PUMATRONIX

ITSCAMPRO MÓVEL

ITSCAMPRO MÓVEL

MOBILE LICENSE PLATE RECOGNITION SYSTEM

Product

Pumatronix Equipamentos Eletrônicos Ltda.

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Changes History

Date	Revision	Updated content
07/23/2020	1.0	Initial Issue referring to Software version 2.6.2
07/31/2024	1.1.0	Specifications of the Android app; General revision of the document layout; Update of the Vehicle Detection image; Version 2.6.2 of the software
09/20/2024	1.2.0	Updates for software versions 2.6.3 to 2.12.0
02/05/2025	1.2.1	Updates to software version 2.12.1; Update of the device registration screen;
11/28/2025	1.3.0	Updates to software version 2.13.0

Overview

ITSCAMPRO Móvel is software that interfaces with capture devices (fixed or mobile equipment such as the VTR 600), displaying the images and logs being captured in real time. It performs analysis using artificial intelligence algorithms to recognize license plates and general vehicle characteristics, for equipment that does not have these built-in functionalities. It also allows the captured data to be sent to another application.

It allows the registration of devices and collects images providing detailed information on the capture such as: license plate identification (OCR), vehicle classification, date and time, location, etc. It has a log report that allows various filters, including searching by license plate.

In addition to the capture device interface functionality, it also has a free app distributed in the Google® Play store, which allows real-time visualization of the vehicles being captured, as well as alerts for monitored vehicles.

The system stands out for issuing audible and visual alerts via the web interface, the mobile app, or e-mail, for stolen vehicles, vehicles suspected of participating in criminal practices, or vehicles with driving restrictions, offering an agile and proactive response by enabling integration with public security systems such as: PM-MG, PM-PR, Detecta-SP, SPIA (PRF), among others.

ITSCAMPRO Móvel manages vehicle license plates by carrying out the following activities:

- Optimized and efficient collection of daytime and nighttime images of vehicles through the image capture device;
- Automatic reading of license plates, identifying the characters (OCR), for devices that do not have built-in OCR;
- Automatic storage of the information from the license plate read, in the database and in the photos of the vehicle, with the GPS location of the capture;
- Classification of vehicles in images, by type of vehicle (e.g. car, motorcycle, truck and bus), for devices that do not have a built-in Classifier;
- Selection of the license plate syntax to be monitored, according to the type of OCR in operation, from the options: Brazil in the Mercosur standard, Argentina, Bolivia, Chile, Colombia, Ecuador, France, the Netherlands, Mexico, Paraguay, Peru and Uruguay;
- Generation of a report with the recognized license plates, extracting the data from the system by applying different filters, such as filtering by date and time, type of license plate or a specific vehicle license plate, allowing export in CSV format;
- Search for specific license plates to monitor, with the possibility of importing a list of license plates of interest into the system or manually registering each license plate to be monitored;
- Sound alerts, which can be configured by type (theft, documentation, etc.), are issued when the monitored license plates are recognized;
- Registration of up to 4 LPR and 2 panoramic capture devices, operating simultaneously, collecting images, identifying license plates and storing logs, or for the ITSCAM 600, as a single viewer;
- Login and password access to the system, with different levels of permission and system configuration.

ITSCAMPRO Móvel is an essential tool for strengthening security and enabling proactive action.

Note: ITSCAMPRO Móvel can be installed on a PC, MAP, Firefly or ITSCAM600 Plug-in.

Handling Risks

	Data distribution: The content generated by ITSCAMPRO Móvel (captured images and information) is protected by a username and password. However, it is up to the system administrator to control the users who have access to the information and the dissemination of the content.
	Filter by Vehicle Type: To search using the filter by vehicle type, the vehicle classifier license must be enabled in Hardkey and in the system.
	Removing files: When performing log removal, ITSCAMPRO Móvel will completely remove the logs, including database information and images of the server's file system. This operation cannot be reversed.
	Software License: The software and related documentation are protected by copyright. By installing the software, the user agrees to the terms of the License Agreement.
	Internet Access: In the factory default configuration, ITSCAMPRO Móvel does not have an outgoing route set and to access the Internet it is necessary to add one of the interfaces by selecting one of the available ones.
	Reading license plates: When the image capture device has the Save Logs without License Plate function enabled in ITSCAMPRO Móvel, the logs made may contain only the images, without the content of the license plate, in which case it is considered a log with empty license plate.
	License plate file format: When the ITSCAMPRO Móvel license is installed on the MAP, the files sent to ITSCAMPRO Móvel must be in UTF-8 format. If you need to convert the format, we suggest using a converter such as Dos2Unix.
	System Restoration: When restoring a database on ITSCAMPRO Móvel, all the information that was stored on the equipment (including images) will be overwritten.
	Factory Restoration: When restoring an ITSCAMPRO Móvel installation to the factory version, all stored information (including images) will be deleted.
	Restarting ITSCAMPRO Móvel: Requesting a restart of ITSCAMPRO Móvel causes all connections to the image capture devices to be interrupted during the process and there may be a loss of vehicle recognition during this period.
	Log Cleaning: By applying Log Cleaning, all logs will be lost and cannot be recovered.

Models

ITSCAMPRO Móvel can be used in a variety of applications without compromising performance, as long as the installation specifications provided by Pumatronix are respected. These specifications vary according to the site size and the flow of vehicles analyzed.

ITSCAMPRO Móvel is a robust system that can be used as standard or customized. These customizations can modify the way the product works or include specific functionalities, such as customized reports.

Further information on customizing ITSCAMPRO Móvel can be requested directly from Pumatronix.

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1. About the Product

ITSCAMPRO Móvel is the software that provides the operational interface for vehicle monitoring solutions developed by Pumatronix.

When accessing the ITSCAMPRO Móvel system, the main screen is displayed and contains the information and functionalities enabled according to the user's access profile settings. Functionalities can be made available on the *Control Panel*'s home screen, listed and described on Figure 1.

Restricting access to equipment is a feature of the system, given that the information stored may require confidential disclosure.

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

1.1. Control Panel Viewing

The *Control Panel* screen is the main operating screen for ITSCAMPRO Móvel, as it displays images of the logs being made in real time to the user. These logs come from all the devices to which the user has access permission.

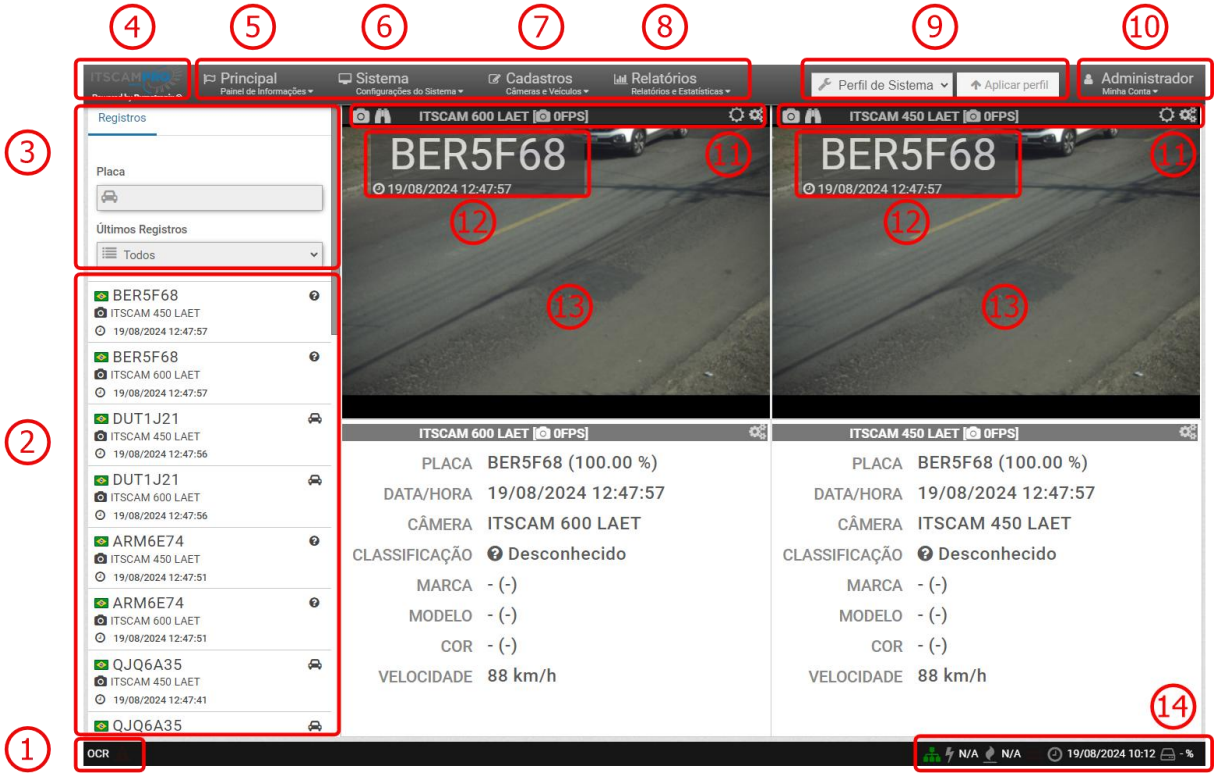
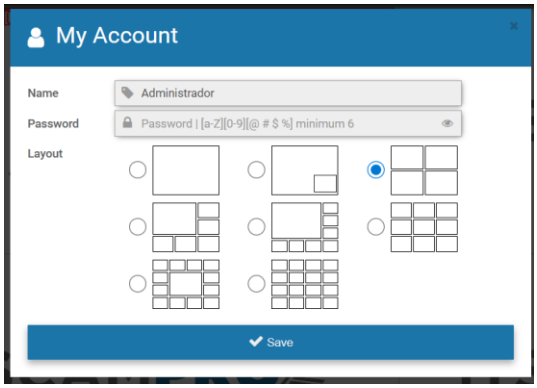


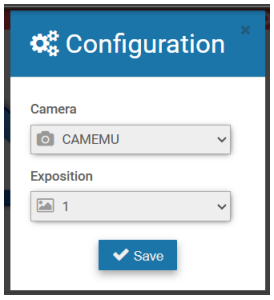
Figure 1 - Control Panel main screen

1) Automatic license plate reading status;
2) List of the last logs made;
3) Searches for specific license plates in the logs made;
4) Access to the Home screen;
5) *Main* menu with information panels;

6) *System* menu with options for access control, settings and system maintenance;
7) *Registration* menu for entering data on image capture devices and license plates of interest for monitoring;
8) *Reports* menu that allows filtering and listing of logs made;
9) Selection and application of a saved *System Profile*;
10) Quick settings for the account of the user logged into the system and options to *Disconnect* or *Stop* the equipment:
    a. It allows you to reset the *Name* and *Password* in the respective fields and the grid layout of the *Control Panel* home screen:



11) Setting options for the device image:
    a. Clicking on the camera-shaped icon captures an image at the moment of clicking;
    b. Clicking on the binocular icon opens the initial zoom configuration screen, which allows the settings to be made using the enabled grid;
    c. By clicking on the gear icon on the right, you can select which device should display the image in the viewing area:



12) Display of the license plate characters referring to the last log made;
13) Area for viewing the image of one or more registered devices;
14) Status of ITSCAMPRO Móvel. The status bar remains visible at all times and displays the current status of the system, with up-to-date information on OCR operation, GPS, disk space and server time.

1.1.1. Log Viewer

The list of the last logs made, displayed on the main screen of the *Control Panel*, shows the main information on the license plate identified and the date and time when the log was made. When clicking on one of the logs listed, the *Log Viewer* window displays the location on a map in the initial tab, the equipment responsible for capturing the image, icons indicating the type of vehicle detected and additional data in the other tabs:

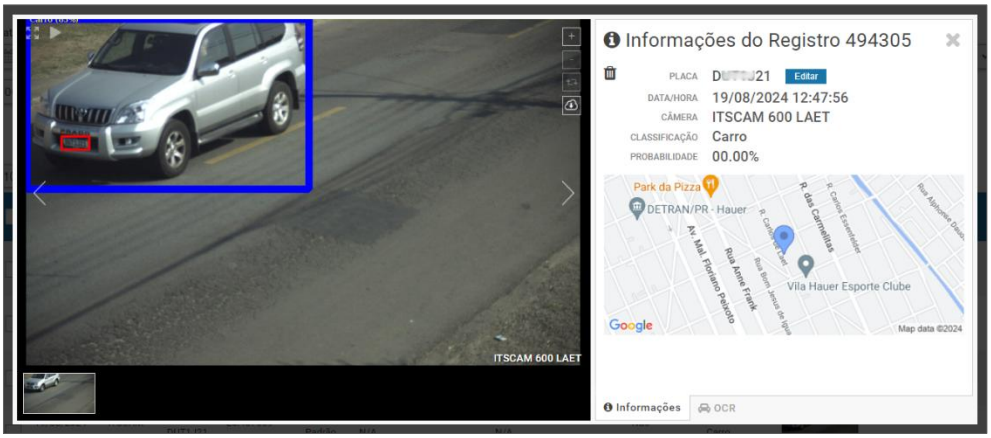


Figure 2 - Log Viewer Information Screen

1.2. Help using ITSCAMPRO Móvel

The question mark symbol available on ITSCAMPRO Móvel screens displays the help content on the left-hand side of the screen. This content provides a brief description of the screen's functionality and more details on the parameters that can be configured.

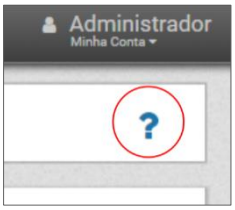


Figure 3 - Help with using ITSCAMPRO Móvel

1.3. ITSCAMPRO Móvel Application for Mobile Devices

ITSCAMPRO Móvel has an application distributed free of charge in the Google® Play store, which allows turning any mobile device (cell phone or tablet) with an Android® operating system into equipment for viewing vehicle information from the ITSCAMPRO Móvel software.

When registering license plates with restrictions or for monitoring, the alert is automatically sent to the user of the mobile device, which emits a visual signal describing the restriction, in addition to the audible signal of the detected monitored license plate, at the same time as the alert is emitted on the ITSCAMPRO Móvel software interface.

The live view of the detected images can be accessed from the home screen:

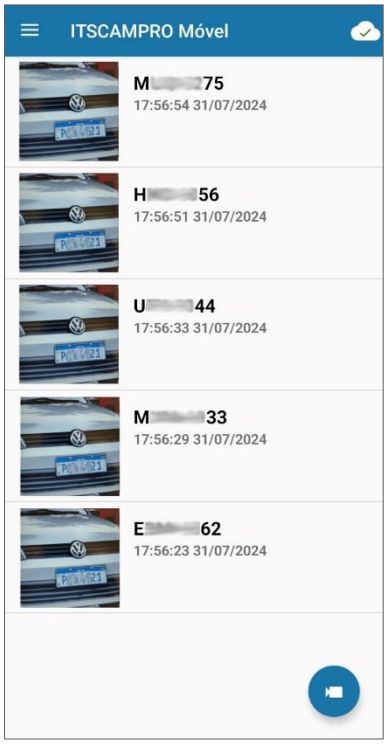


Figure 4 – Application screen for viewing the latest logs made

2. Generated Information

2.1. System Status Information

More detailed information on the system's status and the behavior of ITSCAMPRO Móvel can be obtained by accessing the *Main* > *Dashboard* menu.

The data obtained provides real-time resource consumption statistics, a history of the total number of logs, the number sent to the server and the OCR hit probability for the selected date. The history of CPU load and RAM usage is displayed in graphs:

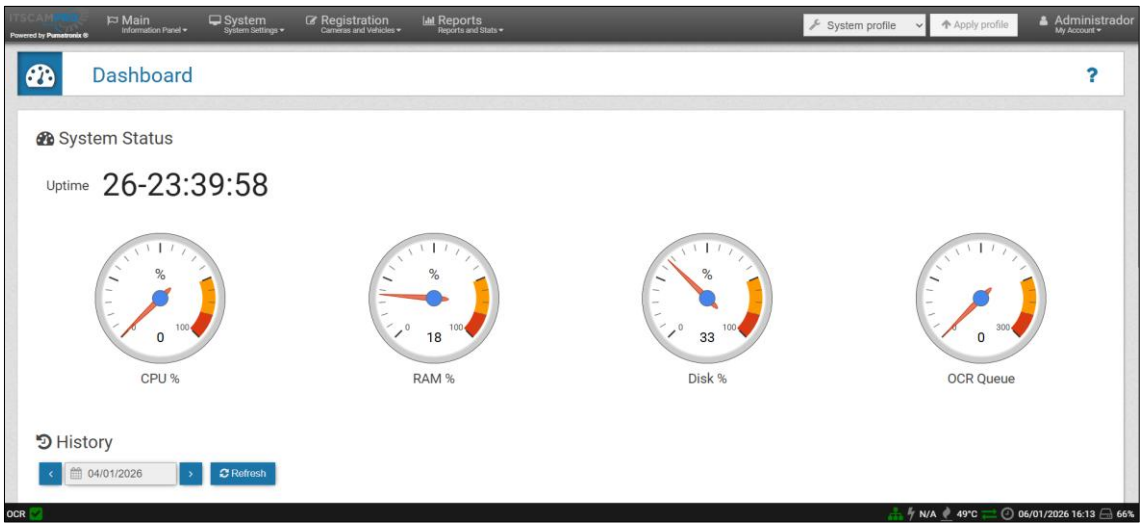


Figure 5 - Dashboard screen displaying System Status graphs

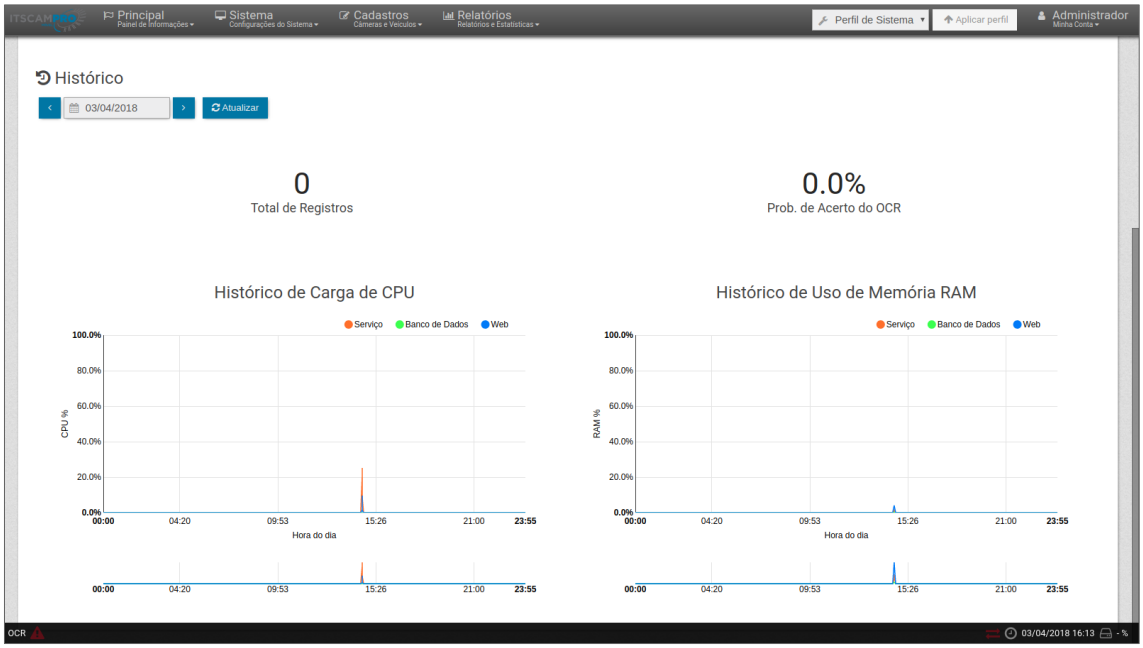


Figure 6 - Dashboard screen displaying History graphs

2.2. Registers Report

By accessing the *Report* > *Registers Report* menu, it is possible to retrieve the data from the logs stored in ITSCAMPRO Móvel using the filter options. The logs found using the filters applied in the search are listed when clicking on *Search*. When clicking on *Clear Filters*, the values applied in the search are reset. The results are presented in report format, with the filter criteria that can be applied to the search:

- *Start Date/Time*: searches by time interval by selecting the starting date and time of the period;
- *Final Date/Time*: searches by time interval by selecting the final date and time of the period;
- *Cameras*: filter the data of one or more registered image capture devices;
- *License plates*: to filter only automatically recognized license plates, unrecognized license plates or all license plates;
- *License plate*: search for a license plate of interest or part of it;
- *Country*: this allows you to search the ITSCAMPRO Mobile database for records from specific countries. An OCR license must be enabled for a country's license plate to be recognized;
- *Vehicle Type*: Option to filter by type of vehicle detected, allowing identification as *Motorcycle*, *Car*, *Bus*, *Truck* or *Unknown*;
- *Trigger Type*: filter by trigger type that can consider the triggers defined in the device's registration (*Default* option), the *Jammer Detector* trigger or both.

Filter by Vehicle Type: To search using the filter by vehicle type, the vehicle classifier license must be enabled in Hardkey and in the system.

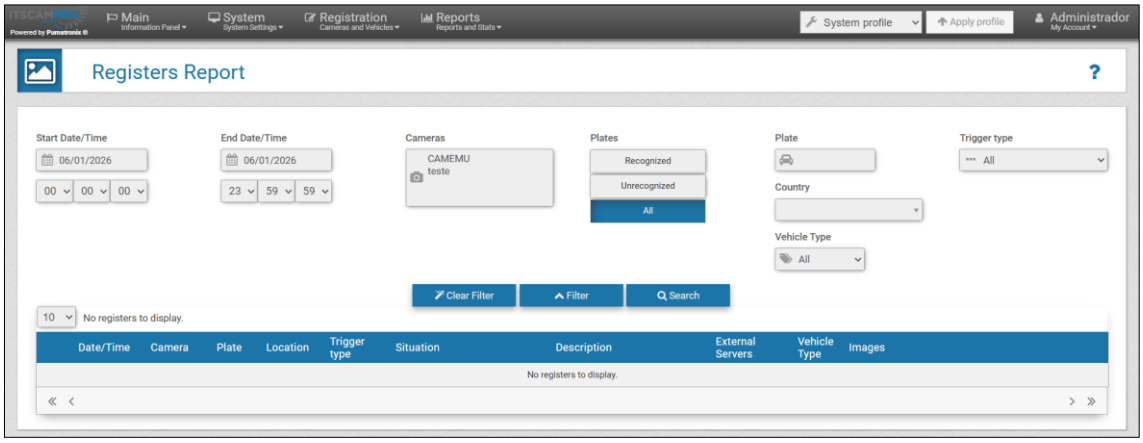


Figure 7 - Registers Report Screen

The logs located with the filter applied are listed, showing the respective data from:

- Date/Time;
- Capture device;
- Recognized license plate;
- Geographical coordinates of the device's location;
- Trigger type;
- Description added;
- Status of sending to External Servers;
- Type of vehicle detected by the Classifier;
- Images of the capture.

By selecting the logs in the selection box on the left, ITSCAMPRO Móvel displays the *Actions* button for selecting the action options for the files in the selected logs:

- *Export selected logs*: exports only the logs, in CSV format;
- *Export selected logs (with images)*: exports the logs and images in ZIP format;
- *Remove selected logs*: removes the logs from the system database.

Removing files: When performing log removal, ITSCAMPRO Móvel will completely remove the logs, including database information and images of the server's file system. This operation cannot be reversed.

2.2.1. Detailed Log Information

The log details are displayed in tabs and contain the data that can be obtained with:

- Sequence of captured images, which can be enlarged or viewed in full screen or copied (by clicking on the download button next to them);
- Log number generated in ITSCAMPRO Móvel;
- License plate read automatically. If the user has permission to change the license plate, an edit button is displayed next to it;
- Temporal information on image acquisition (date and time of capture);
- Spatial information (equipment identification and map display of geographical location, when enabled);
- Option to delete the log. If the user has permission to remove the log, the delete button is displayed;
- Vehicle details (type, origin country).

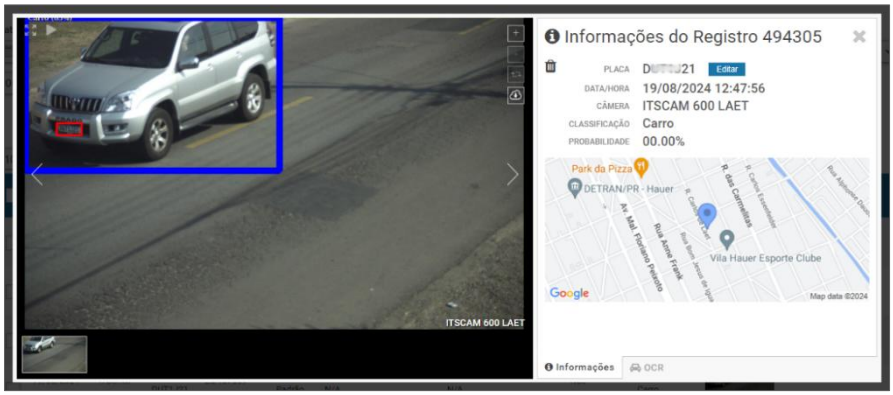


Figure 8 - Logs Information Home screen

Information on the OCR processed for the log can be obtained from the *OCR* tab and refers to:

- the time spent on the recognition;
- to the background color shown on the license plate;
- the type of license plate, which can be motorcycle or not;
- to the license plate's origin country;
- the OCR's hit probability for each identified character.

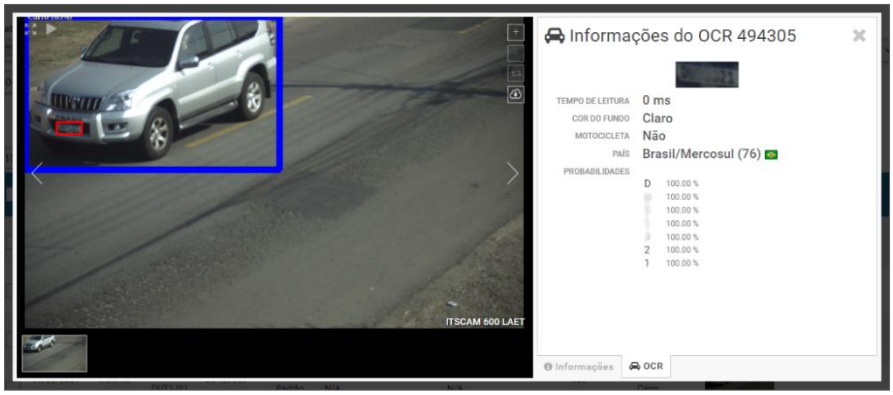


Figure 9 - Log OCR Information tab screen

On the *Sending* tab, it is possible to check the status of the logs being sent to each of the servers enabled in the system.

Figure 10 - Sending Log Information tab screen

3. Additional Documentation

Product	Link	Description
ITSCAMPRO Móvel 2.6.6	WebService Manual	Manual for integrating client solutions with ITSCAMPRO Móvel software via REST WebServices
ITSCAMPRO Móvel	Application Notes Using the Google Maps Service API Key	Step-by-step application of the Google Maps API Key in the ITSCAMPRO Móvel software and visualization of the map in the interface

4. Software Specifications

Version 2.13.0 can be used to upgrade any ITSCAMPRO Móvel System from version 2.7.2. Versions prior to 2.7.2 must be updated in conjunction with Technical Support.

ITSCAMPRO Móvel can be installed on x86 64-bit architecture computers with Ubuntu Server 20.04 and 22.04 operating systems.

To update the ITSCAMPRO Móvel for the VTR 600 and ITSCAM FF 600 products, the use of a generated firmware file is needed.

To view the interface, use the Google Chrome browser on a computer connected to the same data network as the ITSCAMPRO Móvel solution. The Pumatronix solutions that use the software are all the device models in the ITSCAM 400, ITSCAM 450 and ITSCAM 600 lines and in rotary parking enforcement.

4.1. Android Device Specifications for the Application

The ITSCAMPRO Móvel Viewer application can run on any mobile device (cell phone or tablet) with Android® operating system version 8.0 or higher.

The ITSCAMPRO Móvel application can be downloaded from the Google® Play store on the mobile device and must be enabled in the ITSCAMPRO Móvel software (by accessing *System Settings* on the interface):

Figure 11 - Mobile device display screen

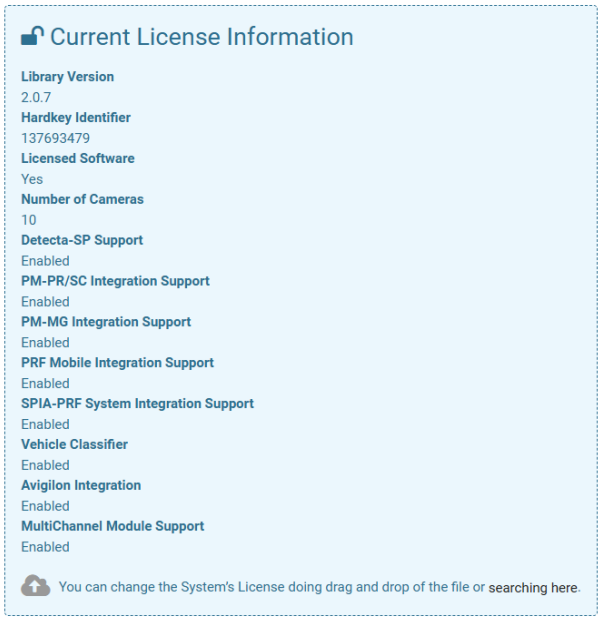
5. Licensing

The ITSCAMPRO Móvel license is a single file associated with the hardware on which the system is installed. If it is necessary to install it on an additional machine, a new license must be requested from Pumatronix Technical Support.

Changes to the number of equipment that can connect simultaneously to ITSCAMPRO Móvel can be requested from Pumatronix Technical or Sales Support.

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

ITSCAMPRO Móvel is software that requires a license to operate. This license specifies the size of the installation and the desired functionalities, and specifies when there is a device authentication error. The items that can be licensed are:



6. Initial Settings

For the ITSCAMPRO Móvel software to be used normally, some initial settings are required, such as access control, system settings and setting the date and time. These settings can be defined by accessing the *System* menu.

6.1. User Registration

ITSCAMPRO Móvel is a system with restricted access. This restriction is made through users and the content made available can be set up per account.

In the *System* menu, the *Users* option displays the accounts registered for access to ITSCAMPRO Móvel, where they can be edited, new ones added or removed. By clicking on the *+New User* button, it is possible to set up a new access to the system:

Figure 12 - Home screen in System>Users

ITSCAMPRO Móvel can operate in isolation with a large number of users, even allowing each user to have their own set up layout. ITSCAMPRO Móvel's user setting is divided into tabs and the meaning of the fields that can be filled in on the *General* tab are:

- *Name*: Name to identify and introduce the user in the system;
- *Active*: Enables or disables the user in the system;
- *Login*: Unique identifier of the user in the system;
- *Password*: User access protection to the system, with at least 6 characters and which must contain lowercase or uppercase letters combined with 1 numeral and at least 1 special character (@, #, $ or %);
- *Access Profile*: Description of what information the user has access to view and manipulate:

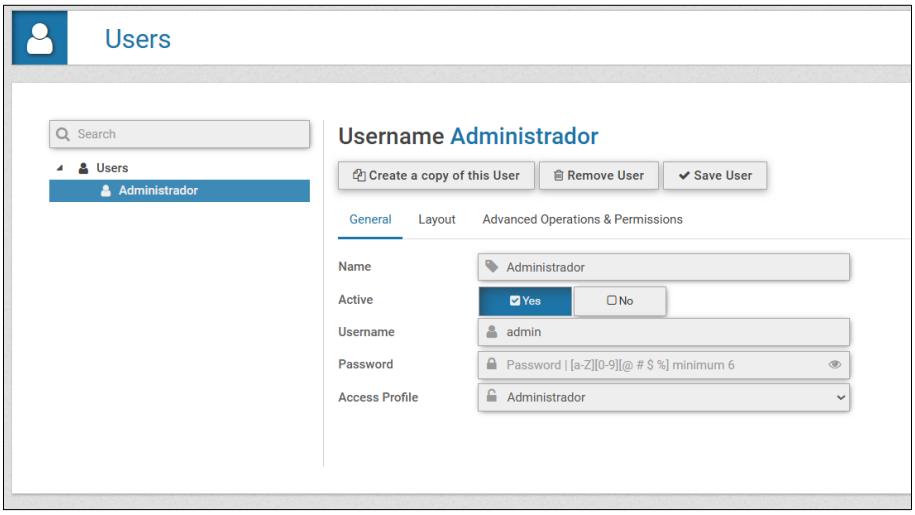


Figure 13 - User configuration screen in the General tab

On the *Layout* tab, select the layout to be displayed on the ITSCAMPRO Móvel *Control Panel* screen (home screen), which is available for quick set up by clicking on the user's name in the menu bar:

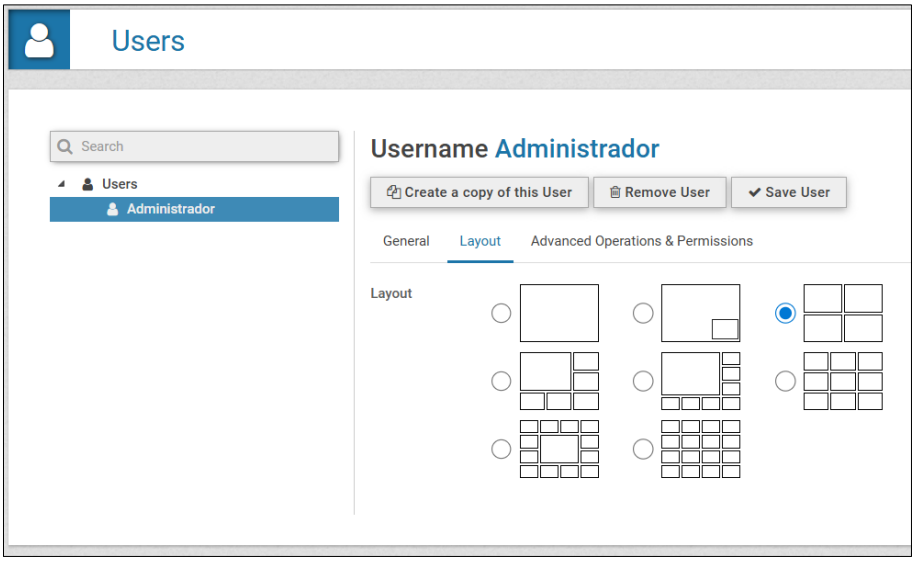


Figure 14 - User settings screen in the Layout tab

In the *Advanced Operations and Permissions* tab it is possible to set up *Auto-Login*. This function will only work properly when using the system directly on the computer running ITSCAMPRO Móvel, as it allows enabling or disabling automatic login for the user:

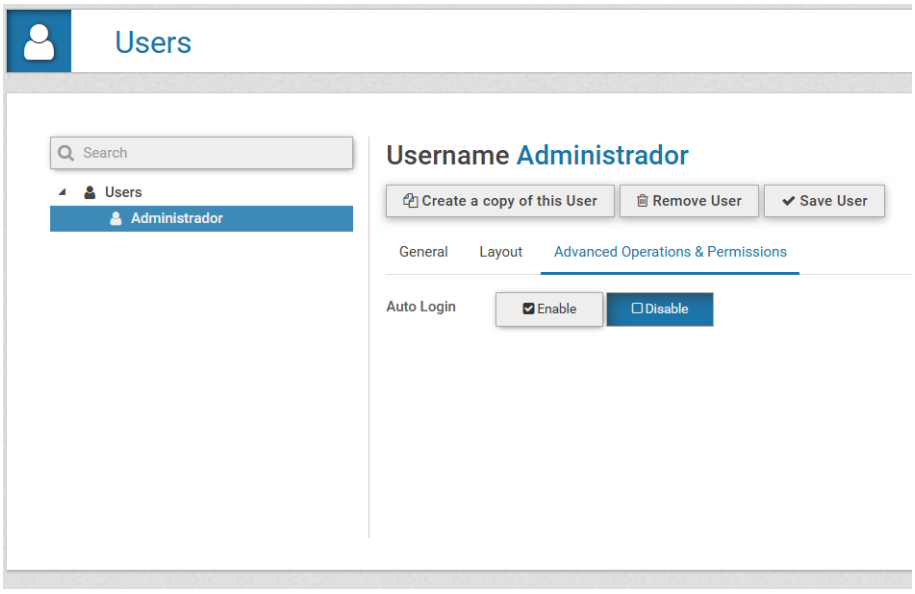


Figure 15 - User settings screen in the Advanced Operations and Permissions tab

6.2. Access Profiles

The users created must be associated with one of the *Access Profiles* set up. The different profiles created make it possible to restrict the level of access permission, considering which screens the user will be able to access when logging into the system. The factory default *Access Profiles* are named *Administrator* and *Operator*.

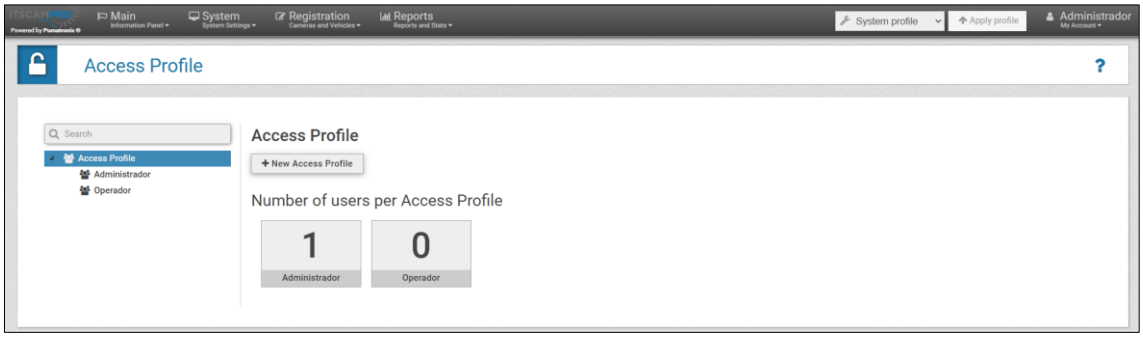


Figure 16 - System > Access Profiles Home screen

In addition, the profile's permission level is set, which can be *Read Only*, which does not allow any changes to be made to the system, or *Administrator*, which has access to all screens:

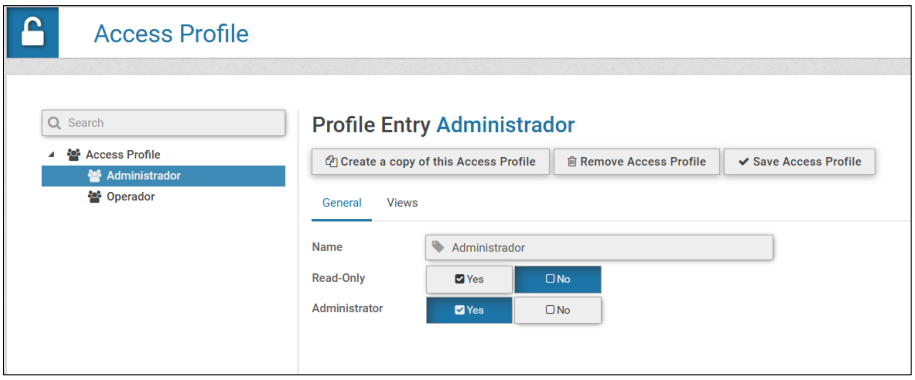


Figure 17 - Screen for creating an Access Profile in the General tab

The *Screens* tab selects the screens to which the profile allows access:

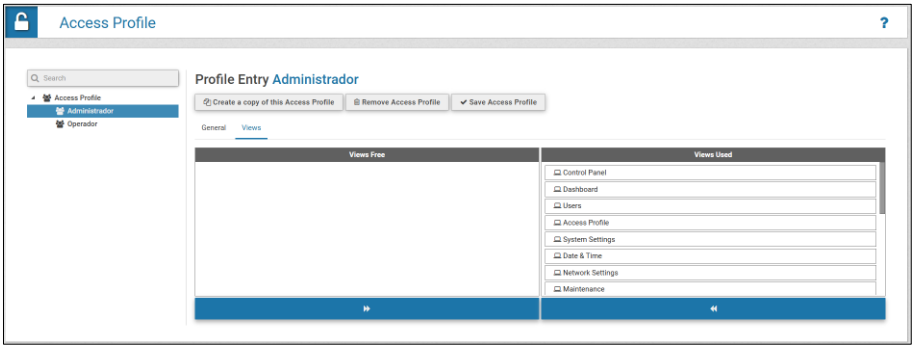


Figure 18 - Screen for creating an Access Profile in Screens tab

6.3. System Settings

When accessing the *System > System Settings* menu, the ITSCAMPRO Móvel configuration categories are grouped and arranged in tabs on the left of the screen, with the *General* tab for the most basic system settings:

- *Language*: Select the language to be used on the interface, choosing Portuguese, English or Spanish;
- *System Name*: Enter an ID that will be displayed on the login screen;
- *System Description*: Insertion of a description of the system to be displayed on the login screen;
- *System Logo*: Insertion of a logo to be displayed on the login screen;
- *Enable Panoramic Camera*: Allows enabling and disabling the use of panoramic image capture devices in the system;

- *Enable OCR off*: Allows enabling and disabling the button that turns off a device's OCR. These buttons are located at the bottom of the image region of the *Control Panel* and change color depending on the equipment's operating status;
- *Automatic login for remote clients*: Allows or prohibits remote clients from automatically logging into the system;
- *Equipment name/ID*: Equipment name or identifier. This information is used by the sending protocol for FTP;

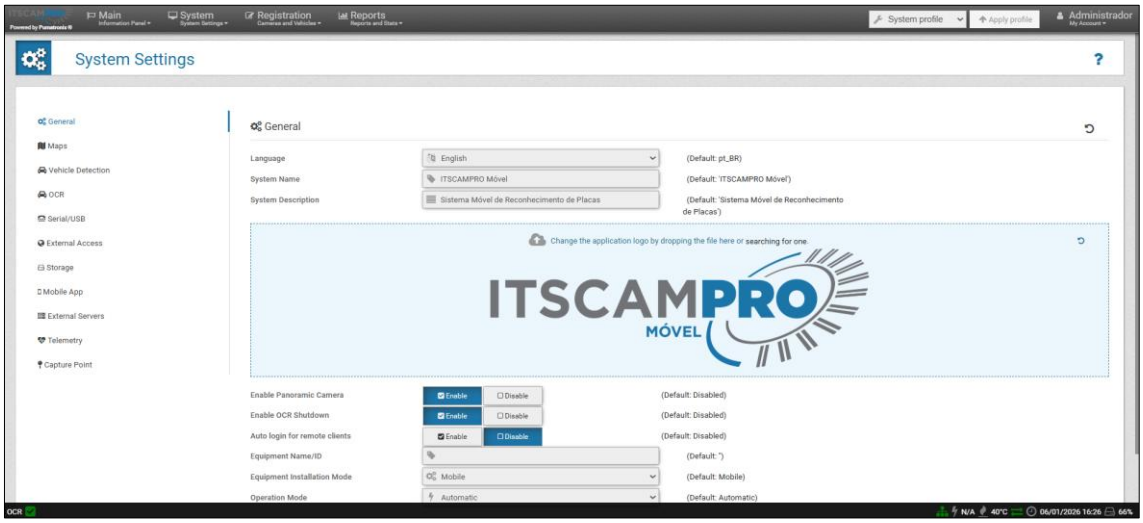


Figure 19 - General System settings home screen

- *Equipment Installation Mode*: Equipment operating mode. It can operate in three modes: *Mobile* (installed on vehicles), *Static* (on tripods) or *Fixed* (installed on poles):
  - *Latitude*: Geographical latitude coordinate of the installation configured as in *Fixed* mode;
  - *Longitude*: Geographical longitude coordinate of the installation configured as in *Fixed* mode;
- *Operating Mode*: Defines whether the system goes into operation as soon as it is started in *Automatic* mode or whether it requires user intervention when the *Manual* option is selected.

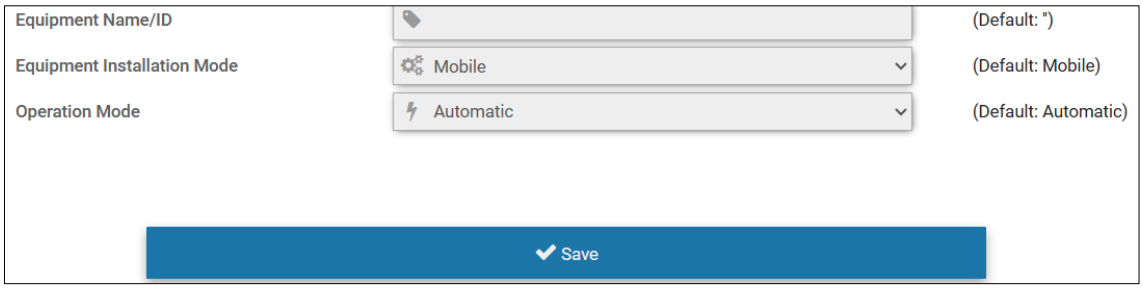


Figure 20 - General System settings screen

6.3.1. Operating Mode

When accessing the system, it may be necessary to activate the start of operation, depending on how the *Operation Mode* is set, as it allows you to set up the triggering of ITSCAMPRO Móvel to start reading the OCR and making logs manually or automatically. In *Automatic* mode, operation is started automatically together with the system. When *Manual* mode is selected, the operation only starts when the user clicks on the *Start Operation* button in the menu bar:

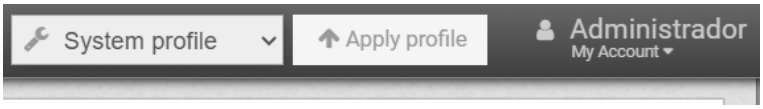


Figure 21 - Location of the Start Operation button

Before starting the operation in *Manual* mode, the data of the user responsible for starting the operation of the ITSCAMPRO Móvel system must be entered:

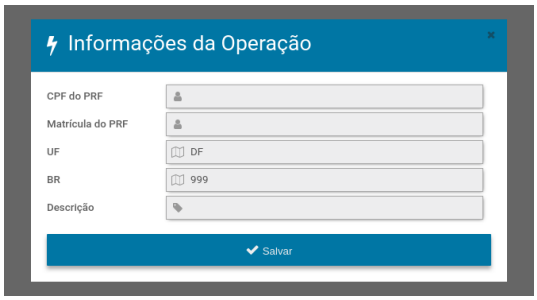


Figure 22 - Screen indicating the data of the user responsible for starting the operation

6.3.2. Maps

Google's geolocation platform (Google Maps) can be used within the ITSCAMPRO Móvel system. This feature allows displaying the location of the installed equipment on the map provided, along with the details of the registration made. To acquire the API Key provided by Google Maps, please refer to the requirements and necessary steps presented in the Application Notes for Using the Google Maps Service API Key.

- *Google Maps key*: Insertion of the key that allows the use of the Google Maps API, available from Google:

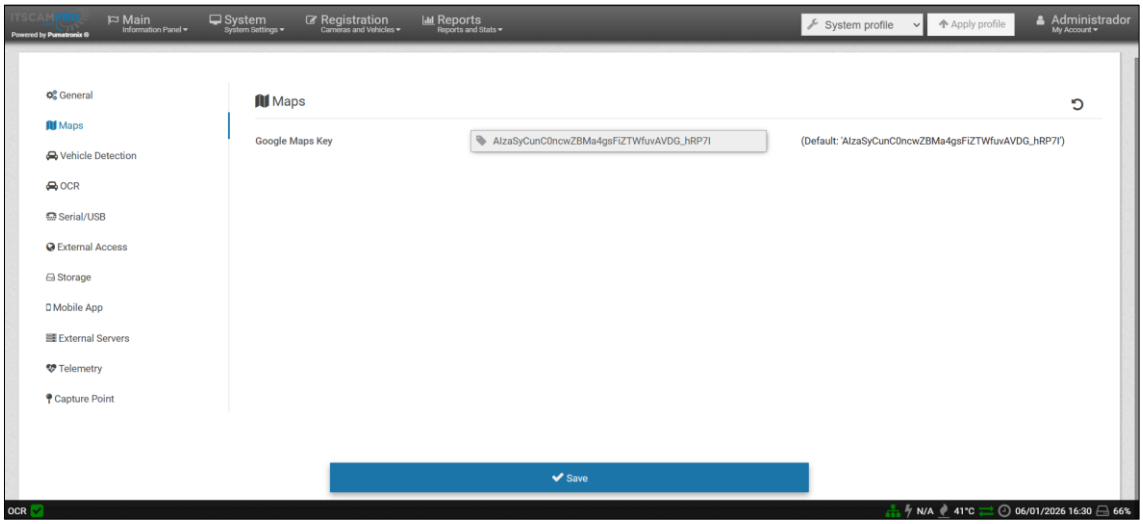


Figure 23 - Maps settings home screen

6.3.3. Vehicle Detection

In the *Vehicle Detection* tab it is possible to change a series of settings that enable the system to operate in a wide variety of environments:

- *Adaptive Detector Control*: Enables or Disables adaptive control of the vehicle detection algorithm;
- *Motion Detector Sensitivity*: Selecting the sensitivity for detecting movement in the image. The more sensitive the detector is, the less immune it is to ambient noise;

- *Motion Detector Trigger*: Selection of the amount of movement in the image that will be considered as a trigger for OCR;
- *Global Recog. Queue*: Enables or disables the equipment's global recognition queue, which prevents duplicate logs. When *Disabled*, adjustments must be made to each image capture device registered, and duplicate logs may occur in the system, depending on the solution used. When *Enable*, the settings refer to all logs received:
    - *Number of Recognitions*: Selection of the number of consecutive recognitions of the same license plate for it to be considered valid;
    - *Vehicle Queue Size*: Selection of the number of license plates that must be read until the first one is read again;
    - *Length of Time in Queue*: Selection of the maximum time a license plate can remain in the queue. If the time is set to a value other than 0 (zero), the license plate can be read again and can remain between zero and ten minutes.

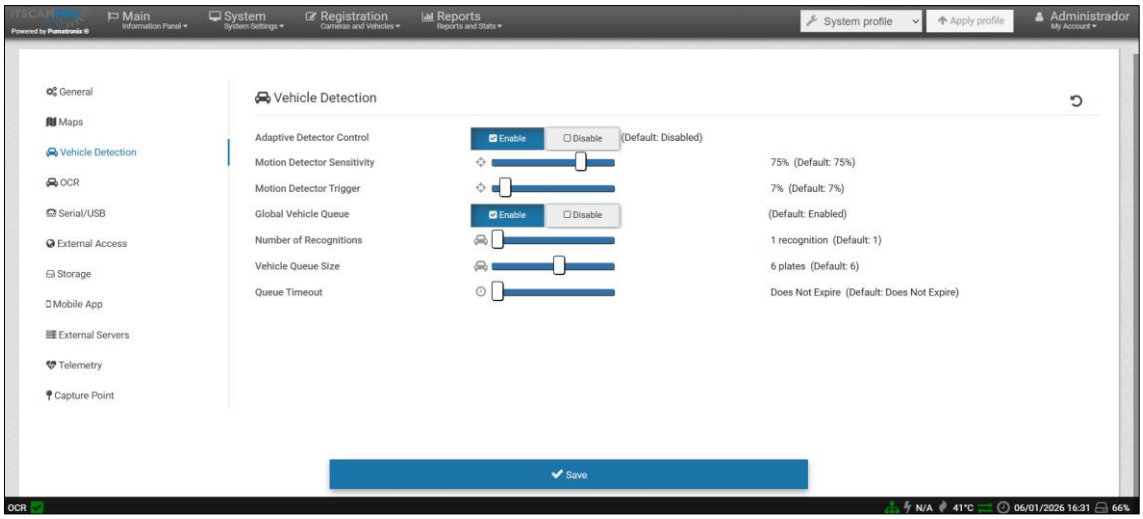


Figure 24 - Vehicle Detection settings home screen

6.3.4. OCR Settings

6.3.4.1. OCR Jidosha

The Jidosha option performs OCR on the device on which ITSCAMPRO Móvel is installed, meaning that the processing required to automatically identify the characters on the license plate image does not use any additional hardware. For the *Jidosha* option, the settings for the parameters must be assigned:

- *Number of OCR Processes*: Selection of the number of vehicle detection processes to be carried out in the system. Can be set to the maximum allowed by the system;
- OCR Queue Size: Selecting the number of images that can remain in the queue for OCR processing;
- *OCR type*: Selection of the type of OCR that will be used, which can be local only in the case of Jidosha or distributed with MAPs;
- *Vehicle Type*: Selecting the type of license plates the OCR will recognize;
- *OCR mode*: Selection of the image processing mode, which directly affects the license plate reading time;
- *OCR timeout*: Selection of the maximum time that the OCR algorithm will process each image frame;
- *Countries*: Selection of the country to be considered in the OCR processing of the images, available for the version. The operation of license plate reading is conditional on the release of the country in the license file and can be made available between the options: Argentina, Bolivia, Brazil/Mercosur, Chile, Colombia, Conesur, Costa Rica, Egypt, Ecuador, the United States of America, France, the Netherlands, Italy, Mexico, Panama, Paraguay, Peru, the European Union and Uruguay;

- *Minimum Character Probability*: Selection of the probability of similarity between the letter that was extracted from the photo and a letter in perfect capture conditions, used to consider a valid character;
- *Low Probability Character*: When the OCR has been set for a lower minimum number of characters than the maximum, it may return a partial license plate reading;
- *Low Probability Character*: character to be included in positions where the characters do not have the minimum probability of certainty;
- *Average License Plate Angle*: Selection of the standard average degree of tilt of the license plate in the image;
- *Average Character Tilt*: Selection of the degree of standard average tilt of the license plate characters in the image;
- *Minimum Character Width*: Selection of the minimum width required for a character to be considered valid;
- *Average Character Width*: Selection of the average width considered in character validation;
- *Maximum Character Width*: Selection of the maximum width allowed for a character to be considered valid;
- *Minimum Character Height*: Selection of the minimum height required for a character to be considered valid;
- *Average Character Height*: Selection of the average height considered in character validation;
- *Maximum Character Height*: Selection of the maximum height allowed for a character to be considered valid;
- *Number of Lanes*: Selecting the number of lanes being monitored per image capture device. Indicates the maximum number of license plates that will be read per image;
- *Maximum OCR FPS*: Selection of the maximum number of images to be processed per second. By default, the system runs as much as the processor can process.

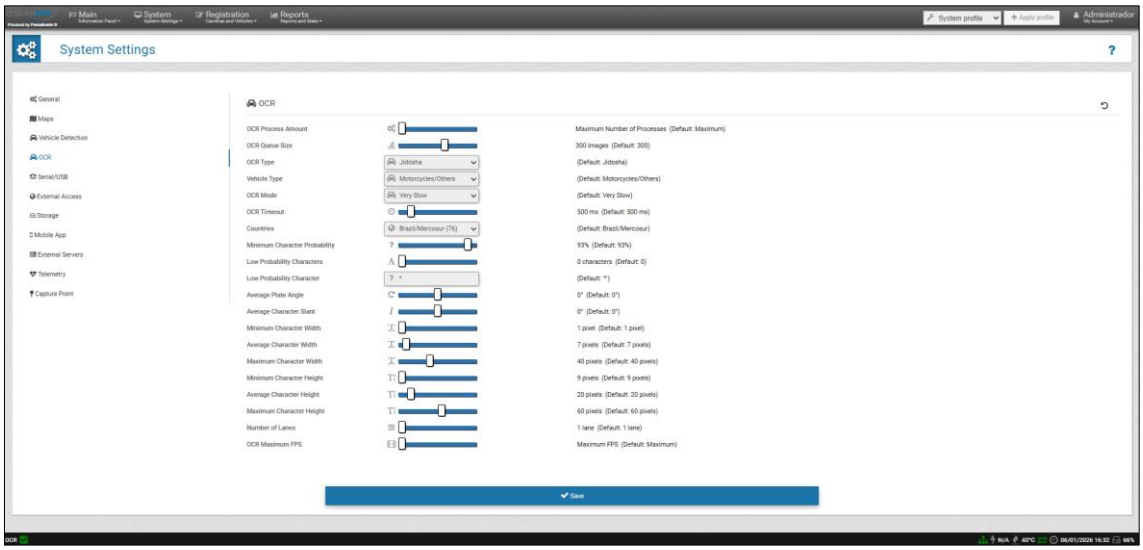


Figure 25 - OCR reading settings home screen

6.3.4.2. OCR Jidosha MAP

When using *Jidosha MAP* as a mechanism for reading license plates, the OCR software is executed inside the MAP - Processing Accelerator Module. The settings required to identify the license plates in the images are maintained*, as indicated in *OCR Jidosha*, with the only addition being the information on the MAP that will perform the OCR:

- *Address*: MAP address for connection;
- *Port*: Port that will be used to receive images;
- OCR Queue Size: Size of the OCR queue that MAP will use.

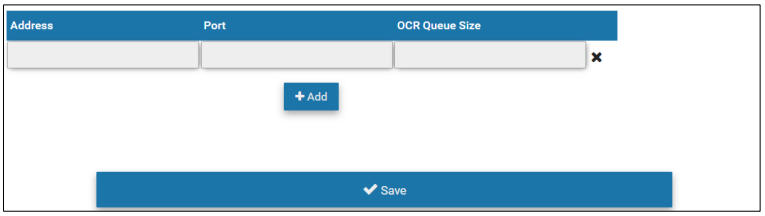


Figure 26 - Jidosha MAP OCR reading settings screen in OCR settings

*The selection of the country to be considered in image OCR processing, applicable to *Jidosha MAP*-type OCR processing, is compatible with version 3.17.0 of the *Jidosha* library, which includes the following countries: Argentina, Brazil/Mercosur, Chile, Colombia, Conesur, Costa Rica, Egypt, the United States of America, France, the Netherlands, Mexico, Panama, Paraguay, Peru, the European Union and Uruguay.

6.3.5. Serial/USB devices

The settings tab for serial/USB devices allows you to parameterize the *GPS* and the *Surveillance* license plate:

- *Enable GPS*: Enables or disables the use of the GPS device in ITSCAMPRO Móvel with support for GPS equipment using the Galileo, BeiDou, GLONASS, GNSS and QZSS satellite systems;
- *Baudrate*: Selecting the communication rate at which the device works;
- *Data Bits*: Selection of the number of data bits the device uses, between the values of 5, 6, 7 or 8;
- *Stop Bits*: Selection of the number of stop bits the device uses, between the values of 1, 1.5 or 2;
- *Parity*: Select the type of parity to be used when communicating with the device from the *Odd*, *Even*, *Brand* and *Space* options;
- *Enable Supervisor*: Enables or disables the use of the Surveillance in ITSCAMPRO Móvel;
- *Surveillance Model*: selection of the hardware model for monitoring equipment operation. In the *Evasion* model, the supervision of fixed equipment is widely used in Toll Evasion installations;
- *Maximum Time*: Selection of the maximum time the *Surveillance*should wait before acting;
- *Interval between Pings*: Selection of the waiting time between keep-alive communications with the *Surveillance* license plate.

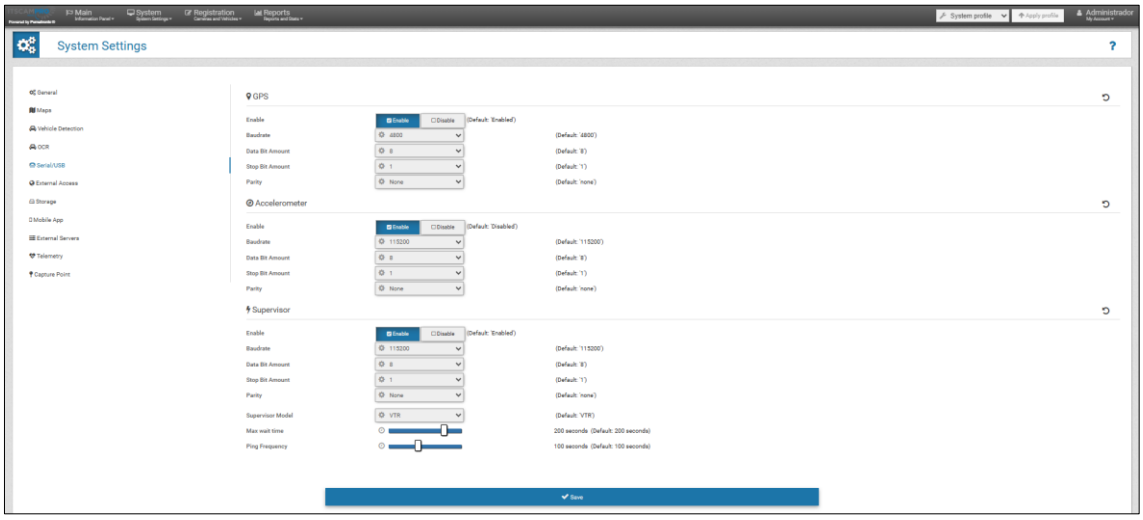


Figure 27 - GPS and Surveillance license plate settings screen

6.3.6. External Access

The *External Access* setting allows changing the ports used to access the system.

- *Service Communication Port*: Port that the system must use to communicate with the ITSCAMPRO Móvel service, with 2005 being the default port used. In the case of external access, it is necessary to include the forward network of this port to the server's IP;
- *Interval Start Port for MJPEG*: In order to be able to view the online video from the devices via NAT, configuring which port range the video will be generated on is needed. In this field, the starting port for the interval is configured, with 10000 being the default port used;
- *Interval Final Port for MJPEG*: In order to be able to view the online video from the devices via NAT, configuring which port range the video will be generated on is needed. In this field, the final port for the interval is configured, with 20000 being the default port used.

These communication ports are configurable and use the TCP protocol, as are the input ports that are fixed and can be used, such as port 80 for the graphical interface and port 22 reserved for maintenance access, which is not mandatory. The outgoing ports are used according to the scenario: when ITSCAMPRO Móvel communicates to ITSCAMPRO, the default port used is 9000; when ITSCAMPRO Móvel communicates to the WebService, the same port as the webservice must be used.

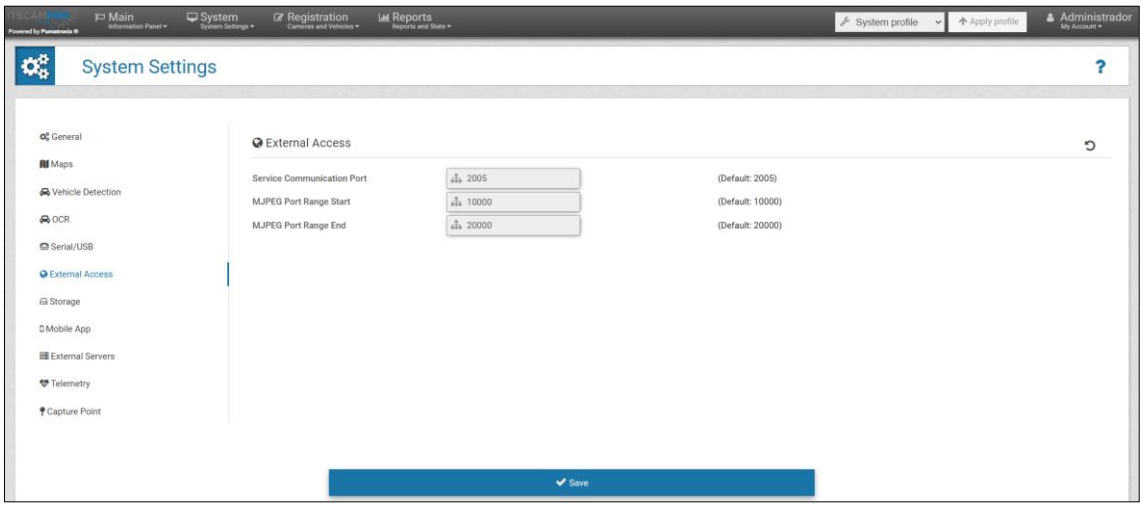


Figure 28 - External access settings screen

6.3.7. Storage

Storage control settings in ITSCAMPRO Móvel:

- *Log History*: Selecting how long images can remain stored in the ITSCAMPRO Móvel database. In *Unlimited* mode, the logs in the database will never be deleted, only the oldest ones can be deleted if the *Minimum Free Storage* is reached;
- *Minimum Free Storage*: Selection of the minimum percentage of free space that must be kept on the hard disk, ensuring stable operation of ITSCAMPRO Móvel. When the minimum percentage is reached, the system recovers itself by cleaning up the oldest images;
- *Storage Cleaning Margin*: Selection of the percentage of disk space that will be freed when the limit is reached, with each storage cleanup carried out (e.g. 10% minimum and 5% margin set, at the end of the cleanup the storage will have 15% free space). Prevents the system from cleaning up each new image when the hard disk is at its lowest limit;

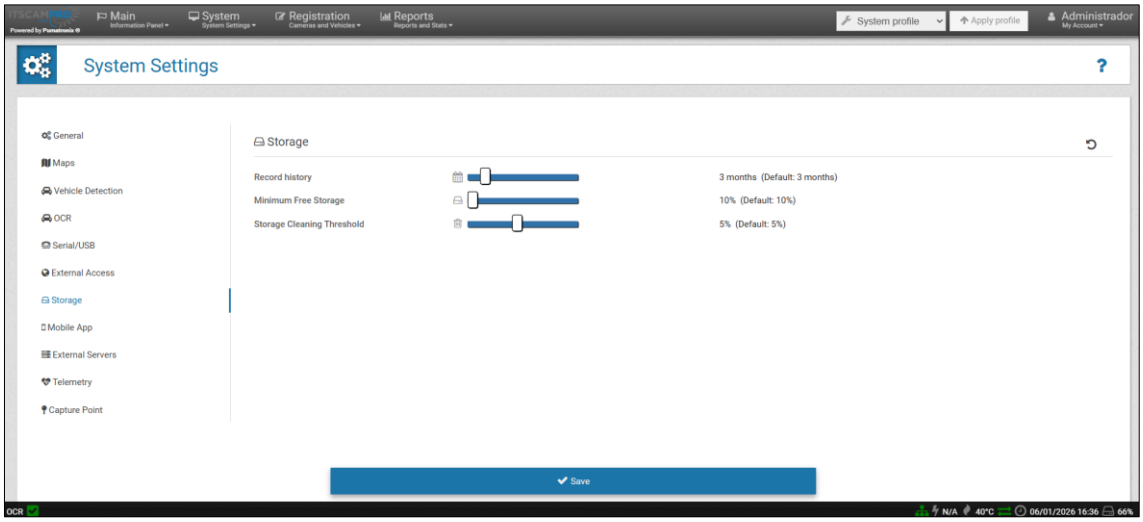


Figure 29 - Data storage settings screen

6.3.8. Mobile Application

Settings for communication between ITSCAMPRO Móvel and the mobile application:

- *Enable Mobile Application*: Enable or disable integration with the mobile app;
- *Mobile Application Port*: Enter the port that will be used to communicate with the mobile application (the network infrastructure must support this configuration).

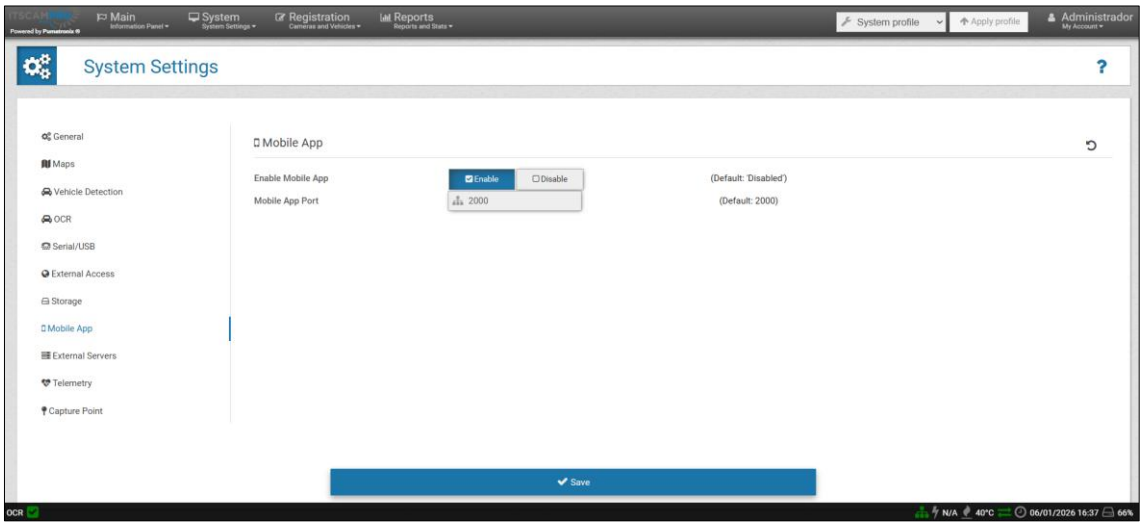


Figure 30 – Mobile application access settings screen

6.3.9. External Servers

ITSCAMPRO Móvel integration settings with external servers for sending data. When enabling the server, the respective fields for configuration are made available. You can check the status of each log in the *Log Report* and the *Log Information* screen.

6.3.9.1. ITSCAMPRO

Integrates ITSCAMPRO Móvel with the ITSCAMPRO server:

- *ITSCAMPRO host*: IP or URL of the ITSCAMPRO server.

- *ITSCAMPRO Port*: Port that will be used to communicate with ITSCAMPRO.

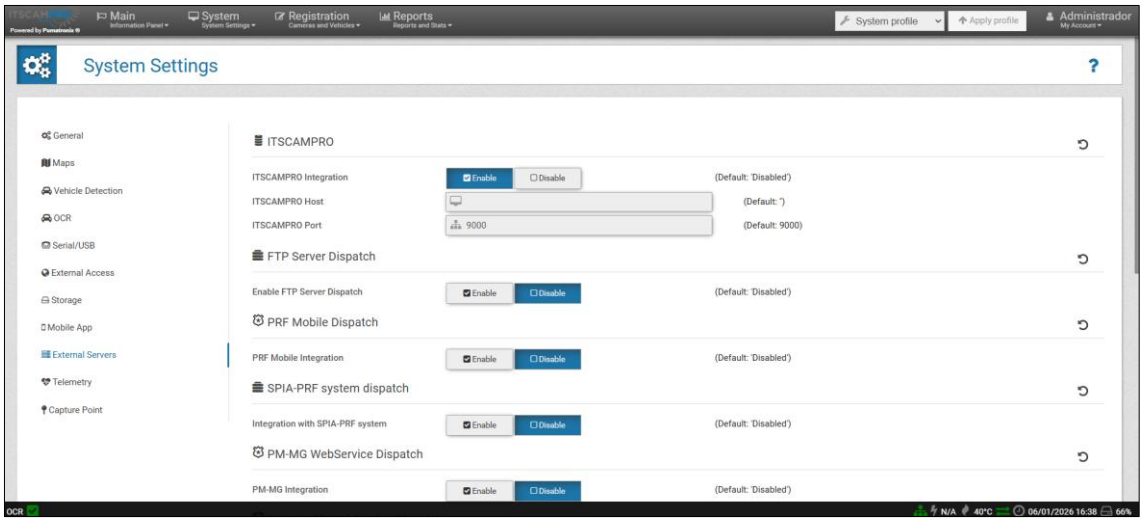


Figure 31 - External servers settings home screen

6.3.9.2. Send to FTP Server

Allows saving files to a server via FTP (*File Transfer Protocol*):

- *Protocol*: Allows choosing the FTP protocol;
- *Send empty license plate*: Enables/Disables sending logs to the FTP server that consider the license plate field to be empty;
- *Destination Validation*: Allows the user to enable/disable validation of the FTP destination address;
- *Passive Mode*: Allows the user to enable/disable passive mode when accessing the FTP server;
- *Send All Exposures*: If enabled, it sends all capture exposures to the FTP server. If disabled, only the first exposure is sent;
- *Send Panoramic Images*: Enable/disable the sending of panoramic images to the FTP server;
- *FTP Server Host*: Address that will be used to communicate with the FTP;
- *FTP Server Port*: Port to be used for communication with the FTP server;
- *FTP Server Username*: Login user for the FTP server;
- *FTP Server Password*: Password for logging in to the FTP server;
- *File Name Format*: Allows customizing the name format of the files to be saved on the FTP server. The tags that can be used in the filename format and which are replaced by dynamic information are:
    - `<datetime></datetime>`: Replaced by the date/time of capture. Allows formatting (yyyy - year | MM - month | dd - day | HH - hour | mm - minutes | ss - seconds);
    - `<cameraname></cameraname>`: Replaced by the name of the device;
    - `<cameratype></cameratype>`: Replaced by the type of device, represented by the letters O (OCR) or P (Panoramic);
    - `<equipment></equipment>`: Replaced by the equipment identifier;
    - `<captureid></captureid>`: Replaced by the capture identifier. Allows formatting (%010d - always use 10 digits with leading zeros);
    - `<plate></plate>`: Replaced by the license plate read by the OCR;
    - `<imageid></imageid>`: Replaced by the image identifier;
    - `<expo></expo>`: Replaced by the image exposure number. Allows formatting (%03d - always use 3 digits with leading zeros);
- *File Format*: ITSCAMPRO Móvel can save images in one of three formats:
    - *JPEG*: Standard system image format;
    - *PNG*: Vector format, but with data compression;

- *WEBP*: Vector format developed by Google with 26% more compression than PNG and 34% more compression than JPEG.

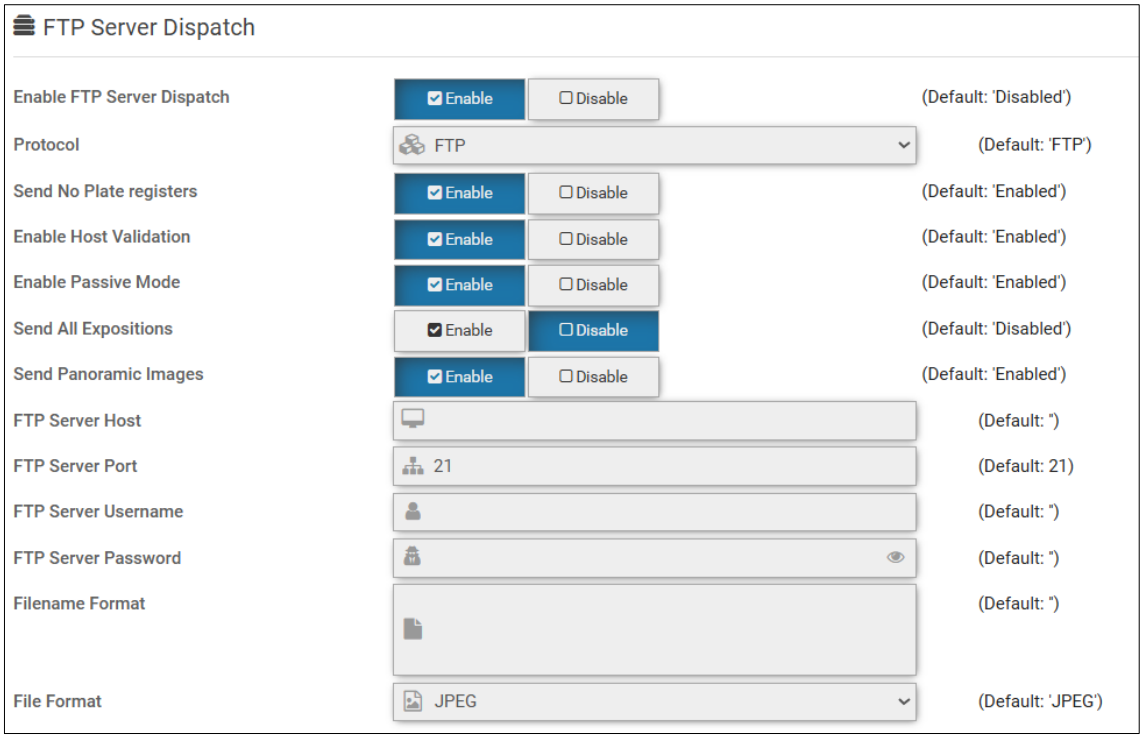


Figure 32 - Send to FTP Server settings screen

6.3.9.3. REST Web Service

It integrates ITSCAMPRO Móvel with systems that use Web Service REST architecture:

- *Web Service URL*: URL of the application server;
- *Number of Attempts*: Number of sending attempts;
- *Connection Timeout*: Maximum time waiting for a connection to return, in milliseconds;
- *Reading Timeout*: Maximum time waiting for a return of the information sent, in milliseconds;
- *Web Service Type*: Format of the data to be sent and received in the web service;
- *Filter by GPS accuracy (HDOP)*: Filters the sending of captures based on the accuracy of the GPS reading (HDOP), with the possibility of not sending logs whose accuracy is below the level selected as acceptable to the configured REST Web Service:
  - *Disabled*: Logs will not be filtered by GPS accuracy;
  - *Ideal (<= 1.00)*: Highest level of confidence, with the highest possible precision at all times;
  - Excellent or better (<= 2.00): Precise measurements;
  - *Good or better (<= 5.00)*: Measurements with adequate precision;
  - *Moderate or better (<= 10.00)*: Moderate quality. Recommended correction;
  - *Poor or better (<= 20.00)*: Low confidence level. Consider discarding data;
- *Log ID Field Name*: Identifies the log's unique identifier field. If not filled in, it will not be added to the sending;
- *Date/Time Field Name*: Identifies the date/time field. If not filled in, it will not be added to the sending;
- *License Plate Field Name*: Identify the license plate field. If not filled in, it will not be added to the sending;
- *Country Code Field Name*: Name of the field for the license plate country code (codes use ISO-3166). If the field is left blank, the information will not be sent;

- *Equipment ID Field Name*: Identifies the equipment identifier field. If not filled in, it will not be added to the sending;
- *Camera ID Field Name*: Identifies the device identifier field. If not filled in, it will not be added to the sending;
- *Latitude Field Name*: Identifies the latitude field. If not filled in, it will not be added to the sending;
- *Longitude Field Name*: Identifies the longitude field. If not filled in, it will not be added to the sending;
- *HDOP Field Name*: Identifies the field responsible for sending the horizontal accuracy of the GPS at the time the log was captured.

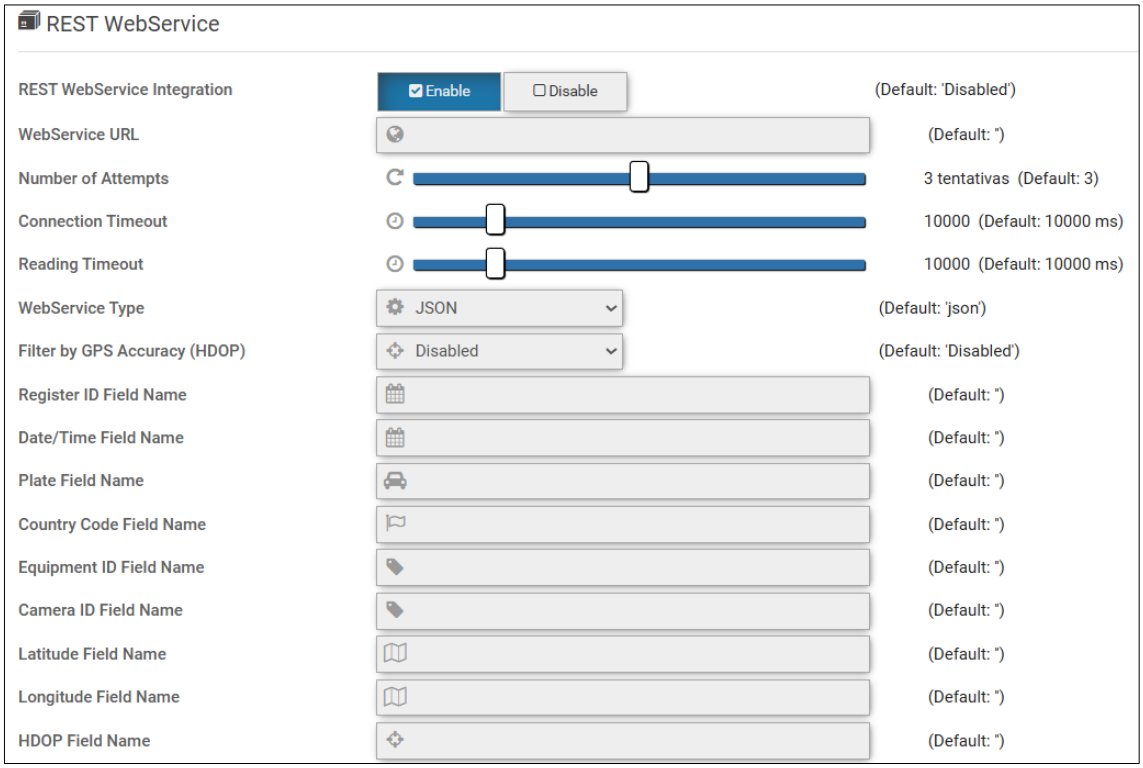


Figure 33 - REST Web Service settings home screen

- *Image Field Name*: Identifies the image field. If not filled in, it will not be added to the sending;
- *Global Prob.*: Identifies the field of global probability of reading the license plate. If not filled in, it will not be added to the sending;
- *Prob. By Character*: Identifies the probability field by license plate character. If not filled in, it will not be added to the sending;
- *Vehicle monitoring data*: Identifies the field for vehicle monitoring data. If not filled in, the information will not be sent;
- *Logged-in Users*: Allows sending logged-in users via REST;
- *Vehicle Type Field Name*: Allows setting the name of the JSON or Part field that will have the vehicle class, if it remains empty the field will not be included in the request;
- *Prob. Vehicle Type Field Name*: Allows setting the name of the JSON field or Part that will have the probability of certainty of the class, if it remains empty the field will not be included in the request.

Figure 34 - REST Web Service settings screen

6.3.9.4. Lince

It integrates ITSCAMPRO Móvel with the Pumatronix Lince system:

- *Environment*: Select the Lince environment that will receive the captured events, from the *Development*, *Homologation* and *Production* options;
- *Customer Identifier*: Unique customer identifier in the Lince cloud. This information can be found by viewing the account data in the Lince;
- *Authentication Code*: Client authentication token with the Lince cloud. This information can be found by viewing the account data in the Lince;
- *Connection Timeout*: Allows changing the maximum time to establish a connection with the Lince platform, in milliseconds;
- *Reading Timeout*: It allows changing the maximum time to receive a return from the information sent to the Lince platform, in milliseconds;

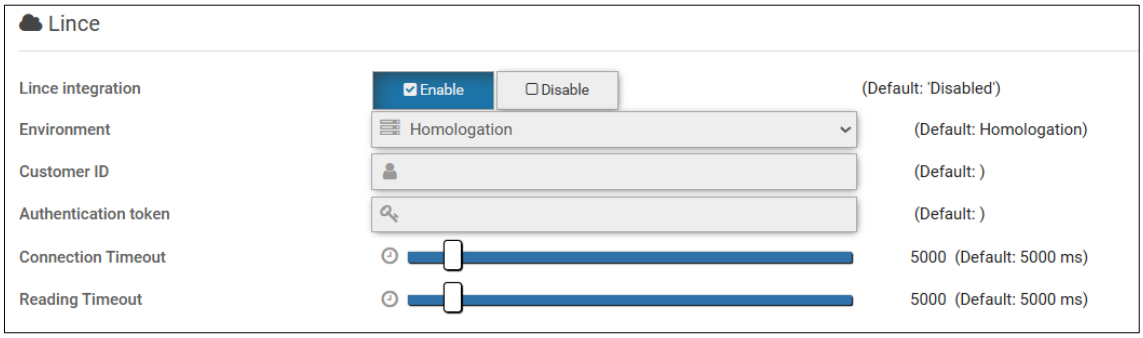


Figure 35 - Lince integration settings screen

6.3.9.5. Avigilon

Integrates ITSCAMPRO Móvel with an Avigilon server:

- *Connection Port*: Port to be used for communication with the Avigilon server.

The other fields follow the same formatting and can be found at REST Web Server.

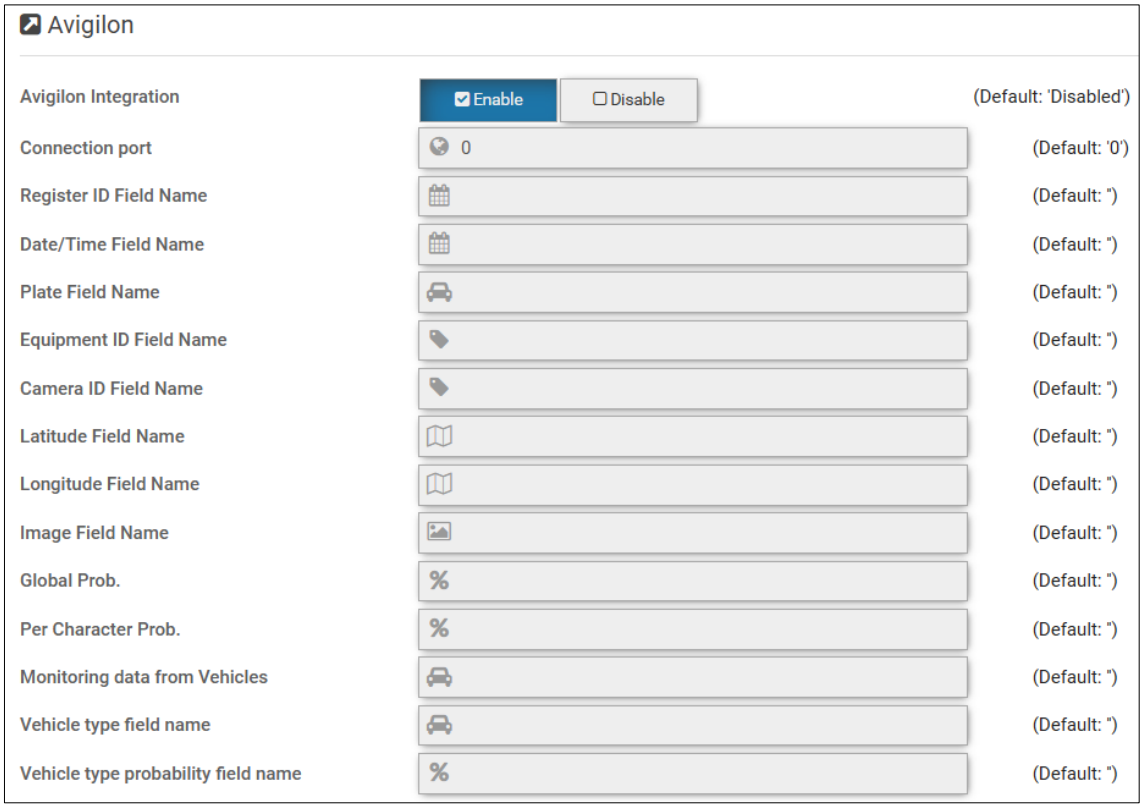


Figure 36 - Avigilon integration settings screen

6.3.9.6. Integration with Perkons and Atlanta

For the integration of ITSCAMPRO Móvel to the Perkons server and Atlanta server to work correctly, it is necessary to set up the *Site* information in the Atlanta system in the *Equipment Name/ID* field and it is necessary to fill in the device id for the Atlanta system in the *External ID* field of the device configuration in *Register > Cameras*.

- *URL for Perkons Server*: URL address of the Perkons server;
- *URL to Atlanta Server*: URL address of the Atlanta server;
- *Number of attempts*: select the maximum number of attempts to connect to the server;
- *Maximum connection time*: select the maximum waiting time to connect to the server;
- *Maximum response time*: select the maximum response time for the server;
- *Send images to all*: when disabled, the device only sends images of license plates that are restricted in the Perkons/Detran database, when enabled it sends images to all traffic;
- *Authorization Token*: Atlanta server authorization token.

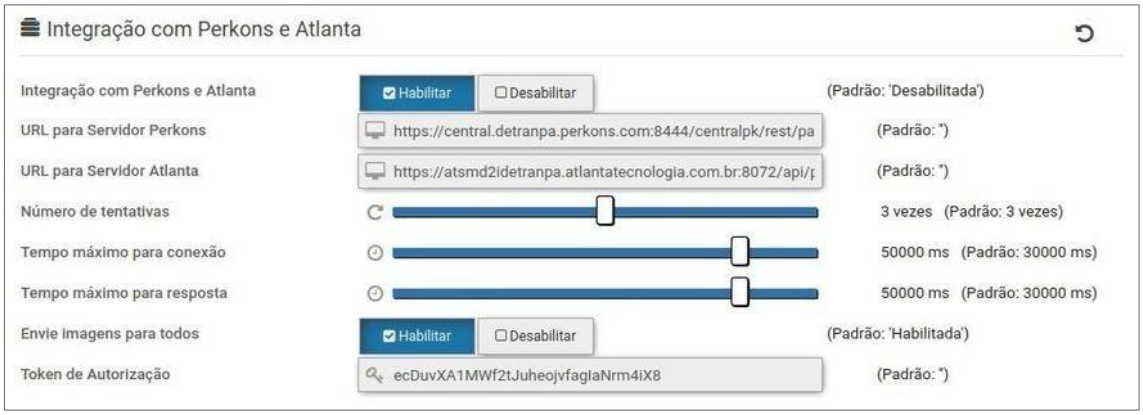


Figure 37– Perkons and Atlanta integration settings screen

6.3.9.7. LEARN Manager

Integrates ITSCAMPRO Móvel with the LEARN Manager system:

- *Web Service URL*: Address of the server sending the logs;
- *Number of Attempts*: Number of sending attempts before cancellation;
- *Connection Timeout*: Maximum time waiting to connect to the server, in milliseconds;
- *Reading Timeout*: Maximum time waiting for a return of the information sent, in milliseconds;
- *System*: Indication of which of the systems configured in LEARN Manager the device should send the logs to;
- *User Agency*: Indicates which agency the LEARN Manager platform user is linked to, as it allows agencies to be created within the same system and each agency can have access to different return information;
- *User*: User login with access to the platform;
- *Password*: User password on the platform for authenticating the session with LEARN Manager;
- *Equipment Type*: Selecting which equipment the LEARN Manager system is receiving logs from, which can be *Mobile Equipment* (VTR 600) or *Fixed Equipment* (ITSCAM FF 600).

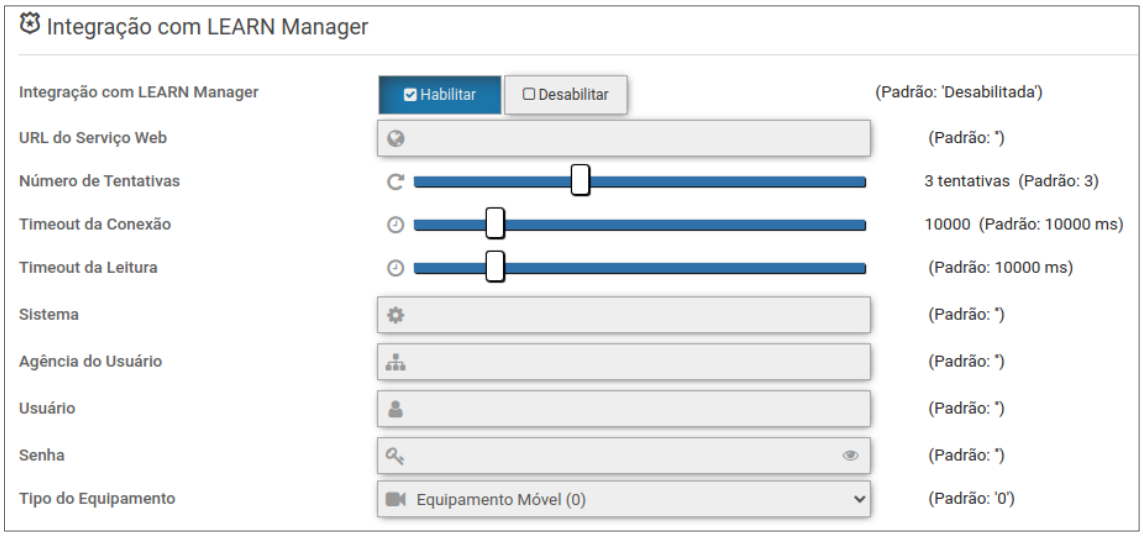


Figure 38 - LEARN Manager integration settings screen

6.3.9.8. PRF Mobile

Integration of ITSCAMPRO Móvel with the PRF (Brazilian Federal Highway Police) system, following the specified protocol.

- *Number of Attempts*: Maximum number of attempts to send a log to the server before it is canceled;
- *Connection Timeout*: Maximum time waiting to connect to the server, in milliseconds;
- *Reading Timeout*: Maximum time waiting for a return of the information sent, in milliseconds;
- PRF's CPF (Social Security Number): PRF Officer's Social Security Number;
- *PRF Registration*: PRF Officer's Registration Number;
- *UF*: State Identification;
- *BR*: Country Identifier;
- *Description*: Optional field for identifying the Operation.

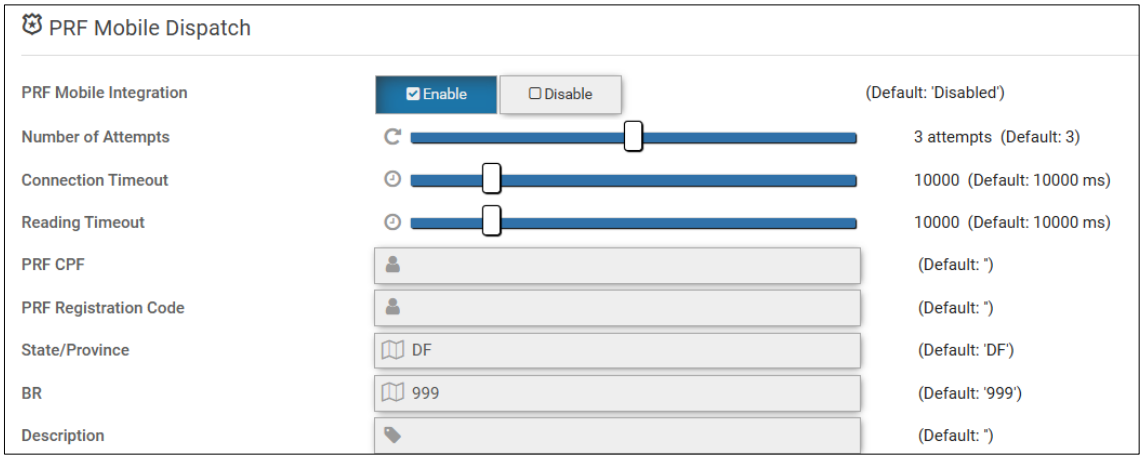


Figure 39 - PRF Mobile system integration settings screen

6.3.9.9. SPIA-PRF

Integration of ITSCAMPRO Móvel with the Brazilian Federal Highway Police's intelligence system called SPIA. The SPIA-PRF WebService needs the lane to be set up and the lane identification is set in the *External Identifier* field of the device responsible for capturing the images. In addition to the lane identifier, location is one of the requirements for the logs that are sent to SPIA-PRF.

- *URL*: Allows setting the URL that will be used to access the SPIA-PRF WebService;
- *Access key*: Sets the access key for the PRF server to accept logs from the system;
- *Company name*: Sets the name of the company that is registered as responsible for the system that is sending the logs to SPIA-PRF;
- *Attempts*: Maximum number of attempts to send a log to the SPIA-PRF server before it is canceled;
- *Connection Timeout*: Maximum time waiting to connect to the server, in milliseconds;
- *Reading Timeout*: Maximum time waiting for a return of the information sent, in milliseconds.

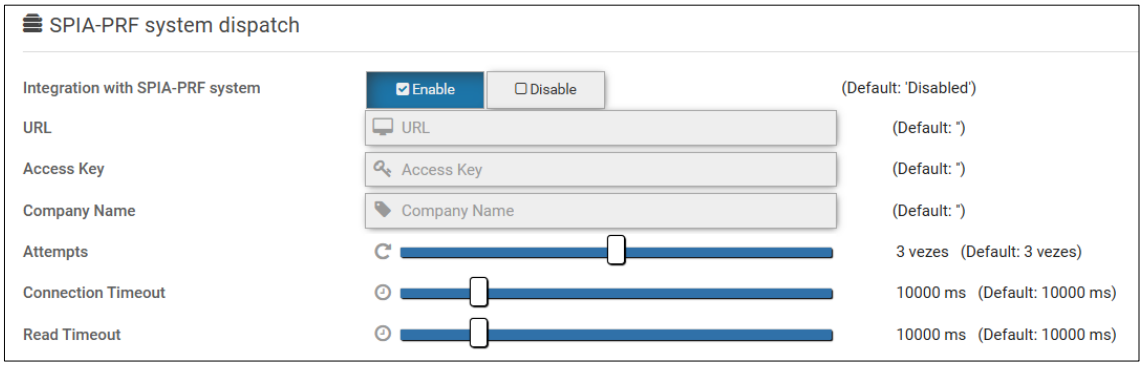


Figure 40 - PRF's SPIA system integration settings screen

6.3.9.10. Paraná Military Police - PM-PR

Integrates ITSCAMPRO Móvel with the Paraná Military Police's system, following the specified protocol.

- *Web Service URL*: Address of the server sending the logs;
- *Number of Attempts*: Number of sending attempts before canceling;
- *Connection Timeout*: Maximum time waiting to connect to the server, in milliseconds;
- *Reading Timeout*: Maximum time waiting for a return of the information sent, in milliseconds;
- *Minimum Similarity Level*: Degree of similarity between the letter that was extracted from the photo and a letter in perfect condition;

- *Maximum Similarity Level*: Degree of similarity between the letter that was extracted from the photo and a letter in perfect condition.
- *Sending Token*: Token for authentication with the server.

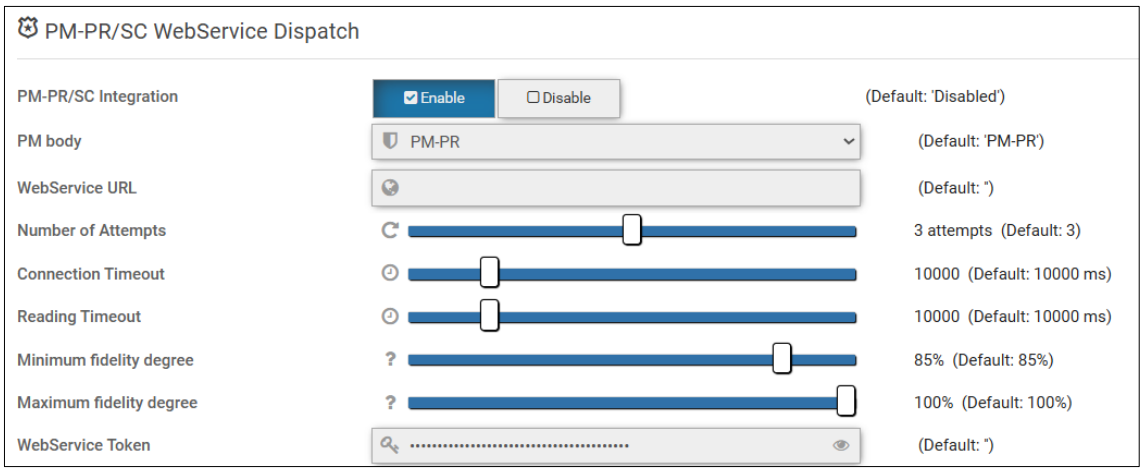


Figure 41 - PM-PR web service sending settings screen

6.3.9.11. Minas Gerais Military Police - PM-MG

Integration of ITSCAMPRO Móvel with the PM-MG, system, following the specified protocol.

- *Web Service URL*: Address of the server sending the logs;
- *Number of Attempts*: Number of sending attempts before canceling;
- *Connection Timeout*: Maximum time waiting to connect to the server, in milliseconds;
- *Reading Timeout*: Maximum time waiting for a return of the information sent, in milliseconds;
- *Sending Token*: Token for authentication with the server.

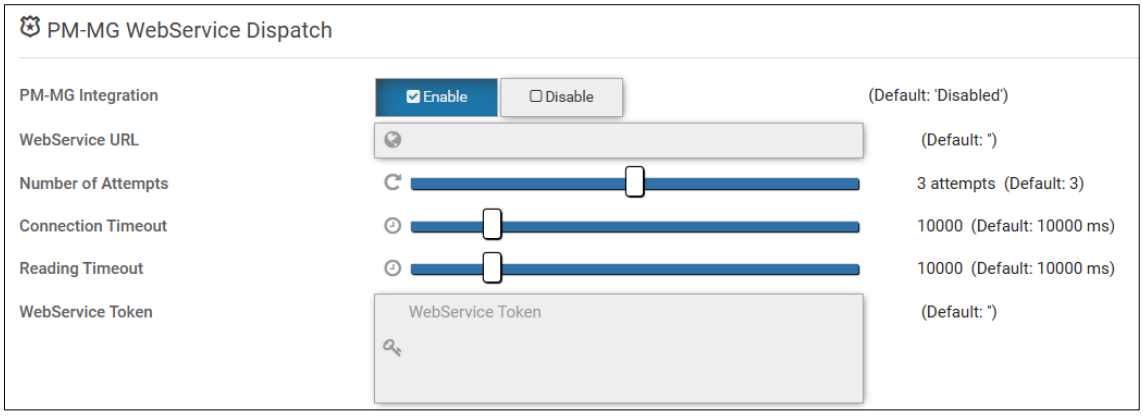


Figure 42 - PM-MG web service sending settings screen

6.3.9.12. São Paulo's Detecta system

Integration of ITSCAMPRO Móvel with the Detecta-SP's system, following the specified protocol.

- *Web Service URL*: Address to which it will be connected;
- *Number of Attempts*: Number of sending attempts before canceling;
- *Connection Timeout*: Maximum time waiting to connect to the server, in milliseconds;
- *Reading Timeout*: Maximum time waiting for a return of the information sent, in milliseconds.

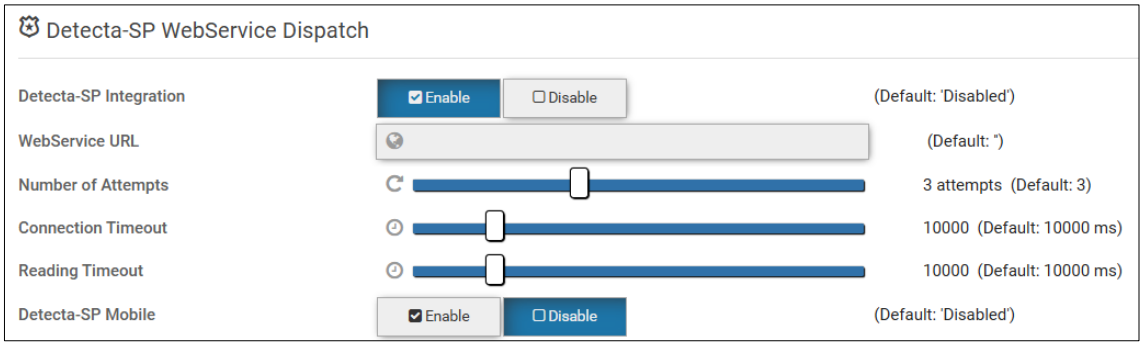


Figure 43 – Detecta-SP integration settings screen

6.3.10. Telemetry

Telemetry is the feature of ITSCAMPRO Móvel that allows the status of registered devices and the system service in operation to be sent via JSON to a cloud server. When enabling the sending of telemetry data, the fields must be configured:

- *Send telemetry data*: Enables or disables the sending of telemetry data;
- *Telemetry server URL*: Address of the telemetry server;
- *Number of Attempts*: Number of sending attempts before cancellation;
- *Connection Timeout*: Maximum time waiting to connect to the server, in milliseconds;
- *Reading Timeout*: Maximum time waiting for a return of the information sent, in milliseconds;
- *Periodicity*: Defines the period for sending telemetry data from ITSCAMPRO Móvel to the cloud server, in milliseconds;
- *Equipment ID Field Name*: Identifies the field that displays the ID of the respective device;
- *Date and Time Field Name*: Identifies the field that displays Date and Time;
- *Date and Time Format*: Defines the format in which the Date and Time will be displayed, which can be in *yyyy-MM-dd HH:mm:ss* format, for example;
- *Equipment IP*: Identifies the field that displays the current IP address of the respective device so that the user can access the equipment remotely;
- *Web Port*: Identifies the field that shows on which port the web is being exposed so that the user can access the equipment remotely;
- *Latitude Field Name*: Identifies the field that displays the latitude of the device's location;
- *Longitude Field Name*: Identifies the field that displays the longitude of the device's location;
- *Camera List Name*: Identifies the field that displays the list of configured devices;
    - *Camera ID Field Name*: Identifies the field that displays the device ID;
    - *Camera Name Field Name*: Identifies the field that displays the device name;
    - *Camera IP Field Name*: Identifies the field that displays the IP address of the device;
    - *Camera Status Field Name*: Identifies the field that displays the device Status.

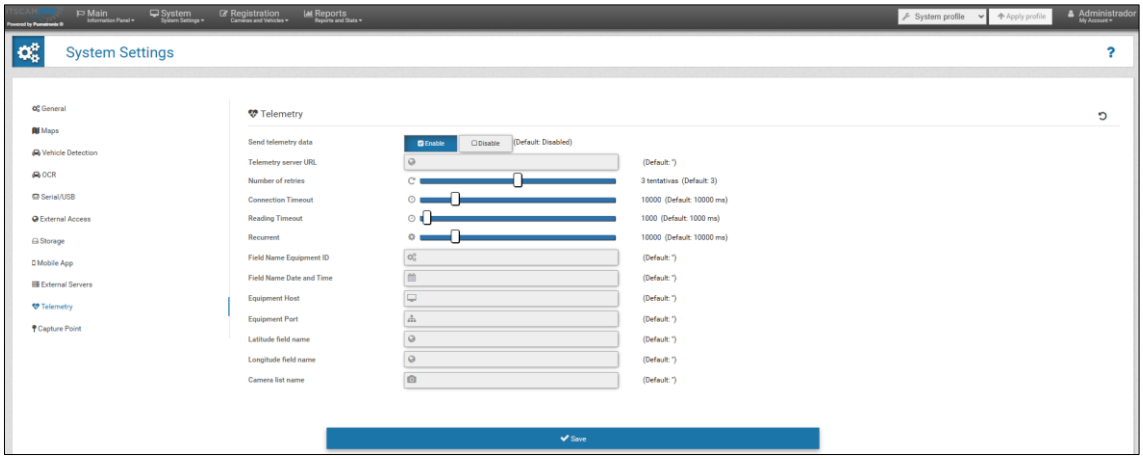


Figure 44 - Telemetry settings screen

6.3.11. Capture Point

The *Capture Point* functionality allows images captured at the same location by more than one device responsible for reading the license plate's OCR to be used, and the reading information is combined in a single log. In this way, it makes it possible for the images of the front license plate reading and the rear license plate reading to be grouped together in a single log, in addition to the class and magnetic profile information (when *Eagle Scan* is enabled). It is possible to identify the type of vehicle with the magnetic profile by analyzing the inductance generated by the loop, which can generate, for example, the following profiles:

Figure 45 - Magnetic Profile that can identify a car

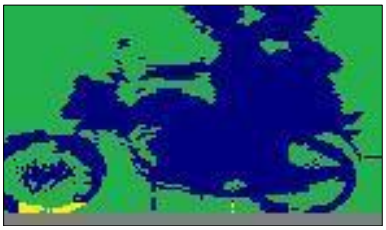


Figure 46 - Magnetic Profile that can identify a motorcycle

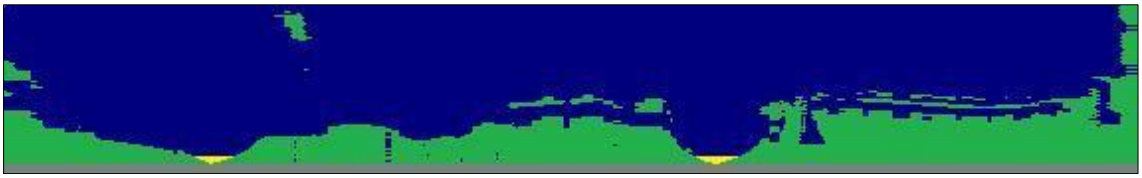


Figure 47 - Magnetic Profile that can identify a truck

The fields that configure a *Capture Point*:

- *Enable/Disable*: Enable or disable a capture point;

- *Capture Point Name*: Defines an ID for the configured Capture Point;
- *Main Camera*: Selecting a registered device that is responsible for capturing the front image;
- *Auxiliary Camera*: Selecting a registered device that is responsible for capturing the rear image;
- *HW Synchronization*: Enables or disables synchronization via the IO connection made between the *Main* and *Auxiliary* devices when they are interconnected in the installation, which allows for a more precise link;
- *Max. Delay Time*: Definition of the maximum acceptable time difference between the image captured by the *Main* device and the image from the *Auxiliary* device, for the link to be considered valid. When *HW Synchronization* is enabled, there is no usable function for this field;
- *Magnetic Loop Validation*: validating the Loop status in the installation scenario in cabins;
- *Eagle Scan*: Enables or disables the use of the Eagle Scan server;
    - *IP/Host*: IP address of the Eagle Scan server;
    - *Socket Port*: Socket port used for communication;
    - *Web Port*: Web port used for communication;
- *Enables Integration with ITSCAMPRO*: Enables or disables the integration of the *Capture Point* with ITSCAMPRO, which allows the user to access the reports of the *Capture Point* logs in the ITSCAMPRO system. This integration uses a protocol that allows more than one capture to be sent and linked on the server;
    - *Server URL*: URL address of the ITSCAMPRO server to be integrated;
    - *User*: Username registered with ITSCAMPRO;
    - *Password*: Password of the respective user.

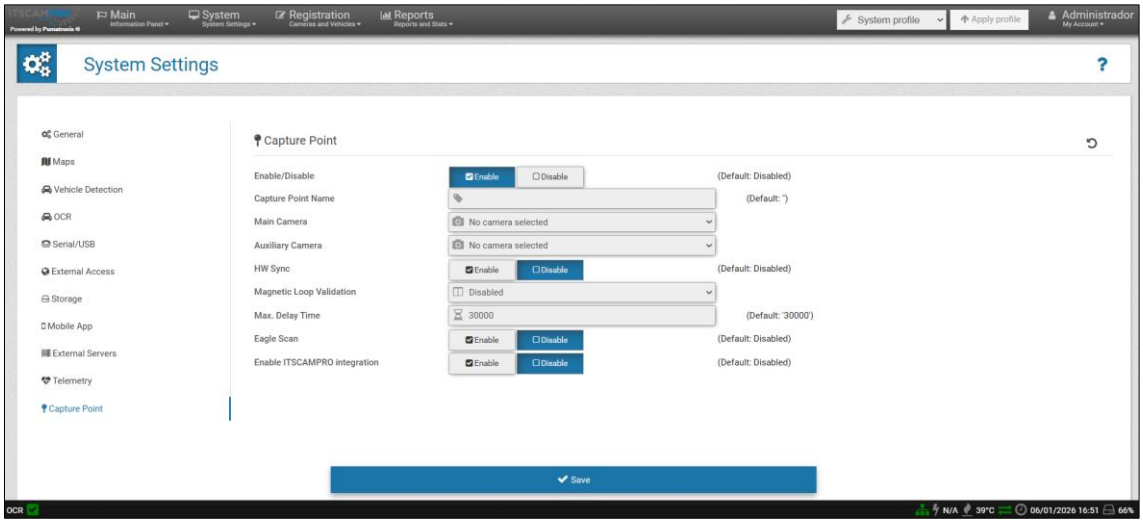


Figure 48 - Capture Point settings screen

6.4. Necessary Conditions for Installation

To view the ITSCAMPRO Móvel interface, the Google Chrome browser must be used via a computer connected to the same data network as the ITSCAMPRO Móvel solution.

6.4.1. Date and Time Settings

Keeping the date and time set to the official time on the ITSCAMPRO Móvel server is extremely important so that the date and time of the logs are always correct. It is possible to adjust by synchronizing with the server or manually.

- *Time Zone*: Selecting the time zone for the location where the Mobile ITSCAMPRO will be used ensures that date and time conversions are carried out correctly.

- *Synchronize Date/Time*: ITSCAMPRO Móvel allows using NTP servers to synchronize the date and time automatically, which is essential for keeping logs always at the correct time;
    - *Synchronization Type*: For ITSCAMPRO Móvel it is possible to use NTP with the operating system's standard server or with a proprietary server;

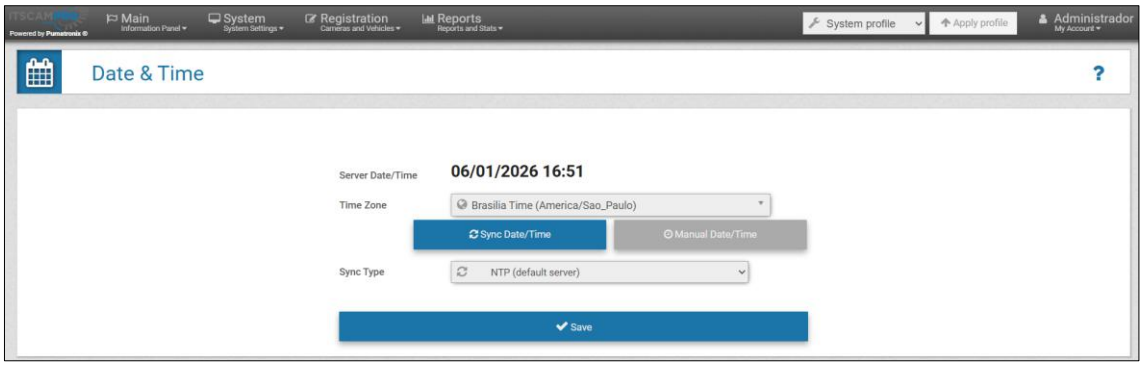


Figure 49 - Date/Time settings screen with default NTP server

- *NTP Server*: Inserting the address of the preferred NTP server;

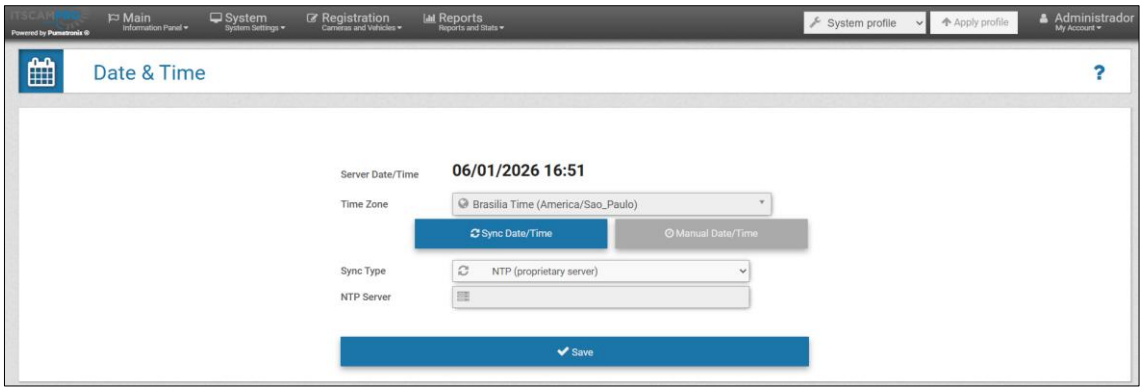


Figure 50 - Date/Time settings screen with proprietary NTP server

- *Manual Date/Time*: In this mode, date and time must be set and updated by the user manually.
    - *Date*: Select the date using the calendar or type it into the field;
    - *Time*: Inserting the correct time and minutes.

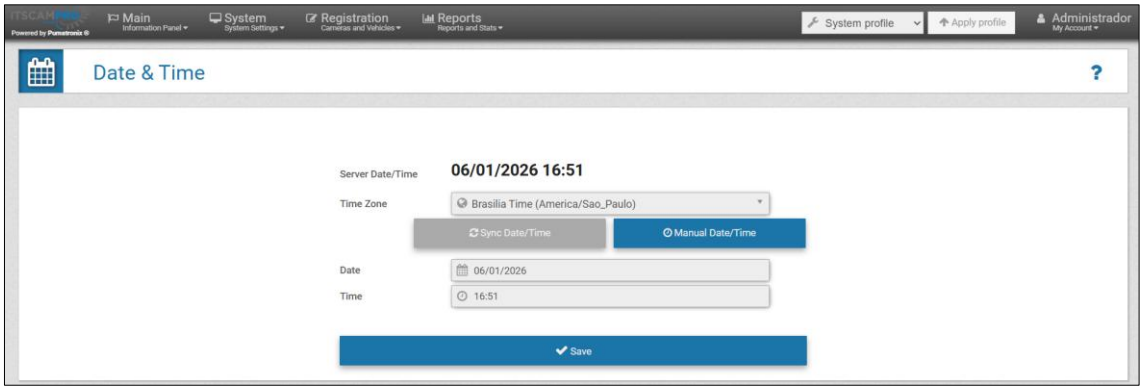


Figure 51 - Manual Date/Time settings screen

6.4.2. Network Settings

After installing the equipment that will provide the captured image data, it is necessary to enter the data for the network connections used by going to *System > Network Settings*. Depending on the solution in

which ITSCAMPRO Móvel is used, different network settings options are available, modifying the settings screen.

First, access the type of network to be set by selecting the tab on the left of the screen and clicking *Enable* to enter the data. The data entered will only be applied once the settings have been saved. When saving, the server is restarted and the page reloaded after 40 seconds.

6.4.2.1. Current Status

The network settings home screen shows the *Current Status* of the interfaces available to ITSCAMPRO Móvel.

- *Save*: Applies the network settings previously entered.

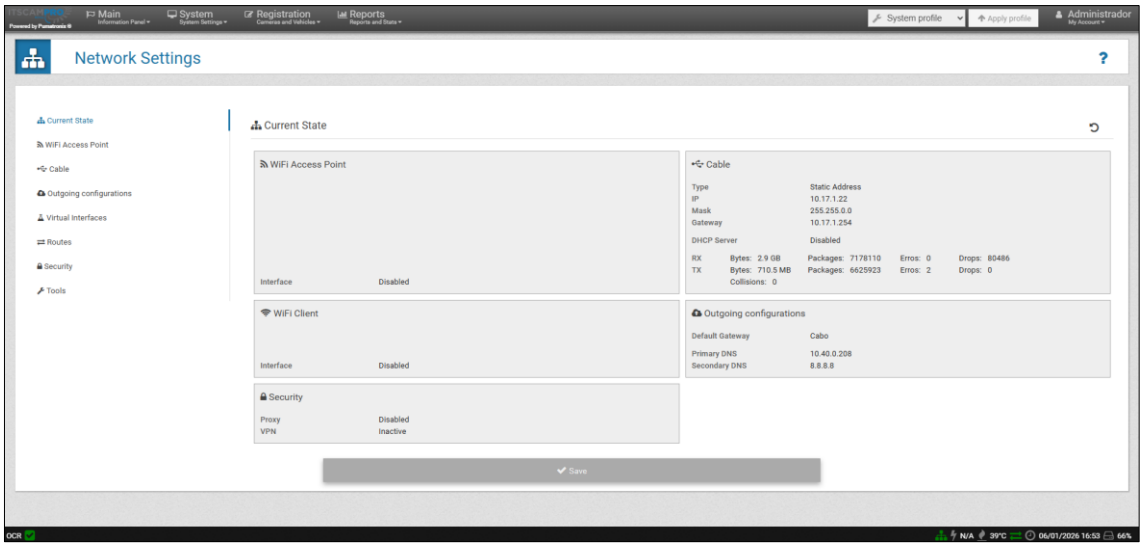


Figure 52 - Network Settings home screen

6.4.2.2. Wi-Fi Access-Point

The Wi-Fi Access-Point network option is configured to access the ITSCAMPRO Móvel system and allows devices such as tablets, notebooks or cell phones to be connected to view the software interface.

- *IP*: Logical address of the machine;
- *Mask*: Netmask to be used;
- *SSID*: Wi-Fi network name;
- *Channel*: Frequency channel that will be used for communication;
- *Password*: Password that will be used to connect to the network.

When enabling DHCP Server, ITSCAMPRO Móvel starts a DHCP server:

- *Broadcast*: Address used to notify all Hosts on the network;
- *Start of DHCP IPs*: Definition of the initial IP number that will be used by the DHCP server;
- *End of DCHP IPs*: Definition of the final IP number that will be used by the DHCP server.

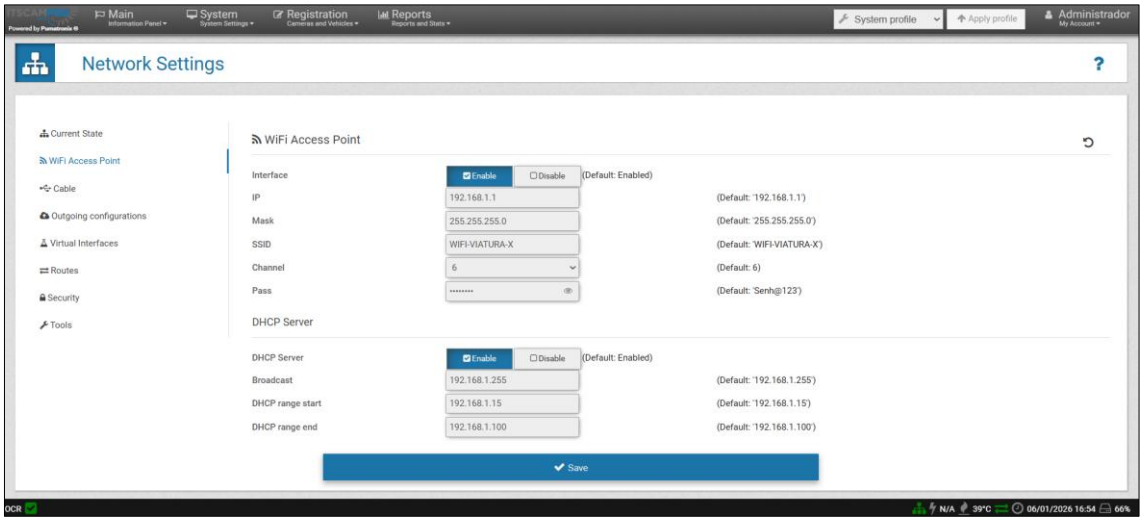


Figure 53 - WiFi Access Point settings screen

6.4.2.3. Cable

The settings of the network connected via cable requires data:

- *Type*: Select the connection type from the *Static Address* or *DHCP Client* options;
- *IP*: Logical address of the machine;
- *Netmask*: Netmask to be used;
- *Gateway*: Outgoing address of the packets;
- *DHCP Server*: Enables ITSCAMPRO Móvel to start a DHCP server;
    - *Broadcast*: Address used to notify all Hosts on the network;
    - *Start of DHCP IPs*: Definition of the initial IP number that will be used by the DHCP server;
    - *End of DCHP IPs*: Definition of the final IP number that will be used by the DHCP server.

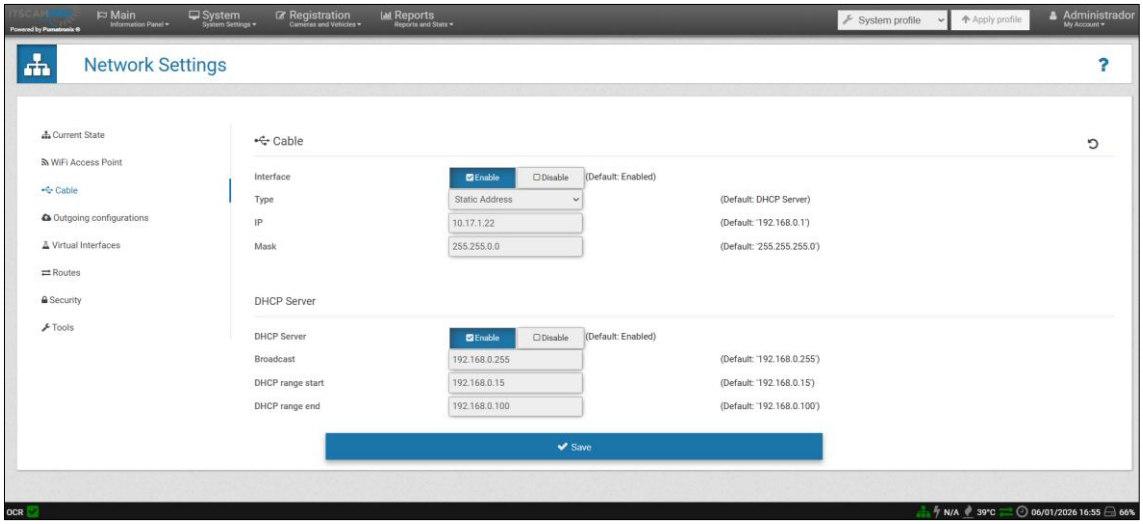


Figure 54 - Wired network settings screen

6.4.2.4. Output Settings

The options for setting data sending are available on the screen:

- *Gateway Default*: Outgoing address of the packets;
- *Gateways Sequence*: Outgoing packet priority sequence;
- *Primary DNS*: Primary DNS server used to resolve Internet addresses;

- *Secondary DNS*: Secondary DNS server used to resolve Internet addresses.

Internet Access: In the factory default configuration, ITSCAMPRO Móvel does not have an outgoing route set and to access the Internet it is necessary to *Add* one of the interfaces by selecting one of the available ones.

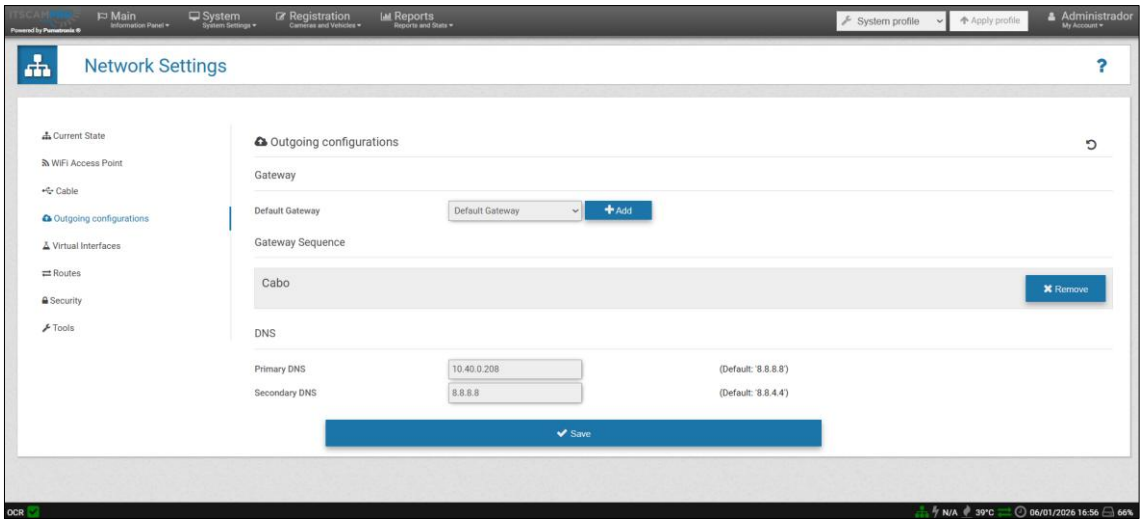


Figure 55 - Network output configuration screen

6.4.2.5. Virtual Interfaces

Virtual network in which ITSCAMPRO Móvel acquires the specified IP:

- *Interface*: Select the interface to be used, from the *Wifi Access point* or *Wired* options;
- *Address*: Address of the interface used;
- *Netmask*: Netmask corresponding to the interface used;
- *Gateway*: Outgoing address of the packets.

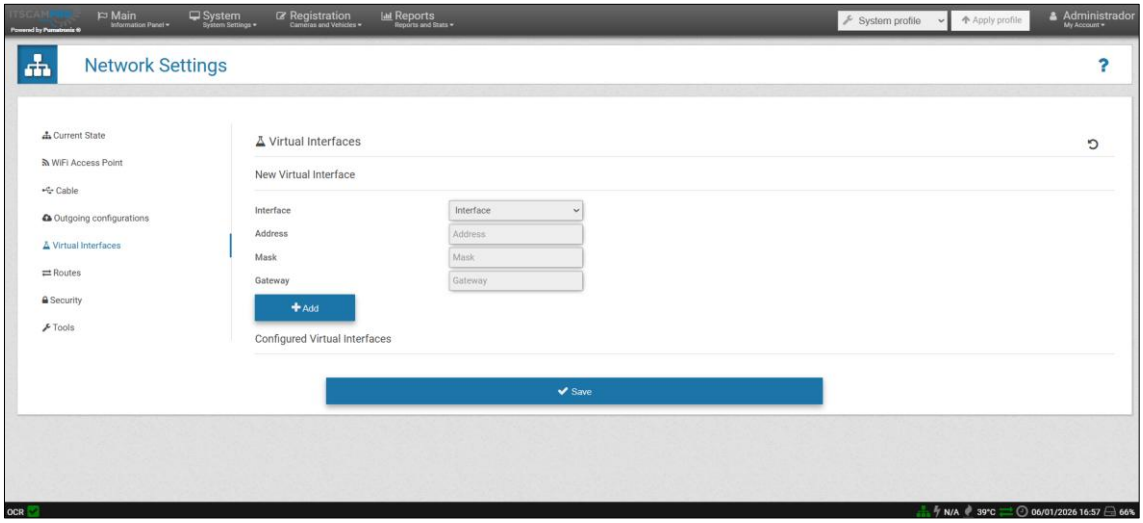


Figure 56 - Virtual Interfaces settings screen

6.4.2.6. Routes

In Routes, the paths that the data packets follow to move around the Internet or the set up network are defined:

- *Type*: Route type that will be created, the route can be for an address or for a network;

- *Address/Network*: Address or Network to be used;
- *Netmask*: Netmask to be used;
- *Gateway*: Outgoing address of data packets;
- *Interface*: Interface used by the network route, which can be wired.

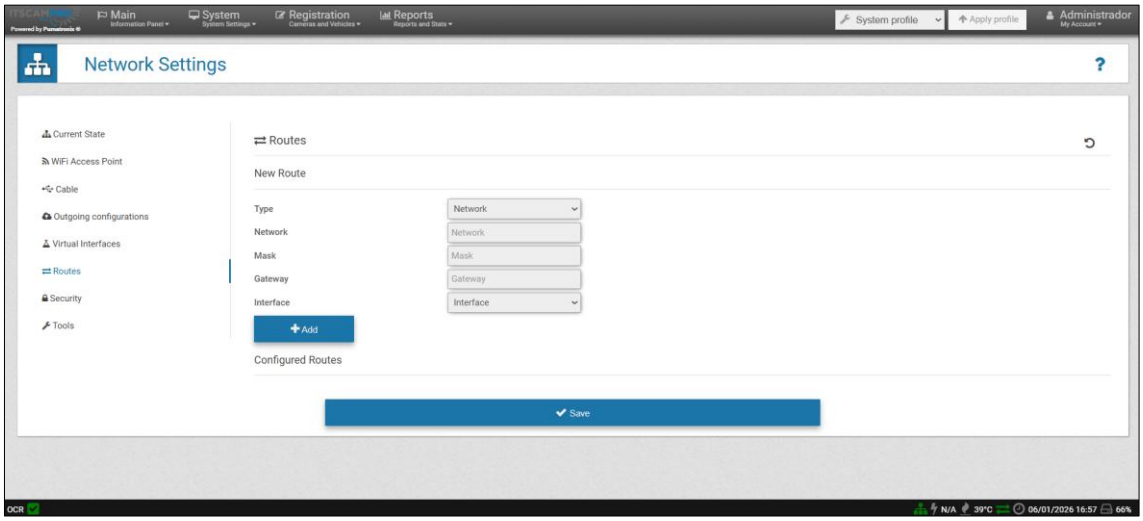


Figure 57 - Routes settings screen

6.4.2.7. Security

The tools that can be used to increase network security are *Proxy* and *VPNs*.

- *Proxy*: Server that forwards requests to the Internet;
- *Address*: Address to be used;
- *Port*: Port to be used;
- *User*: User to be used;
- *Password*: Password to be used;
- *VPN*: Encrypted communication channel.

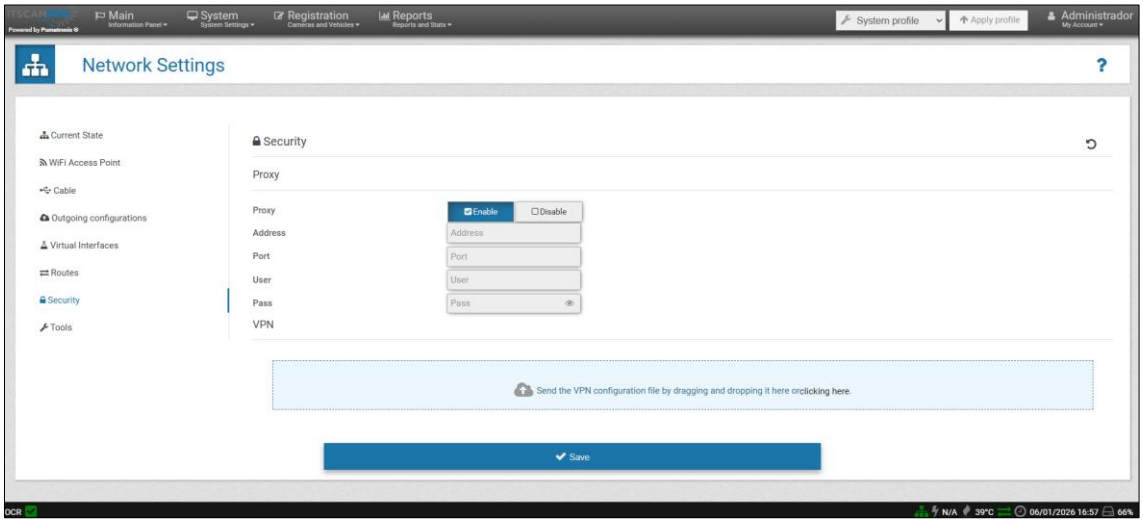


Figure 58 - Network Security settings screen

6.4.2.8. Tools

ITSCAMPRO Móvel provides tools for testing network availability, such as *Ping*, *Trace Route* and *DNS Lookup*:

- *Ping*: It sends packets to the given address via the chosen interface to test whether it is in operation, selecting between the *Wifi Access point*, *Wired* or *3G* options;
- *Trace Route*: It shows a map of all the servers the packet passed through until it reached its destination;
- *DNS Lookup*: Checks the address of the input server;
- *Address*: Address of the interface used;

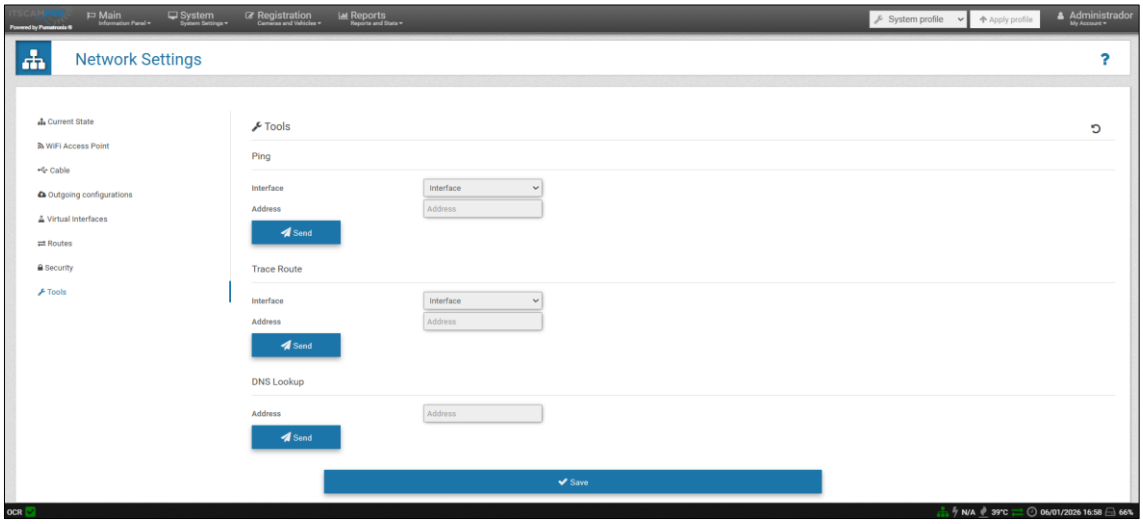


Figure 59 - Network Tools settings screen

6.4.3. Creating System Profiles

System Profiles allow the user to adopt general settings to be applied to the equipment as a whole. The settings in use are saved when a profile is created and can be applied again later, such as the settings for devices and profiles, OCR and servers.

The home screen lists the profiles available for use in the system and for changing the current settings.

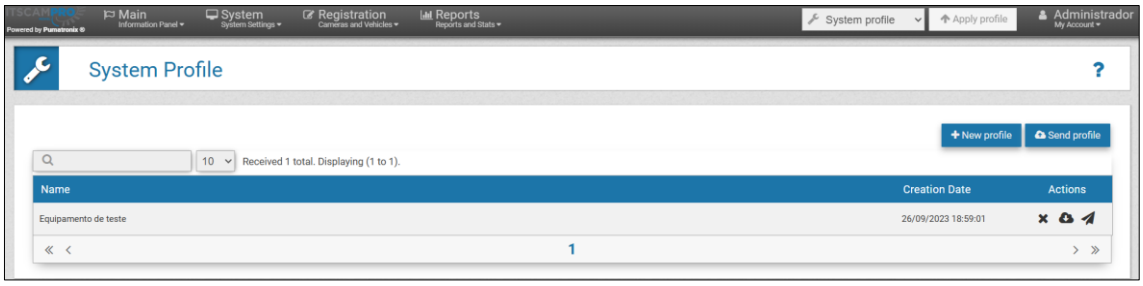


Figure 60 - System Profiles home screen

To save a new profile, considering the current settings in use by the system, click on *+New System Profile* and identify it with a name. It is possible to apply a saved profile by importing the file in *Send System Profile*.

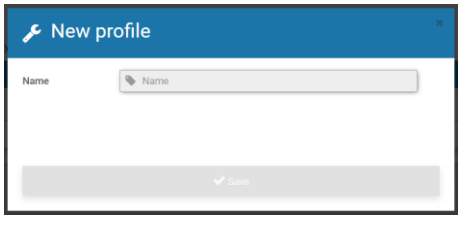


Figure 61 - New system profile settings screen

To import a previously created profile into the system, click on the *Send system profile* button and select the *.pro* extension file to apply.

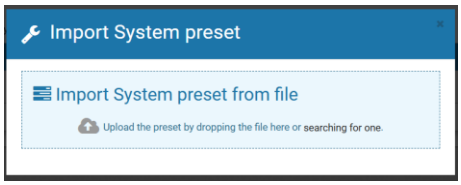


Figure 62 - New system profile import screen

The profiles created remain available in the menu bar. Click on the *System Profile* button and select *Apply Profile* to change the current system settings profile.

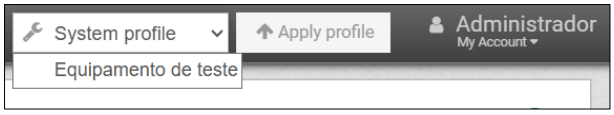


Figure 63 - System profile selection area

6.4.4. Registration of Image Capture and Processing Devices

After setting up the network, it is possible to register the devices for capturing and processing images in the system on *Registration > Cameras*. These remain listed in the branch to the left of the screen and have their image displayed in the initial grid.

Figure 64 - Registration > Cameras home screen

The screen for registering and changing the image capture and processing device displays the settings fields in tabs:

1) The *General* tab contains the device's identification data:

- *Enabled*: Enables the image capture device when selecting *Yes* or disables it when selecting *No*;
- *Name*: Identifies the equipment in the system;
- *Description*: Adds more information to the registered device;
- *Protocol*: select the type of protocol that the system will use to communicate with the device, from the *ITSCAM 400, ITSCAM 450/600, IP Snapshot, IP MJPEG* and *IP RTSP options*;
- *Host*: Device address on the network;
- *Viewing Mode*: Selects the display mode on the main screen;

- *Side*: Side of the vehicle in which the equipment is installed;
- *External ID*: Sets the external identifier to be used for the device. When integrating with the Perkons and Atlanta server, the ID applied to the Atlanta system must be used;
- *Frames per second*: Desired image capture rate;
- *Vehicle classifier*: Vehicle classification functionality, based on size, according to the framework used. When the vehicle occupies less than 60% of the image, the *Panoramic image classification* option should be chosen. However, when it occupies an area of more than 80%, the *Closed image classification* option should be used.

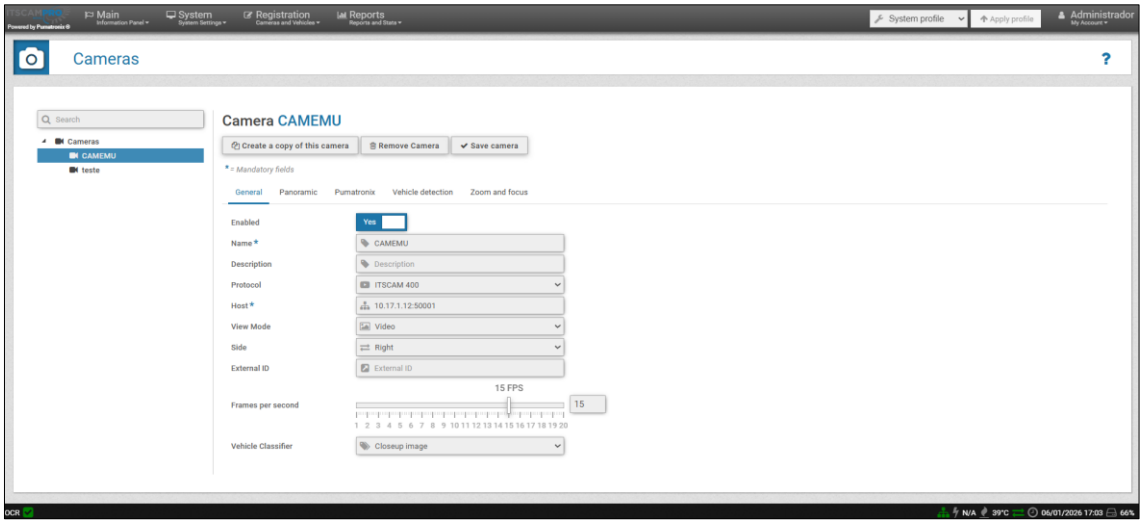


Figure 65 - Registration for a new capture device home screen

2) The *Authentication* tab is where you enter the authentication data for accessing devices that use the ITSCAM 450/600 protocol:

- *User*: User name used to communicate with the device;
- *Password*: User password used to communicate with the device;
- *Authentication Test*: Authentication test performed automatically on devices that support this feature, such as the ITSCAM 600. Displays the result of the authentication attempt on the device;

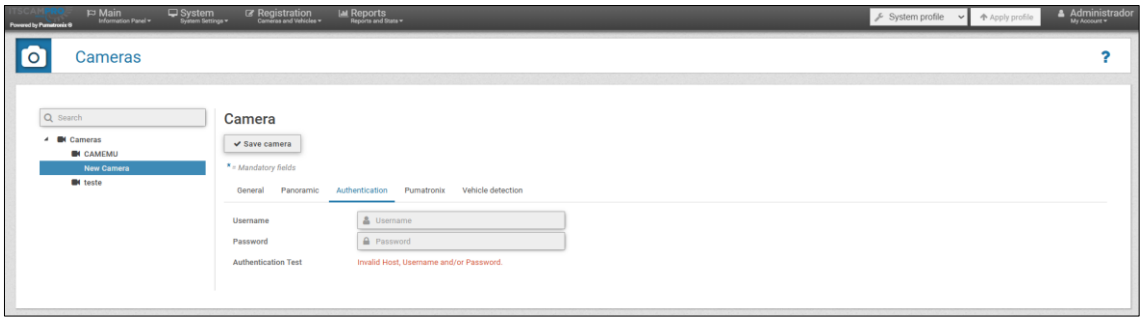


Figure 66 - New device registration screen, Authentication tab

3) The settings for Pumatronix image capture and processing devices that use the ITSCAM 400 protocol can be made in the Pumatronix tab:

- *Rotate 180°*: Sets whether the generated image should be rotated by 180° to send it to the OCR;
- *External Lighting*: Sets whether the equipment has external lighting or integrated lighting;
- *Save Logs Without a License Plate*: By enabling this option, the system generates logs even when it does not recognize a valid license plate;
- *Profile*: SEts which profile the device should use;

- *Motion Filter*: Enables the motion filter functionality on the device, which can use the *Discard Frames* functionality for frames without motion, by setting a minimum motion threshold for the device to discard;
- *Number of Exposures (Daytime)*: Selecting the number of images that will be captured in *Daytime* mode when the system requests photos. Each exhibition has a different setting;
- *Number of Exposures (Nighttime)*: Selecting the number of images that will be captured in *Nighttime* mode when the system requests photos. Each exhibition has a different setting;
- *Daytime Mode Trigger*: Sets the device's trigger when it is operating in daytime mode;
- *Nighttime Mode Trigger*: Sets the device's trigger when it is operating in nighttime mode; The available trigger options are detailed in the ITSCAM 400 product manual.

Reading license plates: When the image capture device has the Save Logs without License Plate function enabled in ITSCAMPRO Móvel, the logs made may contain only the images, without the content of the license plate, in which case it is considered a log with empty license plate.

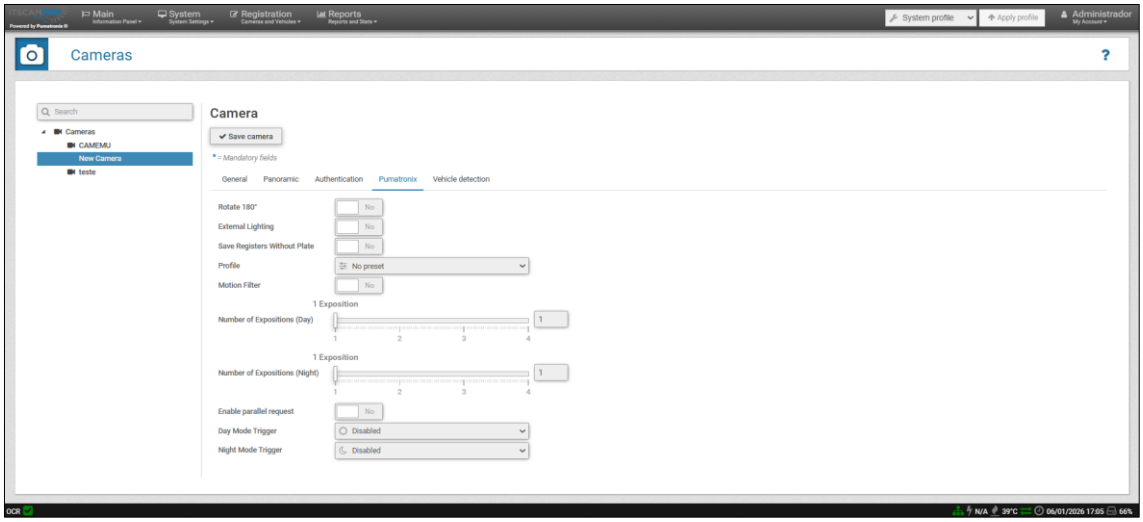


Figure 67 - New device registration screen, Pumatronix tab

4) The perspective adjustments that promote the best OCR performance are available for ITSCAM 400 protocol devices in the OCR tab, which displays the image preview of the image capture device.

- *Grid Lines*: Displays the grid lines that help in the framing adjustments of a vehicle's license plate, in an ideal size for the OCR to read the image. Click on the *Preview* option to enable or disable it;
- *Region of Interest*: It allows delimiting in the image the region in which to search for a license plate and read the OCR, which enables the *Motion Detector* only in the selected region, reducing image processing. Click on the displayed image to define the position of the region of interest, creating the 4 vertices of a polygon. To adjust, double-click on the polygon created and drag the vertex to the desired position. To reset, click on *Clear region* on the left:

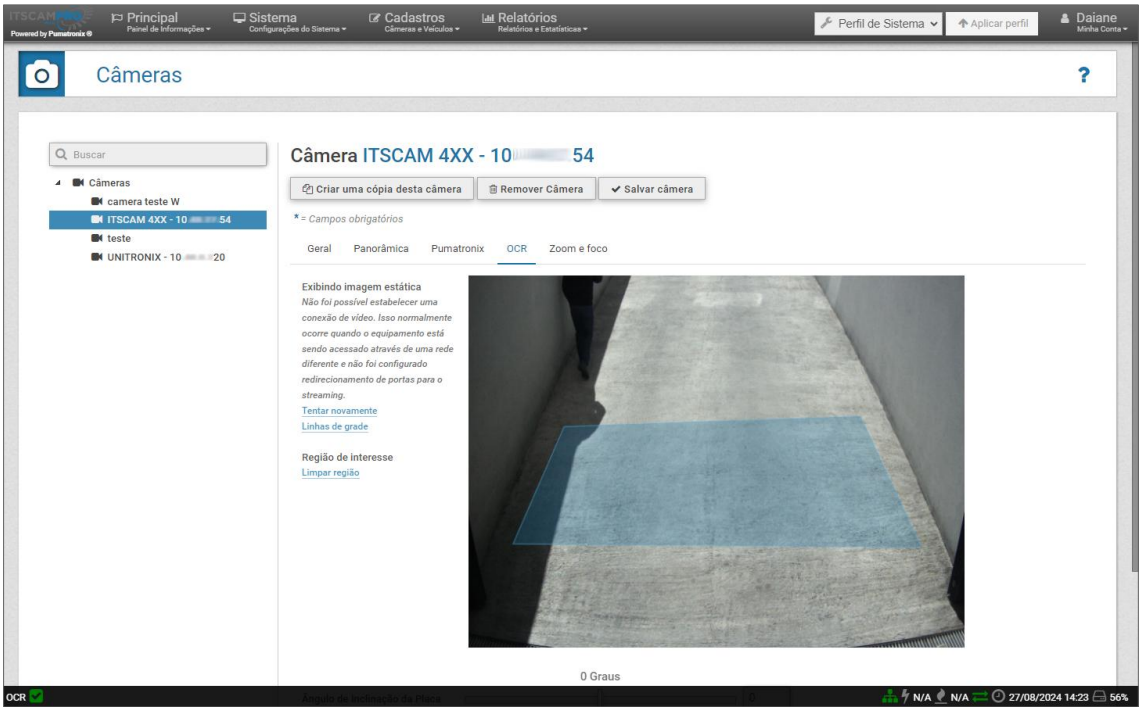


Figure 68 - New device registration screen, OCR tab

- *License Plate Inclination Angle*: Sets the inclination in degrees of the license plate, measured counterclockwise from the horizontal axis. For example, if the y-coordinate of the last character in the image is above the y-coordinate of the first character, the angle is positive;
- *Character Tilt Angle*: Sets the inclination in degrees of the characters, measured counterclockwise from horizontal axis. For example, if the top of a character is to the left of its bottom, the tilt is positive:

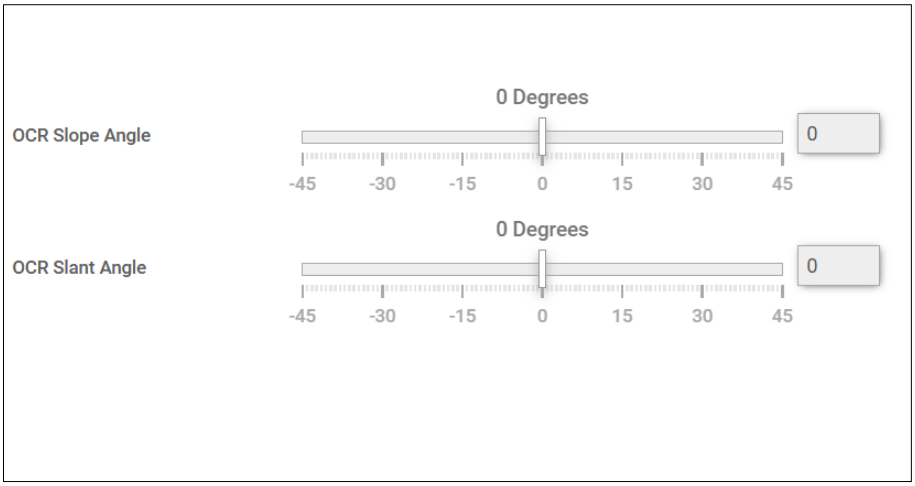


Figure 69 - OCR angle settings screen

5) The settings on the *Vehicle Detection* tab are only available when the *Global Recognition Queue* is disabled in the *System Settings > Vehicle Detection* menu. In this way, the logs are sent to the system from each registered device and, depending on how they are installed, they can end up capturing images of the same vehicle, which leads to duplicate records in the system. In order for license plate recognition to be performed independently of other registered devices, they must be adjusted:

- *Number of Recognitions*: Number of times a license plate must be recognized sequentially to be considered valid;
- *Vehicle Queue Size*: Number of license plates that must be read until a repeated reading is recognized as valid;
- *Length of Time in Queue*: Time that the license plates read are stored for validation;
- *Trigger detection*: Select *Yes* or *No* to enable the feature that collects all moving images when a vehicle passes:
    - *Detection window size*: selection of the time that must be waited, in milliseconds, for a motionless image after the end of a vehicle's passage, in order for the log to be considered finished;
    - *Image selection without OCR*: selection of which image detected with movement in the passage of the vehicle should be considered in the log, whether from the beginning, middle or end of the passage.

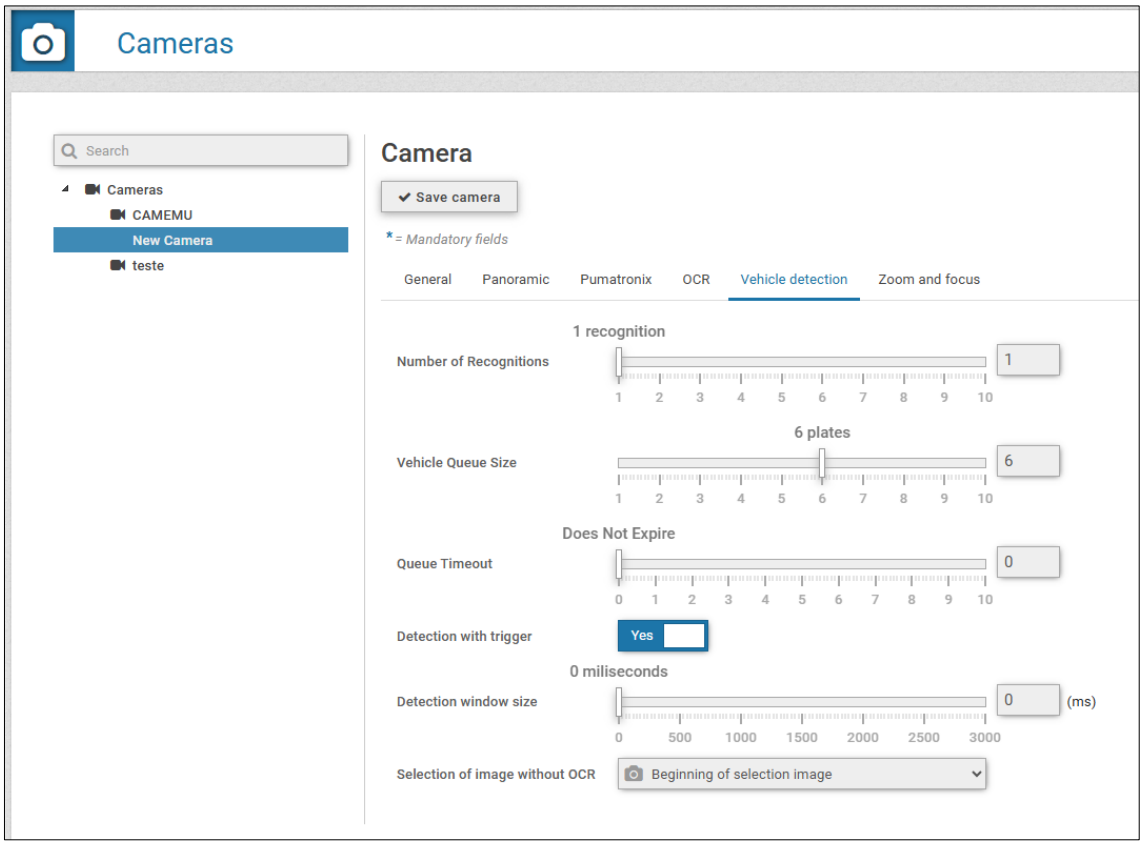


Figure 70 - New device registration screen, Vehicle Detection tab

6) Zoom and Focus adjustments for Pumatronix ITSCAMs can be made via the ITSCAMPRO Móvel interface:

- *Grid Lines*: Displays the grid lines that serve as a reference for framing the image, adjusting zoom and focus. Click on the option to enable or disable viewing;
    - *Zoom*: zoom applied only in the viewing area, for devices with a motorized lens, to ease fine-tuning;
    - *Zoom* (buttons): Increases or decreases the equipment's zoom, for devices with a motorized lens;
    - *Focus* (buttons): Equipment focus adjustments for devices with motorized lenses;
    - *Auto Iris*: Enables the use of auto iris in lenses. It is advisable to leave this feature off during the zoom and focus adjustment period.

When finished, click *Save* to apply the adjustments made.

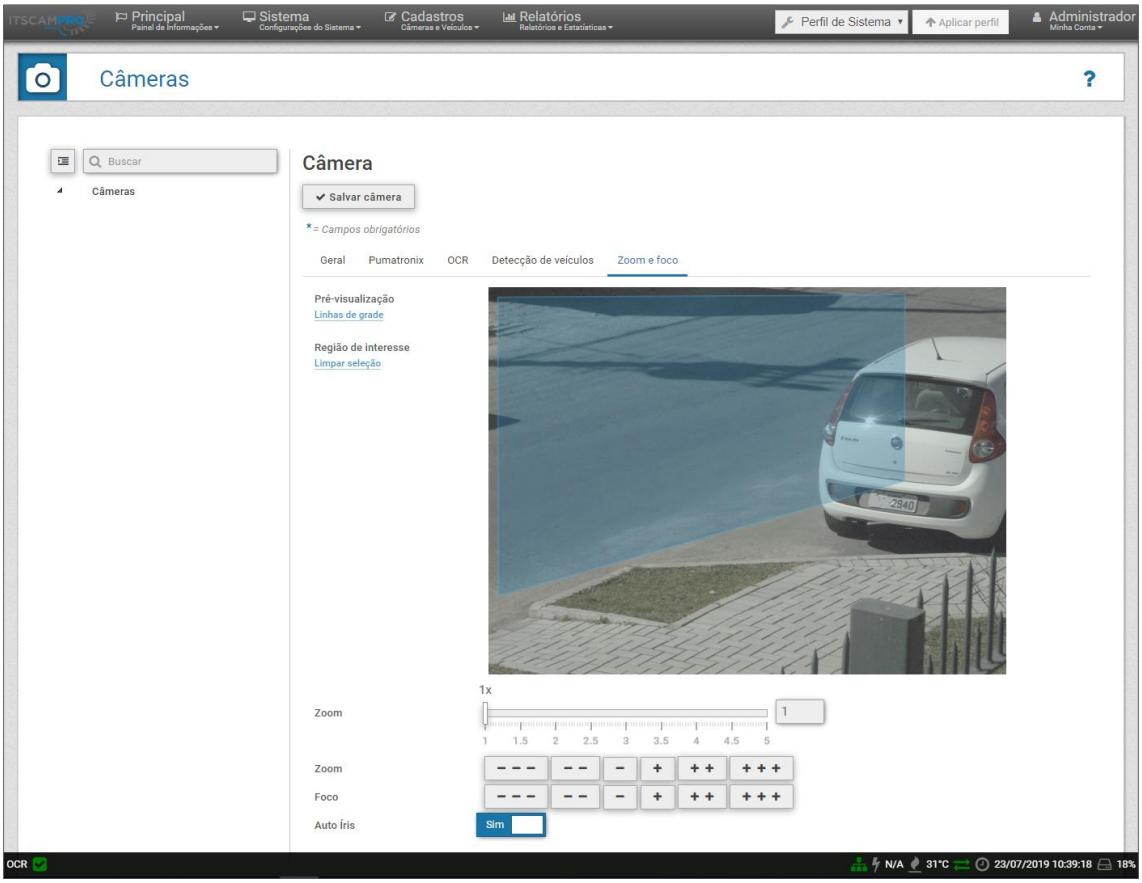


Figure 71 - New device registration screen, Zoom and Focus tab

6.4.5. Registering Profiles for Devices

Profiles can be applied to ease the set up of image capture and processing devices in the field. They contain the main settings that can be used according to the ITSCAMPRO Móvel application, with a description and the values applied.

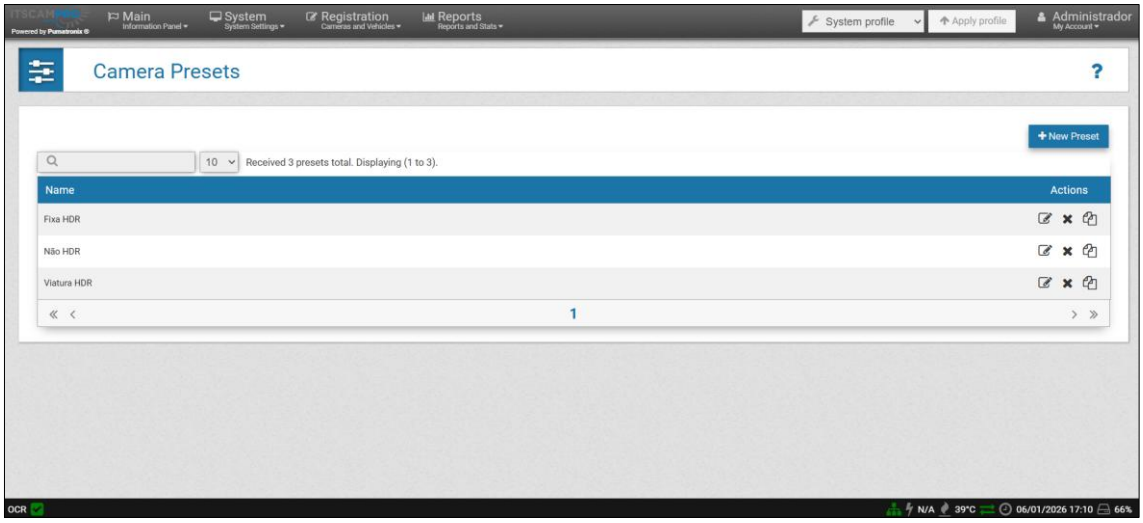


Figure 72 - Profiles home screen

The options for adjusting an ITSCAM Profile can be accessed by clicking on *+New Profile* or on the edit button:

- In the *General* tab a name that identifies the profile shall be entered:

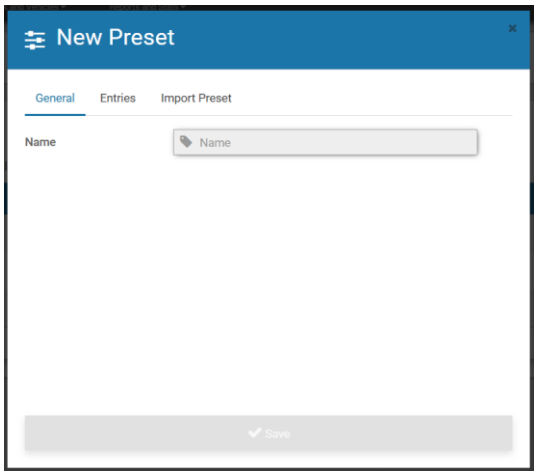


Figure 73 - Edit existing profile screen, General tab

- The *Values* tab displays the *Description*, *Key* and *Value* of the fields relating to the imported or copied profile:

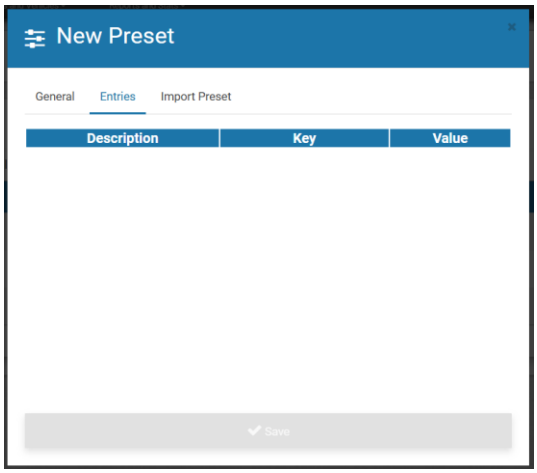


Figure 74 - Edit existing profile screen, Values tab

- The *Import Profile* options are available:
  - *Import Camera Profile*: It is possible to import the profile of a Pumatronix device connected to ITSCAMPRO Móvel, which is connected to the same network, without the equipment needing to be registered in the system.
  - *Import Profile File*: It is possible to import a file with the text generated by the Pumatronix device that is in use by the system.

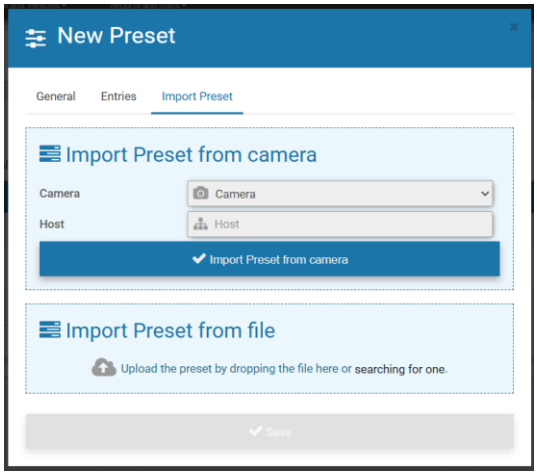


Figure 75 - Edit profile screen, Import Profile tab

6.4.6. Registration of Monitored Vehicles

ITSCAMPRO Móvel allows users to register each license plate they want to monitor, with the aim of sending an audio alert when the license plate is detected, along with the description entered by the user. It is possible to manage notifications, enabling and disabling them according to monitoring needs.

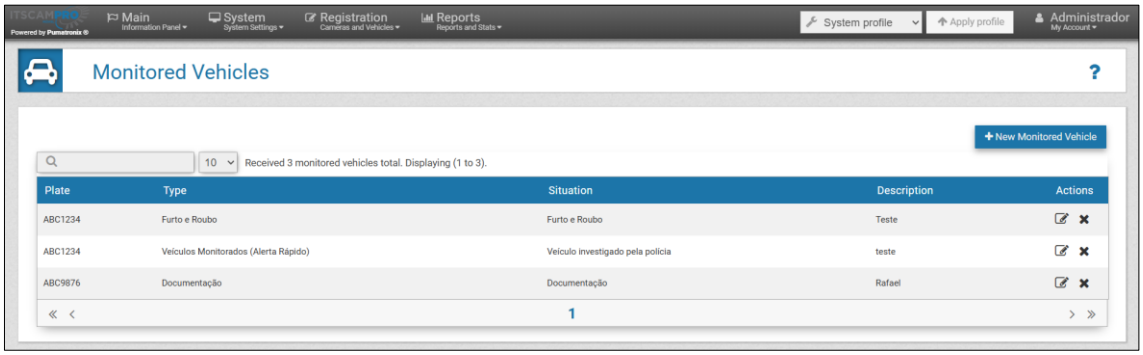


Figure 76 - Registration monitored vehicles home screen

The creation screen appears when clicking on *+New Monitored Vehicle*. To change a license plate, click on the *Edit Monitored Vehicle* action on the right.

- *License Plate*: License plate of the vehicle being monitored;
- *Type*: Monitoring Type. This field is configured in Monitoring Types (allow audio to be played when the card is recognized);
- *Status*: Vehicle status. This field serves as a summary description;
- *Description*: Description of why the vehicle is being monitored.

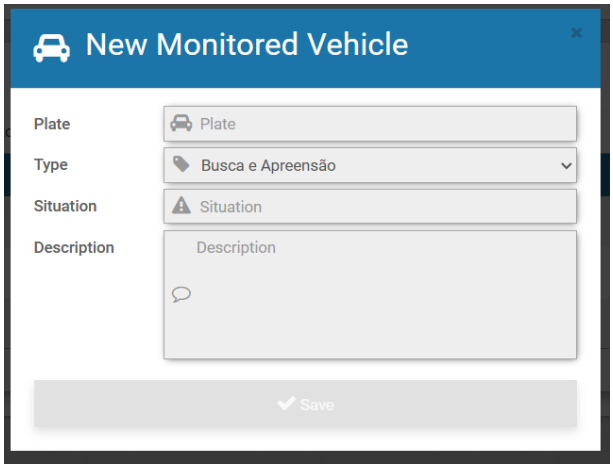


Figure 77 - New monitored vehicle registration screen

6.4.7. Monitoring Types

The ITSCAMPRO Móvel supports vehicle monitoring through manual insertion or import of CSV files, in addition to integration with several existing and/or customized security systems (sending to generic REST server).

The main functionality of monitoring types, in addition to classification, is to allow the configuration of a standard or custom audio to be played when a monitored vehicle is identified.

When manually registering monitored vehicles, the association is made directly through the type selection. For import and integrations, the External ID field is used (in integrations, fields returned in the response to requests can be mapped by the External ID).

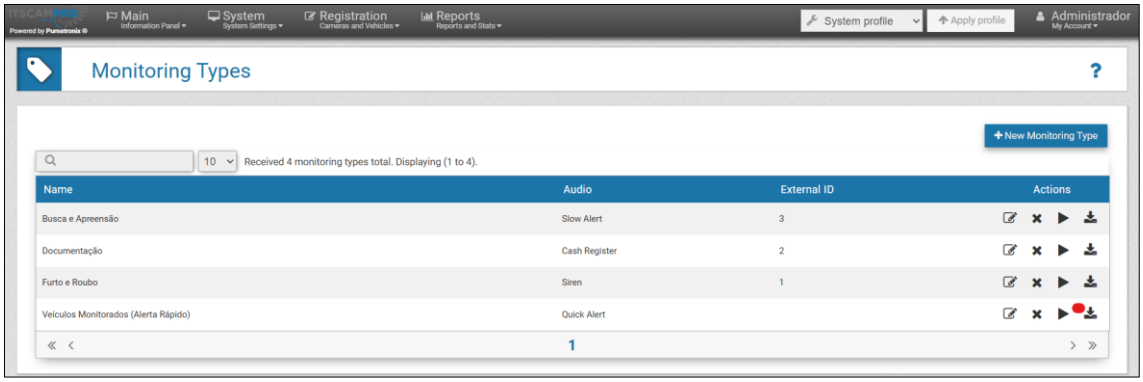


Figure 78 - Home screen for Monitoring Types

The creation screen is displayed when you click on +New Monitoring Type. To change a registered license plate, click on the action available on the right, Edit Monitoring Type.

- *Name*: Monitoring type name;
- *Audio*: Audio that will be played when a monitored vehicle associated with the monitoring type is identified. You can choose between a default audio or upload a custom MP3 audio file;
    - File (MP3): Custom MP3 audio file (when opted for uploading);
    - *Audio Name*: Name of the new audio that will be saved (when opted for uploading; can be reused in other types of monitoring);
- *External ID*: Identifier used when importing CSV files and in integrations with external systems, allowing the mapping of monitored vehicles with monitoring types

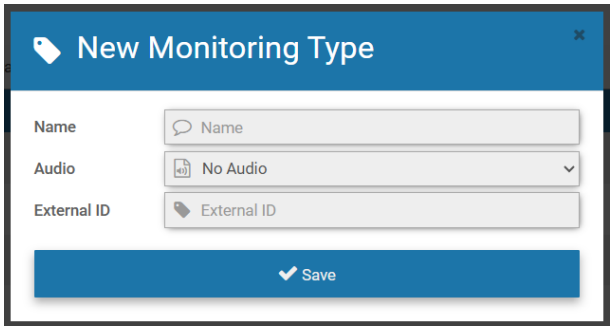


Figure 79 - New Monitoring Type Registration Screen

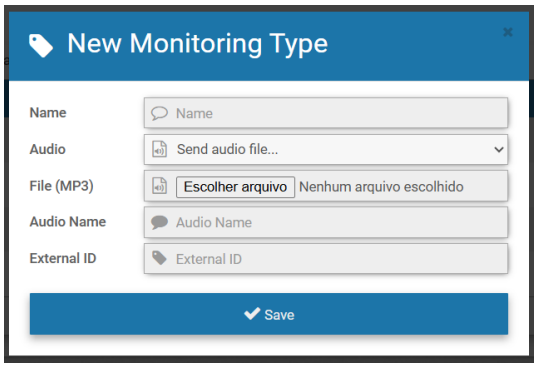


Figure 80 - New Monitoring Type registration screen sending a customized audio file

6.4.8. Zoom and Focus Adjustments

To complete the installation of ITSCAMPRO Móvel, it is necessary to make some adjustments to optimize OCR processing, such as framing and adjusting the zoom and focus of the installed devices. This requires considering the lenses used by the equipment and the ideal distance for reading the license plate. For more information, see the manual for the respective solution and device.

Using the software interface, the Zoom and Focus setting options are available by clicking on the binocular-shaped button on each image displayed on the main *Control Panel* screen. On this screen, the image of the selected device is enlarged and allows adjusting zoom and focus for the selected device, as well as enabling or disabling autofocus. In order to ease calibration, it is possible to use the reference grid by clicking on the icon (top left). To close the settings screen, simply click on the X button in the top right-hand corner.

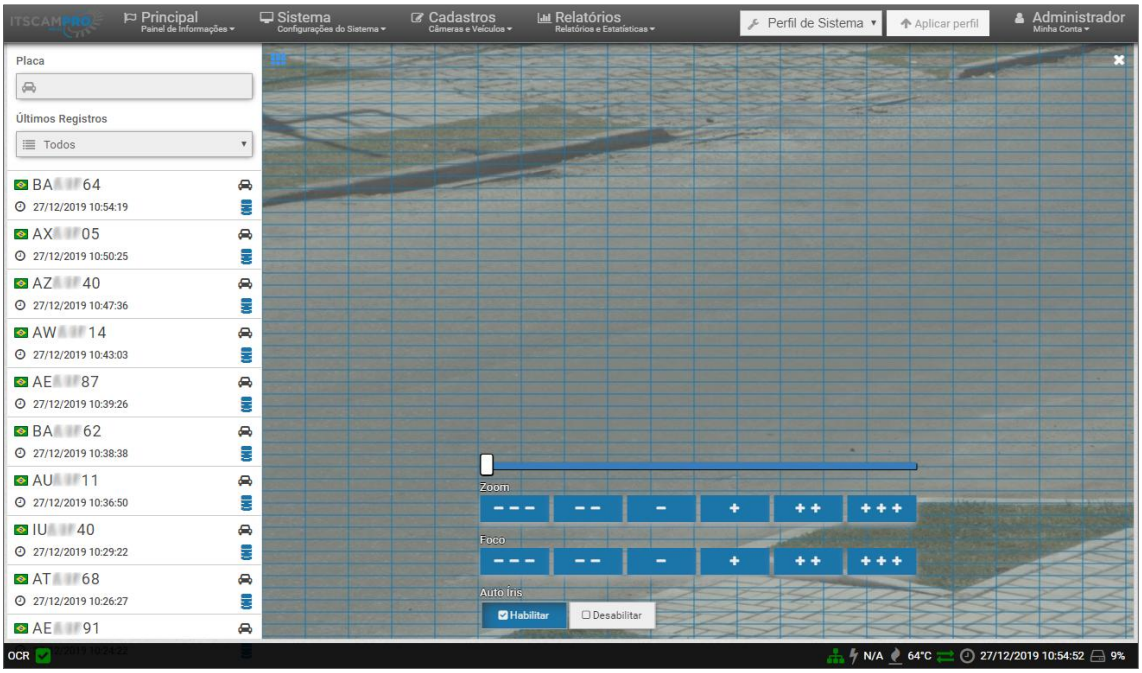


Figure 81 - Zoom and Focus for a registered device settings screen

7. First Access

ITSCAMPRO Móvel can be accessed using the Google Chrome browser from a laptop that is on the same data network, via the external access address and from 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 navigation bar, followed by the user credentials. However, on first access, it is advisable to create the other users and restrict the use of the administrator account. To log in for the first time, use the factory default data on the login screen:

User	*admin*
Password	*admin*

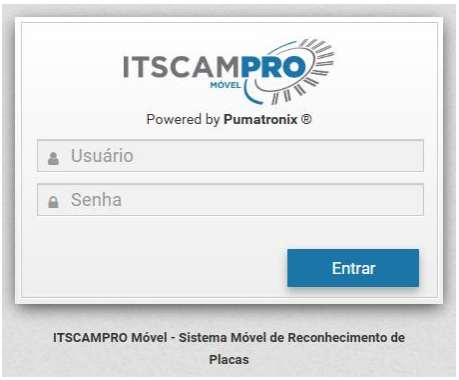


Figure 82 - ITSCAMPRO Móvel system login screen

8. Care and Maintenance

Certain precautions are necessary to ensure the product's performance and extend its useful life.

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

From the System Status view, you can obtain information on the status of the system's operation and the behavior of ITSCAMPRO Móvel in *Main > Dashboard*. With the data obtained, the right decisions can be made to carry out maintenance on the system.

8.1. System Maintenance

By accessing the *System > System Maintenance* menu, it is possible to perform the main operations with the server where ITSCAMPRO Móvel is installed, so physically access the equipment to do so is not needed. The maintenance options for accessing the system are described below.

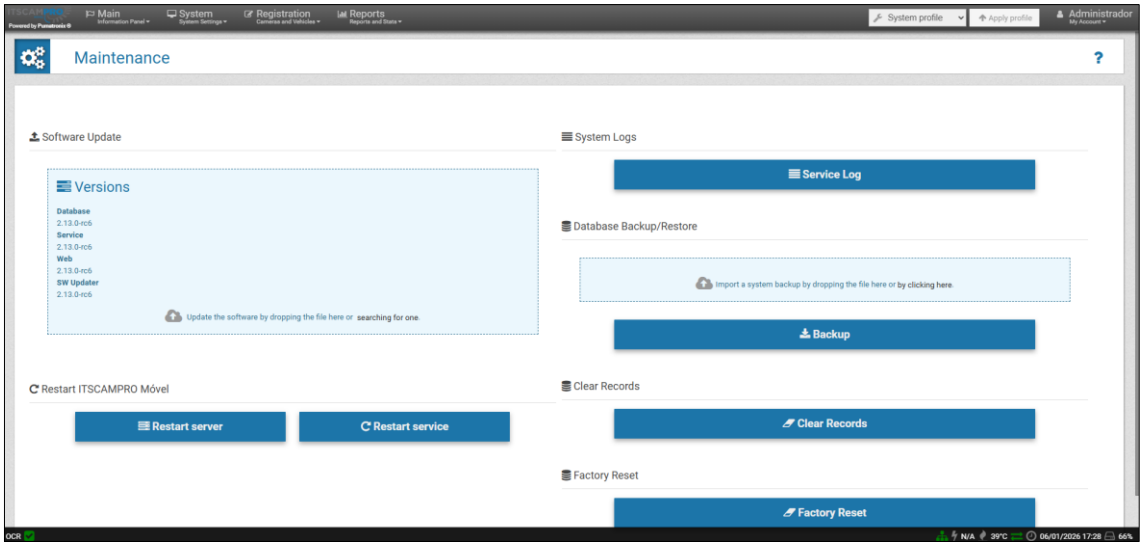


Figure 83 - System Maintenance home screen

8.2. Updating ITSCAMPRO Móvel

ITSCAMPRO Móvel has three software packages, which can be upgraded individually. The update process takes place entirely in the background, after the update file has been uploaded to the Software Update area, where the current versions are displayed. However, it is advisable to back up the data before the update process.

The first package to be installed on the system is the file containing the database, named *itscamprom-db_2.X.Y.swu*. To install it, drag the file to the *Versions* area or click on the link shown in the image to search for a saved file. Next, the file named *itscamprom-service_2.X.Y.swu* must be installed by dragging or selecting it via the link. Finally, install the file named *itscamprom-web_2.X.Y.swu* which contains the entire interface for the new application.

8.3. ITSCAMPRO Móvel Logs

ITSCAMPRO Móvel has a complete log of all the operations carried out by the system in the background, which can be downloaded from the *System > System Maintenance* screen under the *Service Log* button. This log file helps the development team to identify and analyze anomalies in the system.

8.4. Backup and Restore

ITSCAMPRO allows creating complete system backups. The backup files generated are saved in a proprietary format and can only be used by ITSCAMPRO Móvel.

To perform a backup, the *Backup* button must be clicked and to restore, the saved backup file must be selected or dragged to the area indicated in *Database Backup/Restore*.

System Restoration: When restoring a database on ITSCAMPRO Móvel, all the information that was stored on the equipment (including images) will be overwritten.

The *Factory Reset* restore option reverts the ITSCAMPRO Móvel database to its default values, removing previously saved data.

Factory Restoration: When restoring an ITSCAMPRO Móvel installation to the factory version, all stored information (including images) will be deleted.

ITSCAMPRO Móvel allows users to restart equipment directly via the graphical interface in the *Restart server* option. When selecting the *Restart the service* option, only the software is restarted, but in both options there may be a loss of logs during the process.

Restarting ITSCAMPRO Móvel: Requesting a restart of ITSCAMPRO Móvel causes all connections to the image capture devices to be interrupted during the process and there may be a loss of vehicle recognition during this period.

8.5. Log Cleaning

The *Log Cleaning* function cleans data by deleting all the logs that have been made. Used to free up storage space on the equipment while maintaining the configuration options made.

Log Cleaning: By applying Log Cleaning, all logs will be lost and cannot be recovered.

8.6. Enable Maintenance Status

ITSCAMPRO Móvel can trigger the Maintenance period, which allows the product's watchdog (installed on the *Surveillance Board*) to be deactivated for 10 minutes. This way, the equipment can be accessed to carry out the necessary maintenance.

9. Privacy Policy

In compliance with the General Data Protection Law (LGPD) - Law No. 13709, dated August 14, 2018, this product has programmable functions for capturing and processing images that may infringe the LGPD when used in conjunction with other equipment to capture personal data.

The equipment does not collect, use or store personal information, whether sensitive or not, for its operation.

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

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