SISTEMA ITSCAMPRO
Product Manual

Revision 2.0

PUMATRONIX

www.pumatronix.com

Pumatronix Equipamentos Eletrônicos Ltda.

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Change History

Date	Version	Updated content
08/02/2018	1.5.7	Initial Version
10/29/2021	1.8.0	ITSCAMPRO app for Android system
12/01/2022	2.0	Update of document layout, insertion of content for versions 1.8.1 to 1.11.2

Overview

The continuous increase in population in urban areas implies major challenges in the public management of cities. Intelligent services that use Information and Communication Technologies (ICTs) become increasingly relevant in helping to monitor, control and make efficient and quick decisions to solve the problems inherent in the large concentration of people, such as mobility and safety in traffic, energy efficiency, public security, supply control, among others.

The concept called Smart Cities is a global trend that classifies the strategic use of infrastructure and services from the application of IT solutions in urban planning and management, bringing results to the social and economic needs of a city. Therefore, the use of Information Technology allows cities to develop economically while increasing the quality of life of their inhabitants by generating efficiency in urban operations.

Examples of these technologies are Intelligent Transport Systems (ITS), where Pumatronix products are used. ITSCAMPRO is a system that performs optimized and efficient management of vehicle images, designed to receive a large number of images per second and allow the use of data science.

Using ITSCAMPRO, searches can be performed for one or more vehicle license plates, among all stored images. The plate models that the system can recognize include those of Brazil in the Mercosur, Argentina, Chile, France, Mexico, Netherlands, Paraguay and Uruguay standard. You can also import a list of plates of interest or manually register which ones should be monitored. From the list of monitored vehicles, different types of alerts can be configured to, for example, inform each type of legal restriction that the system can differentiate. The images stored in ITSCAMPRO are the data source for reporting on traffic, path time, origin and destination, among other information.

Handling Risks

	**Distribution of information: The content generated by ITSCAMPRO (captured images and information) is protected by user and password. However, it is up to the system administrator to control users who have access to information and the dissemination of content.**
	**Plate reading: When ITSCAMPRO receives a license plate recognized as "000000", "" or when no data is reported, it is correctly set to empty.**
	**Similarity Search Application: For image similarity search functionality, hardkey is required to be used, which limits the application to the number of image capture devices configured.**
	**Software License: Software and related documentation are protected by copyright. By installing the software, you agree to the terms of the License Agreement.**
	**System Restore: When restoring a database in ITSCAMPRO, all information that was stored on the equipment (including internal references to the images) will be overwritten.**
	**Factory Restore: When you restore an ITSCAMPRO installation to the factory version, all information that was stored (including images) will be erased.**
	**ITSCAMPRO Restart: Requesting ITSCAMPRO restart causes all connections to image capture devices to be interrupted while the server and service are re-established, and vehicle recognition may be lost during this period.**
	**External image resolution: The external image in jpg format must have a minimum resolution of 800x600 (SVGA), so that it can be used by the comparison algorithm with sufficient information in the search for similar vehicles.**

Models

ITSCAMPRO can be used in a variety of applications without performance impairment, provided that the installation specifications provided by Pumatronix are respected. These specifications vary depending on the size of the installation and the flow of vehicles analyzed.

ITSCAMPRO is a robust system that can be used in the standard way, or it is possible to hire customizations. These customizations can modify the operation of the product or may include specific features, such as custom reports. In addition to the available software appearance settings, changes in visual identity can be made. More information about ITSCAMPRO customization can be requested directly from Pumatronix.

Table of Contents

1. Getting to know the product

When accessing the ITSCAMPRO System, the home screen configured for the logged-in user is displayed, such as the Mosaic screen, which contains the thumbnail images of the records made in real time. These records come from all image capture devices to which the user has access. The restriction of access to equipment is a system feature, considering that the information stored may require confidentiality of disclosure. More details on the availability of information is available in User Control and Information Availability.

When selecting the image of an equipment, it is highlighted to the left of the mosaic of varying format (as selected) and below it the vehicle information identified in real time by the selected device is displayed. Below the tile is the list of vehicles detected by monitoring, in which the detailed information of the record made can be viewed by clicking on the camera icon to the left of the item listed. In the list of Monitoring are the data compiled in the Security Panel: date and time of capture, identified plate, data of the equipment that performed the capture and the source database.

The interface screen contains the menu bar and functions always visible and available for access:

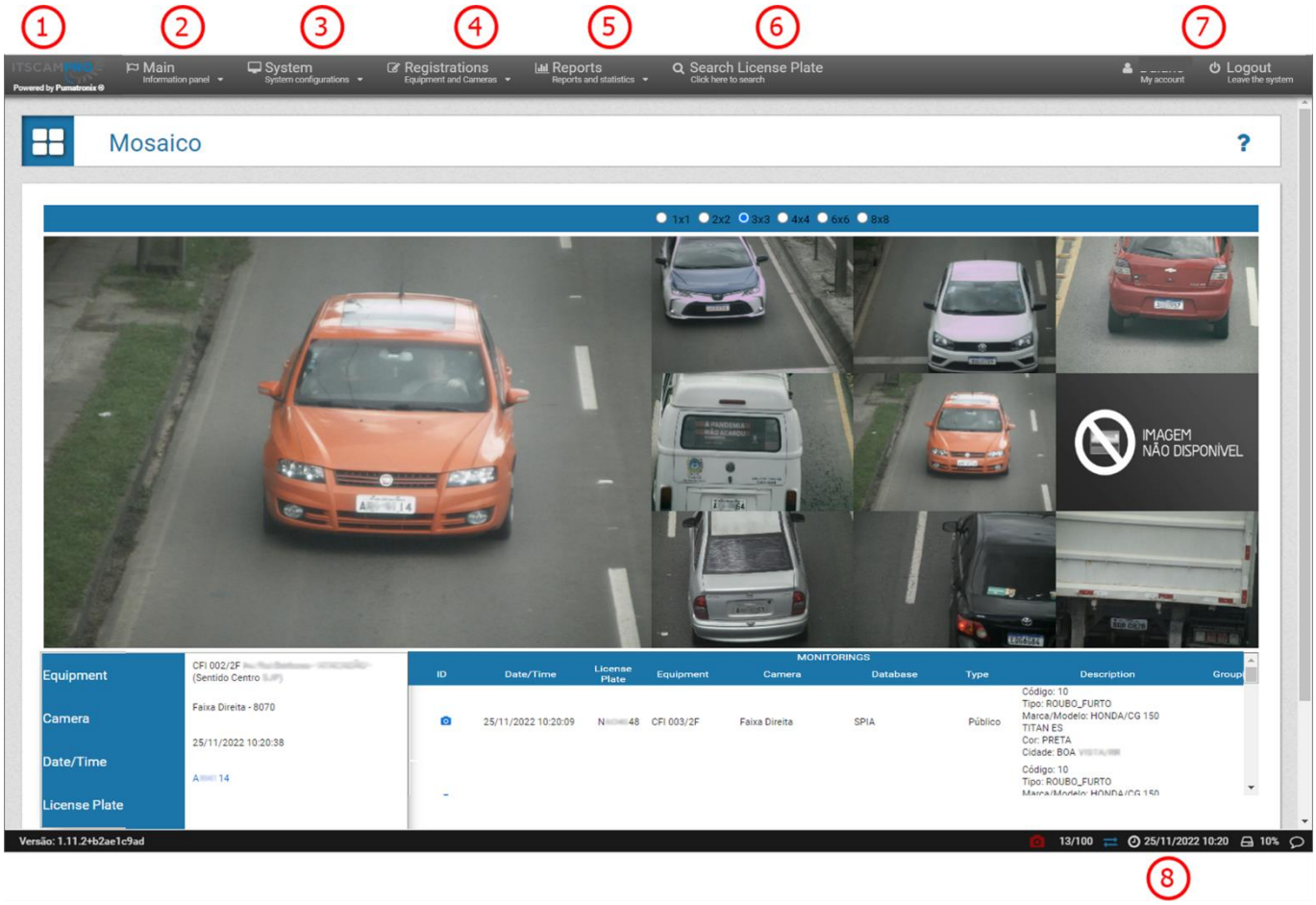


Figure 1 - Features available in the interface: 1) Access to the home page, 2) Main Menu, 3) System Menu, 4) Registration Menu, 5) Reports Menu, 6) Search Plate Function, 7) User Account Data and Logout, 8) Status Bar

In the *Main* menu (2) are the options for searching for vehicle, traffic, and system information. In the *System* menu (3) are the options for managing content access, settings, and the system maintenance process. In the *Registration* area (3) it is possible to add the equipment that provides the capture data to

the system and the embedded devices authorized to connect to the system, list the groupings for COMPARE, enter the information for monitoring vehicles and specific sections and create notifications to users.

The *Reports* menu (5) displays the information clustering options that the system can generate. While a quick search for a vehicle (informing its license plate) can be done using the Search License Plate option (6). The logged in user information, account and login settings are in the upper right corner of the screen (7).

Help to Use ITSCAMPRO

The question mark symbol available on the ITSCAMPRO screens displays the help content on the left side of the screen containing a brief description of the screen functionality and further details on the parameters that can be configured. For the configuration fields, the system default values are indicated, to facilitate the adjustment process.

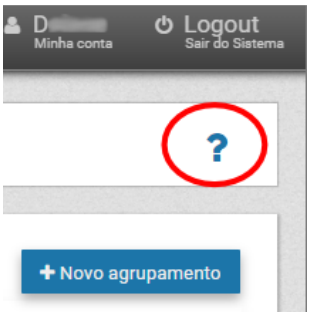


Figure 2 – Location of the ITSCAMPRO Help Symbol

Creating New Items

In ITSCAMPRO, several objects can be added, such as users, equipment, image capture devices, configuration profiles, monitored vehicles, among others. This feature is always available on the button with the "**+**" symbol.

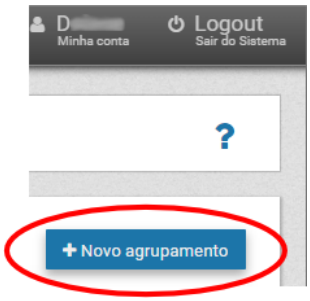


Figure 3 - Symbol for inclusion of items in ITSCAMPRO

Detailed View of a Record

When a vehicle is registered in ITSCAMPRO, more details can be viewed on the *Mosaic* screen by clicking on the camera icon of the record, or through the *Capture Report* by clicking on the photo corresponding to the vehicle. These details are organized in tabs (*Information*, *Statistics* and *History*) and correspond to:

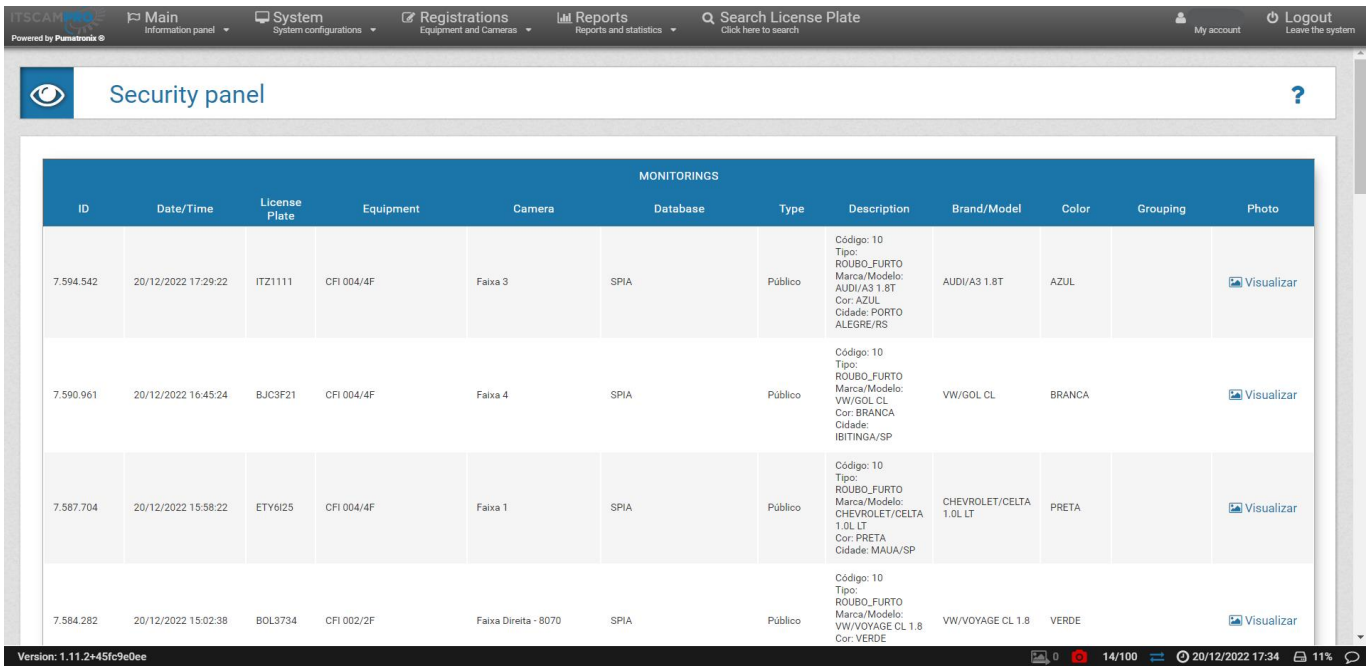
- Sequence of captured images, which can be viewed in full screen, copied (by clicking on the button on the vertical bar located on the right side of it) and enlarged;
- Number of the record generated in ITSCAMPRO;

- License plate reads automatically from the vehicle. If the user has permission to change the plate, an edit button is displayed next to it;
- Temporal information of image acquisition (date and time of capture);
- Spatial information (equipment and geographical location);
- Information on the dangerous cargo code in vehicles that have this information. If the user has a license to use this functionality and is enabled for the equipment;
- Details of the vehicle plate (time taken for recognition, background colour, etc.);
- Vehicle details (type, country of origin);
- History of changes in the record in the system (change in the characters of the plate);
- Option to delete the record, if the user has permission to remove the record, through the delete button displayed next to the image;
- Access option to *Similarity Search*, when there is the COMPARE module installed in the system, available through the Magnifier button.

Security Dashboard View

Vehicle plates can be registered in ITSCAMPRO so that the system monitors automatically on associated equipment. When one of these monitored plates is identified, an alert will be issued by ITSCAMPRO. This alert can be in pop-up, audible, or email format. In addition to the alert, all monitored vehicle records are organized in list form in the *Security Panel*. This means that this is the main screen for monitoring vehicles. However, the displayed records are conditioned to the equipment released for the user profile that is connected to ITSCAMPRO.

The list with the records informs the identifier code, the temporal information, the license plate of the vehicle automatically identified in the image, the equipment and device responsible for the image capture, the *Database*, *Description*, *Make/Model* and *Color* referring to the registration in the database and the possibility of checking the images and record information, clicking on the *View* link to the right of the list.



Traffic Dashboard View

ITSCAMPRO can be configured so that two monitoring equipment characterizes a *Monitored Section* and thus allows to extract statistical traffic data referring to the routes traveled by the vehicles. This information is updated in real time in the Traffic Panel, in the graphs that can be accessed by clicking on the *Time/Speed Graph* of the respective section. The traffic data for the section is the time spent to travel the section and the average speed estimate (the most detailed information can be obtained in the Time and Speed Report). The management of the sections monitored by the equipment can be done through the *Registration* menu in the option *Monitored Sections*.

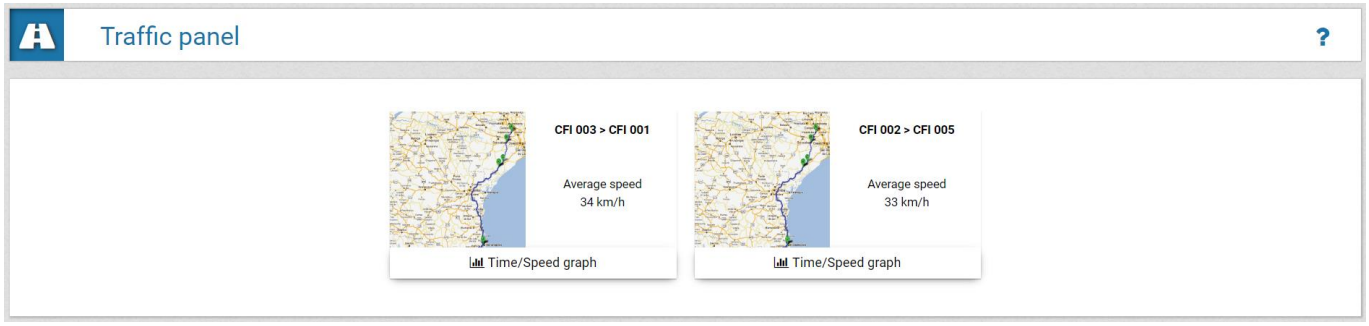


Figure 4 - Traffic Panel Home Screen

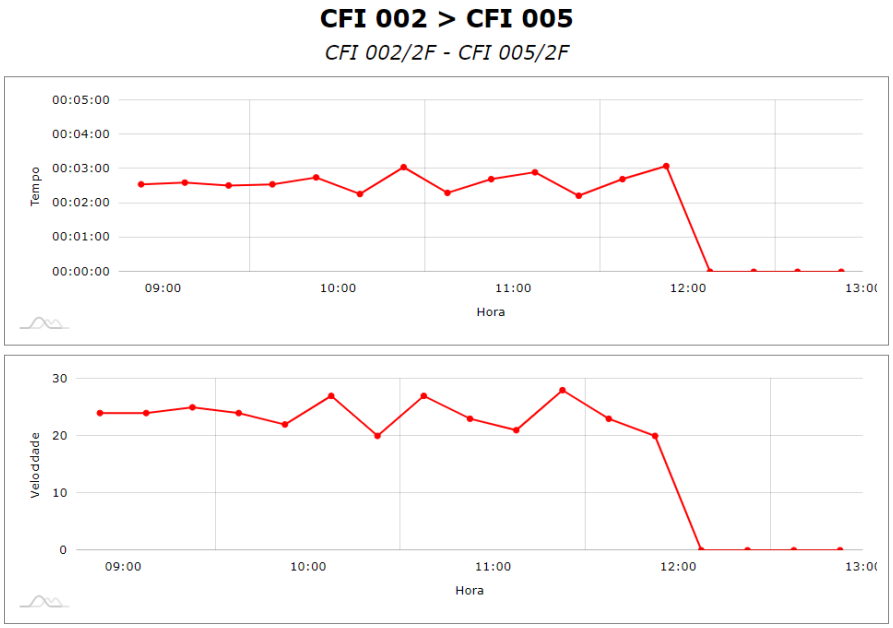


Figure 5 - Content of the Time/Speed Graph screen

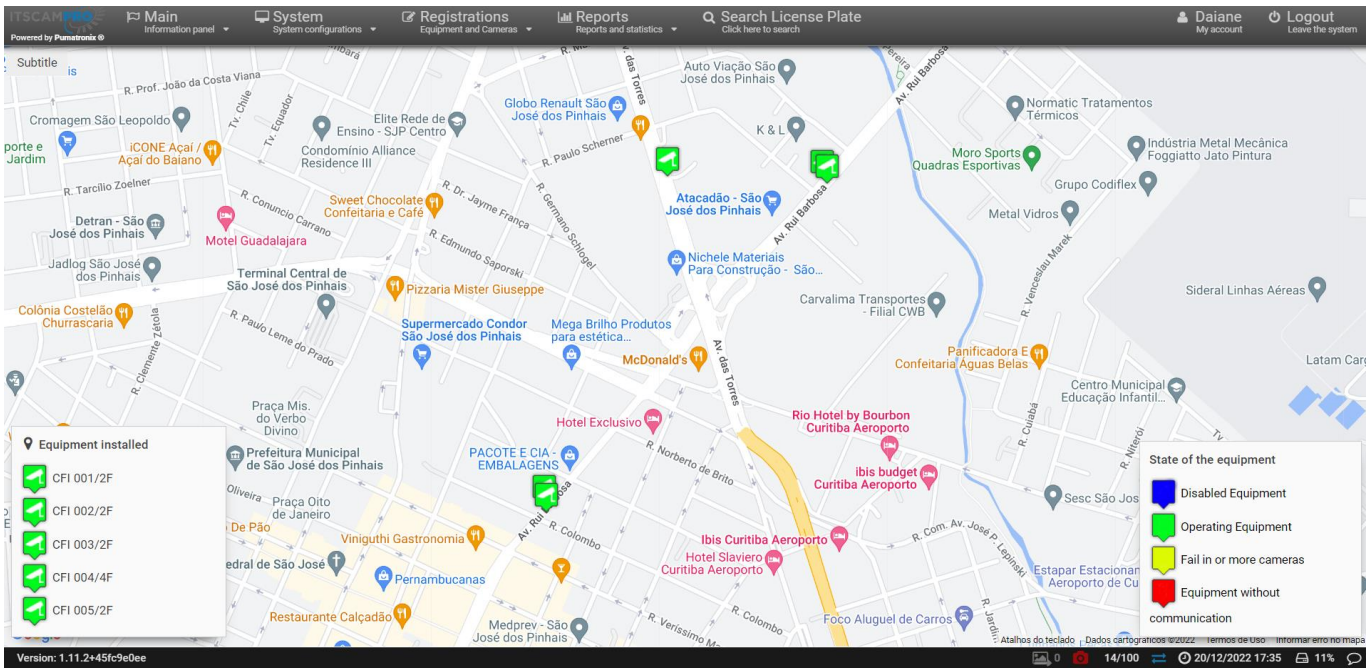
Map Display

ITSCAMPRO may make available the registered monitoring equipment or locations located on a map, considering the geographical position (latitude and longitude) of the registration. In this display, the equipment status is represented by the color of the icon, which indicates whether it is *Disabled*, *Operating*, *Failed on one or more cameras* or *No communication*.

At the top left of the map is the *Caption* button that displays or hides the list of *Installed Equipment* and the *Equipment Status* legend. When you click on one of the equipment listed, it is centered in the visualization on the map, containing the name, geographical coordinates, and the list of corresponding capture devices, with the period resulting from the last update.

To identify the type of connected equipment, the icons displayed on the map allow you to identify which type they refer to:

- mobile phone icon, which refers to a mobile device;
- a toll gate, which refers to a *Toll Plaza*;
- in camera format, which refer to monitoring points of the *Fixed* (pole), *Static* (tripod) or *Mobile* (vehicle) type.



ITSCAMPRO Mobile App

ITSCAMPRO has an app distributed free of charge in the Google® Play store, which allows you to transform any mobile device (mobile or tablet) with Android® operating system into a plate reading and vehicle information sending equipment for the ITSCAMPRO software.

This application has an Android® version of Pumatronix's *Jidosha* plate reading algorithm, which allows all image processing and plate reading to be performed directly through the mobile device and only the necessary vehicle data is sent to the ITSCAMPRO solution.

Figure 6 – Viewing the image on the Mobile Device

When registering plates with restriction or for monitoring, the alert is automatically sent to the user of the Mobile Device, who issues a visual signal with the description of the restriction, in addition to the detected plate sound signaling, while the alert is issued in the ITSCAMPRO software interface.

In addition to the live view of the images detected by the image capture device of the mobile device, it is possible to access the list of the last records made by the device:

When searching for records made using the device interface itself, the date range and sending of data to the ITCAMPRO software are search parameters:

2. Generated Information

In addition to the information accessed through the *Main* menu regarding vehicles, traffic and the system, the data recorded by the ITSCAMPRO System can be retrieved in report and graphic format, accessing the options in the *Reports* menu.

Capture Report

All vehicle records stored in ITSCAMPRO can be retrieved in report format. To perform the selection of records, it is necessary to specify the search criteria for records in the database, which allows filtering:

- by *Equipment* (may correspond to one or more equipment);
- by the devices that made the image capture (*Cameras*);
- by the *Groupings* registered for the COMPARE function;
- for the time interval in which it was recorded, specifying the start and end date and time;
- per specific *License Plate*;
- by automatically recognized, unrecognized or all *License Plates*;
- by the *Type of Vehicle*, that is, it is possible to know if the record is of a motorcycle or some other type of vehicle;
- by the *Plate Type*, which selects the plate records based on the background color (light or colored in relation to the text);
- by *Capture Number;*
- by *Evading*, presenting only the records of *Evading* vehicles, only the *Non Evading* ones or both;
- by the *Country* of the plate, which allows to identify if it originates in Brazil/Mercosur, Argentina, Chile, Costa Rica, Mexico, Paraguay or Uruguay;

- by *Vehicle Class*, when the *Classifier* function is activated and it is identified if the record is of a *Car*, *Motorcycle*, *Truck* or *Bus*;
- by the *Hazardous Cargo Code*, which displays in the reports and on the Record information screen, the hazardous cargo code detected in the vehicle image.

Vehicle type and license plate information can be retrieved only if it is associated with the record. This information is sent by equipment developed by Pumatronix such as OCRFF, ITSCAM FF, ITSCAMPRO NM1, VTR4 and VTR1. To confirm the submission to another ITSCAMPRO, a search may be performed considering the forwarding status. More specific reports can be obtained by defining as a search criterion, in addition to those listed, the vehicle's license plate and/or the record number in the system.

ITSCAMPRO allows you to transform the search results into a *pdf* report and export them into a comma-separated values (*CSV*) file. However, in the *CSV* file, the images of the records are not exported.

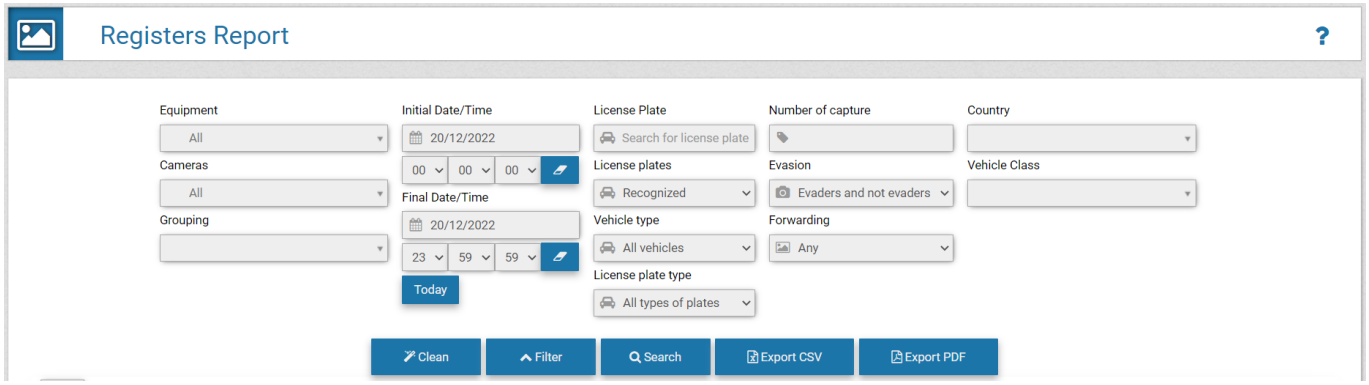


Figure 7 - Screen of the filters that can be applied to the search of the records

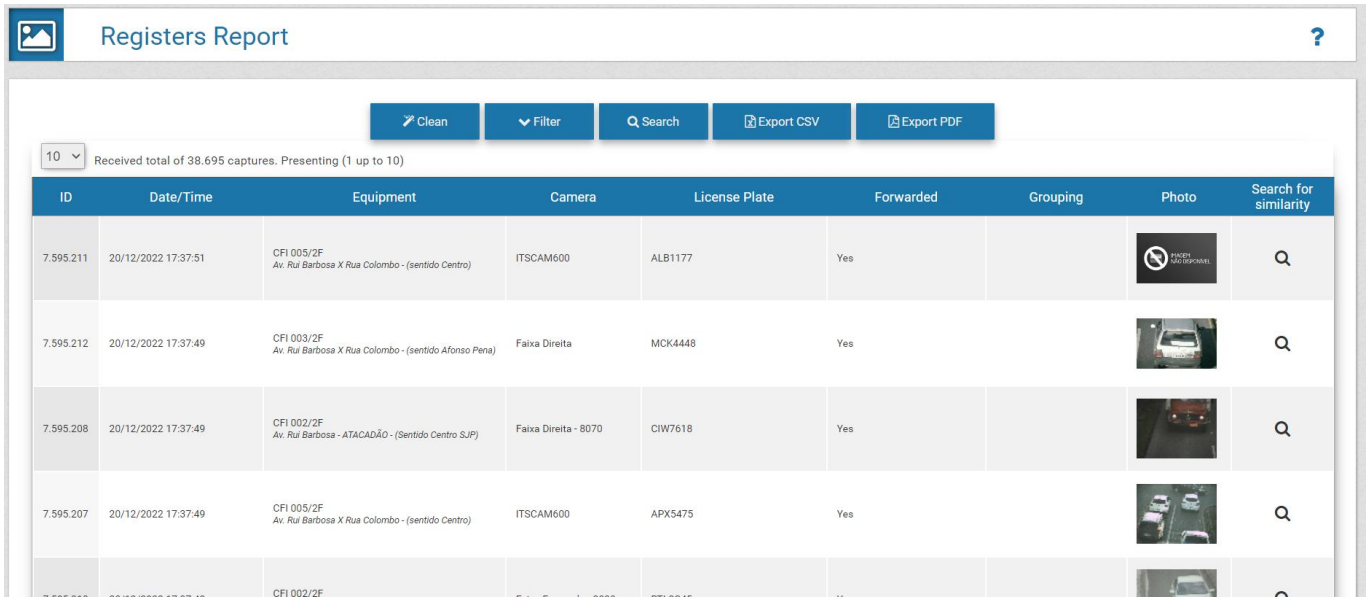


Figure 8 - Result of the search for records

Similarity Search Report

The ITSCAMPRO *Similarity Search* tool presents a report of the images of vehicles registered and stored in ITSCAMPRO and in a database, which have characteristics like an image used as a base. This functionality is released in the *COMPARE* module, which requires the upload and installation of the license in the ITSCAMPRO software, adaptation or installation of the image capture devices and the activation of the

module, connecting the Hardkey to the processor, which limits the number of devices that can be configured. Another requirement for the search to locate records with similar images is the enabling of the image capture device to extract vehicle data from the captured images.

Similarity Search Application: For image similarity search functionality, hardkey is required to be used, which limits the application to the number of image capture devices configured.

In situations where the additional monitoring point has a different framing from the base image, it is possible to delimit a *Region of Interest* to reduce the search for similar descriptors only in the portion delimited on the image that will be used as a base, optimizing the performance of COMPARE:

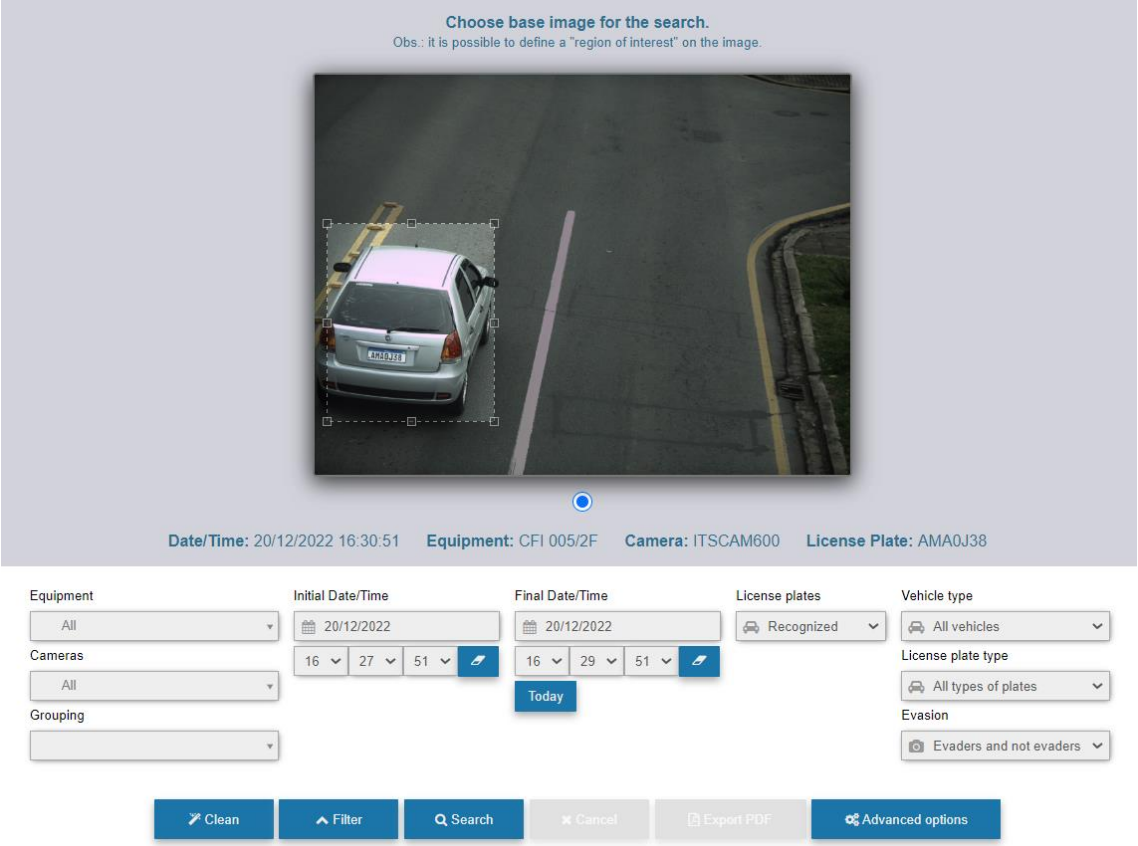


Figure 9 - Screen of the search for similarity with delimitation of the region of interest on the image

The filter options allow you to specify which information of interest should be used in the search for records with similarity in the image. The system verifies whether there is a *Monitored Section* registered with the equipment and, if so, the fields for the *Similarity Search* filter are optimized and consider the times and equipment configured for the section, when the image used as a base refers to a record.

The search result in the records is presented in report format, displaying the images located in the ITSCAMPRO database. When clicking on the *Compare Images* button, the image located as similar and the one used as a base are presented in an enlarged format, allowing a better visualization of details, including the *Magnifier* functionality on the images.

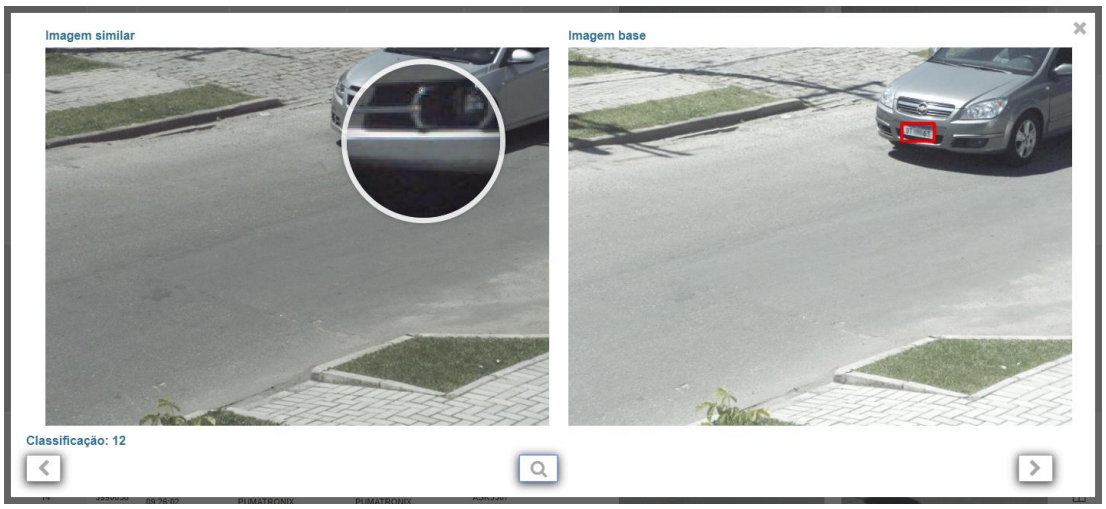


Figure 10 - Screen of the Compare Images function of the search for similarity

Search for Similarity Using Record Image

The images presented in the *Capture Report* can be used as a basis for searching for records with similar images. To locate a similar image stored in an ITSCAMPRO record, simply access the *Similarity* functionality available in the column to the right of the report presented, or when accessing the *Record Information* from the image presented in the report, the search page opens when clicking on the magnifying glass icon on the screen.

Figure 11 - Similarity Search screen for the detected capture

Search for Similarity Using External Image

To use an external image as a reference, the menu *Reports > Similarity Search* must be accessed. In this option, the image file must be sent in *jpg* format, with a minimum resolution of 800x600 (SVGA), saved in a database external to ITSCAMPRO and the search criteria for records must be filled in manually.

External image resolution: The external image in jpg format must have a minimum resolution of 800x600 (SVGA), so that it can be used by the comparison algorithm with sufficient information in the search for similar vehicles.

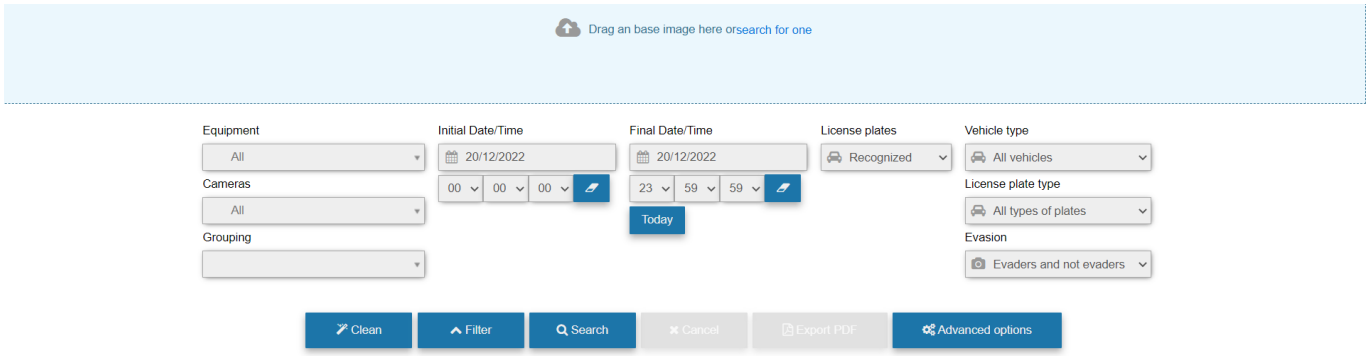


Figure 12 - Similarity Search start screen using external image

Groupings

The records stored in the database can be more easily located when added to the *Groupings*, which consists of a common identifier that can be added to the description of the record, making it easier to search.

Images associated with a grouping are not removed by the automatic disk space management process.

Accessing from the *Registrations* menu, *Groupings* are displayed in list form, with thumbnail captures. It is possible to locate the records added to *Groupings* using as a filter in the search.

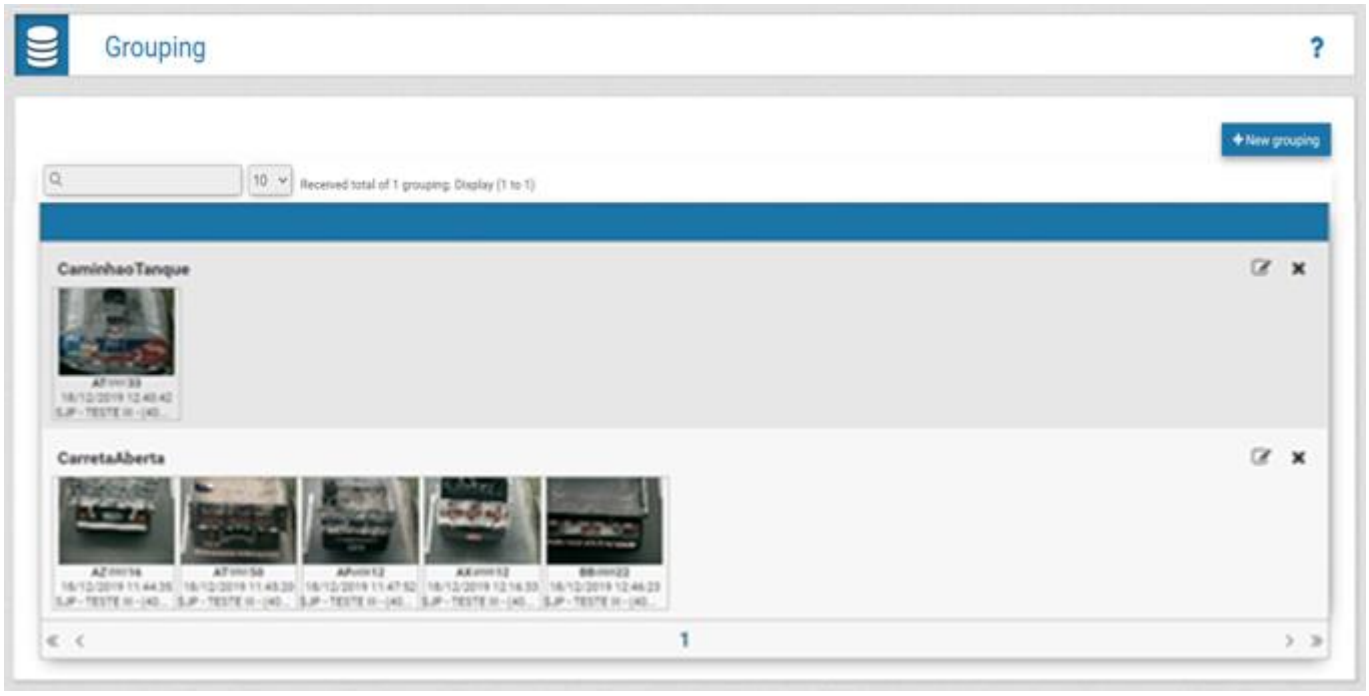


Figure 13 - Example screen of Groupings created and applied to records

Vehicle Monitoring Report

The ITSCAMPRO system makes vehicle identification records, through the Automatic Reading of its plates and allows specific vehicle plates to be registered for the purpose of monitoring by the system, which detects the recognition of the specified plate in any of the capture equipment. It is possible to register a license plate separately or a file in CSV format with a list of license plates can be imported. Likewise, the PRF-SPIA system database can be used.

When there is the identification of a vehicle license plate registered for monitoring, the system send visual alerts and optionally, it can emit sound alerts and send an e-mail with the data identified in the capture.

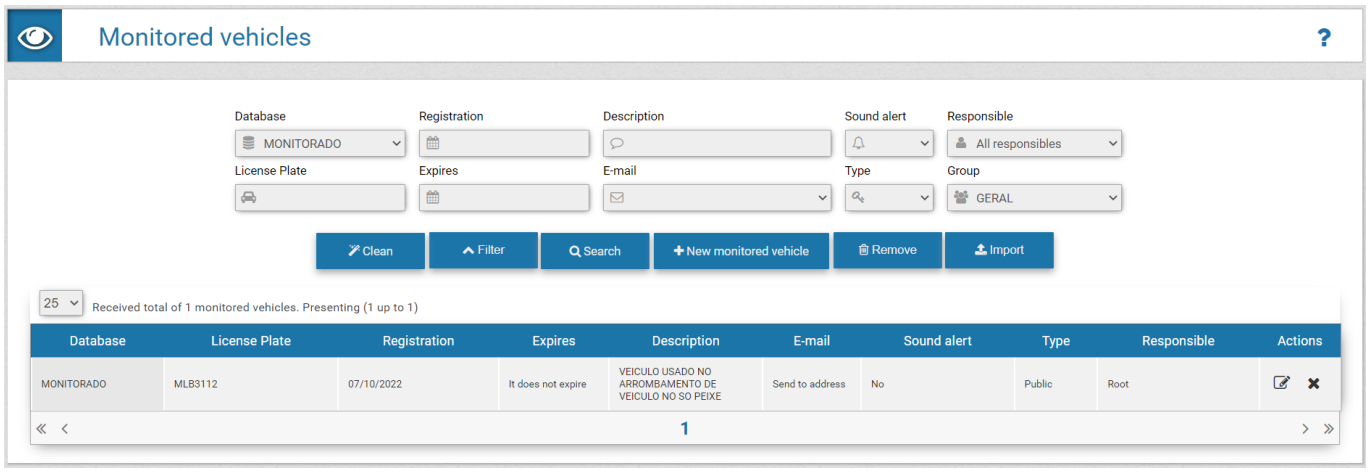


Figure 14 - Start screen when accessing Registrations > Monitored Vehicles

The *Monitoring Report* lists the vehicle identification events monitored based on the filters applied in the search, with the options to filter by the *Equipment* that identified the vehicle, by the time interval, by a specific *Vehicle Plate*, by the source *Database* of the monitored plate, by a specific *User* who created the monitoring, by a User *Group* and by a specific *Description* or based on a fraction of a description.

The generated report contains the vehicle records monitored considering the filters applied and can be exported in *pdf* format.

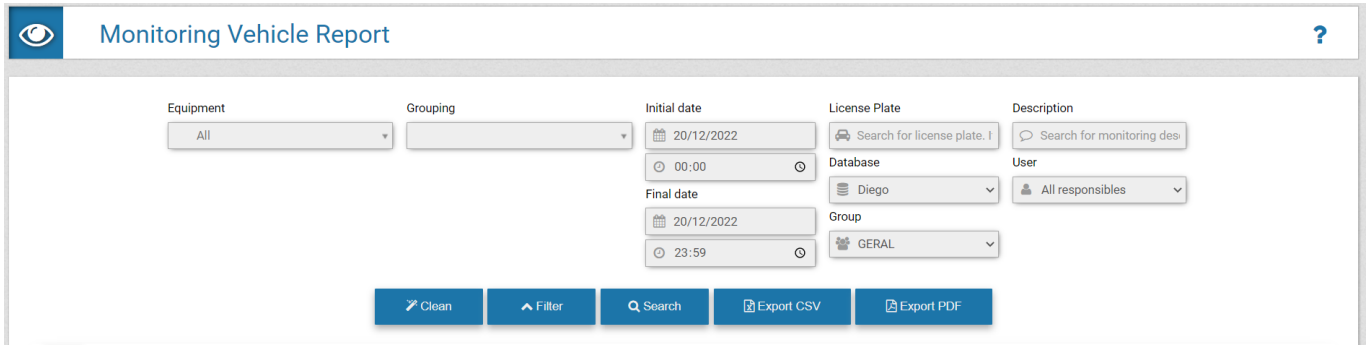


Figure 15 - Home screen when accessing Reports > Vehicle Monitoring

Plate Search Report

The search for a specific plate or for a partial plate stored in the database can be quickly performed in the *Search Plate* option, always visible in the top menu. Click the field, enter the desired plate, and press *Enter* to perform a search.

Figure 16 - Example of using the Search Plate field

The search screen for similar plates opens in a new browser tab and initially displays only the list of similar plates found in the records. When selecting one of the similar plates found, the information is listed

indicating the *Equipment* and *Camera* responsible for the records for this license plate, along with the captured image.

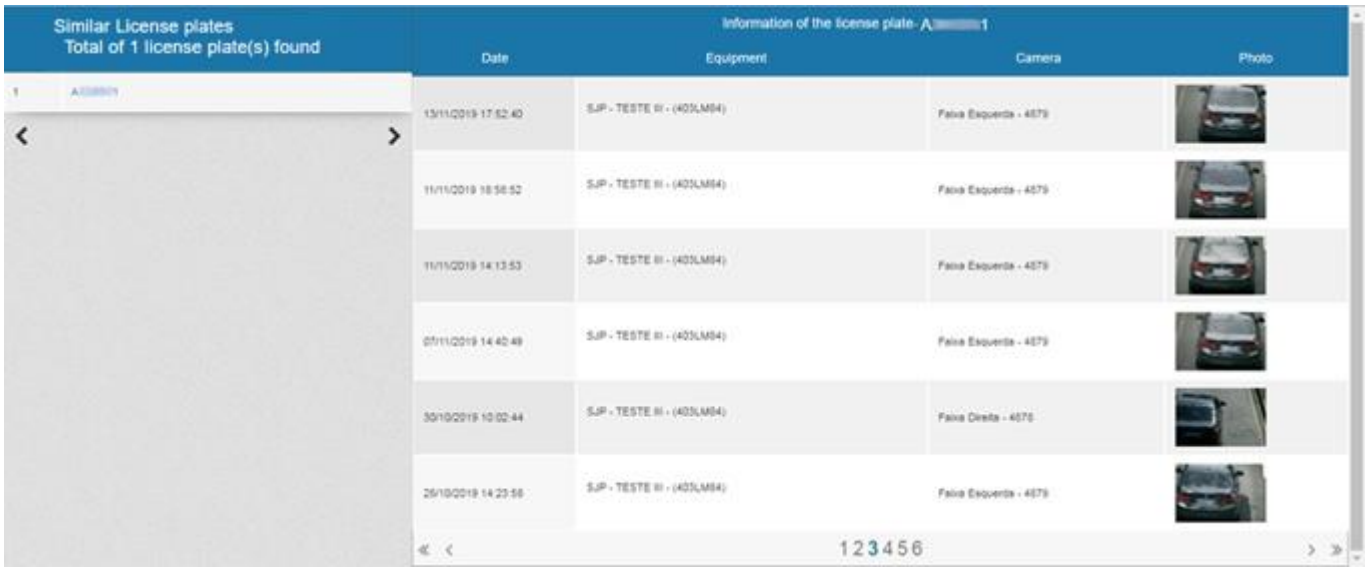


Figure 17- Page with the result of the Search Plate function

Correlations Report

The Correlations Report can be used to identify vehicle behavior patterns. This type of report shows all vehicle captures that were made within the reported parameters.

The parameters that can be used to select the data are the monitoring points (image capture devices) and the desired time interval. These parameters allow identifying the frequency with which vehicles are identified at the same monitoring point and correlate the captures of two or more equipment at a given time. It is also possible, using the interval between captures as a filter, to search for vehicles that have passed all selected equipment within a given time range.

When choosing to make correlations without specifying a time interval between records, the equipment to be used and the time interval must be specified. However, a search tolerance can be set. This value will be modified to the reference date/time minus the tolerance value and the reference date/time plus the tolerance.

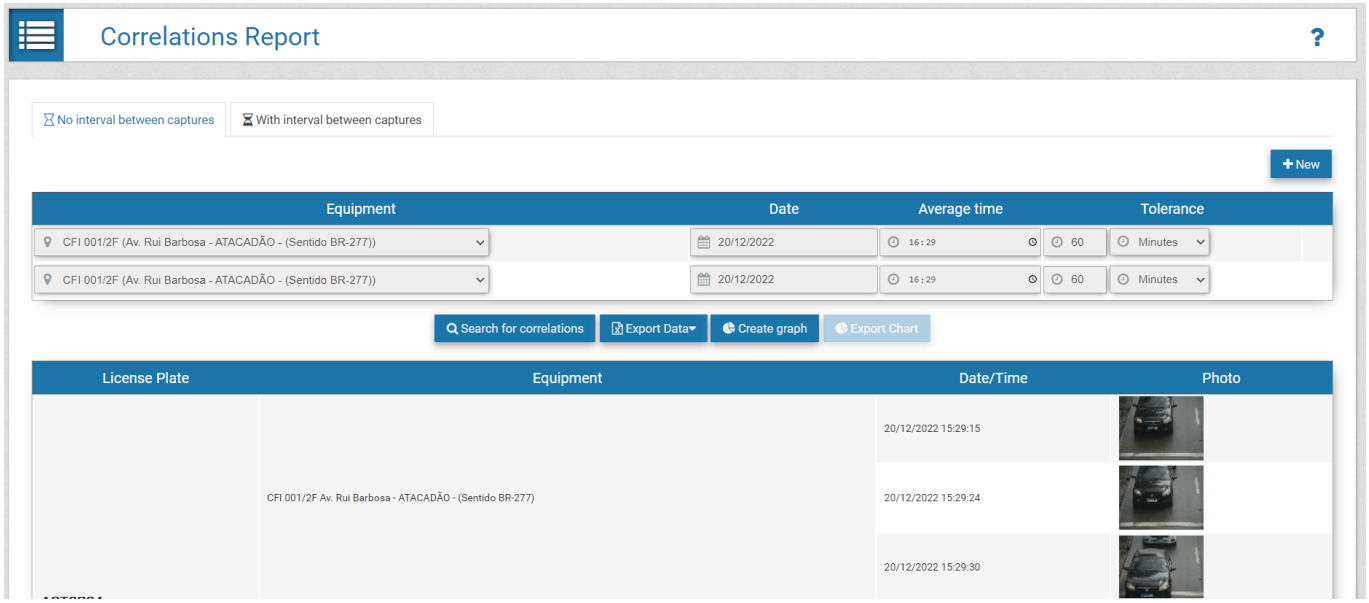


Figure 18- Correlations Report screen without interval between captures

When choosing to generate a report that considers the interval between captures, in addition to the selection of equipment and the time interval, the maximum time between captures must be specified. This time selects only the records of the vehicles that were identified in all the equipment chosen within the reported period.

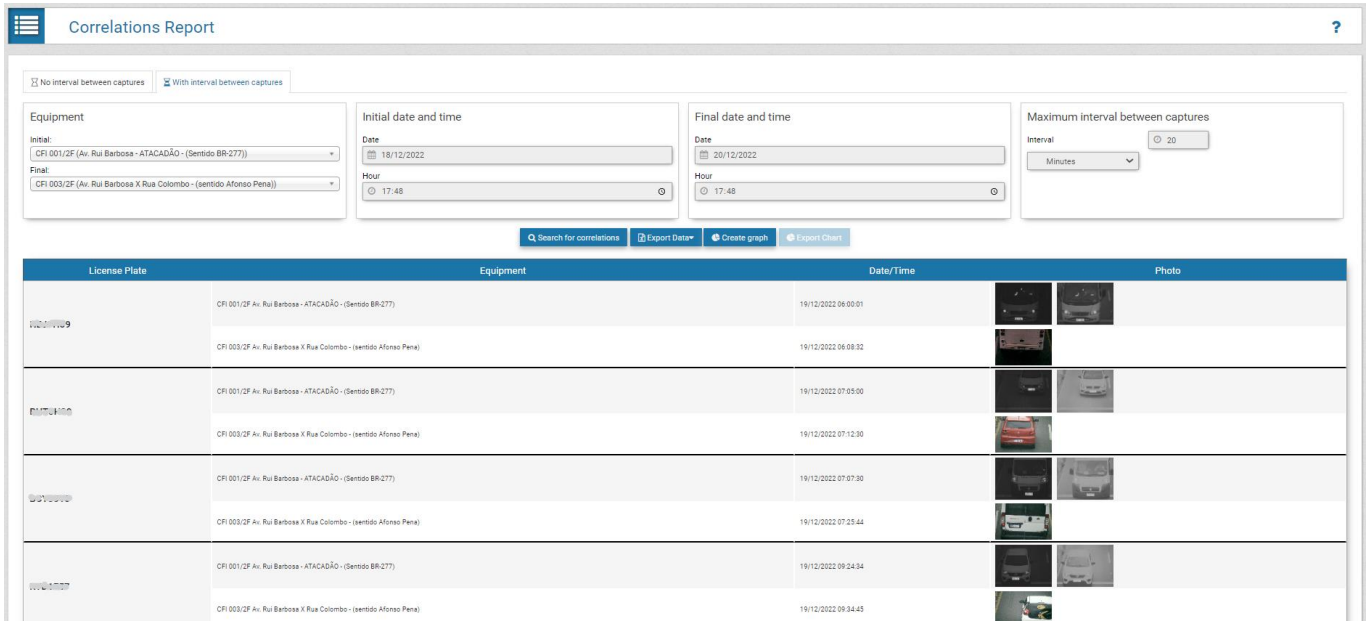


Figure 19 - Correlations Report screen considering the maximum interval between captures

Traffic Report

The ITSCAMPRO system was developed as a statistical traffic system and the *Traffic Report* is a tool that compiles the data of records generating a graph with the number of vehicles captured by equipment. The usual traffic is displayed for the selected week, displaying a graph for each day of the week with the number of records indicated per hour.

The report is generated considering the selected equipment and the start or end date, as the period considered will always correspond to one week (7 days). The report can be exported in a *pdf* or *csv* format.

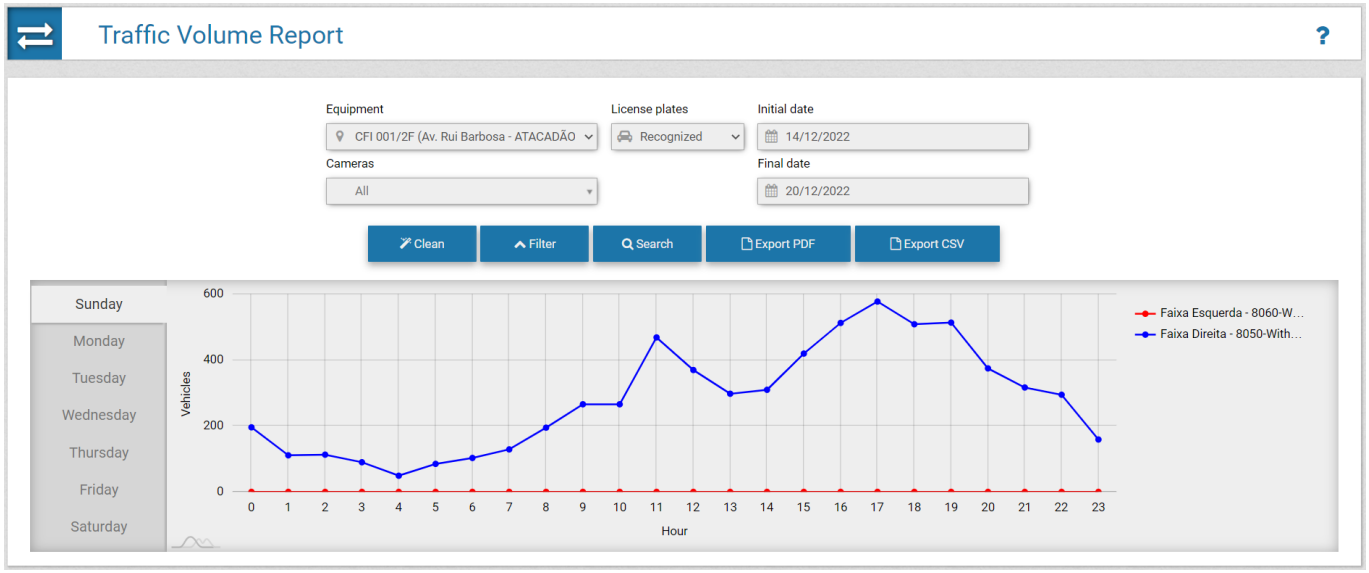


Figure 20- Example of Traffic Report generated for equipment with 4 capture devices

Time and Speed Report

ITSCAMPRO has the concept of *Section*, that is, two image capture equipment are defined and the route between these points can be used to calculate differentiated statistics such as the flow of vehicles, the average time spent to travel the *Monitored Section* and the average speed of the road.

In this type of report there is an additional parameter, which corresponds to the *Cut-off Time*, which is equivalent to the maximum value that a route may take, in order to remove from the calculation, the vehicles that, for example, stopped during the route. The other parameters for issuing this report are the section and the initial and final dates of the search.

The generated reports can be exported in a *pdf* or *CSV* file.

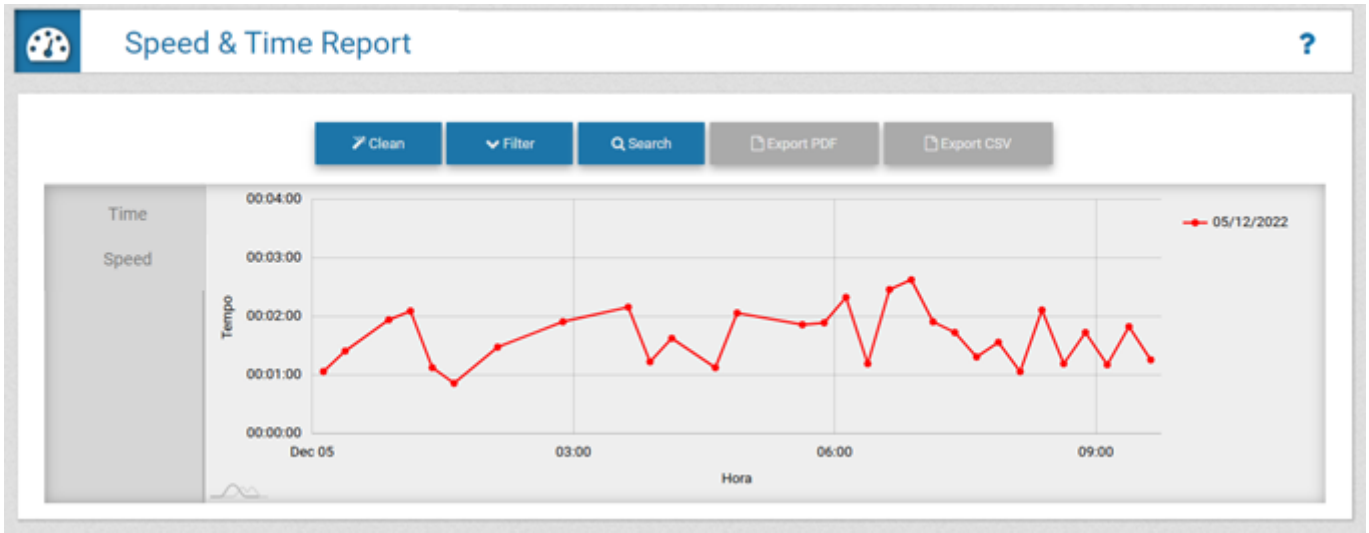


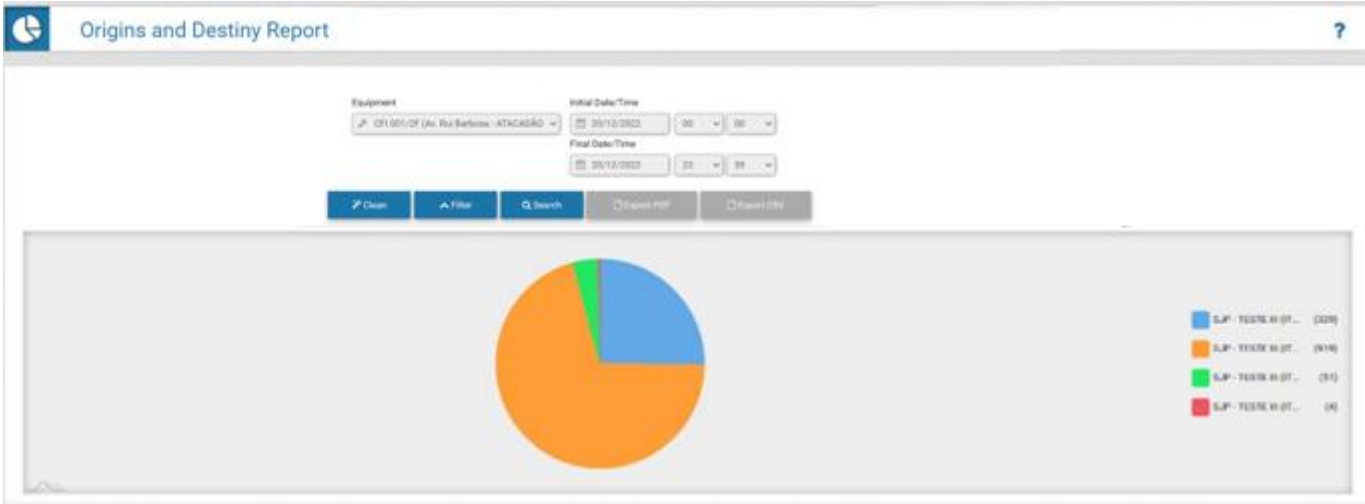
Figure 21 - Example of a Time graph generated when searching for records in monitored section

Source and Destination Report

ITSCAMPRO is a vehicle image manager that uses OCR technology to perform Automated License Plate Reading. Each time a vehicle is identified in an image capture device, a record is generated.

Selecting an equipment as origin and a time interval (start and end date and time), ITSCAMPRO performs a search for records among the other registered equipment, to locate those that have the same plate identified. The number of records with the same plate read is indicated in the generated graph and shows the percentage of the total by destination equipment, identified by the color in the legend.

The generated reports can be exported in a *pdf* or *CSV* file.



Altered Plates Report

Automatic Reading of Vehicle Plates may display incorrectly read characters. This misreading can be caused by external factors, such as occlusion of part of the plate, poor state of conservation or by some problem in the image. Then, ITSCAMPRO allows authorized users to change the card identified by the system and associated with the record.

The plate change data is stored in the record history, which indicates the user who performed the change and the initial reading value performed. Other users with access permission can view this change history in list or report form.

In the report data view, as well as in all reports in list format, you can change the sorting by list title. Above the list is the data search option, which allows you to locate any data among those displayed in the listing: the plate, the equipment, the image capture device, the date, time, ID, or changes.

Plate reading: When ITSCAMPRO receives a license plate recognized as "0000000", "" or when no data is reported, it is correctly set to empty.

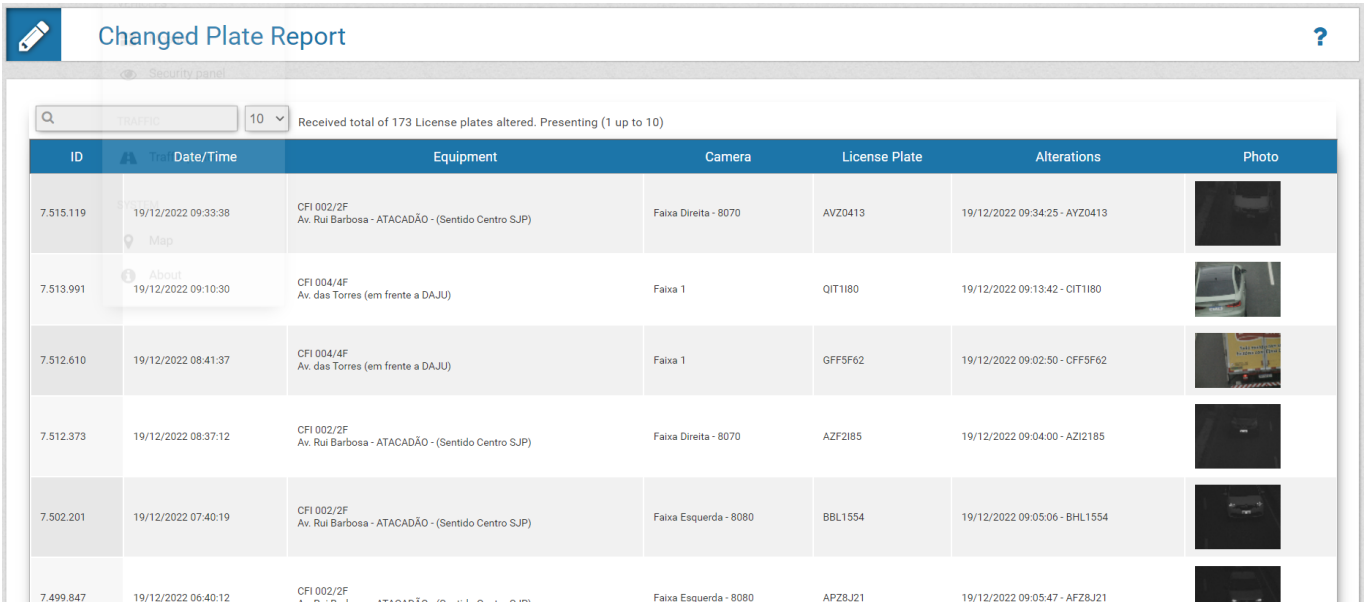


Figure 22 – Example of the home screen of the Changed Plates Report

Notifications

The *Notifications* screen presents the messages generated to communicate the occurrence of *Warning*, *Error,* or *Information* type events, such as the registration of a new monitoring, an approved monitoring or a new registered approach. A notification can be generated by a user for a *Group* or for specific users.

Figure 23- Example of the list of created notifications

3. Additional Documentation

Product	Link	Description
ITSCAM 600	Product Manual	Manual with advanced settings of ITSCAM line image capture and processing devices
ITSCAM FF 600	Product Manual	Manual with the ITSCAM FF 600 Advanced Free Flow IOT Imaging Device Settings

4. Software Specifications

ITSCAMPRO System version 1.11.2 can be installed on any Server running Ubuntu Server 14.04 or 18.04 or 20.04, Debian 8.8 or Oracle Linux. Installation/update on Ubuntu Server 18.04 with static IP address requires reconfiguration of the IP address before server restart, as the default applied by the operating system is DHCP.

Migration to 1.8.6 and higher may take a while if there are too many records in the upload queue. For versions earlier than 1.1.0, the system update must be assisted because the server cannot update automatically.

In case of updating a version prior to 1.5.7, it is necessary that a new license file is generated and updated on the server, as there was a change in the format of the license file. If an incorrect license file is used, the system will block some features, such as Reports and Specific Communication Protocols. Please contact Pumatronix Technical Support for any questions and for the generation of a new license file. To install the update, follow the steps in the ITSCAMPRO Update.

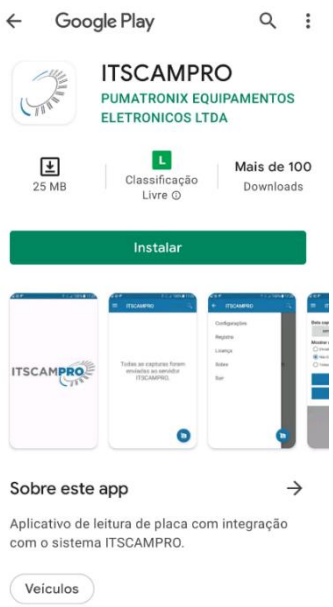
To access the software interface, a device with Google Chrome browser version 56 or higher installed must be used.

Android Device Specifications for the ITSCAMPRO App

The ITSCAMPRO app can run on any mobile device (mobile or tablet) with Android® operating system version 8.0 or higher.

For a good performance of the *Jidosha* card reading algorithm in real time, a cell phone with at least 4 colors and 4G of RAM is recommended.

The download of the ITSCAMPRO application is available in the Google® Play store of the mobile device and must be registered as a new equipment in the ITSCAMPRO software.



5. Licensing

ITSCAMPRO is software that requires a license to function. This license specifies the size of the installation and features enabled. The items that can be licensed are:

- *Number of Cameras:* Maximum number of devices that can connect to the ITSCAMPRO server;
- *Traffic Module:* Availability of traffic reports such as Time and Speed, Origin and Destination, among others;
- *Monitoring Module:* Registration of monitored vehicles, related reports and alerts when detecting a monitored vehicle;
- *Telemetry Module:* Equipment monitoring, such as NUCs, image capture devices, etc.;
- *Multiple Language Support:* Language application in the system interface. Currently, it can be chosen between Portuguese, English or Spanish;
- *ITSCAMPRO Application Support:* Registration of mobile devices with the ITSCAMPRO application. Additionally, it allows the records sent by the devices to be saved in the system;
- *Support Image Similarity Search:* Performs the search for images with similar content from enabled image capture devices;
- *Number of Fit Cameras to Calculate Descriptors:* Maximum number of devices that may be configured to perform the calculation of the image descriptor on the Server;
- *Support for Integration with PM-PR;*
- *Integration Support with Denatran;*
- *Support for Integration with SPIA-PRF;*
- *Antares Support:* Integration with the Antares system;
- *Detecta-SP support:* Integration with the Detecta-SP system;
- *TAG support:* Integration with the TAG server for installation in conjunction with Nevada. The NEVADA system is used for toll evasion inspection;
- *Support for OCR on the Server:* Enables the ITSCAMPRO Server to run OCR on the no plate records made by the enabled image capture devices;
- *Number of Cameras with OCR:* Maximum number of devices that may be configured to run the OCR on the server;

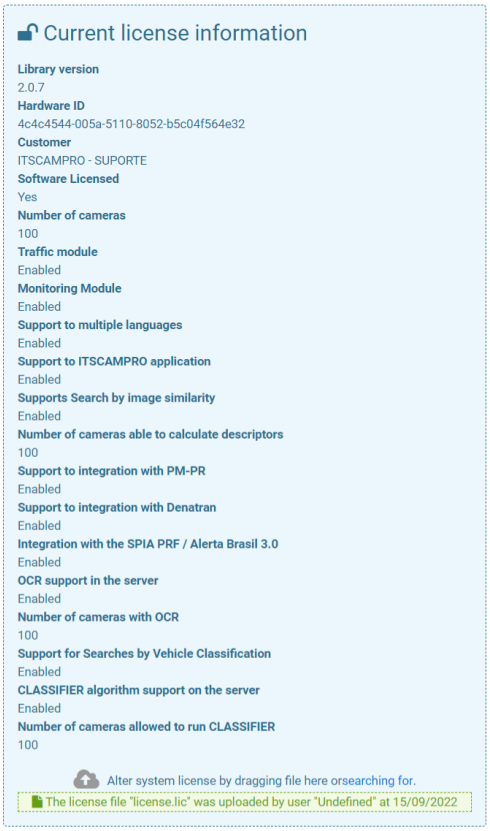
- *Search Support by vehicle classification:* Allows ITSCAMPRO to receive Class information from devices with ITSCAM 600 and provide searches on the basis of the class of the vehicle detected in the image;
- *Support for the CLASSIFIER algorithm on the Server:* Allows the classification detection functionality to be performed on the server and that even older equipment can be used in searches by class;
- Cargo ID Functionality: Allows ITSCAMPRO to read dangerous cargo and present this information in the reports;
- *Integration with third-party cameras:* This functionality allows cameras from other manufacturers to send images to ITSCAMPRO through the FTP protocol;
- *Integration with the ONE System:* This functionality enables integration with the state integrator system.

The ITSCAMPRO license is a single file associated with the hardware on which the system was installed. If it is necessary to install on another machine, a new license must be requested from Pumatronix Technical Support. This change in the amount of equipment that can connect simultaneously to ITSCAMPRO can be requested from Pumatronix Technical or Commercial Support.

For the operation of the ITSCAMPRO application on mobile devices (mobile or tablet), with OCR reading (*Jidosha*) and integration with the ITSCAMPRO solution, specific licenses are required, according to the amount of equipment released for the installation.

Similarity Search Application: For image similarity search functionality, hardkey is required to be used, which limits the application to the number of image capture devices configured.

Software License: Software and related documentation are protected by copyright. By installing the software, you agree to the terms of the License Agreement.



6. Initial Configuration

To start the ITSCAMPRO system, access must be configured, as the default configuration of ITSCAMPRO allows the use and access to the system using devices connected to the same data network. However, access to the system and information can be made by other means, configured through the *System Configuration* menu:

- via the Internet, configuring the fields of the *External Access* tab;
- by the Android app, configurable through the fields of the *Mobile App* tab.

The other necessary configurations can be found in the ITSCAMPRO Integration Manual.

7. First Access

ITSCAMPRO can be accessed by the Google Chrome browser on devices that are on the same data network, by the address for external access and by devices that have the Android/iOS application installed. The IP address of the product is provided by Pumatronix, along with the default user information and password.

To access the system, the IP address provided must be entered in the address bar. Then, you must enter the user credentials. If the main user of the system is not provided, use *root* user and *root* password. However, in the first access, it is indicated to create the other users and restrict the use of the ITSCAMPRO *administrator* account.

The first time it is logged into ITSCAMPRO, the home screen must be configured by accessing the *User* settings.

Distribution of information: The content generated by ITSCAMPRO (captured images and information) is protected by user and password. However, it is up to the system administrator to control users who have access to information and the dissemination of content.

8. Care and Maintenance

The use of the product presents risks, which are presented in the Handling Risks section.

Some care is required to ensure the performance of the product and extend its service life.

Access Control and Information Availability

Users' access to ITSCAMPRO information may be limited by an Access *Profiles* setting. This setting allows you to associate which system screens the user profile will be able to interact with. As the same profile is assigned to more than one user, *Groups* can be created because they allow multiple users of the system to access and view images only of the equipment authorized for the group and share the list of monitored vehicles.

ITSCAMPRO Usage Log

ITSCAMPRO receives data from multiple devices simultaneously and can be manipulated by users with different access patterns. For this reason, the *System Log Report* allows auditing the actions of users. The interface allows you to change the ordering of the list of records and to search in all columns of the table.

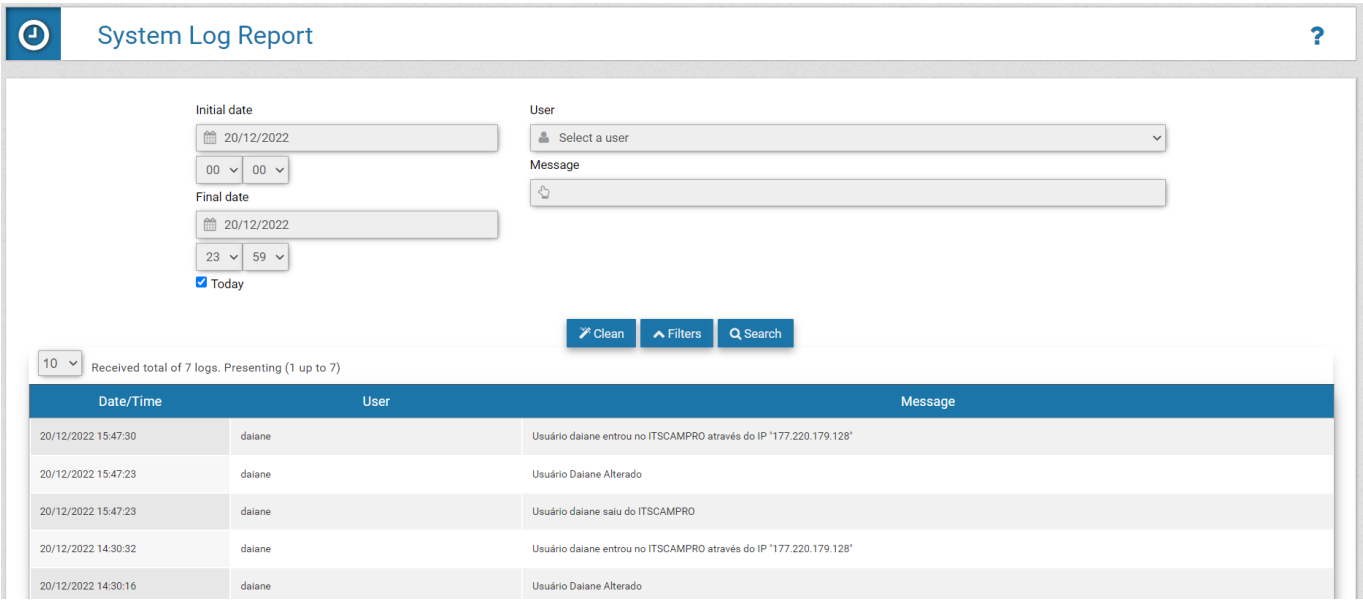


Figure 24 - Example of System Log Report per user

Equipment Status

ITSCAMPRO can be used for equipment management and screening traffic infraction notices. On the *Telemetry* screen, the equipment can be centrally administered and maintained.

Each registered equipment is displayed with a colored icon that indicates whether the equipment has the service running and the latency time of the network within the expected limit; it has the latency time of the network too high or if the equipment has the service stopped/is not responding on the network.

Image capture devices are also displayed with colored icons indicating that the latency time of the network is within the expected limit, too high, or the equipment is not responding on the network.

When selecting an equipment from the list, it is possible to view detailed information about the equipment, including images (if the user is allowed to manipulate the equipment) and the possibility of updating its status (modifying the service in operation or requesting a reboot).

Operating Diagnosis

The evaluation of the operation of ITSCAMPRO can be verified through the system logs. This log displays all operations done by the system in the background. The main function of this log is to assist the development team in the analysis of anomalies that may occur in the system.

ITSCAMPRO Update

ITSCAMPRO has four software packages, which can be updated individually. The process is totally done in the background, after sending each update file, following the correct sequence. However, it is recommended to back up the data before the update process.

When accessing the *System > Maintenance* menu, install the packages in the order indicated by dragging the file to the *Versions* area or clicking the link to search for a saved file. Named files must be installed in the correct sequence:

1) *itscampro-db_1.11.2.swu*
2) *itscampro-system_1.11.2.swu*
3) *itscampro-service_1.11.2.swu*
4) *itscampro-web_1.11.2.swu*

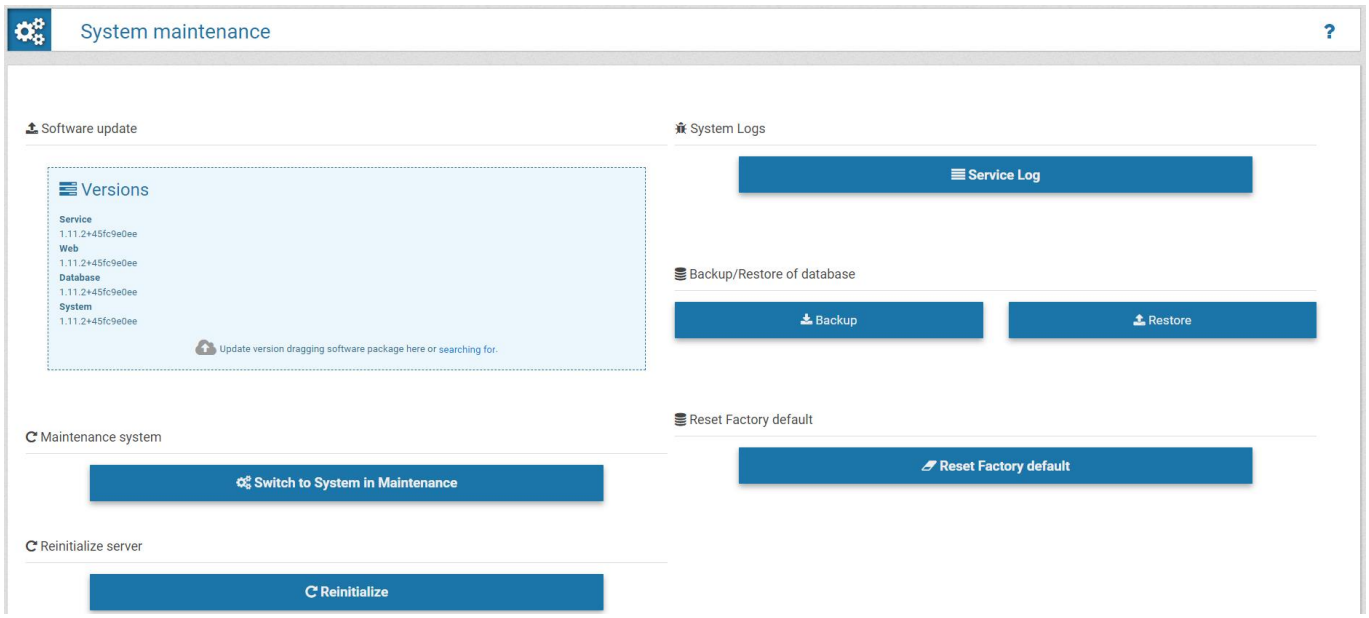


Figure 25 - Software update option on the System Maintenance screen

Backup and Restore

ITSCAMPRO enables the creation of complete system backups. The backup files generated are saved in a proprietary format and can only be used by ITSCAMPRO.

System Restore: When restoring a database in ITSCAMPRO, all information that was stored on the equipment (including internal references to the images) will be overwritten.

Factory Restore: When you restore an ITSCAMPRO installation to the factory version, all information that was stored (including images) will be erased.

ITSCAMPRO Restart: Requesting ITSCAMPRO restart causes all connections to image capture devices to be interrupted while the server and service are re-established, and vehicle recognition may be lost during this period.

9. General Conditions of the Warranty

Pumatronix guarantees the product against any defect in material or manufacturing process for a period of 1 year from the date of issuance of the invoice, provided that, at the discretion of its authorized technicians, a defect is found under normal conditions of use.

The replacement of defective parts and the performance of services resulting from this Warranty will only be carried out at the Authorized Technical Assistance of Pumatronix or a third party expressly indicated by it, where the product must be delivered for repair.

This Warranty will only be valid if the product is accompanied by a *Maintenance Form* duly completed and without erasures and accompanied by an Invoice.

Situations in which the Product Loses the Warranty

1) Use of software/hardware not compatible with the specifications in the Manual;
2) Connection of the product to the power grid outside the standards established in the product manual and installations that present excessive voltage variation;
3) Infiltration of liquids from the opening/closing of the product;
4) Damage caused by natural agents (electric discharge, flood, sea air, excessive exposure to climatic variations, among other factors) or excessive exposure to heat (beyond the limits established in the Manual);
5) Use of the product in environments subject to corrosive gases, with excessive humidity and/or dust;
6) Show signs of security seals tampering;
7) Show signs of opening and modification made by the Client in places of the product not authorized by Pumatronix;
8) Damage caused by accidents/falls/vandalism;
9) Display tampered and/or removed serial number;
10) Damage resulting from transport and packaging of the product by the Client in unsuited conditions;
11) Misuse and not in accordance with the Instruction Manual.

10. Privacy Policy

In compliance with the Brazilian General Data Protection Law (LGPD) - Law No. 13,709 dated 14 August 2018, this product has programmable functions for capturing and processing images that may infringe the LGPD when used to capture personal data together with other equipment.

Pumatronix is not responsible for the purposes, use and treatment of the captured images, and the control of information and ways of operating the product are the exclusive decision of the user or purchaser of the product.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