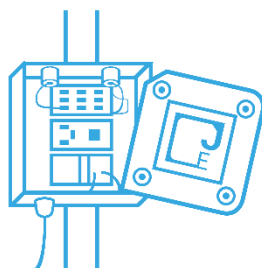


Application
SED Operator
Manual
V4.2.



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Settings	Chyba! Záložka není definována.

Introduction

This manual informs users about the capabilities of the SED Operator application (formerly SED Presentation). It explains how the user is informed about unwanted events, how to view the connection status of individual devices, how to place devices in the correct location, and many other functions.



Figure 1: User Interface

This manual applies to GUI application version 4.1.

Installation

The SED application is supplied as a precompiled version for mobile devices or desktop computers. It can be installed on computers running Windows and Mac OS, or on mobile devices running Android.

To download the desktop application installation files, go to the following link: SED Download

- **Windows: Download and run the SEDOperator_4.1_Win64_Install.exe file and follow the instructions.**
- **Mac OS: Please contact us to obtain the application.**

To download and install the mobile version of the application, go to:

- **Android: SED Google Play**

Firewall Settings

If the application is installed in a highly secured network, the following firewall exceptions must be implemented to ensure proper operation of the application:

Mapbox:

- api.mapbox.com
- IP: 65.9.92.184
- Map background download
- <https://docs.mapbox.com/help/troubleshooting/firewalls/>

SED Server:

- IP: 80.211.41.205
- Port: 44444
- Main server for communication with devices

SED Database

- IP: 80.211.27.91
- Port: 443 (8443)
- Cloud database where audio fragments of alerts are stored.

Login

When connecting to the server for the first time, the user must log in. The JALUD Embedded server details are prefilled automatically:

1. Name: JALUD Embedded Server
2. Host (SED Server IP): 80.211.41.205
3. Port: 44444

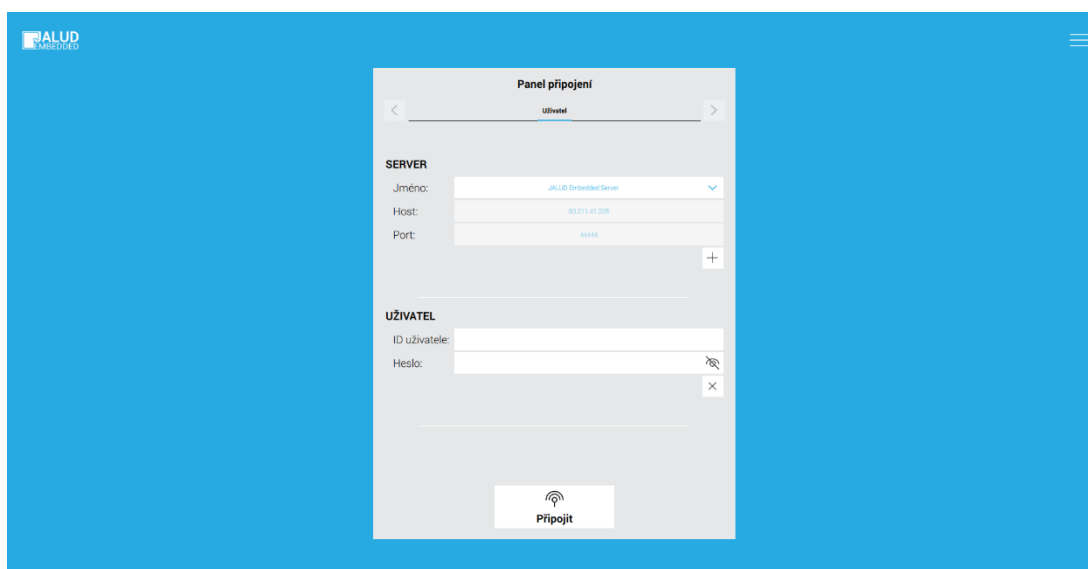


Figure 2: Server Connection

The next step is user authentication using the username and password provided with the purchase.

Once the user is authenticated, a signed personal SSL certificate is downloaded from the server and no further authentication is required. If you experience any problems, please contact us at support@jalud-embedded.com.

After starting the application, the user can connect to another server using the Connection button on the main screen. To change the user or server, it is always necessary to disconnect first.

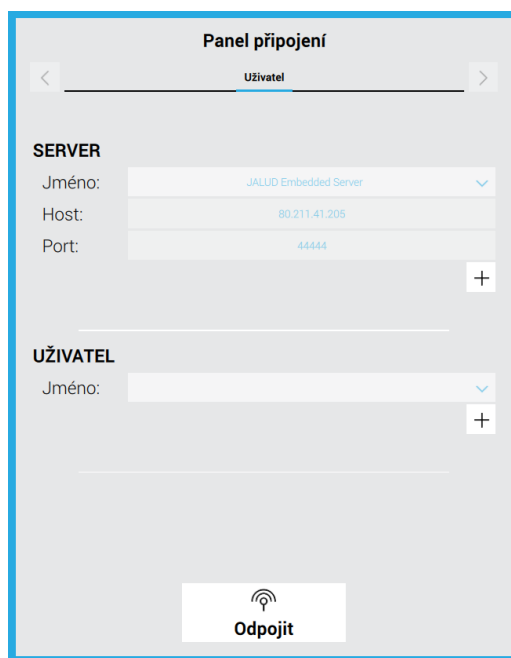


Figure 3: Connection Panel

Multiple User Accounts

A user may have multiple accounts, each with a different set of assigned devices. Each user account has its own unique user ID and password. There are no restrictions on how devices can be divided among user accounts:

- Multiple user accounts can have access to a single device.
- A user account can have access to multiple devices.

User Interface

This section provides a brief overview of the main parts of the SED Operator application view.

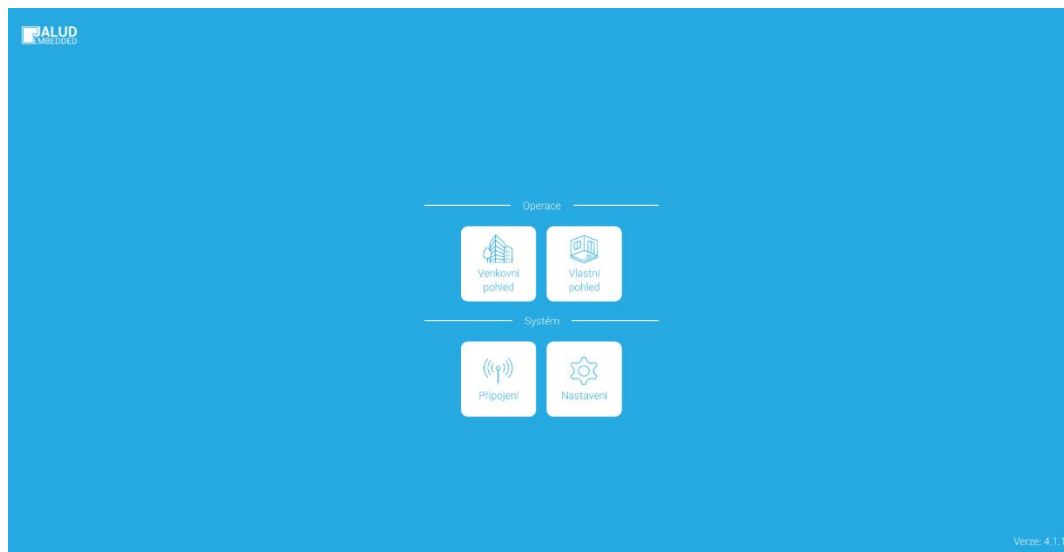


Figure 4: User Interface

System

In the System section of the application, the user can modify some basic application settings or switch between user accounts.

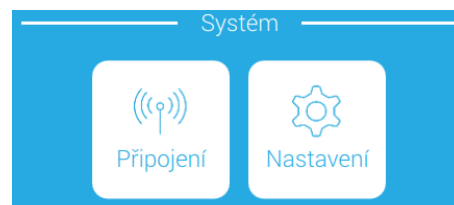


Figure 5: System Section

Connection

After starting the application, the user can connect to another server or user account using the Connection button. The Connection Panel opens; see the information in the introductory Login chapter.

If the user has multiple user accounts, they can switch between them after the first login without authentication. To change the user or server, it is always necessary to disconnect first.

If the user needs to log in to another account for the first time, clicking the New User button displays the User ID and Password fields, and the user can authenticate using the login credentials provided for the new account. If authentication is successful, the corresponding certificate is downloaded and the new user appears in the list of users. 

Note: If the account certificate expires, the user must select New User and authenticate again. A new valid certificate is downloaded and can be used next time.

Settings

The application appearance, language version, and notification settings can be configured in Settings.

Application

In the Application tab, the user can switch between application language versions.

Alarms

Active: By default, alerts are active at all times. The user can set alerts to be displayed only during a specific time period, for example from 22:00 to 6:00. Outside this time frame, the user will be notified by a device status change to "event detected" and back, but the alert will not be triggered.

Action: The user can set how the application will respond to an incoming event notification. There are three possible responses (as with alert rules): trigger an alarm, inform the user in the status bar, or do nothing.

Sound: The user can use the default notification sound or upload a custom one. Clearing the Default checkbox enables the option to add a custom sound.

Volume: The user can select the notification volume level.

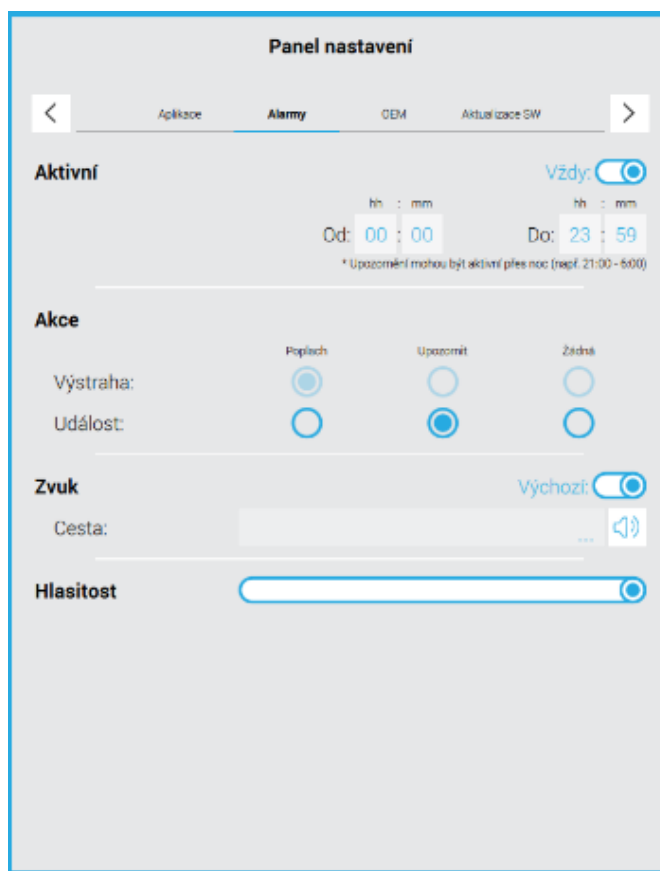


Figure 6: Settings Panel

OEM

Here you can configure items such as a custom logo or the application color scheme.

Logo: If the default setting is selected, the JALUD Embedded logo is displayed on the left side of the application ribbon. If a partner wants to use their own logo, they can clear the default checkbox and use the file dialog to navigate to the logo file.

Color overlay: If this option is selected, a color overlay graphic effect is applied to the logo and its color will match the color of the other icons on the background. In most color schemes this is white or black. If the option is not selected, the logo keeps its original colors. We recommend using a logo with a transparent background.

Color scheme: Several color schemes are defined and the user can choose between them. If there is no color theme that suits your needs, please contact us so that we can expand the list.

Software Update

This settings menu notifies the user when a new application version is available. When a newer version is available, the user is notified in the settings panel. When the current version is marked as obsolete, an error notification is displayed in the settings panel instead.

If the application is out of date or obsolete, the Software Update settings panel shows the user the latest version number and a link to download the installer.

Release notes: The release notes show information about changes in the latest version so that the user can decide whether it makes sense to download the latest version of the application. Release notes may not be available for the latest version. In that case, the user is informed as shown in the figure above.

Operations

In this section, alerts and devices can be monitored on a map in two different modes. Outdoor View is used to display devices on a standard map background. If you want to use a custom map background, for example to display devices indoors, use Custom View.

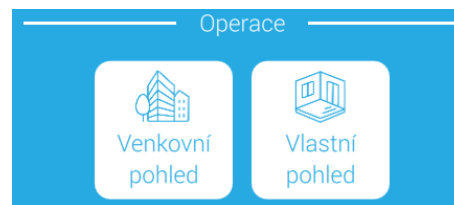


Figure 7: Operations Section

Outdoor View

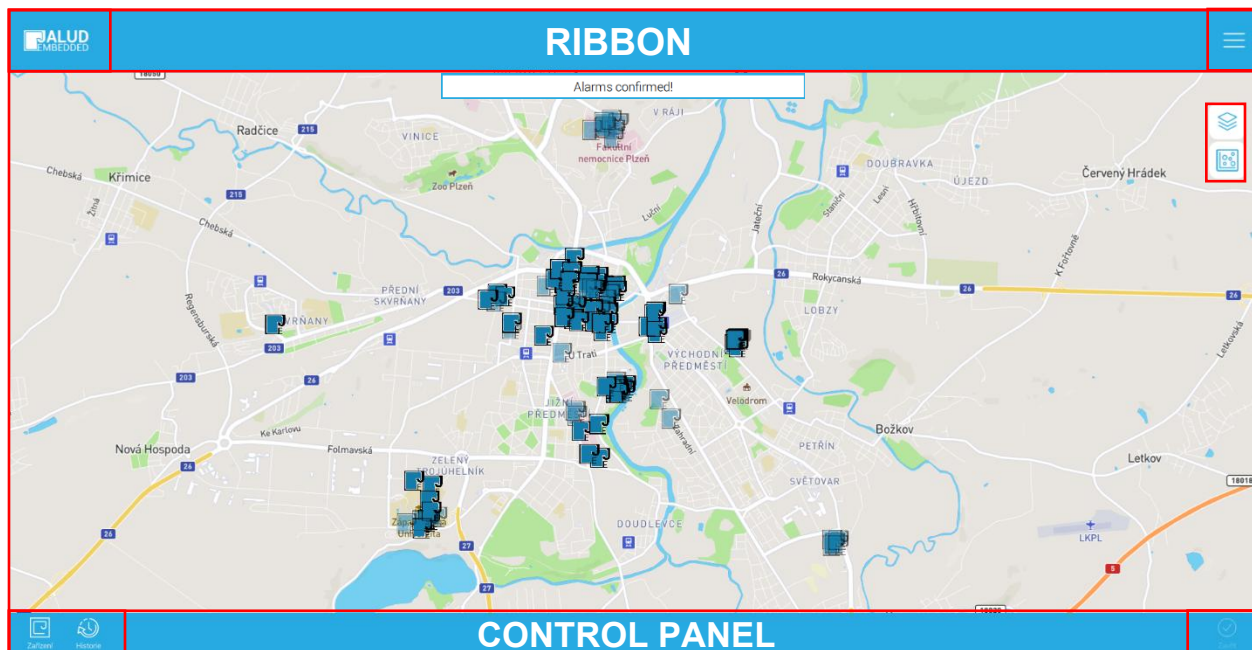


Figure 8: Outdoor View

Ribbon

The ribbon is the upper part of the user interface. The company logo is located on the left side of the ribbon. The user can exit the application by long-pressing the logo icon. In full-screen mode, this is the way to exit the application. On the right side there is a button that returns the user to the home screen. 

Status Bar

The status bar is located in the upper part of the application below the ribbon. It is displayed only when the user needs to be informed about, for example:

- The connection status with the server.
- The connection status of a device has changed.
- An impulsive event that is not an alert has been detected.
- Alarms have been acknowledged or cleared.

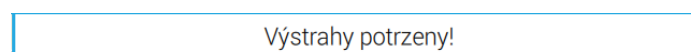


Figure 9: Status Bar

Control Panel

The control panel is located in the lower part of the application and is used to activate or deactivate application functions described in the following chapters. The panel is designed so that it can be used without changes in both the mobile and desktop versions of the SED application.

In the left corner of the control panel there is the Devices tab, which links to the device database, and the History tab, where you can find the alert history. In the right corner there is the Close icon, which is used to clear alerts.



Figure 10: Control Panel

Map Background

The SED application uses the Mapbox map plugin in the background to inform the user about the location of their devices. The default mode is the outdoor map mode, but the user can switch to a custom map mode in the settings (for example an indoor map) - see the Custom View chapter.

The user can choose from several map types. Use the button in the upper right corner of the map to open the gallery of available map types. 🗒

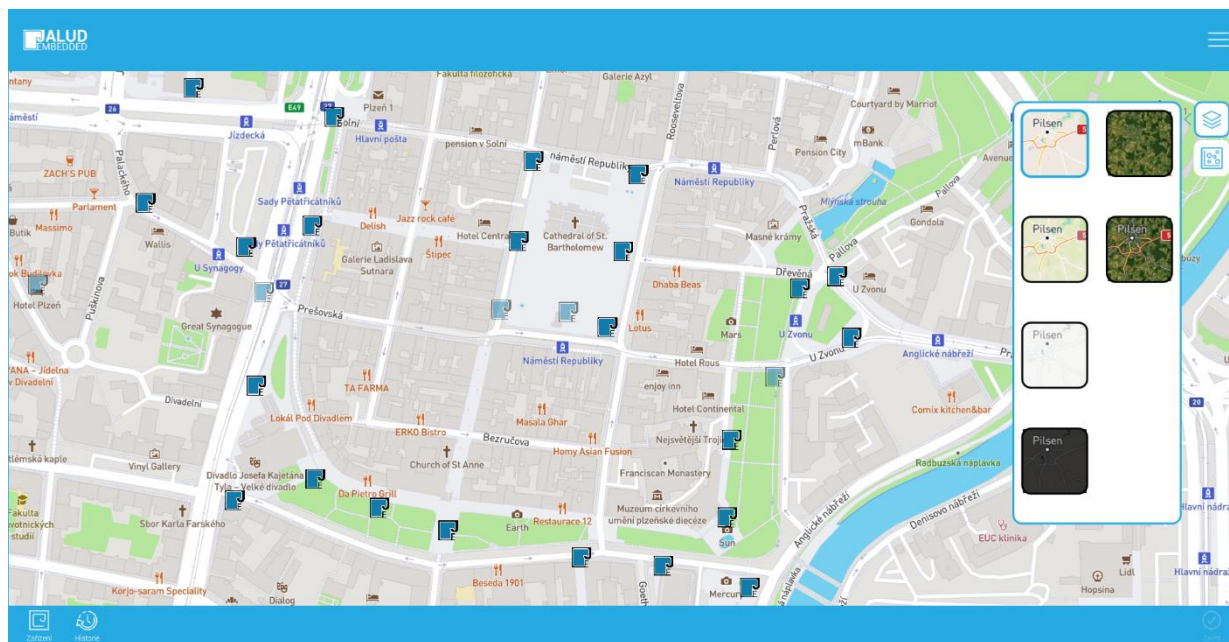


Figure 11: Map Type Gallery

The map type is changed by clicking the corresponding icon. The map type gallery collapses again when a new map type is selected. If the user does not want to change the map type, the menu is closed by clicking the map gallery icon again.

The noise level around the detector can also be displayed on the map background using the icon. This function allows the user to monitor the current noise level around detectors on the map, as well as the average noise level for the last hour or the last 24 hours. More information is available in the Noise Measurement chapter. 

Custom View

When Custom View is active, the custom map background added by the user is displayed. The user can set maps for any number of buildings and floors and place a specific map background for each floor, including an area map or outdoor parts of the building. Maps can be added in the building section, as described below.

The device position on the indoor map has no effect on the device position on the outdoor map. The only limitation is that one device cannot be placed in multiple buildings or floors. However, it can be placed both on the outdoor map (Outdoor View) and on the indoor map (Custom View).

The mode is not limited to displaying only one building. Each building can contain any number of floors. You can switch between individual buildings using the building icon in the upper right corner of the map. Individual floors are displayed by swiping left or right.

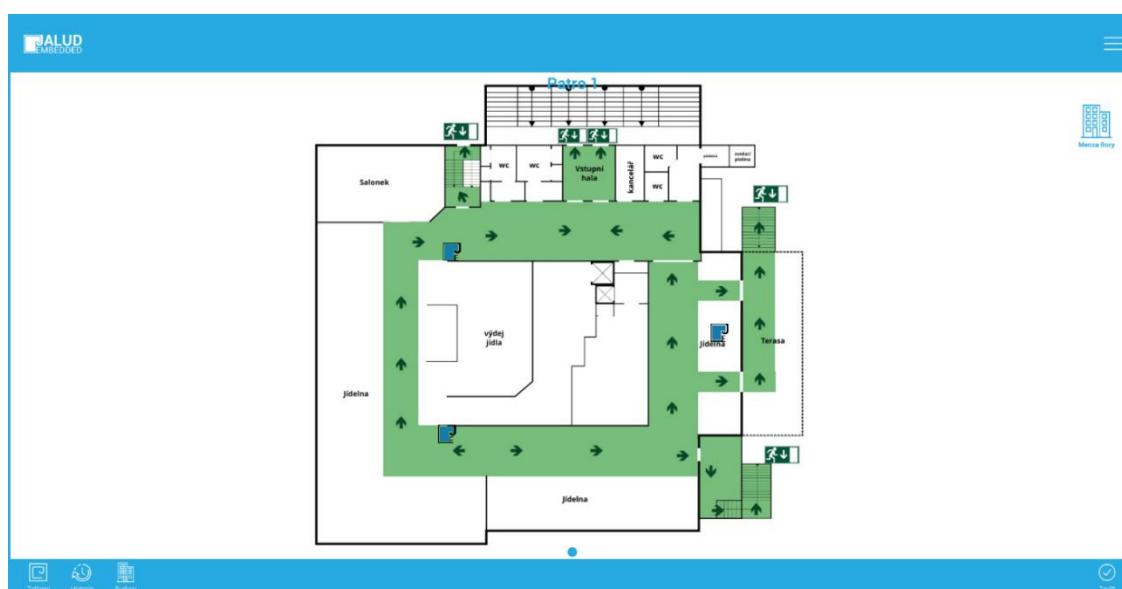


Figure 12: Indoor Map

Devices

The application informs the user about device locations on the map and their current status. Devices are displayed on the map using a marker. The marker differs according to the current device status (see below). 

Device Status

Device status contains information about the current connection status or whether the device has triggered an unacknowledged notification. If the device status changes, the user is informed.

Device Status	Marker	Description
Unknown		The server is disconnected; the device status is unknown.
Disconnected		The device is disconnected.
Signal Lost		The device icon is light and flashing. The connection to the device has been temporarily lost. If the signal is lost for more than 3 minutes, the device is marked as disconnected. Alerts from the device may be delayed.
Connected		The device is successfully connected and protects the area.

Event Notification		The device icon enlarges and flashes. An impulsive event was detected in the area, but it was not classified as a dangerous situation.
Alert Notification		A dangerous situation was detected. The device icon turns red, flashes, and an audible signal is played. The type of dangerous event and the timestamp are displayed below the device.
Alert Acknowledged		The user acknowledged the alarm. The device icon remains red, but no longer flashes and the audible alarm is turned off. Event information continues to be displayed until it is manually cleared.
Device SW Is Obsolete		The device is connected, but the SW version is obsolete - an update is required. Communication between the device and the user application may not be established.
Notifications Disabled		All incoming notifications have been disabled on the device (for 60 minutes).

Information Panel

After clicking the corresponding device on the map that is not in alert status, an information panel is displayed. This panel is primarily used to help the user correctly match the device serial number with the marker on the map. Clicking the displayed information closes the panel again.

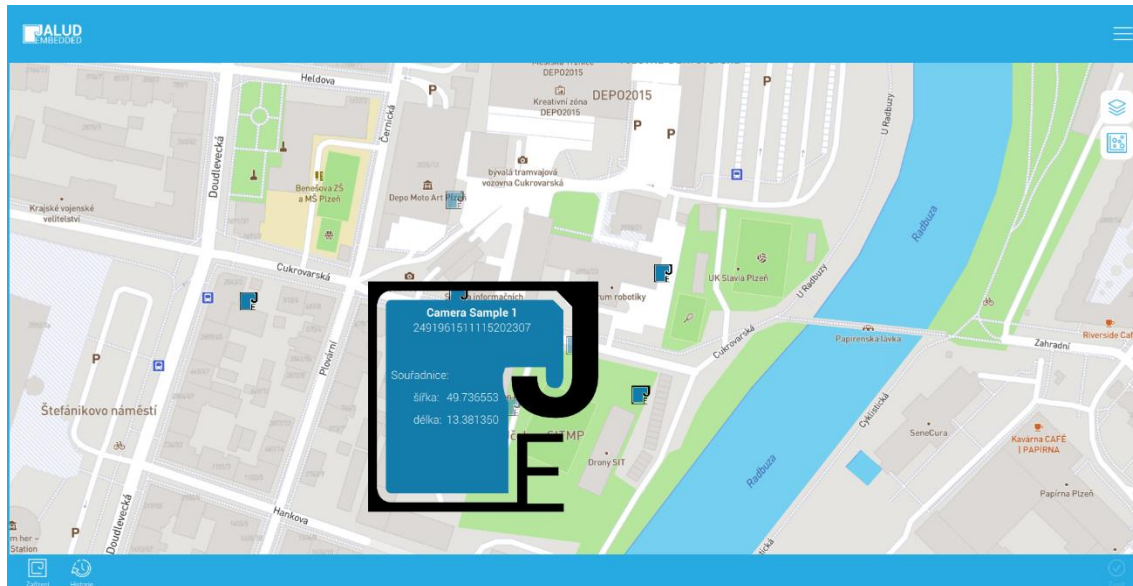


Figure 13: Information Panel

Device Location

When the application is started for the first time, no devices are displayed because their GPS coordinates (latitude, longitude) have not been set. It is up to the user to set the GPS coordinates based on the actual device location. Devices can easily be placed on the map using the Device Panel; see below.

Device Database

The list of devices and their properties is available under the Devices icon on the left side of the Control Panel. Clicking the icon opens the database of devices available to the user. Additional information and device management options are then available on the panel for each device. 

Databáze zařízení						
Č.	Popis	Stav	Graf	Umístění	Alarm Stav	Info
1	Kufr - Hikvision Camera	Odpojeno				
2	Kufr - AXIS Camera	Odpojeno				
3	Kufr - SED Outdoor	Odpojeno				
4	Kufr - SED Indoor	Odpojeno				
5	Tachov - Klubovna	Odpojeno				
6	Tachov - Věž rozhodčího	Odpojeno				
7	JALUD Demo	Připojeno				
8	JALUD Lukas Laptop	Odpojeno				
9	JALUD Demo 1	Odpojeno				
10	Orlen Unipetrol_02	Odpojeno				
11	SAMPLE #2	Připojeno				
Zařízení Historie						

Figure 14: Device Database

In the device database, you can filter using the button to display only selected devices.

The export button can be used to save the device list.

The button in the lower right corner of the database is used to disable incoming notifications from all devices for 60 minutes. Confirmation that notifications have been disabled is displayed in the status bar and the button changes its appearance. Devices on the map switch to the Notifications Disabled status and turn grey. Notifications can be reactivated at any time by clicking the alarm button again.

14	Camera Sample 1	Připojeno				
----	-----------------	-----------	--	--	--	--

Figure 15: Device Panel

The Device Panel displays the device name and status (connected, disconnected, signal lost, etc.). Additional options are described below.

Charts

Press the button to display the ambient noise chart. The device regularly sends data with ambient noise values from its surroundings. The data is displayed in a chart and can be further analyzed. A sudden increase in noise level may indicate a potentially dangerous situation (for example, a gathering of sports fans or a demonstration). 

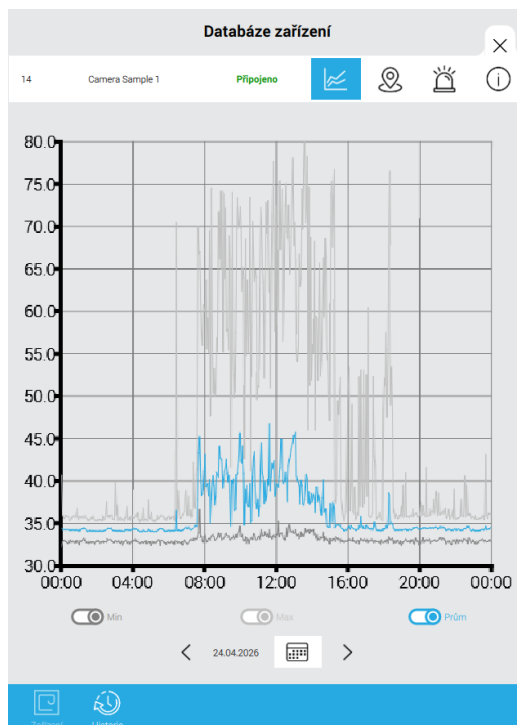


Figure 16: Device Detail - Charts

Location

Use the button to display the device location on the map. After clicking it, the button on the panel of the selected device is highlighted in blue and the device icon on the map flashes. Clicking the location button again returns the device to its original state. If the device is not placed on the map, the location button is displayed in a lighter theme. The device location can be added and edited in the Device Information tab.   

Notification Status

The button allows all notifications for the selected device to be temporarily disabled for 60 minutes. For a device whose notifications are disabled, the pictogram on the panel is shown crossed out and the marker on the map changes from blue to grey. Notifications can be turned back on at any time by clicking the button. If you want to disable notifications from all devices, use the alarm button at the bottom of the database as described above.   

Device Information

The button displays device information. The Device tab shows the S/N, ID, and device name. In the Location tab, you can add or edit the device location. The application distinguishes between Outdoor and Custom device locations. A custom location shows the device placement on a custom map, typically an indoor map. We recommend editing the location on a custom map in the Custom View section. ⓘ

Using the button, the device can be placed easily by clicking on the map. The device information panel appears with coordinates that are saved after confirmation. The device location can also be entered or changed using the button. After the GPS coordinates are entered, the change is automatically reflected in the location on the map. ⓘ

Databáze zařízení	
7	JALUD Demo
Připojeno	
Zařízení Poloha	
Venkovní	
Zeměpisná šířka:	49.737
Zeměpisná délka:	13.379653
Vlastní	
X:	0.939394
Y:	0.147373
Patro:	0
Budova:	Žádný

Figure 17: Device Information - Location

Event History

The History tab contains a database with information about alerts. When the database is opened, the current date is displayed and events detected on that day are downloaded from the cloud database. The user can change the date at the bottom of the panel using arrows or the calendar. The database is accessible from the Control Panel. 

Historie událostí						
Č.	Časové razítko	Zařízení	Typ	Přehrát	Obr.	Info
11	01:01:38	Synpoint_02	Pískání pneumatik			
10	00:59:40	Hlavní nádraží - parkoviště (V0460)	Agrese			
9	00:43:32	Piaristu_Mikulov	Mušský křik			
8	00:33:37	Americká Anglické nábřeží (V023180)	Agrese			
7	00:28:16	Sady 35 - Parkoviště (V019805)	Mušský křik			
6	00:27:36	Sady 35 - Riegrova (V019765)	Mušský křik			
5	00:27:19	Sady 35 - Riegrova (V019765)	Agrese			
4	00:26:41	Sady 35 - Riegrova (V019765)	Mušský křik			
3	00:25:26	Sady 35 - Riegrova (V019765)	Mušský křik			
2	00:03:43	Hlavní nádraží - parkoviště (V0460)	Agrese			
1	00:03:43	Hlavní nádraží - Šumavská (V0462)	Agrese			

Figure 18: Event History

Event information contains the following information:

- The event sequence number within the active date.
- The timestamp when the record was activated.
- The name of the device that triggered the alarm.
- Event type - Gunshot, Glass Break, Scream, etc.
- Play button - plays the audio fragment of the event. 
- Image button - If the device contains a camera module, images from the time of the alert can be displayed. Images are available only for events since the application was started; they are deleted after the application is closed. To download images, use the export button.  

- Info button - displays a panel with additional information. ⓘ



Figure 19: Alert Information Panel

The Info button displays the following information: ⓘ

- Energy - event energy in dB
- Ambient - ambient noise level around the device in dB
- Confidence level - the percentage confidence that the event is the identified alert type.
- Date and time
- in the Feedback tab - feedback on the event entered by the operator.

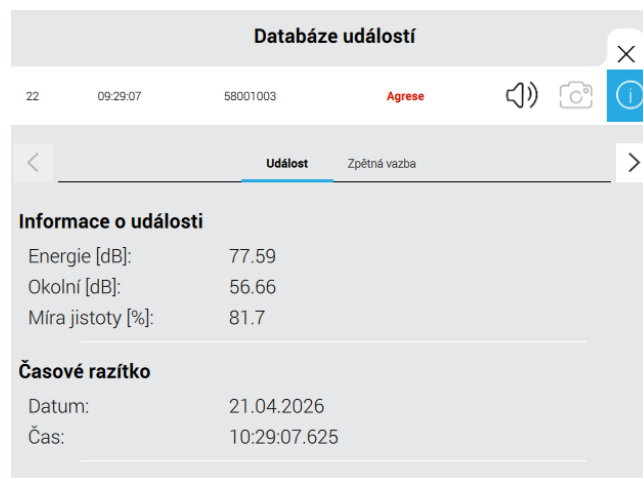


Figure 20: Event Information

The user can export alerts, including images and recordings, and save them to the local computer.

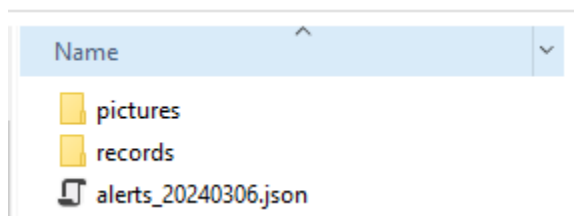
To export data, follow these steps:

- Go to the date in the alert history from which the events should be exported.
- Press the Export button and select the folder to which the data should be exported.



(Photos are available in the history only since the last application startup.)

The data is saved to the selected folder. Event information is saved in the alerts_yyyymmdd.json file, recordings are exported to the records folder, and images are exported to the pictures folder.



Figures 21: Exported Alerts

Alerts

The main purpose of the SED application is to inform the user about dangerous or unwanted events in the area around the devices. When such an event is detected, an alert is triggered and the Active Alarms panel opens on the right side of the screen. The device that detected the event switches to the triggered-alert state, an audible alarm is played, and basic alert information is displayed on the line below the device.



Figure 22: Alert Triggering

Alert Types

Below the device on the map, a pictogram of the event/alert type and a timestamp are displayed. If multiple alerts are triggered by a device, they are displayed as a list. Icons for the individual event types that the device can recognize are shown in the following table.

All alert and event types can be found here.

- **Gunshot:** the sound of gunfire from pistols, rifles, and other common types of weapons.
- **Glass break:** the sound of breaking glass. SED focuses on detecting the sound of a broken window or glass partition, but it can also detect the sound of a broken bottle in public spaces.
- **Scream:** panic scream of women. Detection of this sound may indicate (sexual) assault, kidnapping, etc.



- **Child scream:** panic scream of children. Detection of this sound may indicate assault, attempted kidnapping, etc.
- **Male scream:** panic male scream. Detection of this sound may indicate assault. It may overlap with aggression detection.
- **Aggression:** aggressive shouting, sounds of fighting or assault, aggressive patients in central or emergency admissions and waiting rooms, etc.
- **Spray:** preparation of a spray can before spraying a protected location.
- **Angle grinder:** the sound of a grinder cutting through, for example, a border fence or a lock during bicycle theft.
- **Motor vehicle:** the engine sound of a passing vehicle. Protection against unauthorized entry into a remote protected area, such as a national park.
- **Traffic:** the sound of rolling resistance from the tires of a passing vehicle. The purpose of detection is the same as for the previous sound.
- **Siren:** the sound of an ambulance, police, or fire brigade siren, or checking the functionality of a warning siren, for example in mines.
- **Drone:** the sound of a flying drone - prevention of contraband smuggling into prisons, privacy violations, etc.



- **Loud event:** an alarm triggered by an event that does not fall into any detected category but exceeds the configured noise level. It can be used, for example, to detect night-time disturbance, unauthorized entry into a warehouse, etc.; see Settings - Alerts section.



When an alert is triggered, the device sends a short section of the audio signal that was classified as a dangerous or unwanted situation. This audio section is 0.5 to 1.5 seconds long and therefore does not conflict with GDPR, because it cannot be linked to any specific person - see [GDPR study].

The user can play the audio sample and immediately assess the severity of the alert or distinguish false alarms without wasting resources.

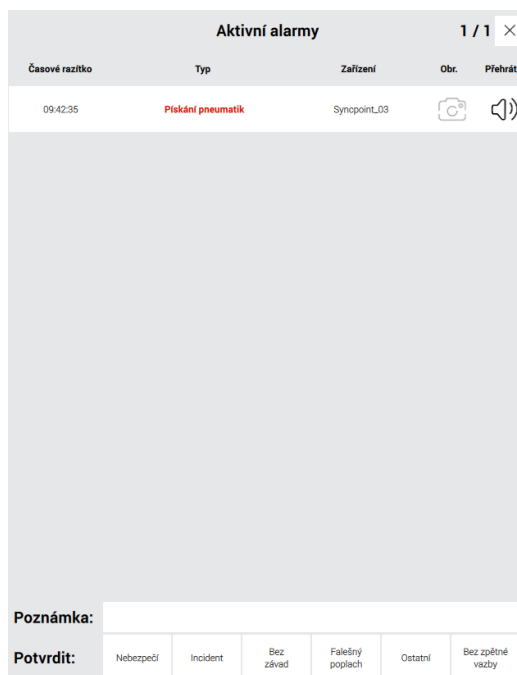
The audio sample can be played by clicking:

- the speaker icon on the active alert panel 
- the speaker icon next to the alert timestamp below the device marker 
- the device in the acknowledged-alert state (if there are multiple alerts, the sound of the last recorded alert is played) 

After alerts are acknowledged and cleared, the audio recording can still be played from the History database on the panel of the relevant event.

Acknowledging and Clearing Alerts

If an event is detected by a device, the alarm sound is played and the device is shown on the map in the Alert Notification status. The Active Alarms panel is displayed on the right side of the screen. The alert requires operator interaction before it can be cleared.



Figures 23: Active Alerts (Alarms)

The interaction takes place in two steps. First, the alert must be acknowledged in the active alerts panel.

The operator can classify the alert as:

- **Danger:** The warning indicated a dangerous situation, such as gunfire or assault, panic, or something similar.
- **Incident:** A detected act of vandalism or disturbance of public order, such as broken glass, graffiti spraying, unauthorized entry of a motor vehicle, or night-time disturbance.
- **No issue:** The sound was correctly detected as an alert, but it did not indicate a public order violation - for example, shouting during a game, glass breaking in a glass recycling container, etc.
- **False alarm:** An incorrectly triggered alert where the sound does not correspond to the detected event.

- **Other:** Sounds that do not belong to any of the categories above - for example, a system test. A feedback note is mandatory for this type of feedback.
- **No feedback:** This option is used mainly when the application is installed on multiple devices and it is not necessary for multiple operators to enter feedback.

Super or Admin users can close alerts without acknowledgement using the button. 

Feedback is important to us and helps us improve detection models. At the same time, feedback is useful for users as well. It provides a better overview of events and makes it possible to evaluate them further.

Acknowledging an alert moves the devices from Alert Notification status to Alert Acknowledged status and they stop flashing on the map. Alert information remains below the device markers until the alerts are cleared.

Clearing is performed using the Close button in the right corner of the Control Panel. Clearing alerts moves the devices from Alert Acknowledged status to Connected status. Alerts below the device are no longer displayed. Alert data can still be viewed in the

History tab. 

Event Localization

If at least three devices detect the same event, the exact position of the sound source is triangulated and displayed to the user. Triangulation is calculated based on the difference between the timestamps when each device detected the event. The latest timestamp indicates the device farthest from the sound source.

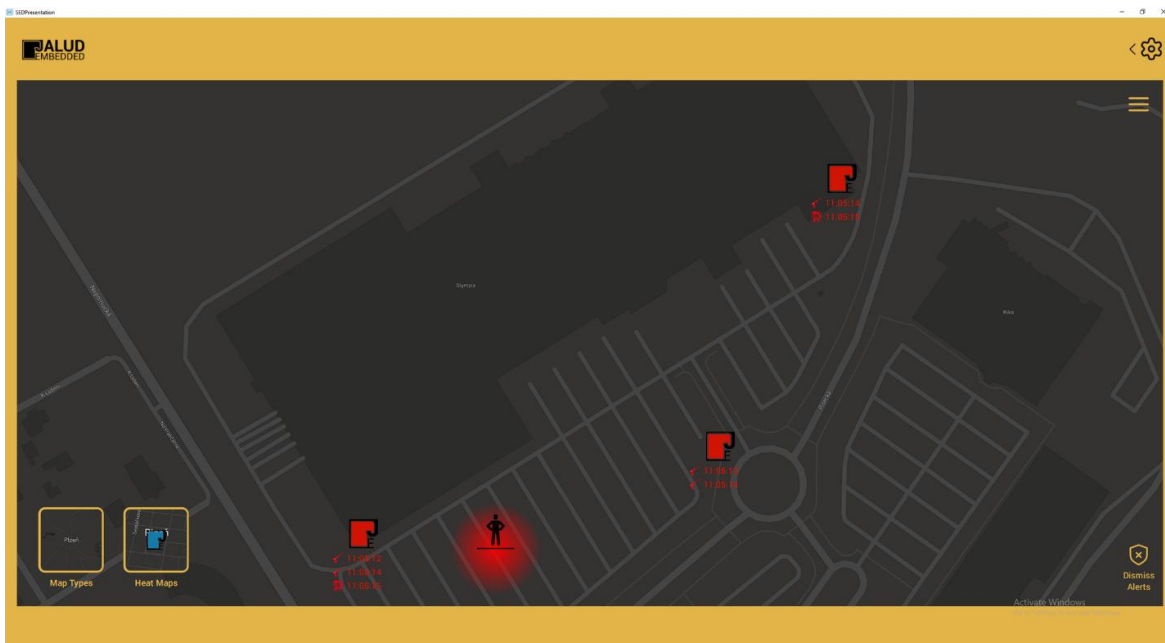


Figure 24: Alert Source Localization

Localization accuracy ranges from 10 to 30 m and depends on several factors:

- **Strength and speed of the internet connection.** The better the internet connection, the better the time synchronization between devices.
- **Relative position of the devices.** Ideally, devices should be placed as the vertices of an even triangle.
- **Distance between devices.** The farther apart the devices are, the less dependent localization is on time synchronization accuracy, but there is a greater chance that only one or two devices will record the event. The optimal distance is between 80 and 200 m.
- **Relative position of the sound source and the devices.** If the sound source lies inside the triangle defined by three devices, accuracy is higher.
- **Number of devices in the area.** The more devices used for triangulation, the higher the accuracy.

The localization marker in the SED application fades over time. The brightest marker indicates the latest alert. This information can be used to determine the movement of the sound source and estimate where it is heading.



Figure 25: Alert Source Movement

Noise Measurement

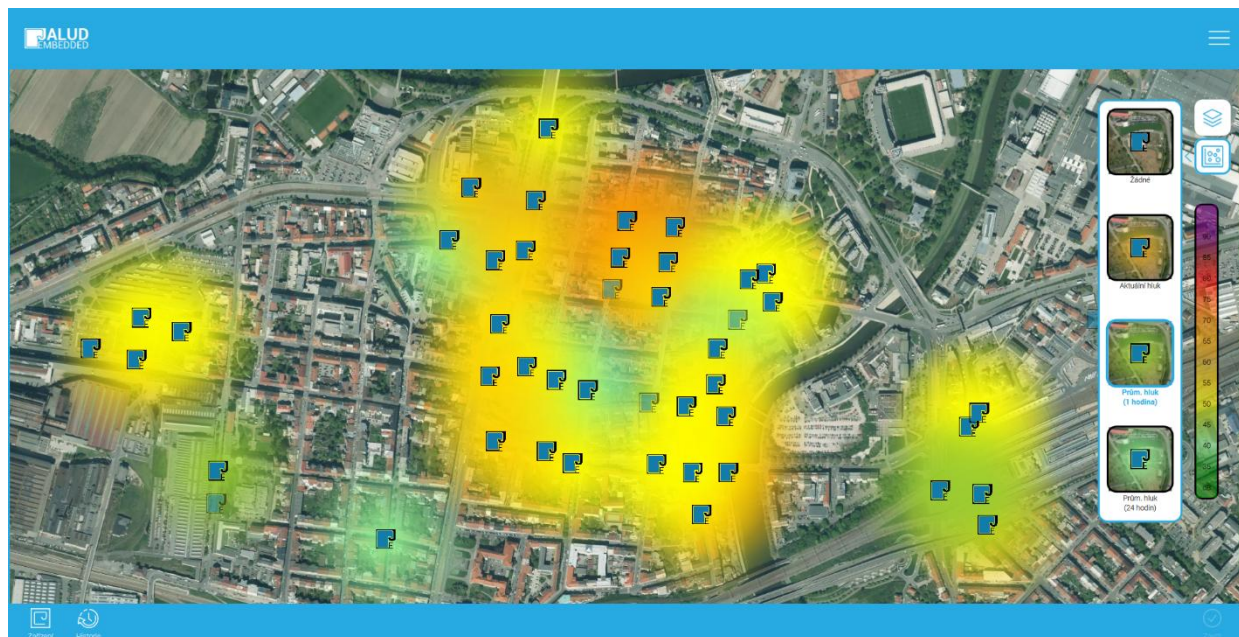


Figure 26: Noise Heat Map

The noise level around the detector can also be added to the map background using the icon. Noise measurement is a supplementary function that informs the user about the noise level around each SED device. The user can choose whether to display the current noise level or the average noise level for the last hour or 24 hours. 

This information can be used for multiple purposes:

- A sudden increase in noise level may indicate a potentially dangerous situation (for example, a gathering of sports fans or a demonstration).
- It can inform the user about night-time disturbance.
- It can indicate shouting before a street fight.
- Etc.

The decibel level is displayed in the application as a heat map. The legend showing which color corresponds to which dB level is located on the right side of the map. The legend is visible only when the noise level heat map is active.

Interior

In this tab, the user can switch to the indoor map. If the indoor map is enabled, clearing this option in the settings displays the outdoor map again.

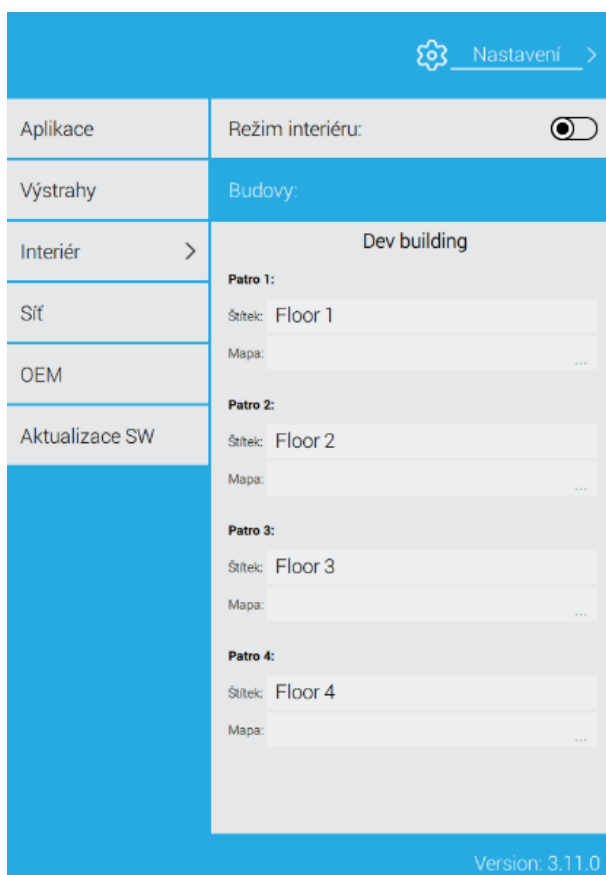


Figure 27: Settings - Interior

A new building can be added easily using the button; existing buildings can be edited using the button. The user can add any number of buildings and assign the corresponding number of floors to them.  

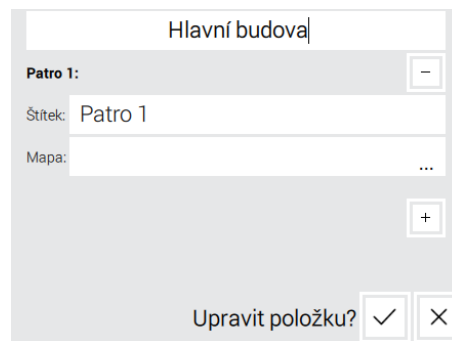


Figure 28: Available Software Update

An indoor map can be added by clicking the ... field next to Maps. Interior mode is not limited to displaying only one floor of a building. It is possible to upload a custom map background, including an area map or outdoor parts of the building.