. 8.5-1,Table 8.5-1).

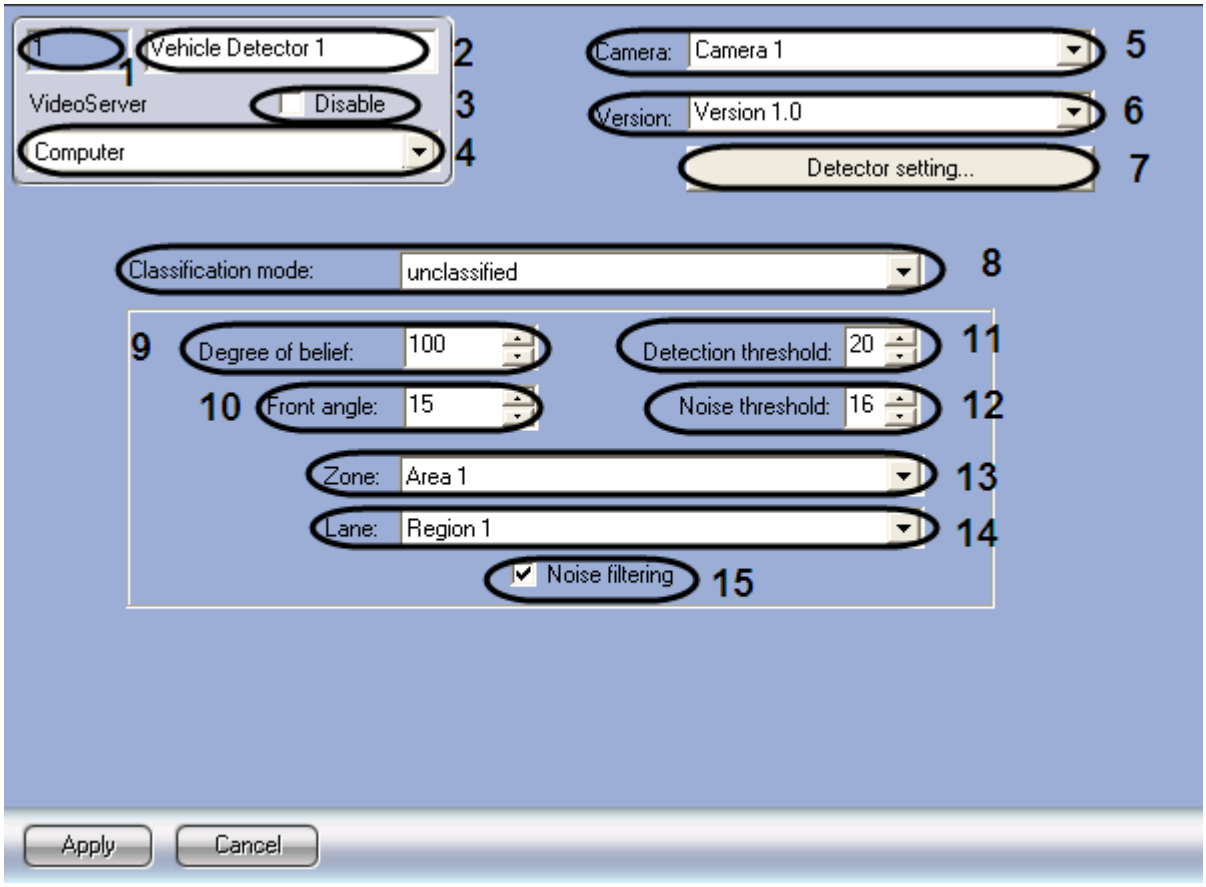

Fig. 8.5-1 The Vehicle detector object settings panel

Table 8.5-1 The Vehicle detector object settings parameters description

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	ID	Automatically	Displays the ID number of the Vehicle detector object	Numbers	-	From 1 and above. Depends on the number of the Vehicle detector objects in the system
2	Name	Enter the value in the field	Set the name of the Vehicle detector object	Latin, Cyrillic and special symbols	the Vehicle detector	A sting, containing a sequence of characters (letters, digits, characters)n on case-sensitive Number of characters– from1 to 60.
3	Disable	Is set by a	Set the	Boolean type	No	Yes– the

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
		checkbox	Vehicle detector object's state(enabled or disabled) in the system			Vehicle detector object is disabled and is not in use No -the Vehicle detector object is enabled and in use
4	Computer	Select the value from the list	Set the Computer parent object in the system, to which this Vehicle detector object is related	Names of objects, registered in the system «Computer»	Name of the parent object«Computer»	Depends on the objects number«Computer» in the system
5	Camera	Select the value from the list	Set the number of cameras in the Vehicle detector	Names of objects, registered in the system «Camera»	-	Depends on the objects number«Camera» in the system
6	Version	Select the value from the list	Set the version of the Vehicle detector	Versions of the Vehicle detector	Version1.0	Version1.0
7	Detector setting	Press the button	Provides the access to a graphic tool of the detection zone setup	-	-	-
8	Classification mode	Select the value from the list	Set the vehicle's classification mode	Names of classification types	unclassified	unclassified – vehicles are not classified Only vehicle's length– vehicles are classified according to their length
9	Degree of belief	Enter the value in the field	Set the degree of belief to the Vehicle detector's indications.	%	100	From 0 to 100

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
			This parameter is designed for the detector's description.			
10	Front angle	Enter the value in the field	Set the angle, corresponding to the angle's projection, formed by the vertical camera's support pole and its objective's optical axis to the vertical plane , parallel to the road	Angle in degrees	15	From 0 to 60. He IS not recommended to set over 45°
11	Detection threshold	Enter the value in the field	Set the detector's triggering threshold. Is experimentally determined value	Conventionsl units	20	From 0 to 100
12	Noise threshold	Enter the value in the field	Set the detector's noise threshold. 10%-30% less than the triggering threshold	Conventionsl units	16	From 0 to 100
13	Zone	Select the value from the list	Set the object «Zone»/ «Region», corresponding to the territory, where the Vehicle detector is located.	Names of objects, registered in the system«Zone»/ «Region»	-	Depends on the number of «Zone»/ «Region»objects, registered in the system
14	Lane	Select the value from the list	Set the Region object , corresponding to the lane	Names of objects, registered in the system«Region»	-	Depends on the number of Region objects, registered in

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
			, processed by the Vehicle detector			the system
15	Noise filtering	Is set by a checkbox	Includes vehicles' identification algorithm with an extremely noisy video signal	Boolean type	No	Yes- vehicles' identification algorithm with an extremely noisy video signal is enabled No - vehicles' identification algorithm with an extremely noisy video signal is disabled

8.6 The Vehicle processor settings panel

The Vehicle's processor object settings panel includes the following interface elements (Table 8.6-1, Fig. 8.5-1).

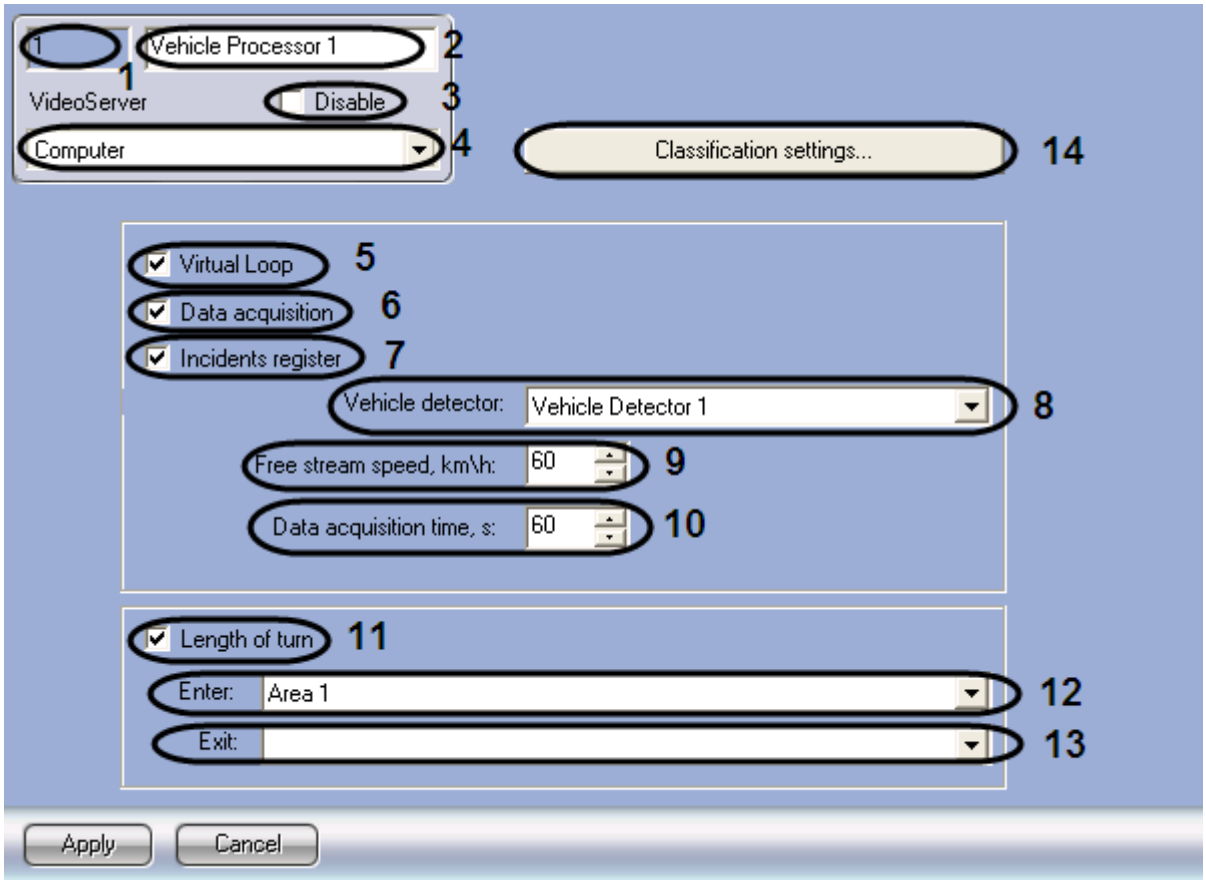

Fig. 8.6-1 The Vehicle processor system object setup

Table 8.6-1 Vehicle processor object description

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	ID numbder	Automatically	Displays Vehicle's processor object's ID in the system	Numbers	-	From 1 and above. Depends on the Vehicle's processor objects number in the system
2	Name	Enter the value in the field	Set the object's name «Vehicle's processor» in the system	Latin, Cyrillic and special symbols	Vehicle's processor	A sting, containing a sequence of characters (letters, digits, characters)non case-sensitive Number of characters if from 1 to 60.
3	Disable	Is set by a checkbox	Set the Vehicle's processor object state(enable d or disabled)in the system	Boolean type	No	Yes– «Vehicle's processor» object is disabled and is not in use No –Vehicle's processor object is enabled and in use
4	Computer	Select the value from the list	Se the Computer parent object in the system, to which Vehicle processor object is related	Names of objects, registered in the system «Computer»	Name of the parent object«Comp uter»	Depends on the objects number«Comp uter» in the system
5	Virtual loop	Is set by a checkbox	Enables the mode that is resulted in retranslation of messages about vehicle's passing in or out of the detection zone.	Boolean type	No	Yes– Virtual loop imitation mode is enabled No – Virtual loop imitation mode is disabled
6	Data acuisition	Is set by a checkbox	Enables the mode that is resulted in traffic data acquisition	Boolean type	No	Yes– traffic data acquisition mode is enabled

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
			and storing them to the database			No – traffic data acquisition mode is disabled
7	Incidents register	Is set by a checkbox	Enables the mode that is resulted in accidents fixation in the traffic stream	Boolean type	No	Yes– accidents fixation mode is enabled No – accidents fixation mode is disabled
8	Vehicle detector	Select the value from the list	Set the module Vehicle detector which data have to be processed	Names of objects, registered in the system Vehicle detector	-	Depends on the Vehicle detector objects number, registered in the system
9	Free stream speed, km/h	Enter the value in the field	Set the Free stream speed constant which is to be entered in the database in case when for the data acquisition time no vehicle has been registered	Number Speed in km/h	-	From 0 to 200
10	Data acquisition time	Enter the value in the field	Set the Data acquisition time, coming from vehicle detector module. Upon the end of this time validity the data are stored in the database	Number Speed in km/h	-	From 0 to 3600
11	Length of turn	Is set by a checkbox	Enables the mode, which results in determining the Length of turn	Boolean type	No	Yes– determining the Length of turn mode is enabled No – determining the Length of turn mode is

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
						disabled
12	Enter	Select the value from the list	Set the region object corresponding to the area, located at the entrance area to the detection zone	Names of Region objects, registered in the system	-	Depends on the Region objects number, registered in the system
13	Exit	Select the value from the list	Set the region object corresponding to the area, located at the exit area from the detection zone	Names of Region objects, registered in the system	-	Depends on the Region objects number, registered in the system
14	Classification settings	Press the button	Access to Classification settings of detected vehicles	-	-	-

8.7 The Traffic Monitor object settings panel

The Traffic Monitor interface object is designed for creation and setting up of the window for displaying the textual information about the characteristics of the traffic.

Fig. 8.7-1 shows the Traffic Monitor object settings panel.

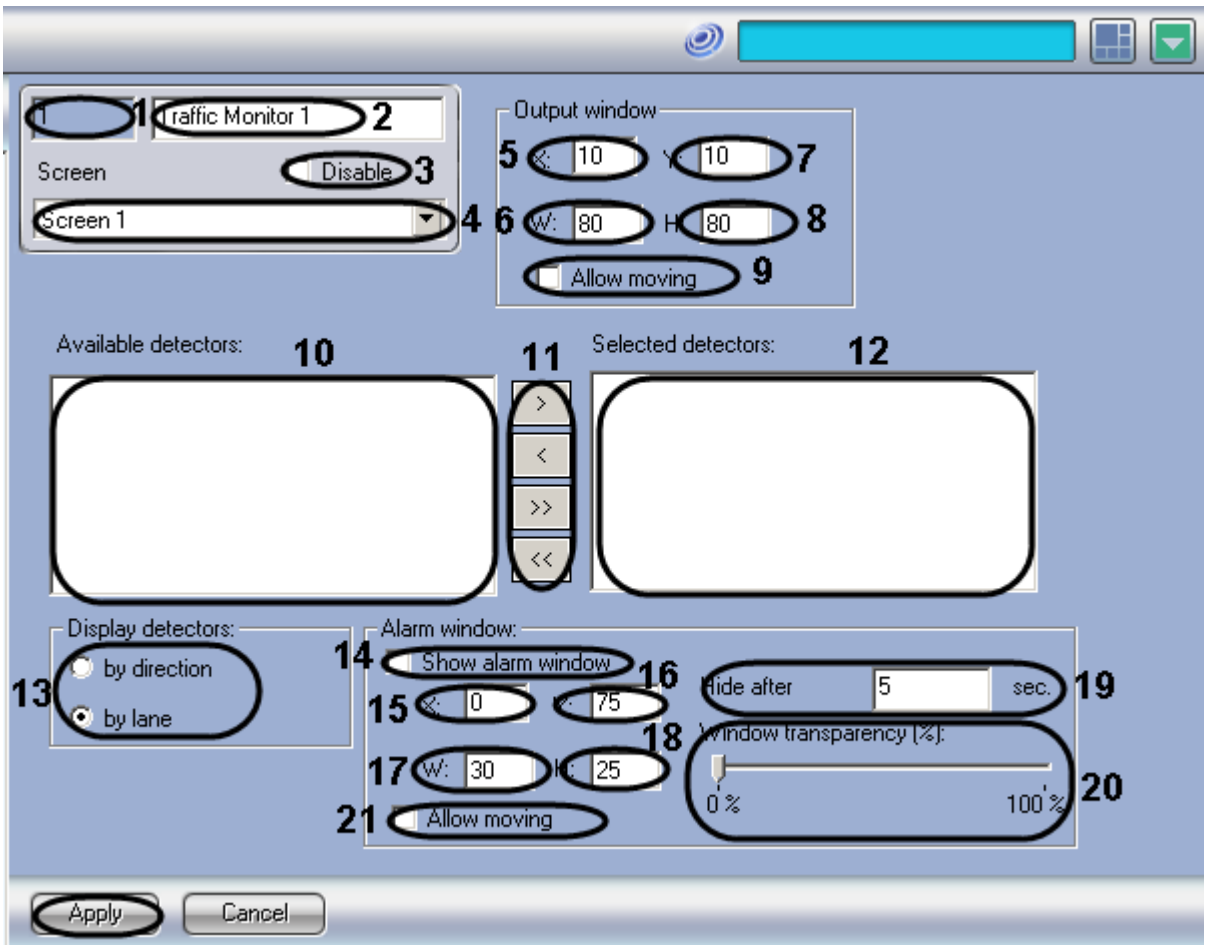

Fig. 8.7-1 The Traffic Monitor settings panel

Table 8.7-1 describes the elements of the Traffic Monitor window.

Table 8.7-1

	Parameter name	Field type	Description	Data type	Default value	Value range
1	ID*	Auto	The ID of the object in the video surveillance system.	Number	-	1 and higher Depends on the number of Traffic monitor objects.
2	Name*	Text field	The name of the object in the video surveillance system	Latin, Cyrillic and special symbols	Traffic monitor	Case-insensitive character string, 1 to 60 symbols.
3	Disable	Checkbox	Setting up of the object state	Boolean	No	Yes – Traffic monitor object is not used in the system No – Traffic monitor object is used and active.
4	Screen	List	Selecting the parent Screen object to link Traffic Monitor to.	Screen object names	Parent Screen name	Depends on the number of Screen objects.
Coordinates group						
5	X	Text field	X coordinate of the upper left corner of the window	% of screen width	Not specified	0 to M*100, where M is the number of surveillance

	Parameter name	Field type	Description	Data type	Default value	Value range
						monitors
6	Y	Text field	Y coordinate of the upper left corner of the window	% of the screen height	Not specified	0 to M*100, where M is the number of surveillance monitors
7	W	Text field	Window width	% of screen width	Not specified	0 to M*100, where M is the number of surveillance monitors
8	H	Text field	Window height	% of the screen height	Not specified	0 to M*100, where M is the number of surveillance monitors
9	Allow moving	Checkbox	Allows moving the LPR Viewer window across the screen	Boolean	No	Yes – moving allowed No – moving not allowed
Available recognizers – Selected recognizers group						
10	Available recognizers	List	The system automatically generates the list	List of recognizers	List of detected recognizers	List of detected recognizers
11	Add (>)	Button	Adding selected items from the Available recognizers list to the Selected recognizers list	-	-	-
11	Remove (<)	Button	Removing selected items from the Selected recognizers list	-	-	-
11	Add all (>>)	Button	Adding all items from the Available recognizers list to the Selected recognizers list	-	-	-
11	Remove all (<<)	Button	Removing all items from the Selected recognizers list	-	-	-
12	Selected recognizers	List	List of recognizers selected from the Available recognizers list	List of recognizers	Not specified	List of recognizers
Display detectors group						
13	By lane By direction	Radio-button	Selecting the way the detectors are displayed, by lane or by direction	Boolean	By lane	By lane By direction
Alarm window						
14	Display Alarm window	Checkbox	Enable the alarm window display	Boolean	No	Yes – display the alarm window No – do not

	Parameter name	Field type	Description	Data type	Default value	Value range
						display the alarm window
15	X	Text field	X coordinate of the upper left corner of the Alarm window	% of the screen width	Not specified	0 to M*100, where M is the number of surveillance monitors
16	Y	Text field	Y coordinate of the upper left corner of the Alarm window	% of the screen height	Not specified	0 to M*100, where M is the number of surveillance monitors
17	W	Text field	Alarm window width	% of the screen width	Not specified	0 to M*100, where M is the number of surveillance monitors
18	H	Text field	Alarm window height	% of the screen height	Not specified	0 to M*100, where M is the number of surveillance monitors
19	Hide after	Text field	Specifying the time to display the Alarm window for	Seconds	Not specified	0 to 59
20	Window transparency	Slider	Setting up the Alarm window transparency	%	0	0 to 100 0 relates to the opaque window 100 relates to the transparent window
21	Allow moving	Checkbox	Enable the moving of the Alarm window across the screen	Boolean	No	Yes – moving allowed No – moving not allowed

*The element name is not displayed in the settings panel.

8.8 The Vehicle tracer object settings panel

The Vehicle tracer settings panel contains the following interface elements (Fig. 8.8-1, Fig. 8.8-2,Table 8.8-1).

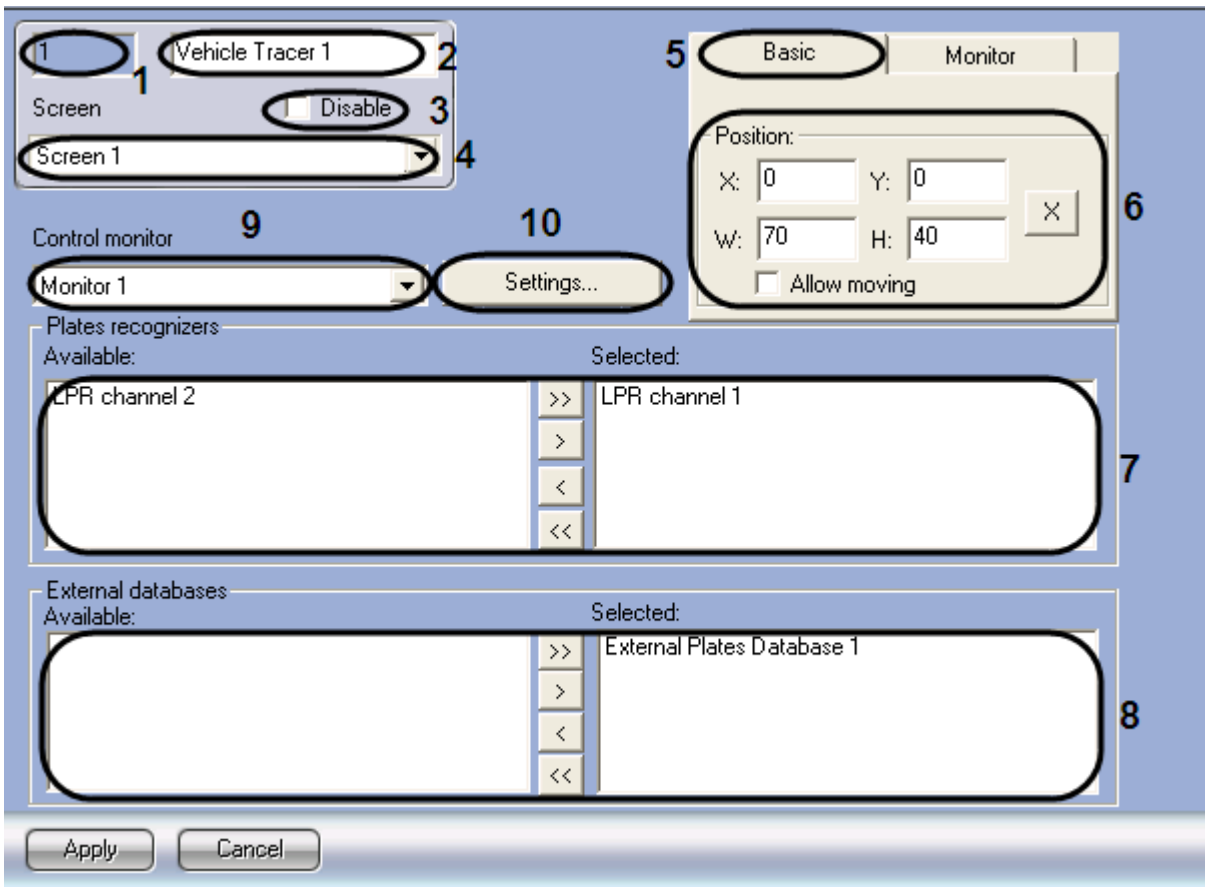

Fig. 8.8-1 The Vehicle tracer settings panel. Basic tab.

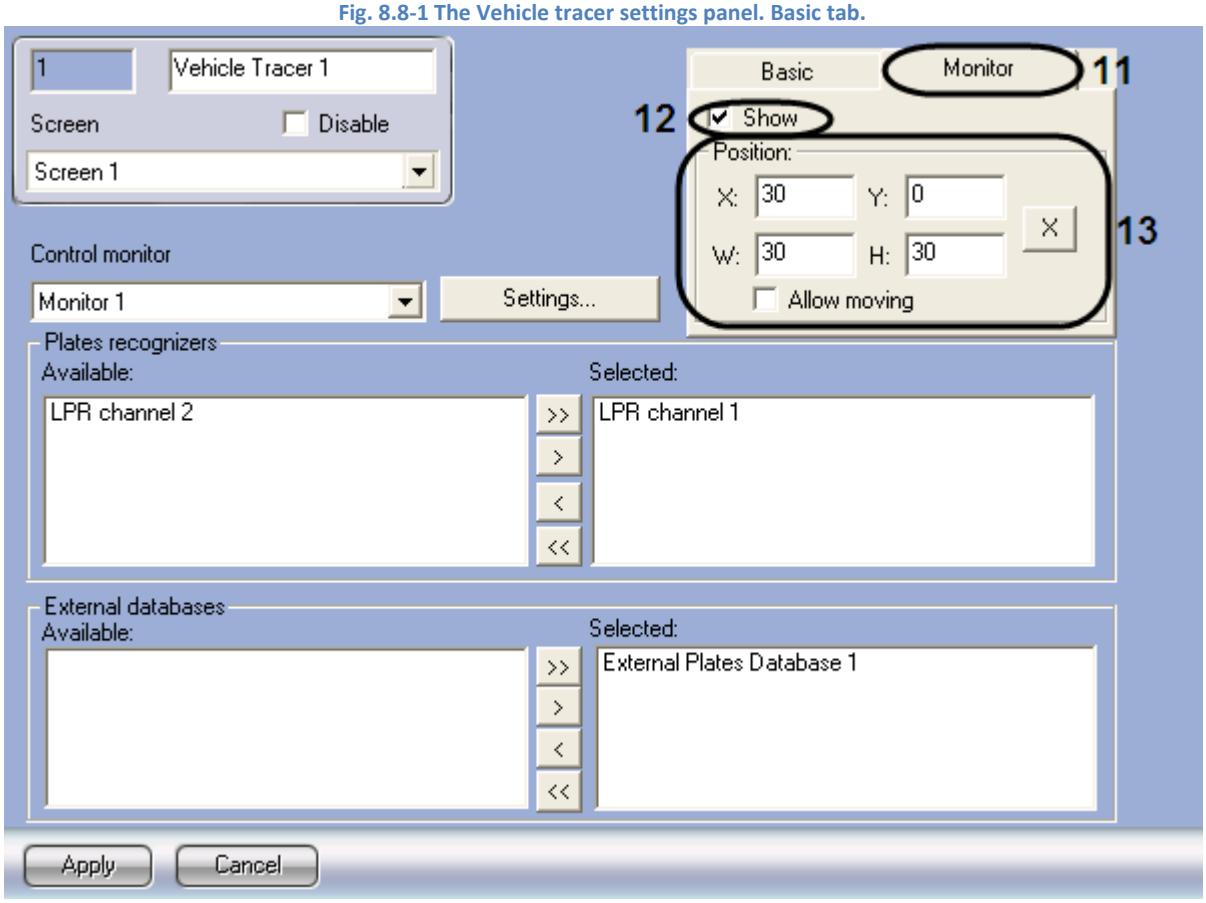

Fig. 8.8-2 The Vehicle tracer settings panel. Monitor tab.

Table 8.8-1 The Vehicle tracer object settings description

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	ID number	Automatically	Displays the «The Vehicle tracer» object's ID number in the system	Number	-	From 1 and above. Depends on the number of Vehicle tracer objects in the system
2	Name	Enter the value in the field	Set the Vehicle tracer object name in the system	Latin, Cyrillic and special symbols	The Vehicle tracer	A sting, containing a sequence of characters (letters, digits, characters)non case-sensitive Number of characters if from 1 to 60
3	Disable	Is set with a checkbox	Set the Vehicle tracer object's state (enabled or disabled) in the system	Boolean type	No	Yes –The Vehicle tracer object is disabled and not in use No – The Vehicle tracer object is enabled and in use
4	Screen	Select from the list	Set the screen parent object in the system, to which this Vehicle tracer object is related	Names of Screen objects, registered in the system	Name of the Screen parent object	Depends on the number of Screen objects
5	Basic	Go to the tab	Access to settings of the component position Active monitor on the screen	-	-	-
Coordinates group on the Basic tab						
6	Field «X»	Enter the value in the field	Set the horizontal coordinate of the X axis of the Active monitor's component	% regarding the screen's width	-	From 0 to M*100, where M – is the number of installed video surveilance monitors

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
			left upper corner on the screen			
	Field «Y»	Enter the value in the field	Set the vertical coordinate of the Y axis of the Active monitor's component left upper corner on the screen	% regarding the screen's height	-	From 0 to M*100, where M – is the number of installed video surveilance monitors
	Field «W»	Enter the value in the field	Set the width of the Active monitor's component	% regarding the screen's width	-	From70 to M*100, where M – is the number of installed video surveilance monitors
	Field «H»	Enter the value in the field	Set the height of the Active monitor's component	% regarding the screen's height	-	From 39 to M*100, where M – is the number of installed video surveilance monitors
	Button«  »	Click the button	Entering the text window for visual setiing the coordinates and sizes of the Active monitor's component	-	-	-
	Allow moving	Is set with a checkbox	Enables moving the Active monitor's component	Boolean type	No	Yes – moving is permitted No – moving is unavailable
Plates recognizers group						
7	Available	Automatically	Displays the list of LP recognisers servers, available for displaying in the Vehicle tracer interface window	-	-	-

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Selected	Automatically	Displays the list of LP recognisers servers,displayed in the Vehicle tracer interface window	-	-	-
	Buttons « > », « < », « >> », « << »	Click the button	Selection of LP recognisers servers, to be displayed in the Vehicle tracer interface window	-	-	-
External databases group						
8	Available»	Automatically	Displays the list of External Platesd databases, that may be used for the identified objects analysis	-	-	-
	Selected	Automatically	Displays the list of External Platesd databases, selected for the identified objects analysis	-	-	-
	Buttons « > », « < », « >> », « << »	Click the button	Selection of Platesd databases for the identified objects analysis	-	-	-
9	Settings	Click the button	Access to The Vehicle tracer interface and also to the voice notification	-	-	-

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
			settingswhile registering the alarms: overspeeding, identification of the plate in the external database			
10	Monitor for controlling	Select from the list	Set the Monitor interface object to play back the video archive from the LP recognition camera upon the command from the Vehicle tracer window	Names of Monitor objects, registered in the system	-	Depends on the number of Monitor objects, registered in the system
11	Monitor	Go to the tab	Access to the settings of Events monitor component on the screen	-	-	-
12	Display	Is set with a checkbox	Displays the Events monitor component on the screen	Boolean type	No	Yes – the Events monitor component is displayed on the screen No – the Events monitor component is not displayed on the screen
Coordinates group on the Monitor tab						
13	Field«X»	Enter the value in the field	Set the horizontal coordinate of the X axis of the Events monitor's component left upper corner on the screen	% regarding the screen's width	-	From 0 to M*100, where M – is the number of installed video surveilance monitors

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Field «Y»	Enter the value in the field	Set the vertical coordinate of the Y axis of the Events monitor's component left upper corner on the screen	% regarding the screen's height	-	From 0 to M*100, where M – is the number of installed video surveilance monitors
	Field «W»	Enter the value in the field	Set the width of the Events monitor's component	% regarding the screen's width	-	From 0 to M*100, where M – is the number of installed video surveilance monitors
	Field «H»	Enter the value in the field	Set the height of the Active monitor's component	% regarding the screen's height	-	From 0 to M*100, where M – is the number of installed video surveilance monitors
	Button «  »	Click the button	Entering the text window for visual setiing the coordinates and sizes of the Events monitor's component	-	-	-
	Allow moving	Is set with a checkbox	Set the possibility of moving the Events monitor's component	Boolean type	No	Yes – moving is permitted No – moving is unavailable

9 Appendix2. Database replication via MS SQL Server

Note 1. Detailed information about database replication via MS SQL Server is given in reference manual– for example, page http://msdn.microsoft.com/ru-ru/library/ms151847%28v=SQL.90%29.aspx.

Note 2. In case of some problems with database replication via MS SQL Server apply to Microsoft technical support service (see. http://support.microsoft.com/?ln=ru).

9.1 Introduction

Replication is the process of data coping among databases that are in the same or different servers and connected via LAN, WAN or Internet. The following terms are used in MS SQL Server replication (Table 9.1-1).

Table 9.1-1 Replication terminology

Term	Description
Publication	Server(database)that sends data to another server(database)
Distribution	Server that controls data flow via replication system. Contains a specialized distributor database. Distribution and Publication can coincide.
Subscription	Server(database)that receives data from the other server(database)
Publication	Sum of articles, sent to Subscription
Article	Main replication module: table or table's subset
Subscription	Data group, received by Subscription
Distribution database	System database that is saved at Distribution and doesn't contain user tables. Is used for saving the task snapshots and all the transactions, waiting for distribution by the Subscription

Note 1. On default Replication service is not installed together with MS SQL Server Express.

Note 2. MS SQL Server Express cannot be used as Publication or Distribution.

In the Auto-Intellect distributed architecture it is reasonable to use replication with topology «Central subscription». In this case several Publication servers (for example servers, installed on traffic control posts) copy the data to the central server– Subscription.

As it is necessary to transmit data among servers of databases, it is recommended to use transactions replication. This replication type is also preferable in case when copied data constantly change, size of copied data is sufficiently great and not necessary to support auto changes of replicated data regarding Publication and Subscription servers. All described terms are executed in the Auto-Intellect distributed architecture.

The following agents are used while replicating:

1. Shots agent. Creates files of databases shots, saves shots in the Distribution server and saves information about shots synchronization state to the Distribution server's database.
2. Register reading agent. Compiles transactions, selected for replication , from the transactions register (that is on the Publication server) to Distribution server's database.
3. Distribution agent. Compiles processing task shots from Distribution server's database to Subscription servers; compiles all the transactions, waiting for distribution, to Subscription servers.

9.2 Replication setup

Replication setup is made in the following sequence:

1. Setup the Publication server, having created a new publication.
2. Setup the Subscription server, having created a subscription to publish the Publication server.

9.2.1 Replication setup features

While setting up the publication, the following features should be born in mind:

1. Run the MSSQLServer and SQLServerAgent server with Windows domain's account, as the Localsystem account is not provided with access to net resources.
2. Replication setup and configuration may be performed only by sysadmin users on MS SQL Server.
3. Service SQLServerAgent and MSSQLServer should be run to replicate the data.
4. Necessary footprint should be entered for Distributor server's database.
5. To replicate tables, containing external keys, all the linked tables should be included into publication.
6. Publication server should be determined on the Subscriber server as a remote server..

9.2.2 Publication setup

To set up Publication server follow the steps:

1. Connect to Publication server in the Microsoft SQL Server Management Studio, and then open the server node (Fig. 9.2-1).

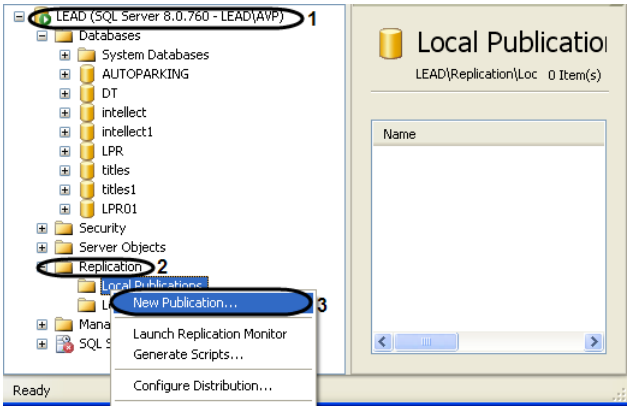

Fig. 9.2-1 New publication

2. Open «Replication» folder and then click with a right mouse button over the «Local Publications» folder (Fig. 9.2-1, 2).
3. Select the point «New Publication» in the opened contextual window (Fig. 9.2-1, 3).
4. «New Publication Wizard» will be displayed in result.
5. Following the instructions of «New Publication Wizard», enter the following information about publication:
   5.1. Distribution server;
   5.2. Directory, where databases' instant shots will be located;
   5.3. Database that has to be replicated;
   Note. LPREX database should be selected while setting up the replication of plates recognition databases.
   5.4. Type of created publication (it is recommended to select transactions' publication or transactions' publication with update subscriptions);
   5.5. Data and data base objects (articles) to be included into publication;
   5.6. steady-state filters of lines and columns;

5.7. Shots agent schedule;

5.8. Accounts that have to run active replication agents (see section «Introduction »);

5.9. Name and publication description.

Publication server is completed.

9.2.3 Subscription setup

To set up Subscription server follow the steps:

1. Connect to Publication server in the Microsoft SQL Server Management Studio, and then open the server node (Fig. 9.2-2).

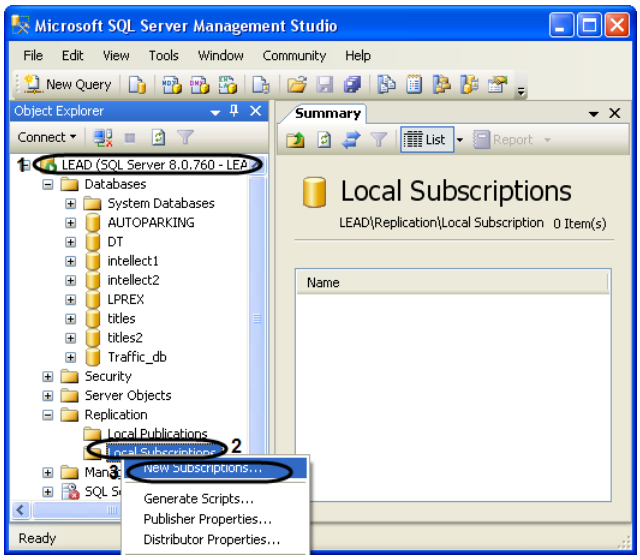

Fig. 9.2-2 New subscription

2. Open «Replication» folder, and then click with a right mouse button over the «Local Subscriptions» folder (Fig. 9.2-2,2).
3. Select the point «New Subscriptions» in the opened contextual window (Fig. 9.2-2, 3).
4. «New Subscription Wizard» will be displayed in result.
5. Following the instructions of «New Subscription Wizard» enter the following information about subscription:
   5.1. Publication name, that is being subscribed;
   5.2. Publication server name and subscription database name;
   5.3. Whether the Distribution server's agent runs on distribution or subscription;
   5.4. Whether the Distribution server's agent operates constantly, according to schedule or on demand;
   5.5. If there is necessity for the agent to create shots of original short for subscription and also necessity for distribution agent to use this shot on the subscription server;
   5.6. Accounts which the Distribution agent will be run with.

Subscription setup is completed.

9.3 Example of setting up the Traffic replication database

Two kinds of servers take part in the replication:

1. Server, publishing the data, i.e. where the data are added and transferred to the central database;
2. Server, storing data from all the publishing servers to a single central database.

Publishing servers should operate under control of the «SQL Server 2008»full version.

Note 1. «SQL Server Express» program doesn't permit data publishing.

Note 2. Setting up the replication for recognition database is done in a similar way.

9.3.1 Setting up the replication on the publishing server

To set up the replication do the following operations on every server, publishing the data:

1. Run the utility «Sql Server Configuration Manager» (for this select on the taskbar: «Start» ⇒ «Programs» ⇒ «Microsoft SQL Server 2008» ⇒ «Configuration Tools» ⇒ «SQL Server Configuration Manager»).
2. The utility window «Sql Server Configuration Manager» will open in result (Fig. 9.3-1).
3. On the left part of the «Sql Server Configuration Manager» utility select the value «SQL Server Services» (Fig. 9.3-1, 1).
4. SQL Server service will be displayed on the right part of the window in result. It is necessary to check whether the «Sql Server Agent (MSSQLSERVER)» service is run:

4.1. In case when the (MSSQLSERVER)» is run there will be «Running» value in the column «State» (Fig. 9.3-1, 2).

4.2. In case when the «Sql Server Agent (MSSQLSERVER)» is not run, run it by clicking the «Play» button on the upper control panel (Fig. 9.3-1, 3).

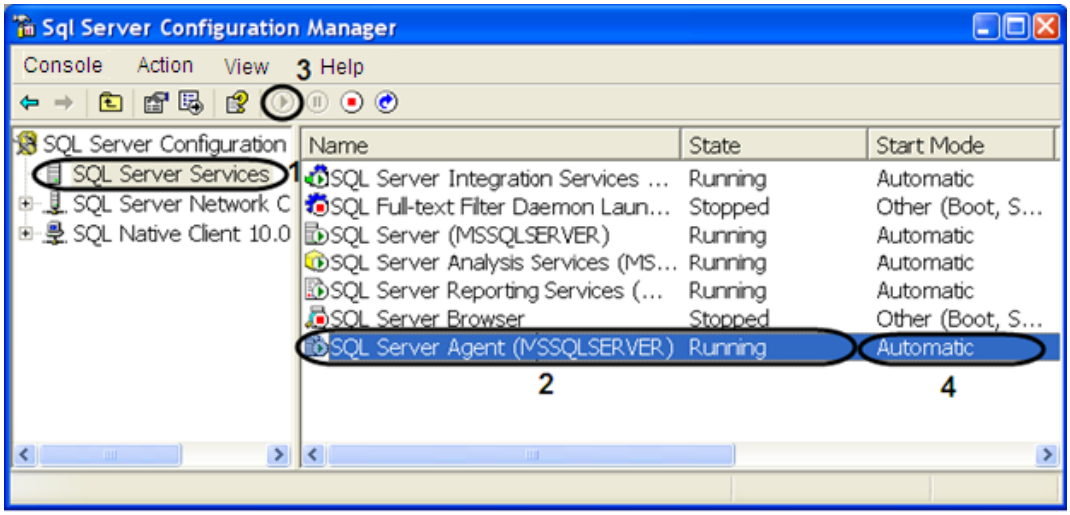

Fig. 9.3-1 Running the "Sql Server Agent"

5. «Sql Server Agent (MSSQLSERVER)» service can be configured for auto run of the server or may be run manually. To set the auto run parameters do the following:

5.1. Give a right click upon the «Sql Server Agent (MSSQLSERVER) »service.

5.2. Select the point Features in the opened contextual window.

5.3. Features: Sql Server Agent (MSSQLSERVER) » window will open in result (Fig. 9.3-2).

5.4. Go to the tab«Service» (Fig. 9.3-2, 1).

5.5. From the dropdown list of the «Start Mode» parameter select the value «Automatic».

5.6. Click Ok to save the changes (Fig. 9.3-2, 3).

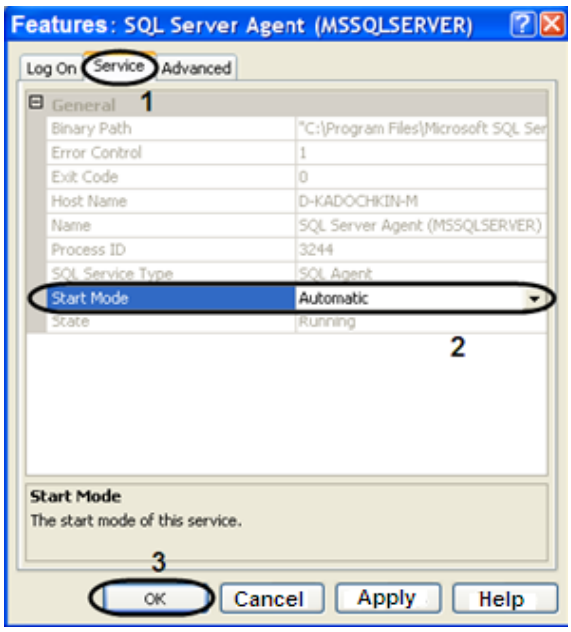

Fig. 9.3-2 Features "Sql Server Agent"

5.7. The parameter «Start Mode» was named as «Automatic» in result (Fig. 9.3-1, 4).

6. Run the utility «Microsoft Sql Server Management Studio» and after connecting to the data publishing server open the server node (Fig. 9.3-3, 1).

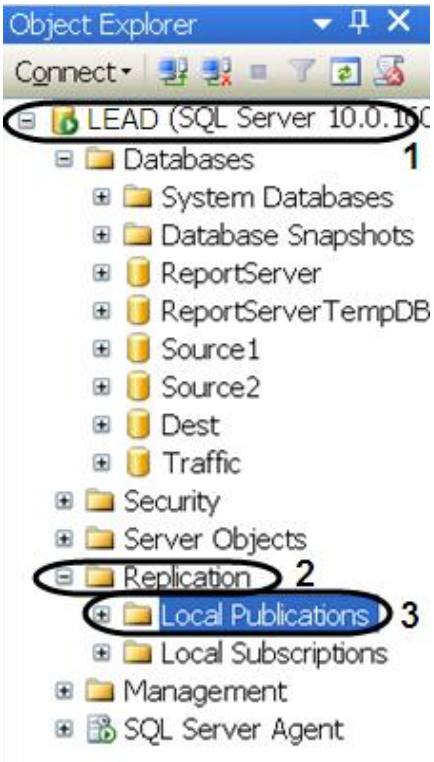

Fig. 9.3-3 Creating a new publication

7. Open the «Replication» folder (Fig. 9.3-3, 2), and then make a right click upon the «Local Publication» folder (Fig. 9.3-3, 3).

8. Select the point «New Publication» in the opened contextual menu.

9. «New Publication Wizard» will be displayed in result.

10. Following the wizard's instructions «New Publication Wizard», enter the following information about the publication:

10.1. Select the distributor database from the list «Databases» (Fig. 9.3-4, 1).

10.2. Click Next to continue (Fig. 9.3-4, 2).

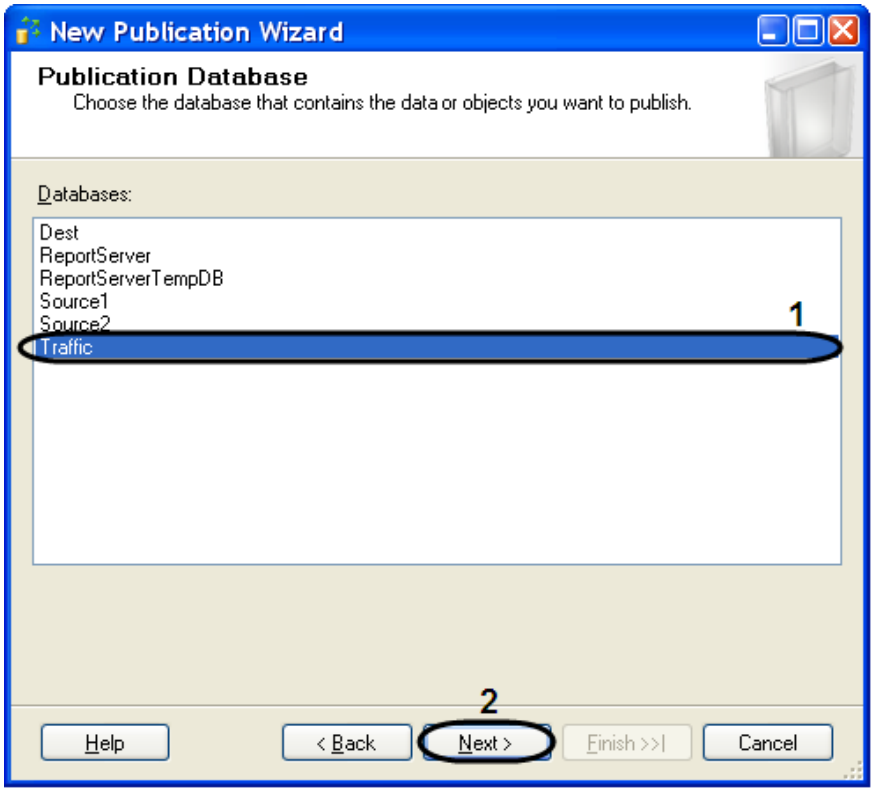

Fig. 9.3-4 Databases selection

10.3. Select the type value of the publication that is being created from the list «Publication Type» - «Merge publication» (Fig. 9.3-5, 1).

10.4. Click Next to continue (Fig. 9.3-5, 2).

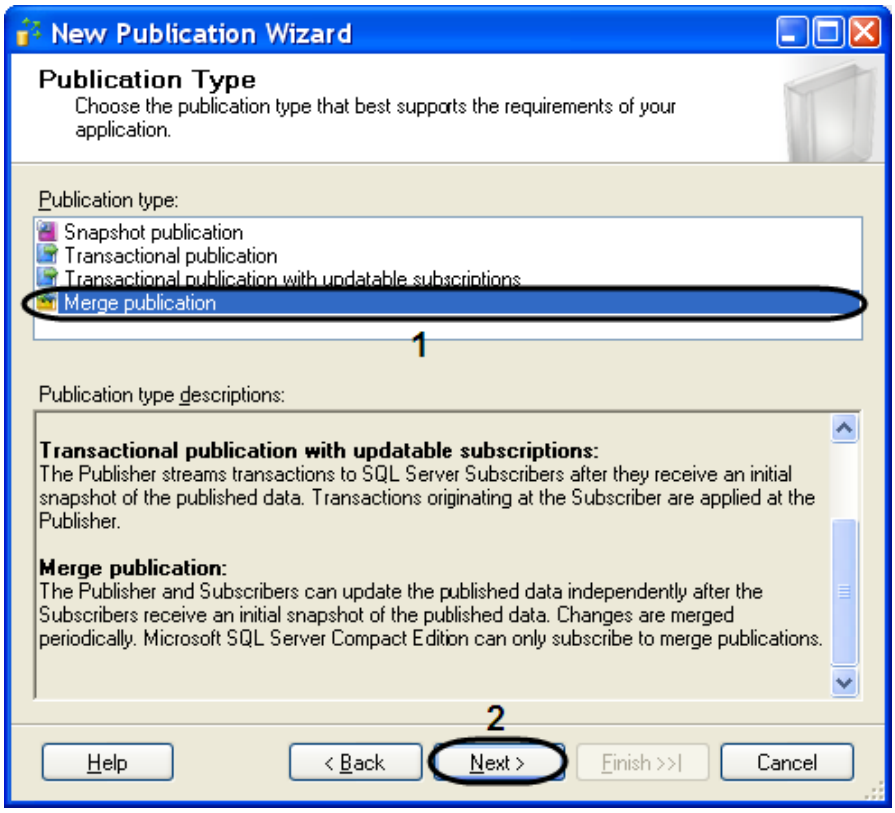

Fig. 9.3-5 Publication type selection

10.5. State the subscriber type, setting the checkbox «Sql Server 2008» (Fig. 9.3-6, 1).

10.6. Click Next to continue (Fig. 9.3-6, 2).

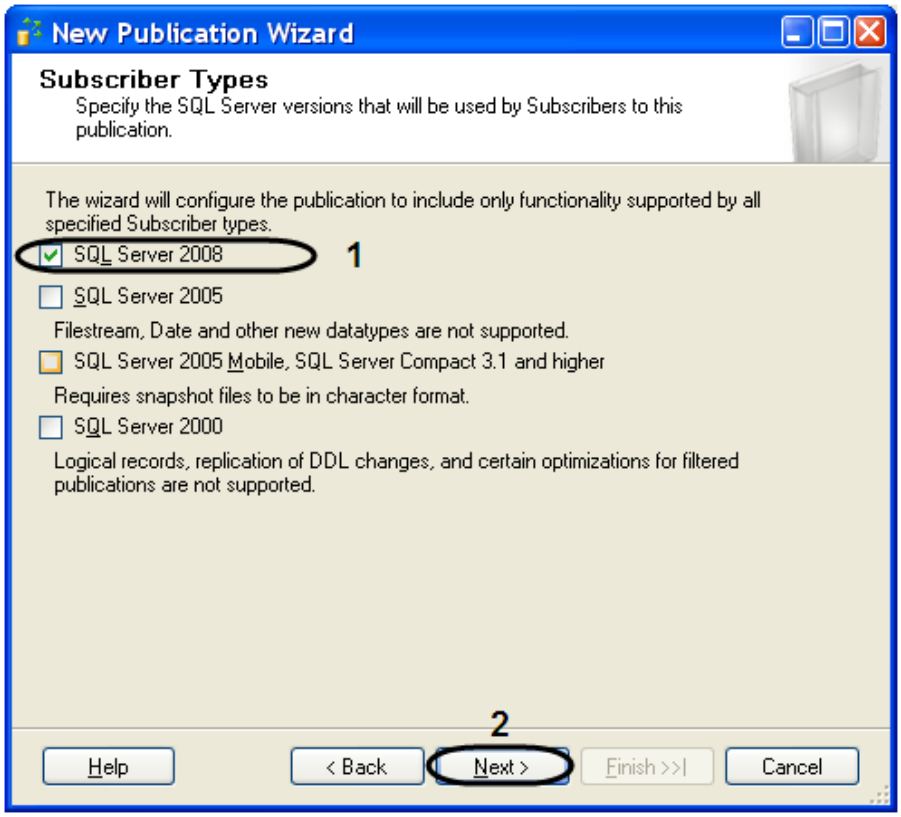

Fig. 9.3-6 Subscriber type selection

10.7. State the database objects to be included into publication, setting the checkbox «Tables» (Fig. 9.3-7, 1).

10.8. Click Next to continue (Fig. 9.3-7, 2).

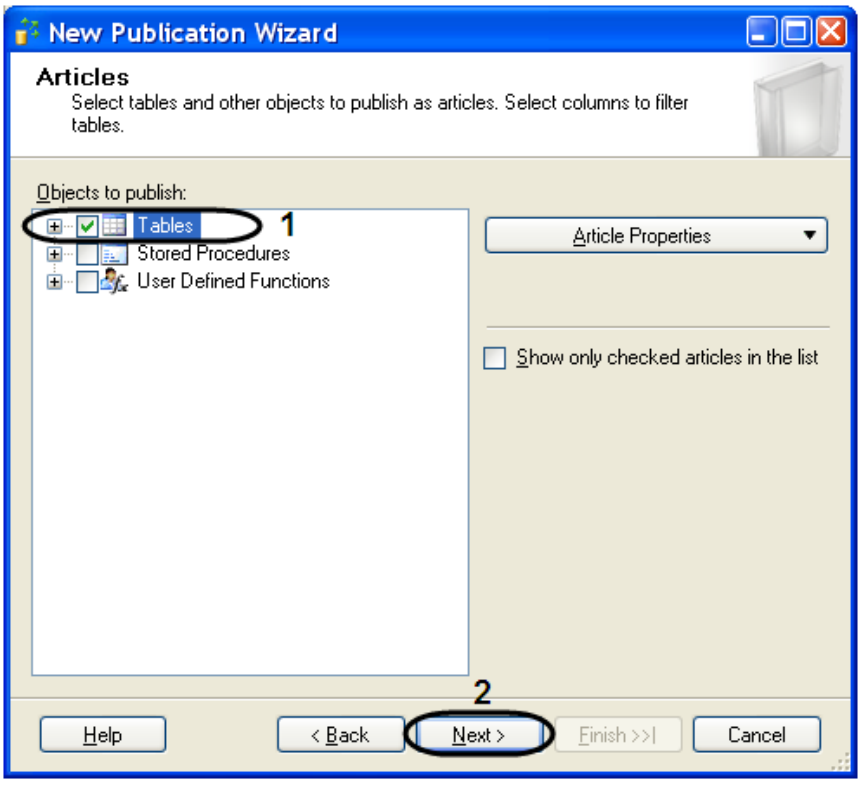

Fig. 9.3-7 Selecting the objects to publish

10.9. Do not change next two tabs.

10.10. Got to the Snapshot Agent tab «Agent Security» and click the «Security settings» button (Fig. 9.3-8, 1).

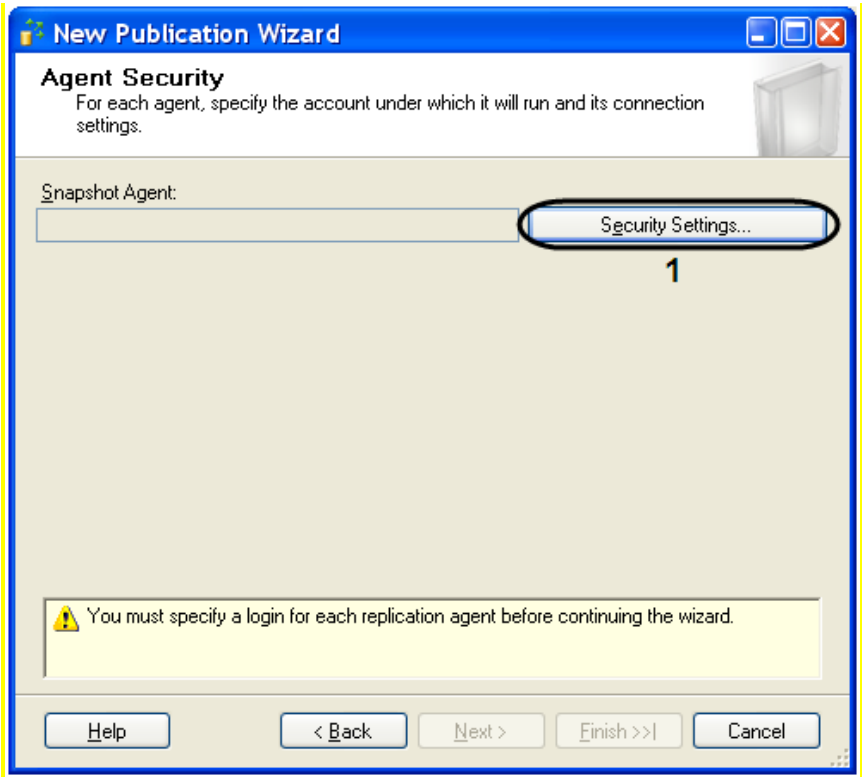

Fig. 9.3-8 Agent Security

10.11. «Snapshot Agent Security» window will open in result (Fig. 9.3-9).

10.12. Set the switch to the position«Run under sql server Agent service account (This is not a recommended security best practice) » (Fig. 9.3-9, 1).

10.13. For saving the changes click OK (Fig. 9.3-9, 2).

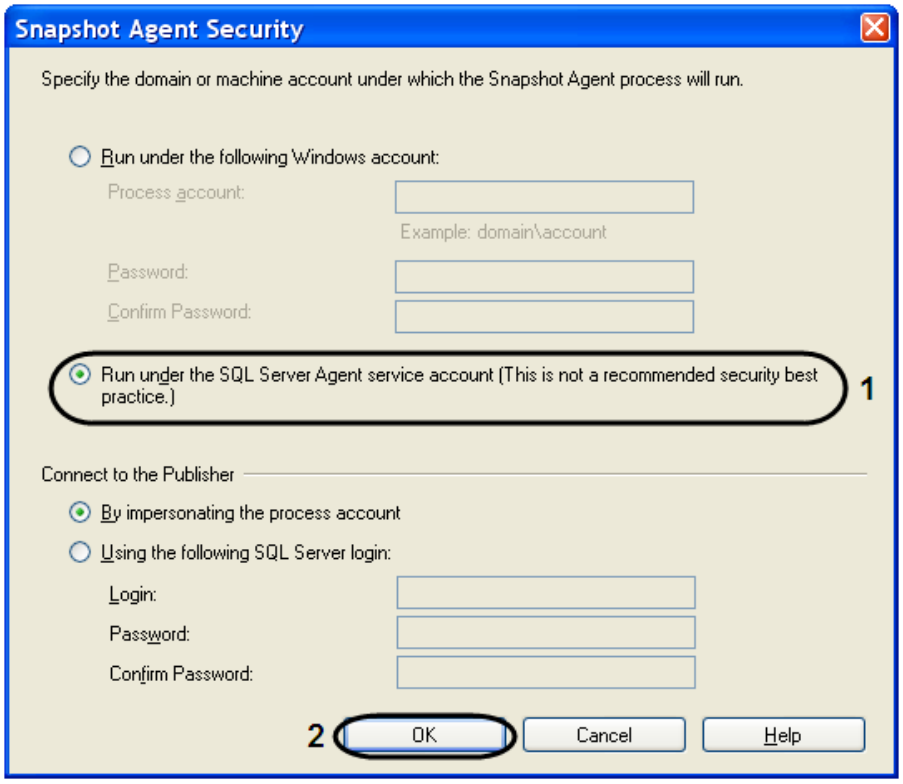

Fig. 9.3-9 Snapshot Agent Security

10.14. On the tab «Complete the wizard» enter the publication name in the field «Publication name» (Fig. 9.3-10, 1).

10.15. Click «Finish» to create a new publication (Fig. 9.3-10, 2).

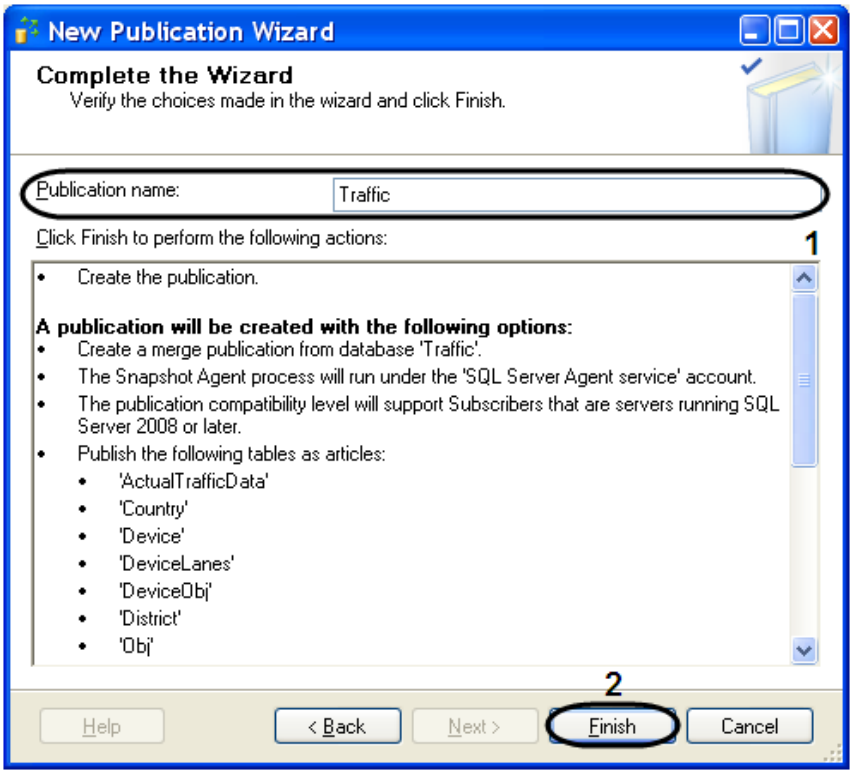

Fig. 9.3-10 Publication name and description

10.16. In the opened window «Creating Publication» there will be displayed the process of tasks performance while creating a new publication (Fig. 9.3-11).

10.17. Click Close to finish the «New Publication Wizard»operation.

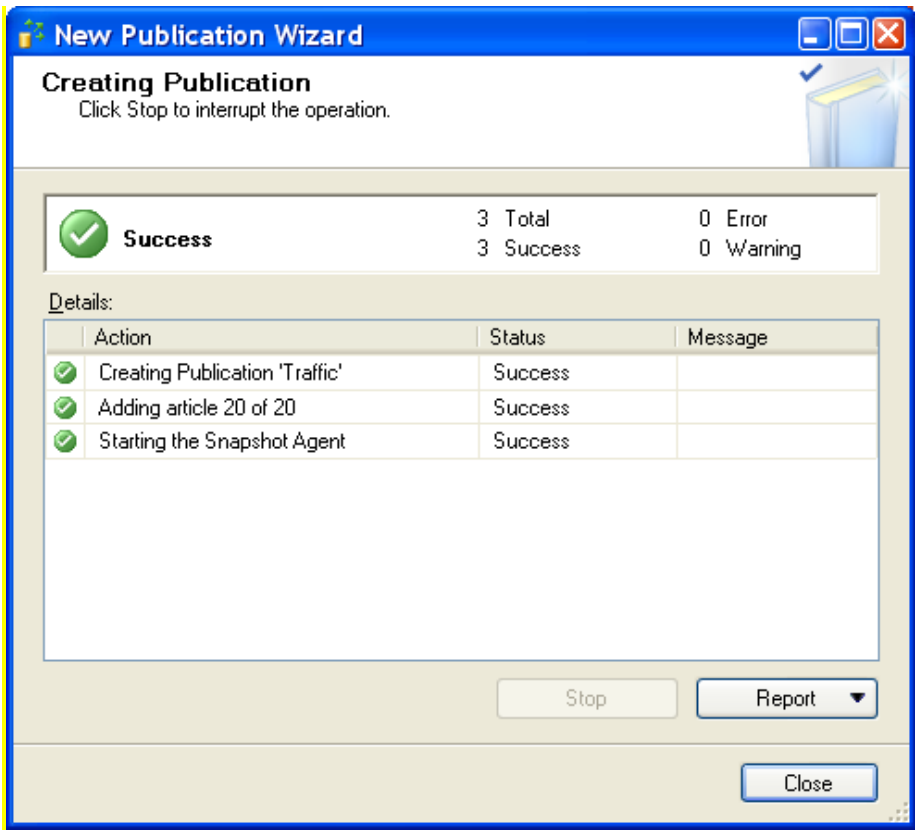

Fig. 9.3-11 Tasks performing status

Setting up the replication on the publishing server is completed.

9.3.2 Setting up replication on the subscriber server

To set up replication do the following on the subscription server, gathering data from all the publishing servers:

1. Run «Sql Server Configuration Manager» (For this select on the taskbar: «Start» ⇒ «Programs» ⇒ «Microsoft SQL Server 2008» ⇒ «Configuration Tools» ⇒ «SQL Server Configuration Manager»).
2. Make sure, that «SQL Server Agent» service is run and configured fro auto start (see section. Setting up the replication on the publishing server, points 3-5).
3. Run the «Microsoft Sql Server Management Studio» utility and after connection to the subscription server open the server's node (Fig. 9.3-12, 1).
4. Open the «Replication»folder (Fig. 9.3-12, 2) and then make a right click upon the «Local Subscriptions» folder (Fig. 9.3-12, 3).
5. Select the point «New Subscriptions» in the opened contextual menu.

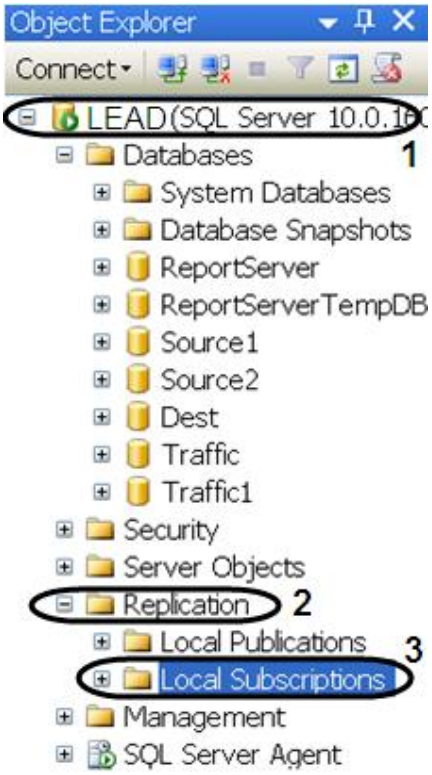

Fig. 9.3-12 Creating a new subscriber

6. «New Subscription Wizard» will be displayed in result.

7. Select the publication server from the dropdown list «Publisher» (Fig. 9.3-13, 1).

Note. Id the publication server is absent in the list one should find it with the help of «Find SQL Server Publisher» function.

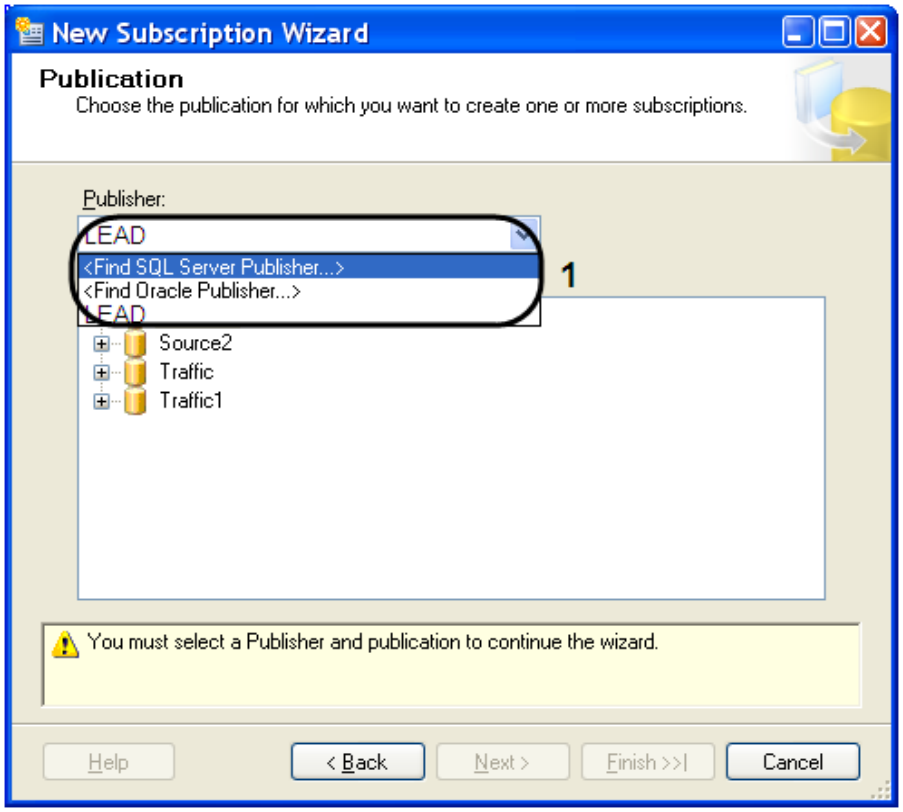

Fig. 9.3-13Selecting the publishing server

8. In the objects tree «Databases and publication» select the publication (Fig. 9.3-14, 1).

Fig. 9.3-14Publication selection

9. Click Next to continue (Fig. 9.3-14, 2).
10. Leave the parameter Merge Agent Location» unchanged.
11. In the «Subscribers» window set the checkbox «Subscriber» next to subscriber (Fig. 9.3-15, 1).

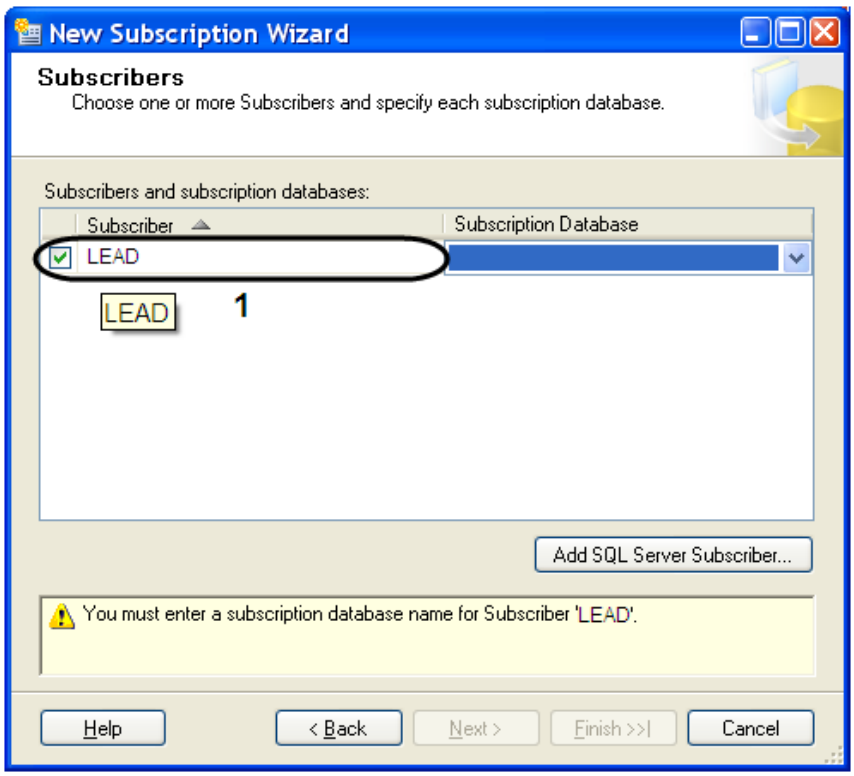

Fig. 9.3-15 Subscriber selection

12. Select the subscription database from the dropdown list «Subscription Database» (Fig. 9.3-16, 1).

Note. In case of connecting the first publishing server one should create a new subscription database, clicking the function «<New database…>».

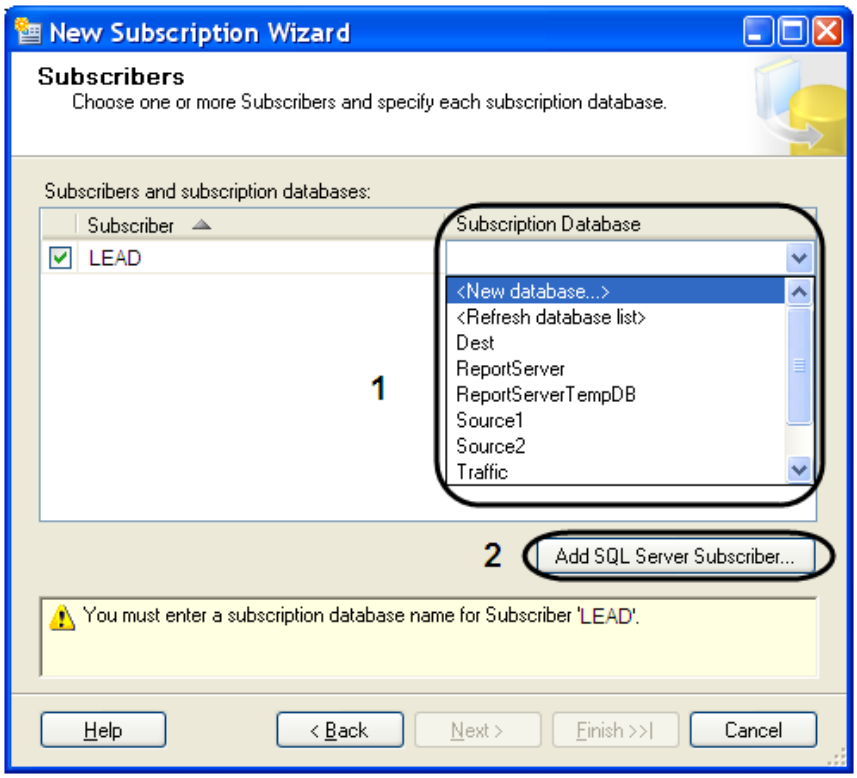

Fig. 9.3-16Subscriber database selection

13. To add SQL Server subscriber click the button «Add SQL Server Subscriber…» (Fig. 9.3-16, 2).
14. «Merge Agent Security» window will open (Fig. 9.3-17).

14.1. Set the switch to the position «Run under SQL Server Agent service account (This is not recommended security best practice) » (Fig. 9.3-17, 1).

14.2. Click Ok to save the changes (Fig. 9.3-17, 2).

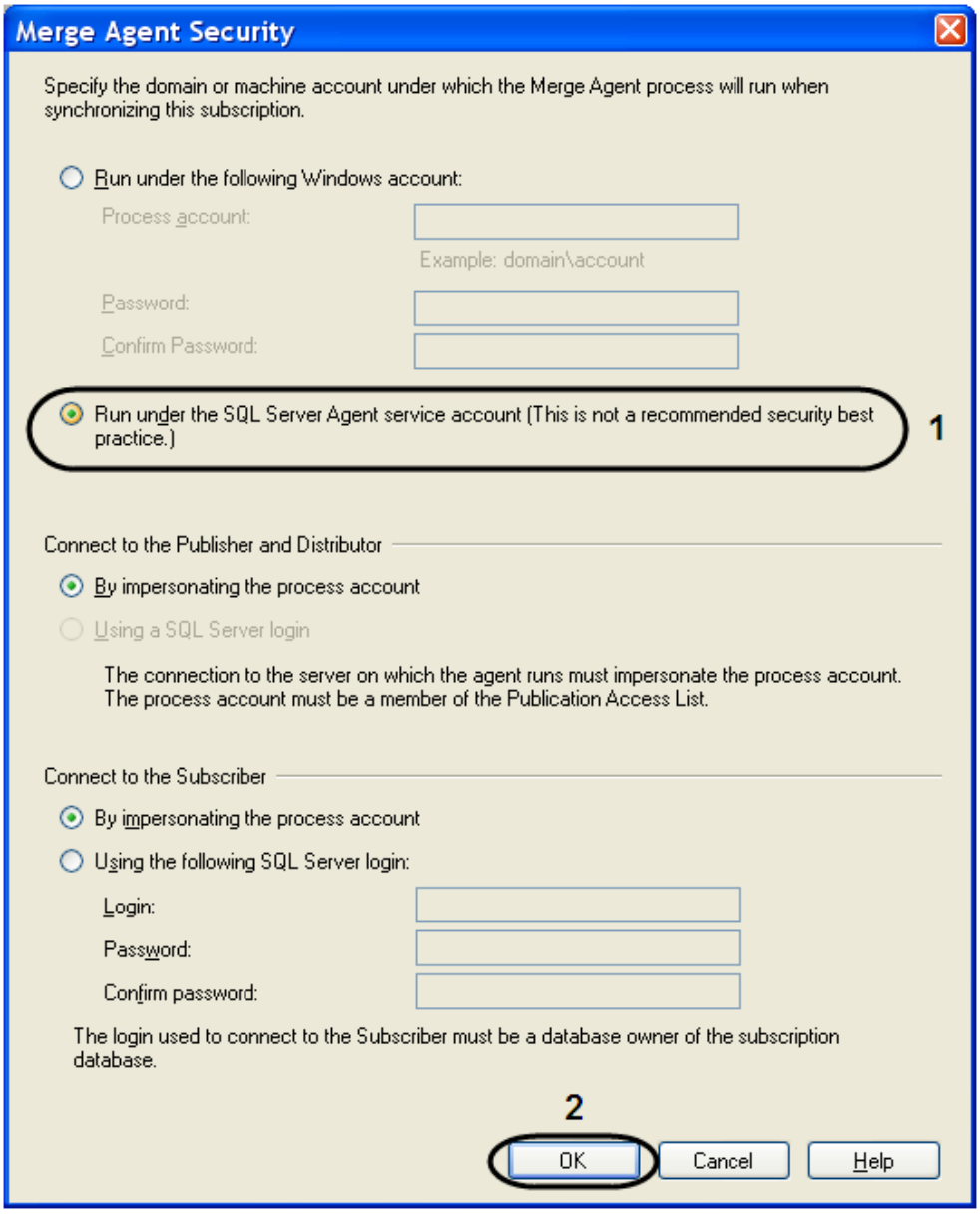

Fig. 9.3-17«Merge Agent Security» window

15. Click Next to continue (Fig. 9.3-16).

16. For distributor agent constant operation select the value «Run continuously» from the dropdown list «Agent Schedule» in the «Synchronization Schedule» window (Fig. 9.3-18, 1).

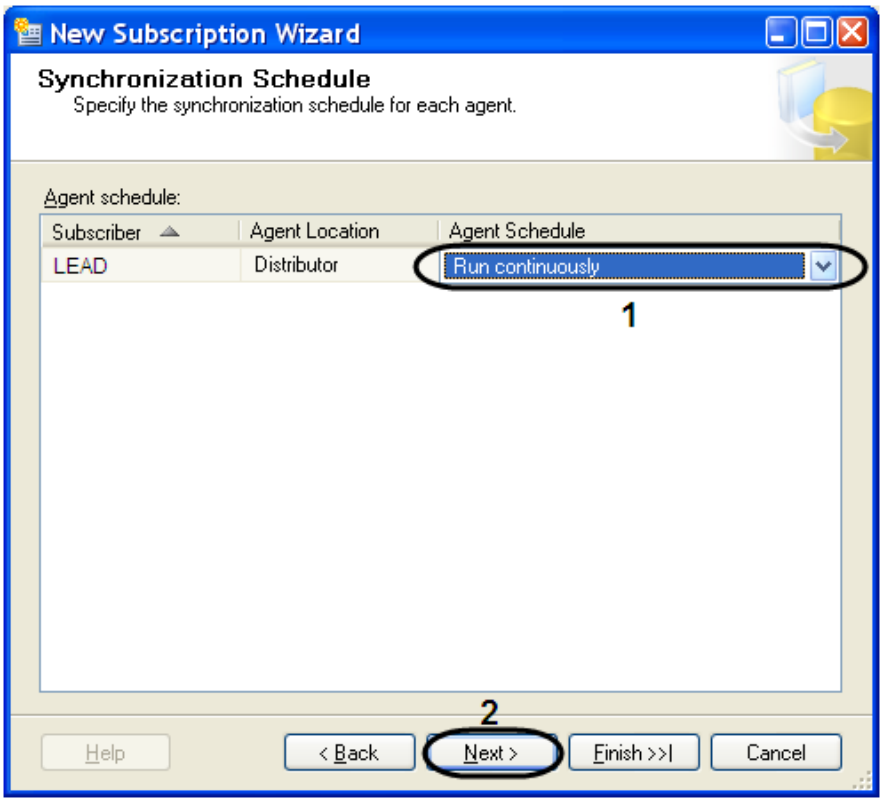

Fig. 9.3-18 Setting up the schedule of distributor agent

17. Click Next to continue (Fig. 9.3-18, 2).

18. In the «Initialize Subscription»window the following should be don:

18.1. Set the checkbox «Initialize» in case of adding the first publishing server (Fig. 9.3-19, 1).

18.2. Uncheck the checkbox «Initialize» in case of adding the second and further servers (Fig. 9.3-19, 1).

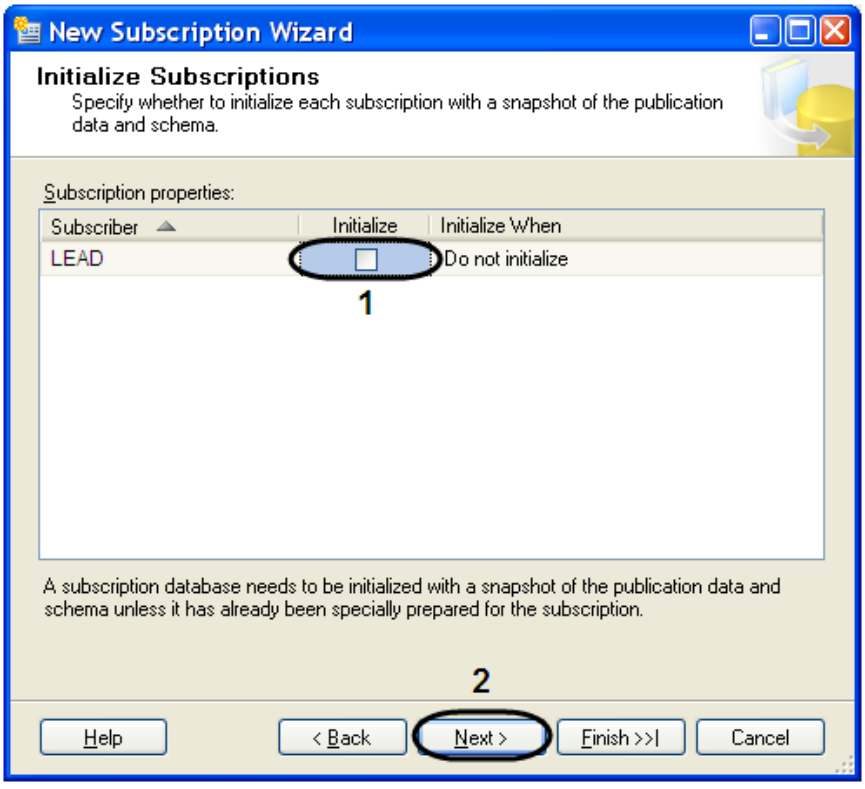

Fig. 9.3-19 Subscriber initialization

19. Click Next to continue (Fig. 9.3-19, 2).

20. Select the «Client»subscription type from the dropdown list «Subscription Type» in the «Subscription Type» window (Fig. 9.3-20, 1).

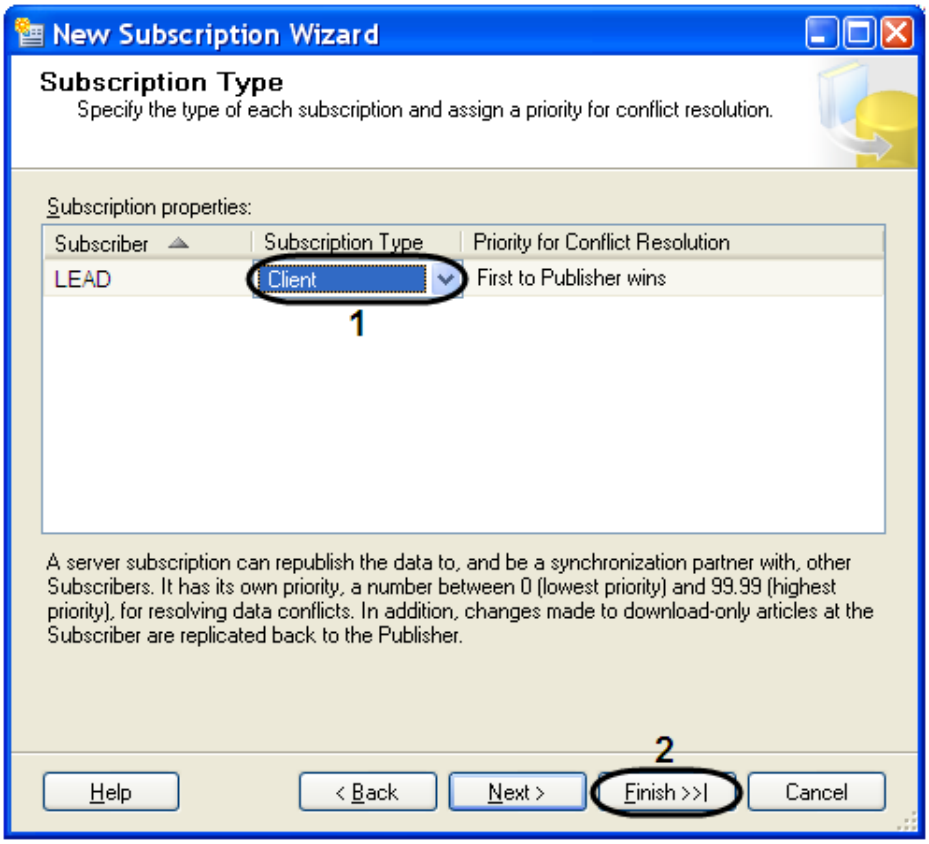

Fig. 9.3-20Subscription type subscription

21. To end the creation of a new subscriber click «Finish» (Fig. 9.3-20, 2).

22. In the opened window «Creating Publication» there will be displayed the process of creating a new subscriber (Fig. 9.3-21)

23. Click Close to end the process of «New Subscription Wizard» operation (Fig. 9.3-21).

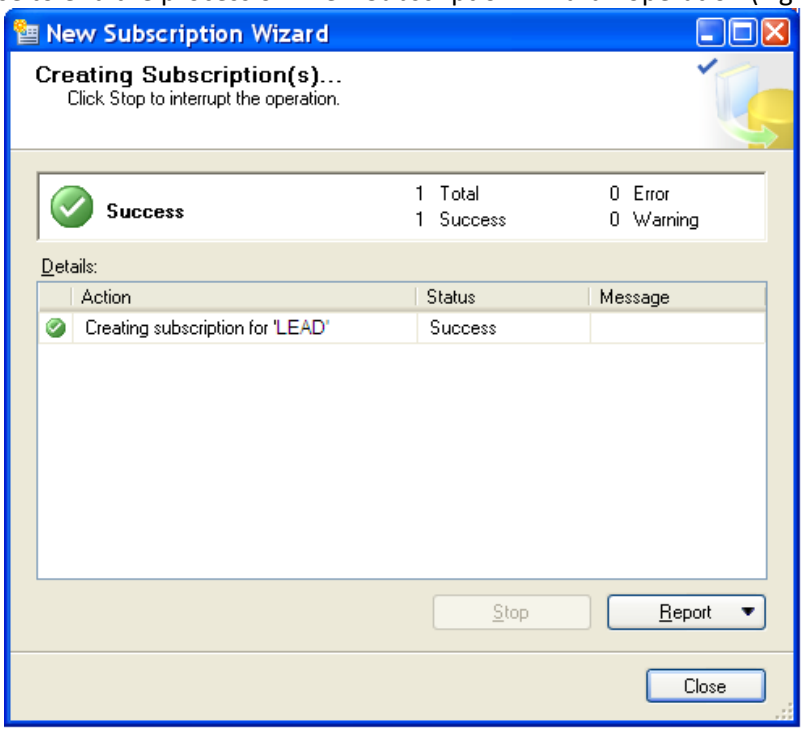

Fig. 9.3-21 Subscription creation task performing status

Setting up the replication on subscriber's server, gathering data from all the publishing servers is completed.

10 Appendix 3. Procedures for the Auto-Intellect database and software for fine imposing interaction

The software for fine imposing is designed for analyzing the stored Traffic enforcement, for checking and correcting the identified plates, imposing the fines.

For the Auto –Intellect database and this software interaction follow the procedures:

1. The procedure, returning the alarm list of the stated type for a stated period of time for the selected detector or for all the detectors (if NULL).

```
spGetDetectionEvents
@eventtype int,                    // alarm's type
@begindate DATETIME,               // time«sec»
@enddate DATETIME,                          // time «up to»
@detector uniqueidentifier = NULL  //detector's ID
```

The following alarm types are singled out:

1 – Overspeeding;

2 – Found in the external database;

3 – Alarm, triggered by the operator

In result «spGetDetectionEvents» will be returned the fields, described in the table (Table 9.3-1).

Table 9.3-1 Fields, returned by the stored procedure

Name	Type	Description
event_time	datetime	Time of alarm
valid_speed	Int	Permitted speed
speed	Int	Speed
speed_over	int	Overspeeding
car_number	nvarchar(50)	Licence plate
address	nvarchar(max)	Address, where the detector is located
direction	bit	Direction
processing_time	datetime	Time of alarm's processing by the operator
comments	ntext	Comments
db_name	nvarchar(50)	External database name
db_info	ntext	Information from the external database (XML format)
operator	uniqueidentifier	Operator's ID
frame	image	Frame
event_id	uniqueidentifier	Unique alarm identifier (GUID)

2. Procedure, returning the list of speed alarms for a stated period for the selected detector or for all the detectors (if NULL).

```
spGetSpeedEvents
@begindate DATETIME,               // time «sec»
@enddate DATETIME,                          // time «up to»
@detector uniqueidentifier = NULL  // detector's ID
```

In result «spGetDetectionEvents» will be returned the fields, described in the table (Table 9.3-1)

11 Appendix 5. Setting up the External plates database in «dbf» format.

To set up the External plates database in "dbf" format do the following:

1. Call for a dialog window Program launch or go to the Start menu and select Run or use the key combination «WIN»+«R» (Fig. 9.3-1).

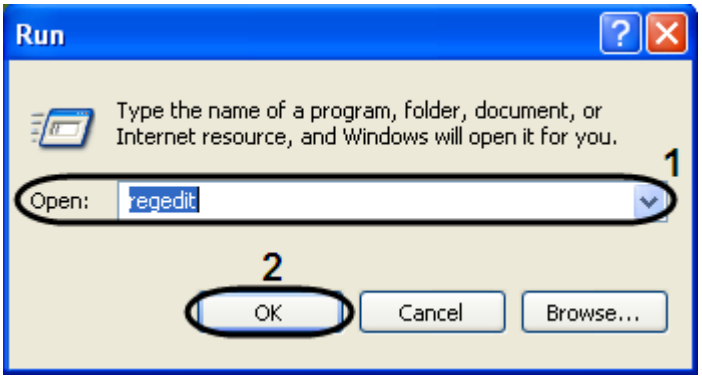

Fig. 9.3-1 Program run dialog window

2. Enter «regedit» in the appeared window.
3. Click «OK».
4. Registry Editor will open in result (Fig. 9.3-2).

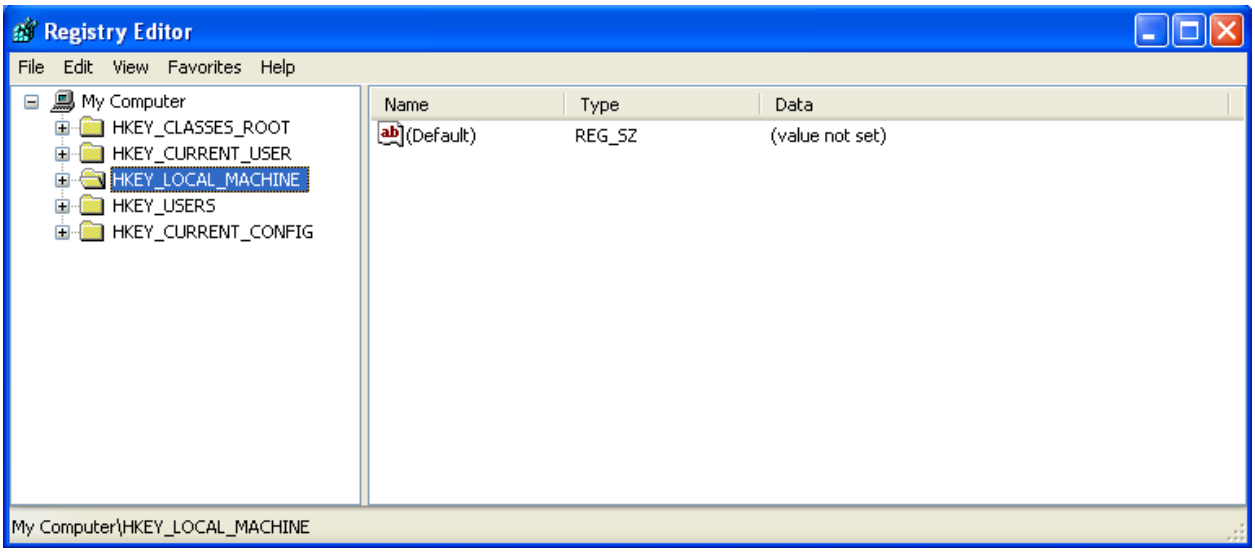

Fig. 9.3-2 Registry editor dialog window

Note. Detailed information about Registry Editor is given in the section «Operation with OS Windows system register » of the document«Intellect program complex: Administrator guide».

5. In the register tree select «HKEY_LOCAL_MACHINE\Software\Microsoft\Jet\4.0\Engines\Xbase» (Fig. 9.3-3).

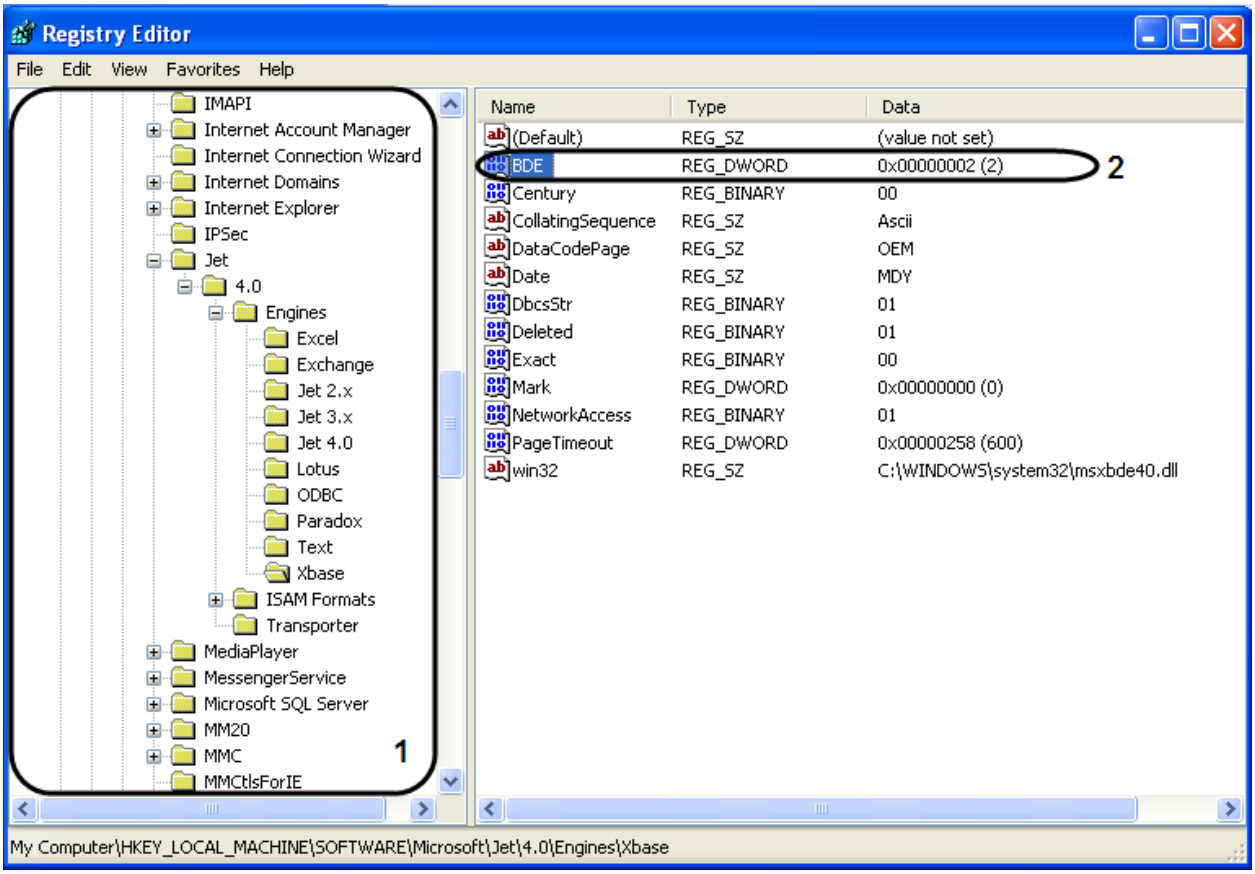

Fig. 9.3-3 Addng the parameter to the register

6. Select the menu point «Edit» ⇒ «Create» ⇒ «DWORD parameter».
7. Assign a name to a new DWORD parameter. For this enter the name in the «BDE» in the activated field, where on default the name «New parameter №1» has already been entered, and then click a mouse in anywhere in the Registry Editor dialog window. The entered name of the new DWORD parameter will be automatically saved.
8. Set the value to the new string parameter. Make a double click with a left mouse key upon the parameter's name for this. Edit DWORD value will open in result (Fig. 9.3-4).

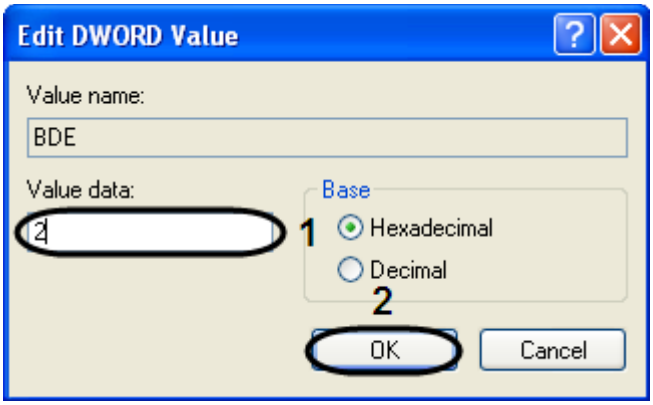

Fig. 9.3-4 Edit DWORD value

8.1. Assign 2 value to the «BDE»parameter (Fig. 9.3-4, 1).
8.2. Click «OK» to save the changes (Fig. 9.3-4, 2).

9. DWORD «BDE» parameter will be created in result of operations in the registry (Fig. 9.3-3, 2).
10. To set up the connection to the external database do the following operation in the Data Link properties window:

10.1. Got to the Provider tab (Fig. 9.3-5).

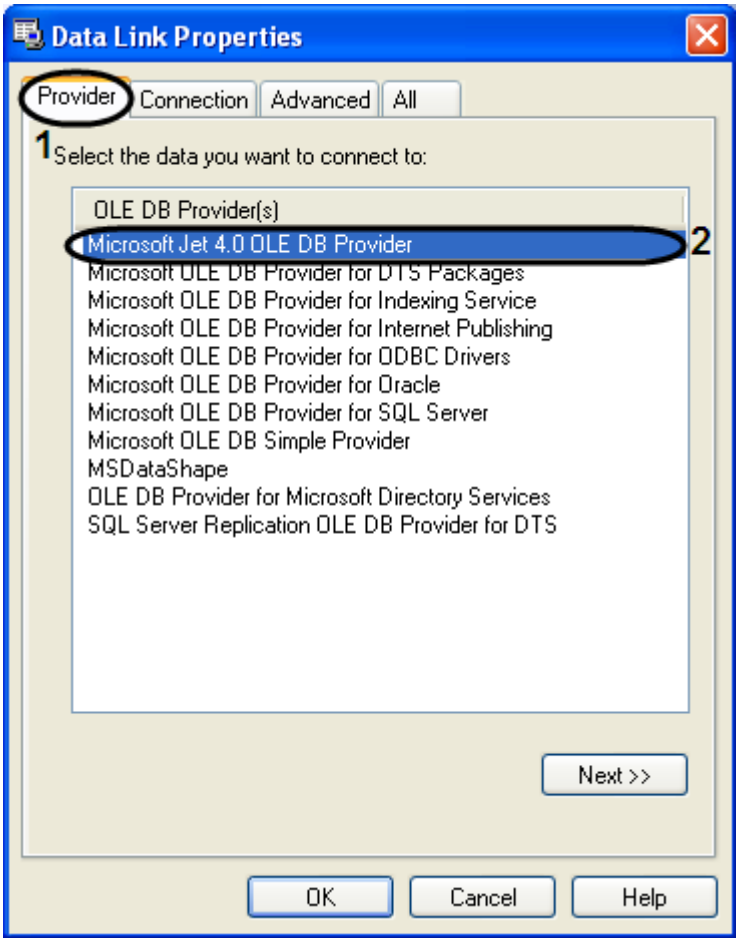

Fig. 9.3-5 Setting up the data provider

10.2. From the list «Providers OLE DB»select the point «Microsoft Jet 4.0 OLE DB Provider».

10.3. Then go to the All tab (Fig. 9.3-6, 1).

10.4. Set the path to «.dbf» files in the value range «Data Source (Fig. 9.3-6, 2).

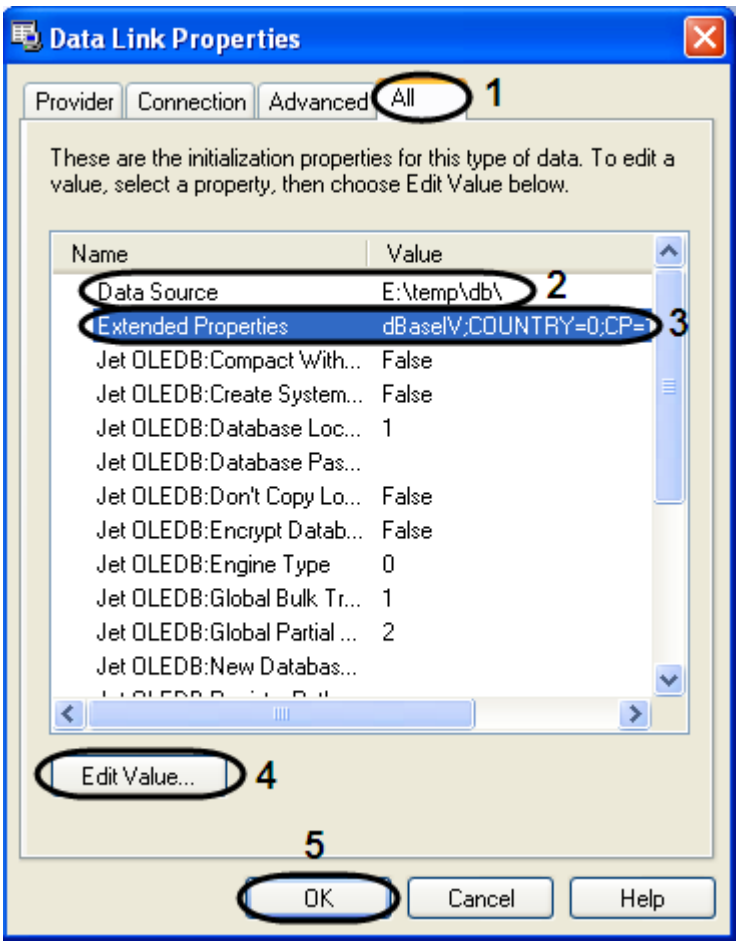

Fig. 9.3-6 All tab

10.5. In the value range «Extended Properties» state «dBase IV;COUNTRY=0;CP=1252:LANGID=0x0409» (Fig. 9.3-6, 3).

Note. The value «COUNTRY=0;CP=1252:LANGID=0x0409» is stated only in case of being stored in DOS-coding.

10.6. *To change the property value click the button «Change value…»* (Fig. 9.3-6, *4).*

10.7. *In the opened window «Edit property value»enter the changes in the field Property value (*Fig. 9.3-7, *1).*

10.8. *Click Ok to save the changes (*Fig. 9.3-7, *2).*

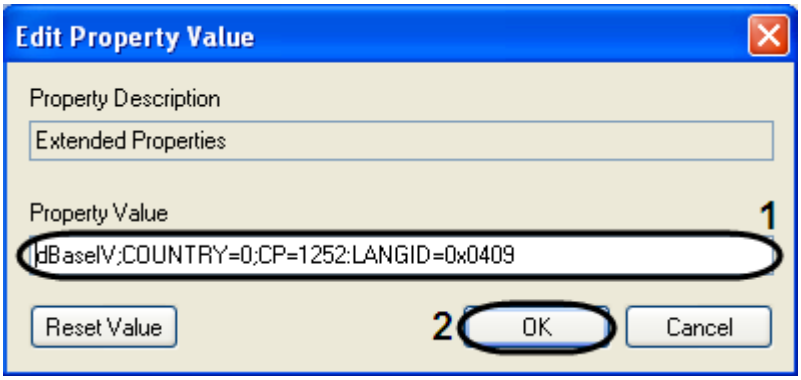

Fig. 9.3-7Edit property value

10.9. Click OK to close *the* window «Edit property value» (Fig. 9.3-6, 5).

As the result the External Plates Database in “dbf” format has been setup.