

Merya RTLS-Mobile[®]



presentation



About the system

- System for help calling certified to the highest fourth category level according to EN
- RFID safety monitoring of people working at hazardous workplaces (also for **EX**)
- RTLS monitoring of people outside “in the open air”
- RTLS monitoring of people in buildings without GPS signal by BlueTooth





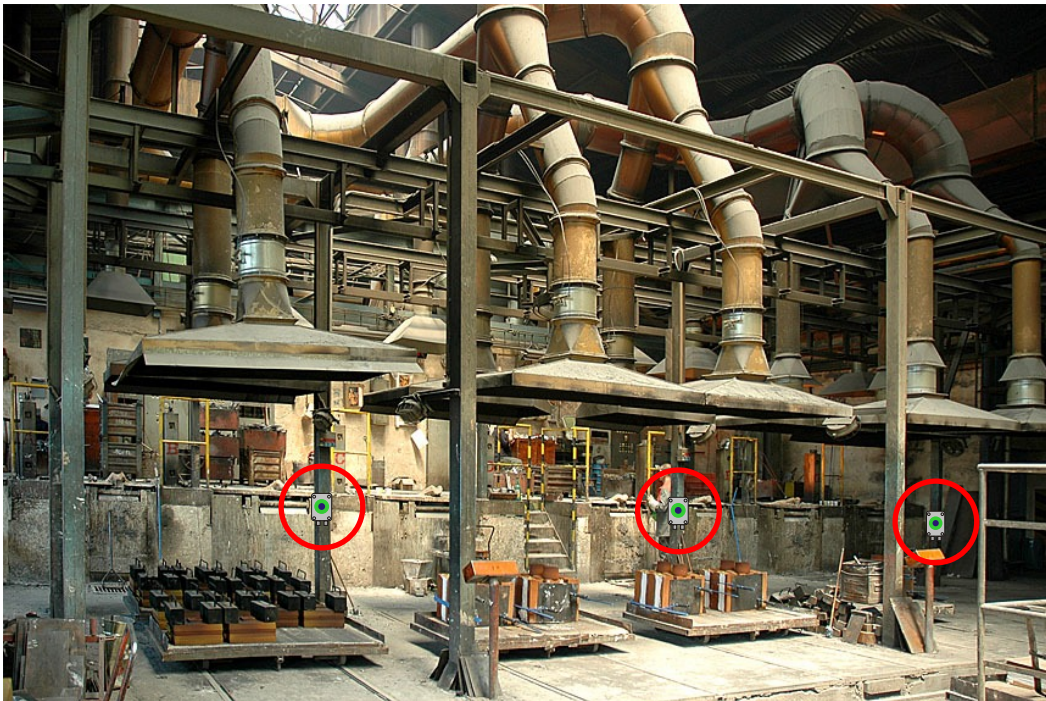
Installation of RBT detectors

working place in industrial environment



Installation of RBT detectors

working place in industrial environment





RLH-Mobile apk for mobile phone

- monitoring of position of wearer (outside by GPS)
- monitoring of position of wearer (inside by BlueTooth)
- detection of lying person
- detection of immobility
- detection of free fall from height
- SOS button for calling help
- local pre-alarm indication
- detection of areas, where postponing of device is possible
- user control of modes with use of NFC tags
- The manufacturer recommends using this type of mobile phone that is tested:
Samsung Galaxy Xcover-4





RLH-Mobile apk for mobile phone (to environments EX:)



The manufacturer recommends using these mobile phones for explosive environments.



Sonim Ecom Smart-Ex 01
Ex-Zone 1/Division1

Sonim Ecom Smart-Ex 201
Ex-Zone 2/Division2



i.safe Avantage 2.0.
Ex-Zone 1/21.



IS 730.2
Ex-Zone 2/22.

Detection and indication of main alarm scenarios

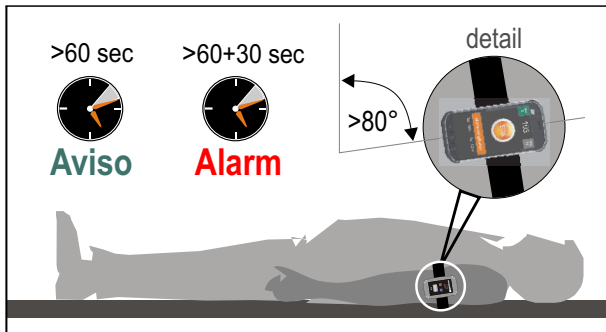


fig. 2 - detection of lying person with use of mobile phone



fig. 3 - detection of immobile person with use of mobile phone

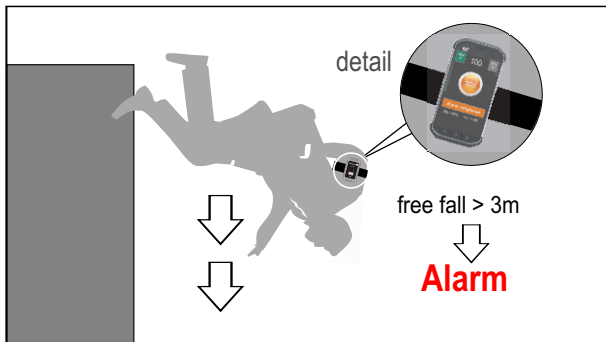


fig. 4 - detection of free fall with use of mobile phone



fig. 5 - detection of SOS call



NFC tags for bypass of safety guarding

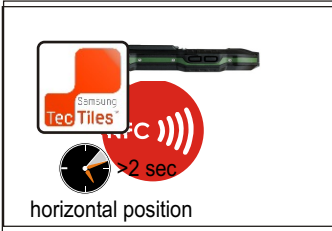
Mobile phone has two basic modes: safety guarding on / safety guarding off (detection of immobility, lean, free fall, SOS button). These modes can be changed with use of NFC tags. Optionally mobile phone supports special mode, which turns on safety guarding (end bypass of safety guarding) only by change of mobile phone from horizontal position to standard position.



Turn off guarding



Turn on guarding



Turn off guarding



Turn on guarding

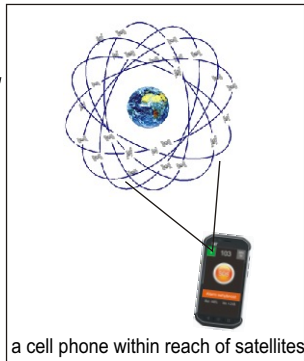
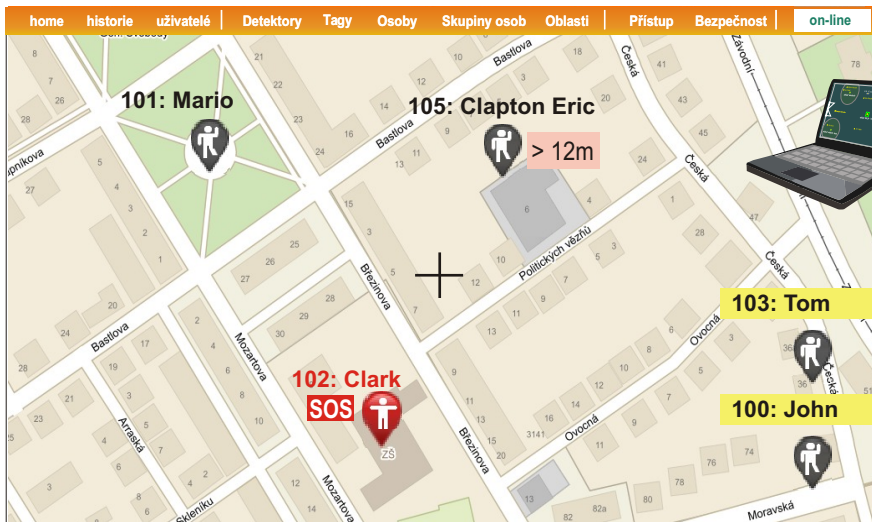
in bypass mode

- mobile phone can be immobile
- mobile phone can be in horizontal position
- "SOS" button does not work
- free fall is not detected

Graphical visualization (2D)

In the open area, location of people is advantageously used by GPS satellites. This position is transmitted to the FLU central unit in regular communication messages. This enables online software to display the status and status of people on online maps (known as mapy.cz)

Coordinates of people are determined by GPS

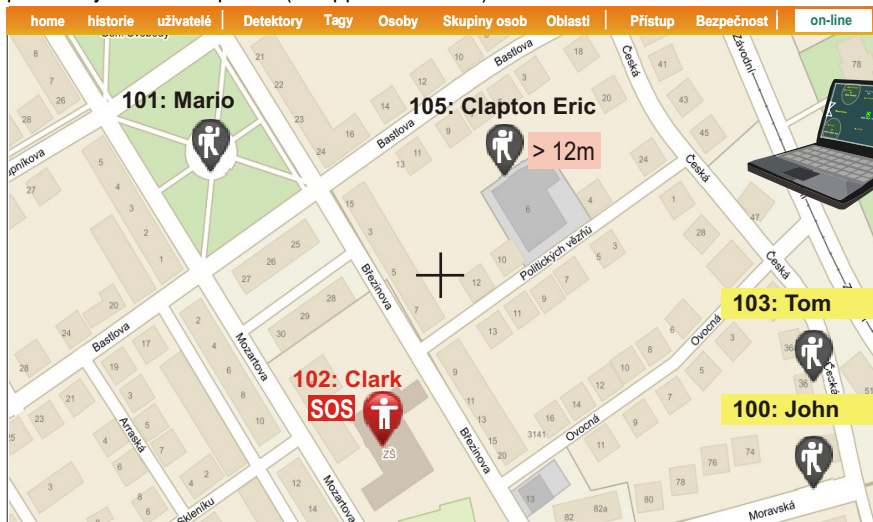


a cell phone within reach of satellites

The GPS coordinates are captured by the mobile from the satellites

Graphical visualization (2D)

In open spaces and in buildings, localization of person locations is advantageously used using **NFC tags**. This position is passed to the central unit when the mobile-phone is approximated to the NFC tag. The person's icon appears on the 2D map exactly where the NFC tag is attached (the NFC tag has a GPS coordinate recorded in its memory). This location view is min. 60 sec and no later than * **before the mobile-phone is attached to another NFC tag**. This method greatly saves battery power in your mobile-phone (as opposed to GPS).



Coordinates of people are determined by NFC tags



* If GPS service and NFC tags are used at the same time, positioning will take up to min. 60 seconds and maximum until the phone is attached to another NFC tag, **or the mobile-phone will receive the current co-ordinate from GPS satellites.**

Virtual areas usable in 2D visualization

Virtual areas (using GPS coordinates) can be defined in the system. These areas can be named and used to define, when they should switch programmable logic outputs of the central unit in the event that there is at least one person in the area etc. These areas can also be used for logging history in which areas (open air), the employee moved and when. E.g. worker Jan Novák was in the area "povrchový důl Sokolov" from 7:00 to 15:30.

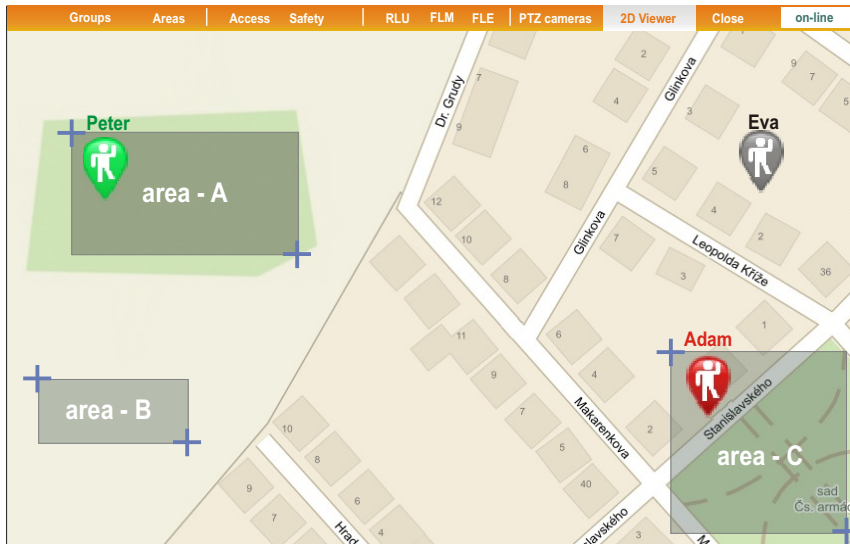
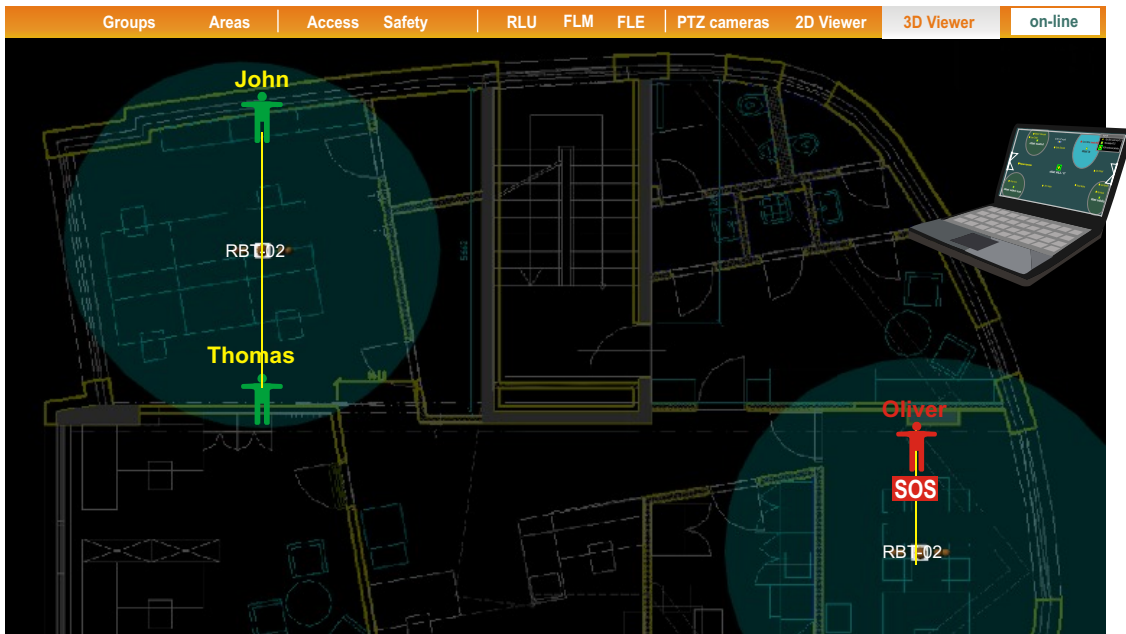


fig. 3B - Virtual areas in the system

Graphical visualization (3D)

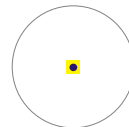
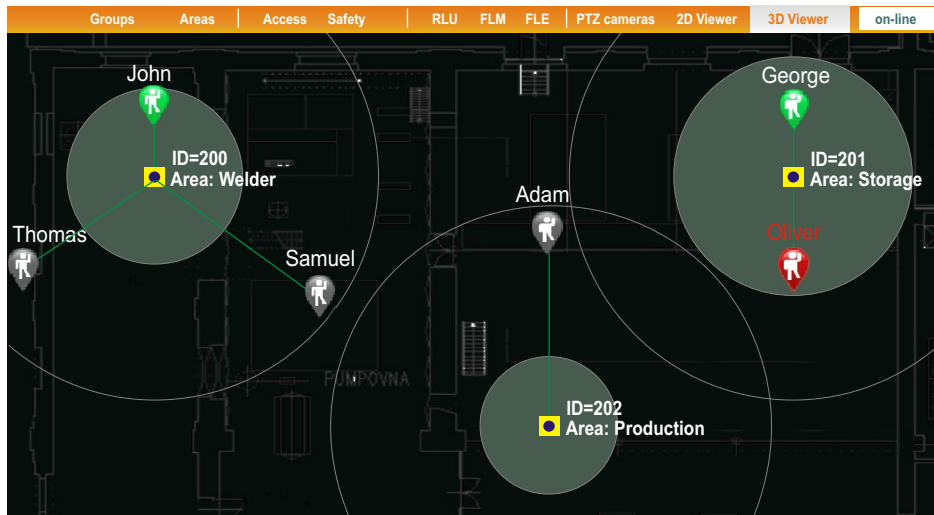
Coordinates of people are determined by detectors

The method of Monitoring of people (items) inside buildings (or outside buildings and on roofs) using radio detectors RBT (Bluetooth). Lack of GPS signal is no obstacle for localization of people inside buildings. Localization is done through RBT detectors, which are equipped by BlueTooth communicator.



Graphical visualization of position of person in area of RBT detector

In case, that person is in radio range of RBT detector, system will show it at the detector, which hears it best (at closest detector). In case, that there is only one person at detector, it is shown at "the twelfth hour". If there are more people at detector, they are regularly spread at perimeter of bubble. Line segments between icons are shorter for people, who are closer to detector (detector get their RF signal stronger) and vice versa. People, who are in the defined range (inside bubble), are displayed by green or red color depending on their authorization. People, who are outside bubble, are displayed by white color.



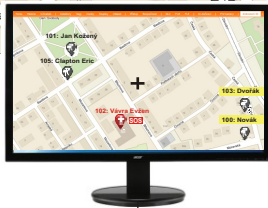
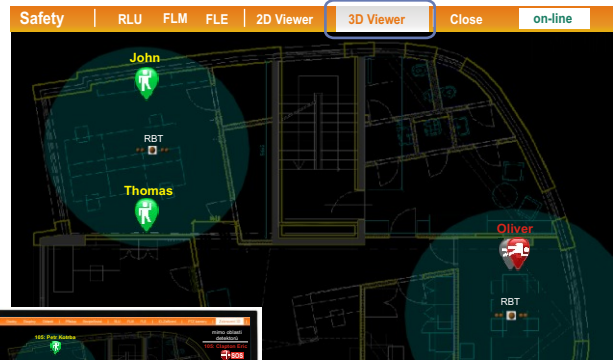
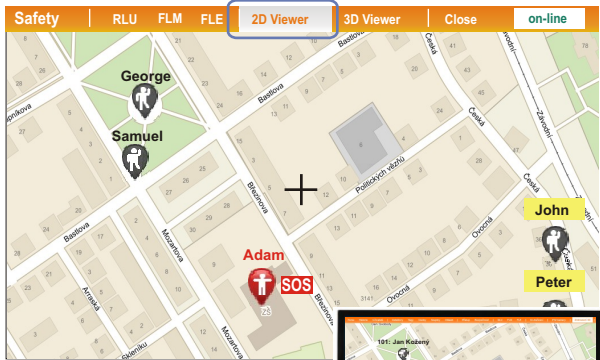
radio range of detector
given by antenna type



Bubble - user defined
range of detector
given by parameter "Range"
in agenda Detectors / Edit

Graphical visualization at two screens

Visualization at two screens uses system properties, display individuals who are monitored in the open air on one screen and individuals who are monitored inside the building on the second screen. System uses GPS satellite navigation outside the buildings and radio monitoring mobile phones using RBT detectors inside the buildings. On the left monitor is used a dynamic service www.mapy.cz.



we recommend this solution!



Indication of state of person in 2D view

2D

name of wearer

event indication



mode indication



position indication



owner's type



background of 2D viewer is mapy.cz service

GPRS, GPS indication



Mobile phone is at least 1 minute not in bubble not in bubble but is remembered in this area

Mobile phone does not have GPS coordinates at least 12 minutes

mobile phone does not communicate with RLU (can communicate via GPRS or via WiFi)

RLU after reset does not get a GPS coordinate from the mobile phone yet or the coordinate is undisplayable in the selected map section on screen

Name

note:
icons in the right bottom corner of the screen

Name



RBT-02 detector



fig. 7 - RBT-02 detector



fig. 8 - RBT-02 detector

RBT-02 properties

- module for communication with RLH-Mobile apk in mobile phone with operating system Android
- BlueTooth technology - BT2.1, IP66 coverage, -25°C / +70°C,
- range of detection to mobile phone can be defined by user
- 1* relay output (relay is **permanently turned on** and turns of if BlueTooh chip does not work)
- antenna OUTSIDE-2400 +3dBm for long range communication (app. 70m)
- power voltage 7-28V DC



RBT-03 detector (power supply by batteries)



fig. 9 - RBT-03 detector



fig. 10 - RBT-03 detector

RBT-03 properties:

- module for communication with RLH-Mobile apk in mobile phone with operating system Android
 - BlueTooth technology - BT4.1, coverage IP66, -25°C / +50°C,
 - range of detection to mobile phone can be defined by user
 - 1* error výstup (triggers, if BlueTooth chip does not work)
 - antenna is internal integrated. Radio range app. 10m
 - power voltage 3.6V DC, recommended battery pack “BatPack RBT” with capacity 6.8Ah
- * battery pack RBT” is not part of product, it has to be ordered separately

Architecture A: completely without detectors

In this variant, the system has no detectors. **Mobile phones with RLH-mobile regularly communicate via GSM / WiFi network with the central RLU** and send it information:

- About a position of the monitored person from GPS satellites (GPS coordinates)
- About a position of the monitored person after attaching the cell to the NFC tag (GPS coordinates) new
- About a position of the monitored person (immobility, inclination, fall, SOS, etc.)

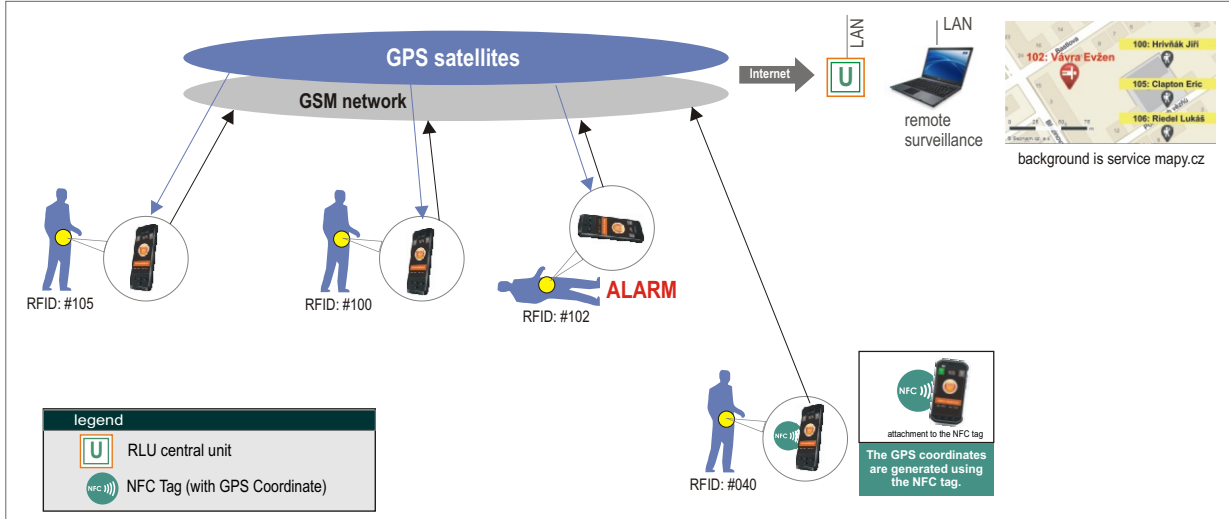


fig. - Architecture "A"

Architektura B: RBT-02/ RBT-03 detectors (BlueTooth)

In this variant, the system has no detectors. Mobile phones with RLH-mobile regularly communicate via GSM / WiFi network with the central RLU and send it information:

- About a position of the monitored person from GPS satellites (GPS coordinates)
- About a position of the monitored person after attaching the cell to the NFC tag (GPS coordinates) new
- About a position of the person monitored persons when the mobile phone range of the RBT detector (position in the plan view)
- About a position of the monitored person (immobility, inclination, fall, SOS, etc.)

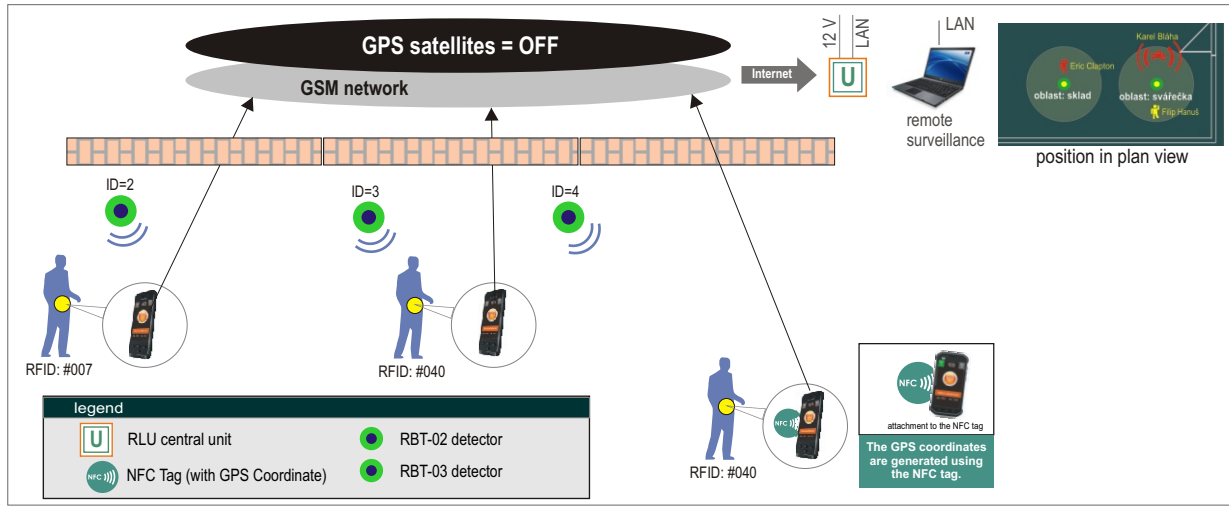


fig. - Architecture "B"

Architektura B: RBT-02/ RBT-03 detectors (BlueTooth)

In this variant, the system has no detectors. Mobile phones with RLH-mobile regularly communicate via GSM / WiFi network with the central RLU and send it information:

- About a position of the monitored person from GPS satellites (GPS coordinates)
- About a position of the monitored person after attaching the cell to the NFC tag (GPS coordinates) new
- About a position of the person monitored persons when the mobile phone range of the RBT detector (position in the plan view)
- About a position of the monitored person (immobility, inclination, fall, SOS, etc.)

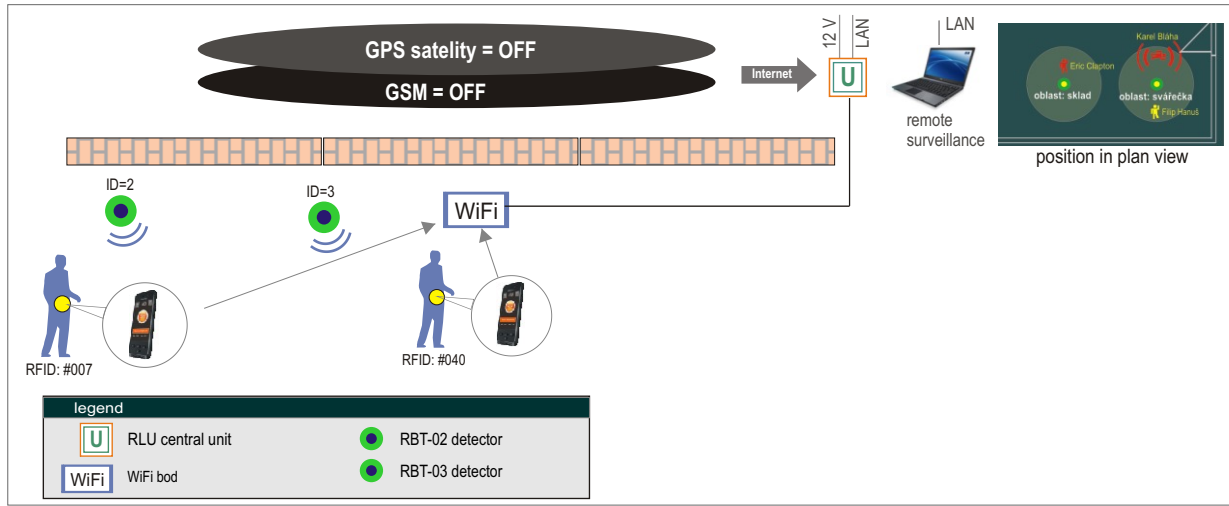


fig. - Architecture "B"

Alarm system outputs

MERYARTLS provides great variability of alarm outputs and alarm scenarios.

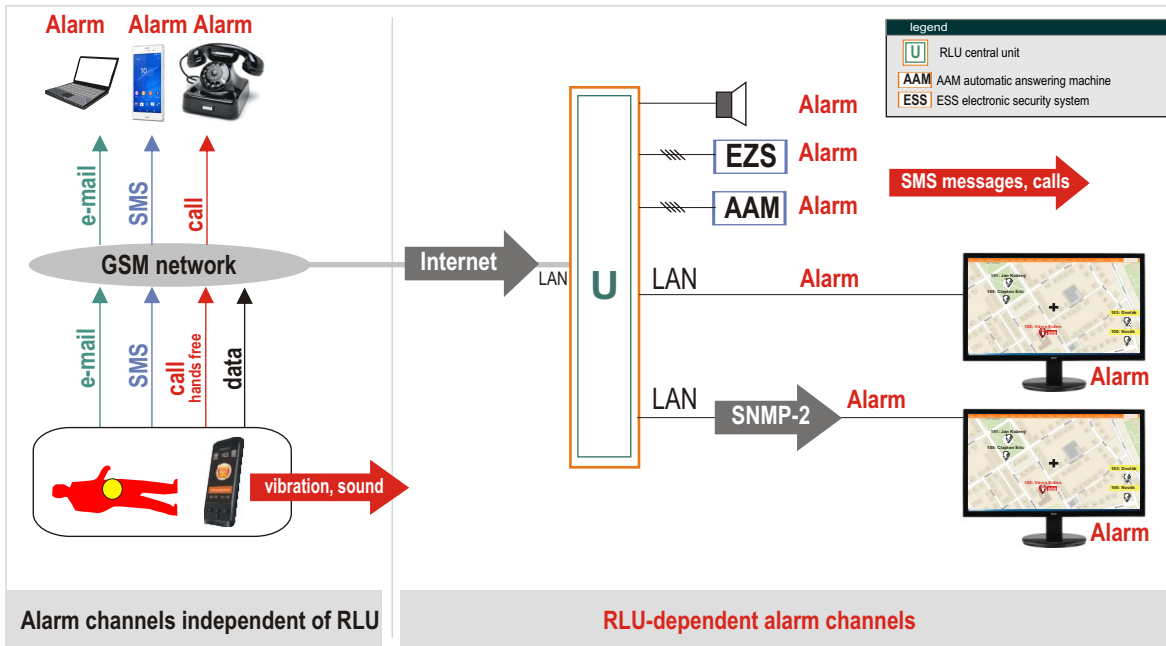
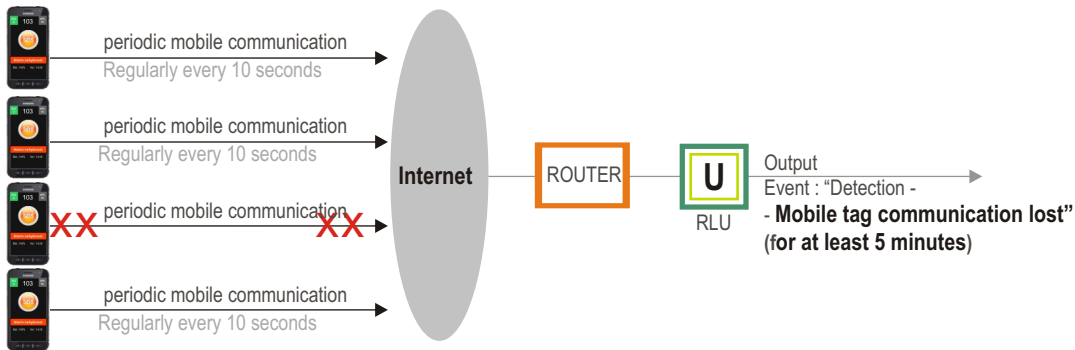


Fig. - Architecture of alarm outputs

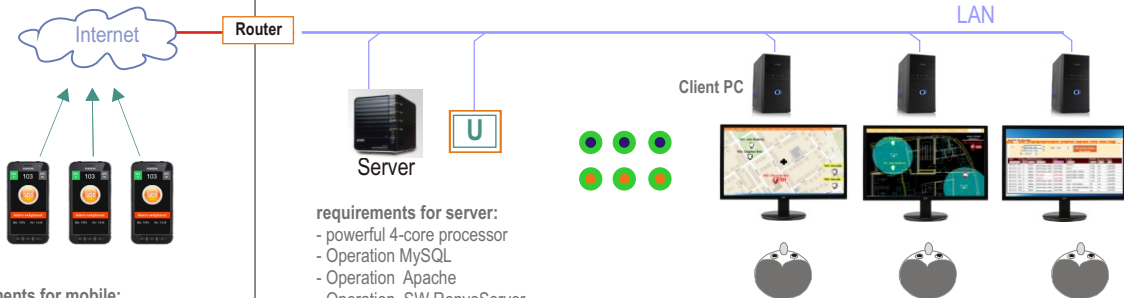


Detection of failure of regular communication with RLH-M mobile phones

The RLU central unit automatically monitors the regular communication of all the mobile phones it has in the configuration. If any of them does not communicate for more than 5 minutes, the "Detection - **Mobile tag communication lost**" output activates and the event will be recorded in history. The event ends when all the phones are communicating regularly.



Architecture - Server at Customer



requirements for mobile:

- Android 4 and higher, data services
- BlueTooth, NFC
- powerful battery, mech. endurance
- SIM card voice and data transmission: approx. 10MB of data per month (2)



(1) ... applies to one mobile and data transmission between RLU and mobile

(2) ... applies to 20 RBT detectors
- for the RLU communication period: 15 sec



requirements for connection of router to Internet:

- fixed external IP address
- about 200 MB of data transferred per month (1)

requirements for server:

- powerful 4-core processor
- Operation MySQL
- Operation Apache
- Operation SW RonyoServer

legend

-  RLU central unit
-  RBT detectors

requirements for Client PC

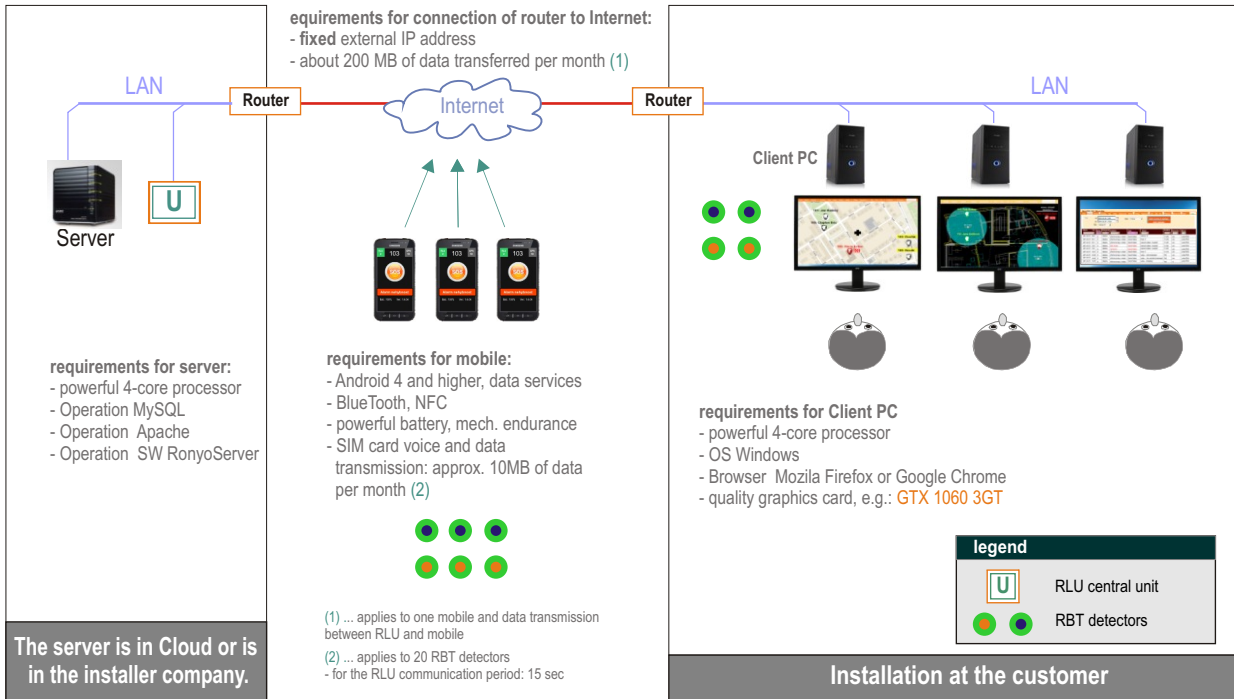
- powerful 4-core processor
- OS Windows
- Browser Mozilla Firefox or Google Chrome
- quality graphics card, e.g.: GTX 1060 3GT

The server is the customer.

Installation at the customer



Architecture - Cloud solution



Local indication of pre-alarm (Aviso)



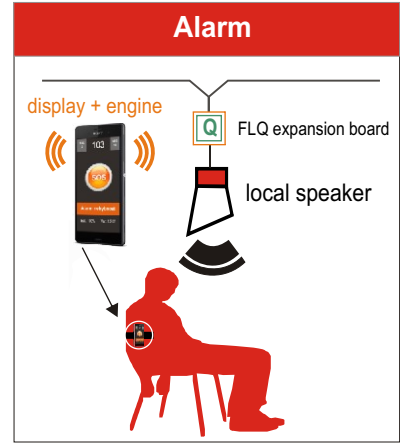
Common mode

Mobile phone has to be moving all the time (depending on set time) and has to be in correct (vertical) position.



Alarm aviso

Avízo should warn person, who created such event. If person removes the reason of such aviso (for example it will start moving again), system terminates "Aviso" indication and does not switch to alarm state.

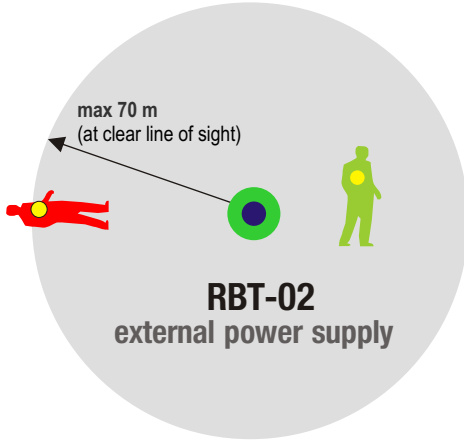


Alarm

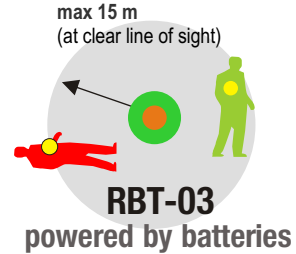
All alarm scenarios are set, if real alarm appears. System can distinguish the alarm and aviso states and handle speaker differently.



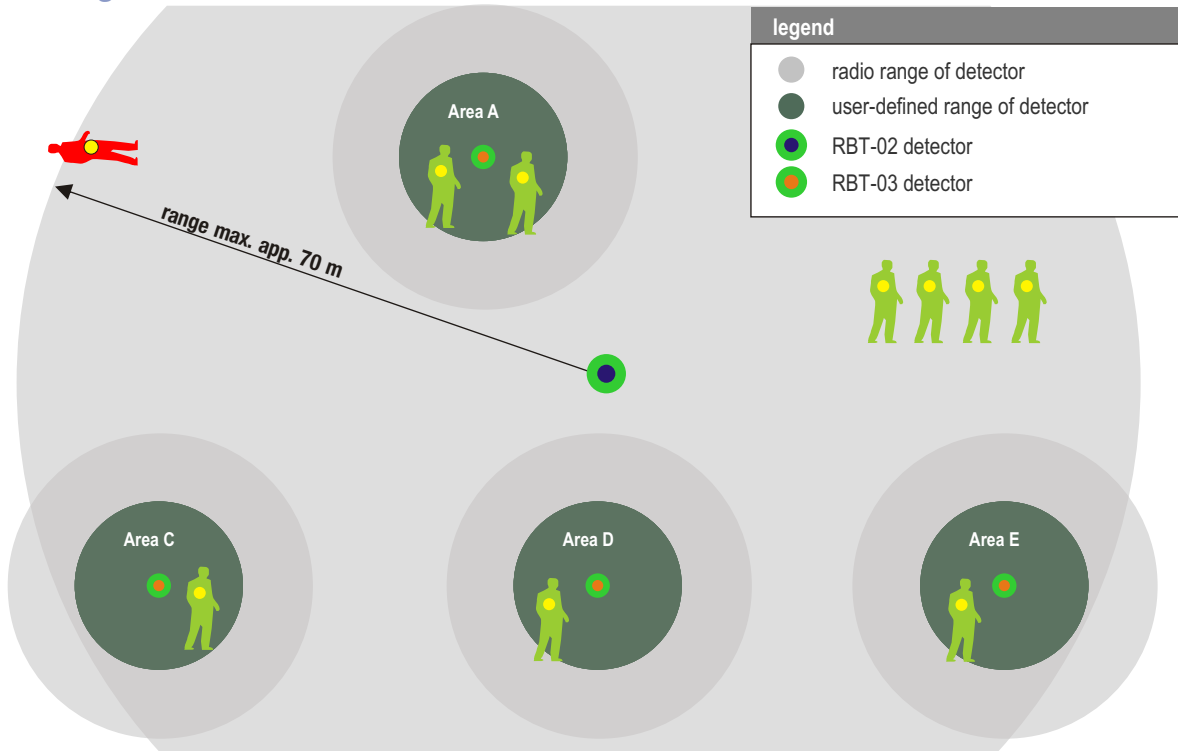
Radio range of RBT detectors



legend	
	radio range of detector
	user-defined range of detector
	RBT-02 detector
	RBT-03 detector

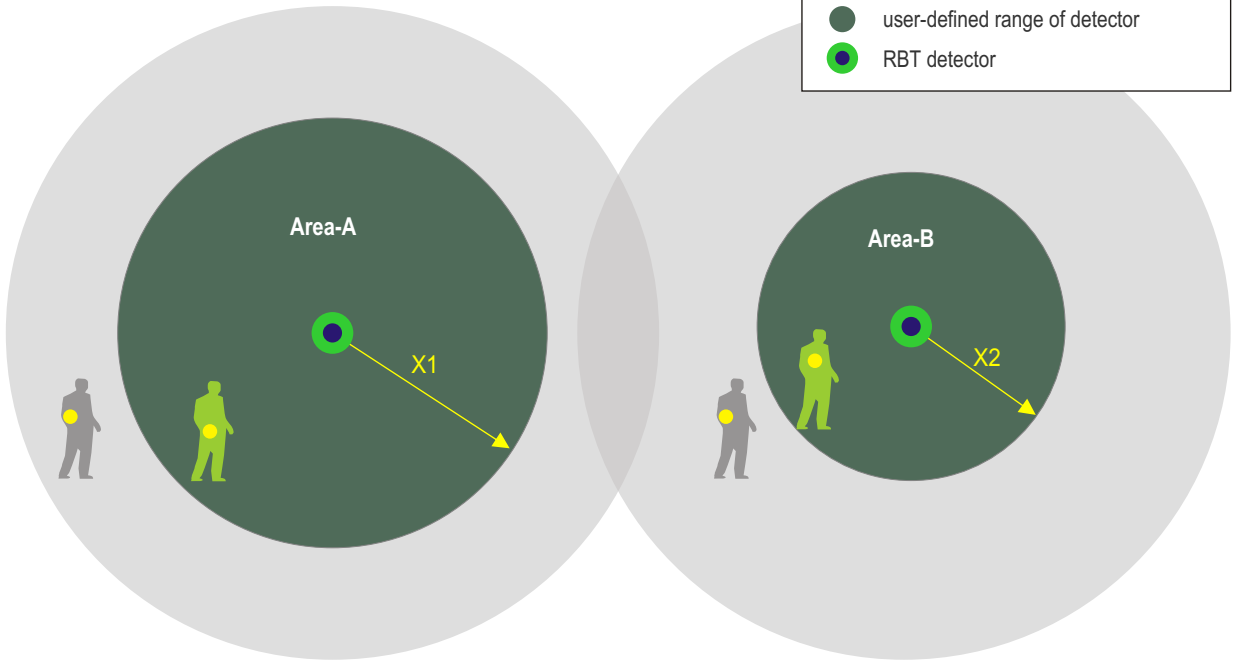


Radio range of RBT detectors

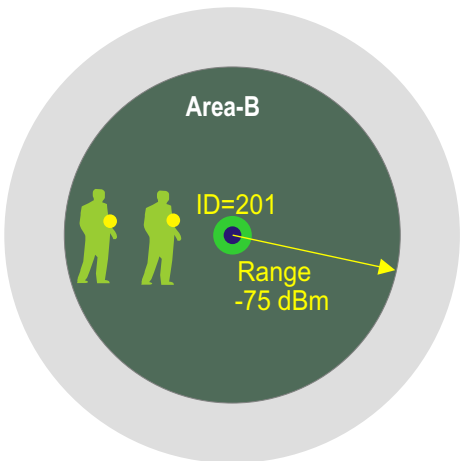


Definition of size of area (user-defined range)

Size of areas (X1, X2) can be defined by user.



Unwanted change of the range size due to interference with the antenna



A person has a phone is placed on the body in such a way that the phone can receive detector's transmission on direct visibility.

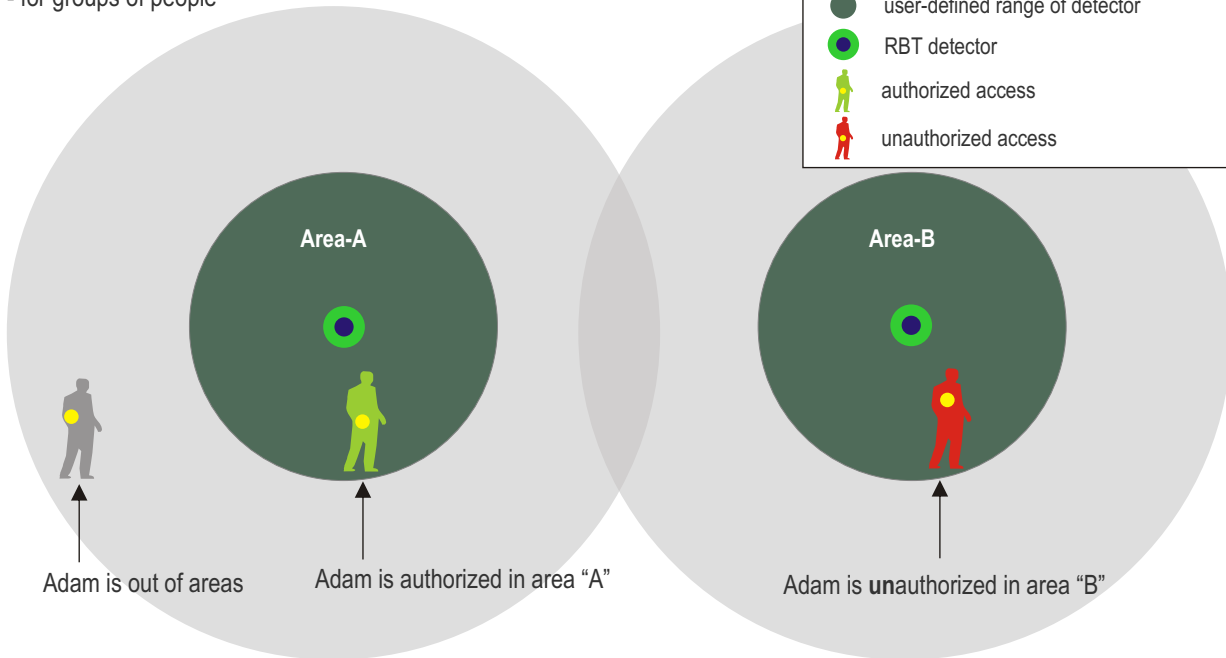


The person turned back to the detector, so that the phone now accepts detector's transmission through his body, and therefore weaker. (note: as the detector's reach would diminish)

Definition of authorization of access to areas




Authorization of access can be defined by user

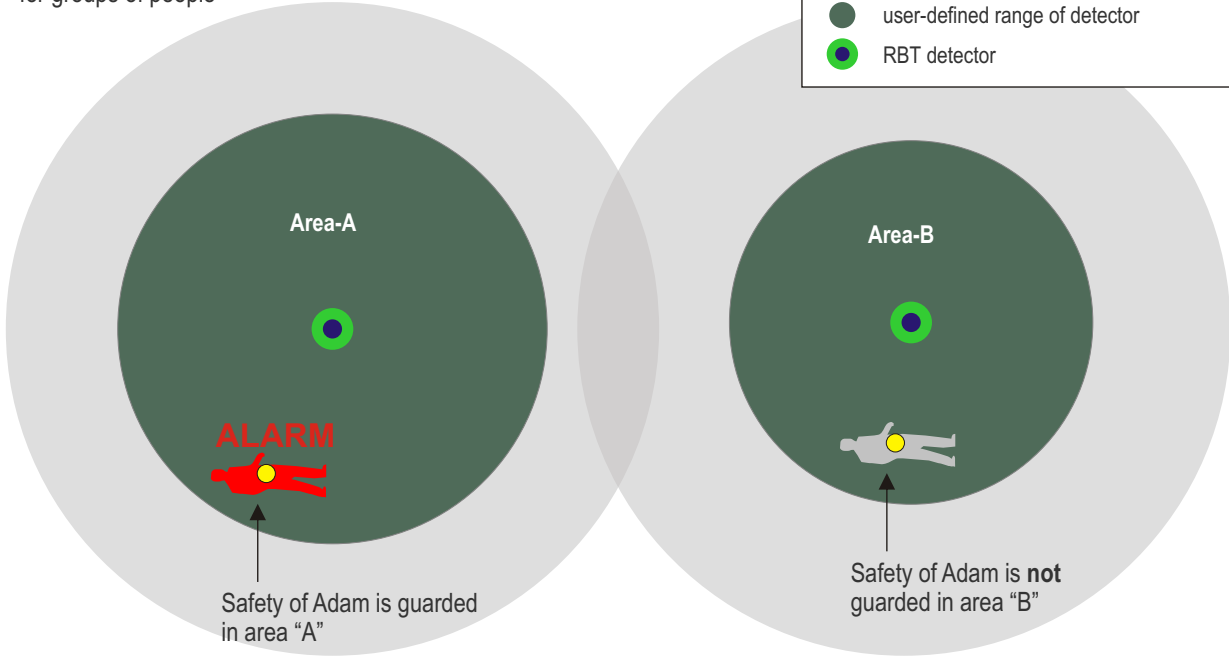
- for each person individually
- for groups of people



Definition of safety guarding

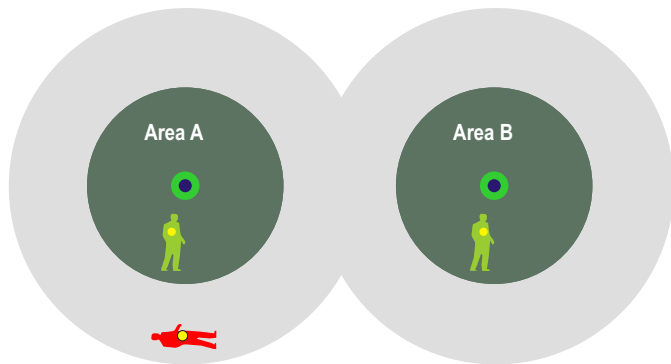
- User can choose, in which areas safety is guarded and in which areas not.
- for each person individually
 - for groups of people

legend	
	radio range of detector
	user-defined range of detector
	RBT detector

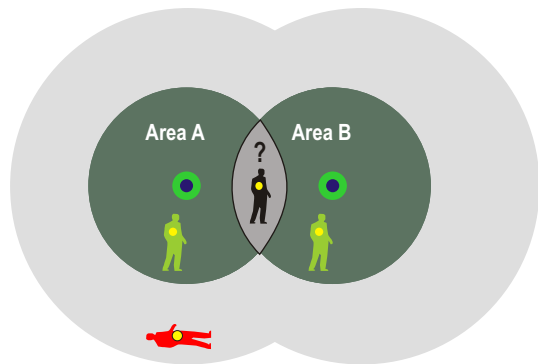




Correct design



Wrong design!!



legend

- radio range of detector
- user-defined range of detector

1.

option: global monitoring

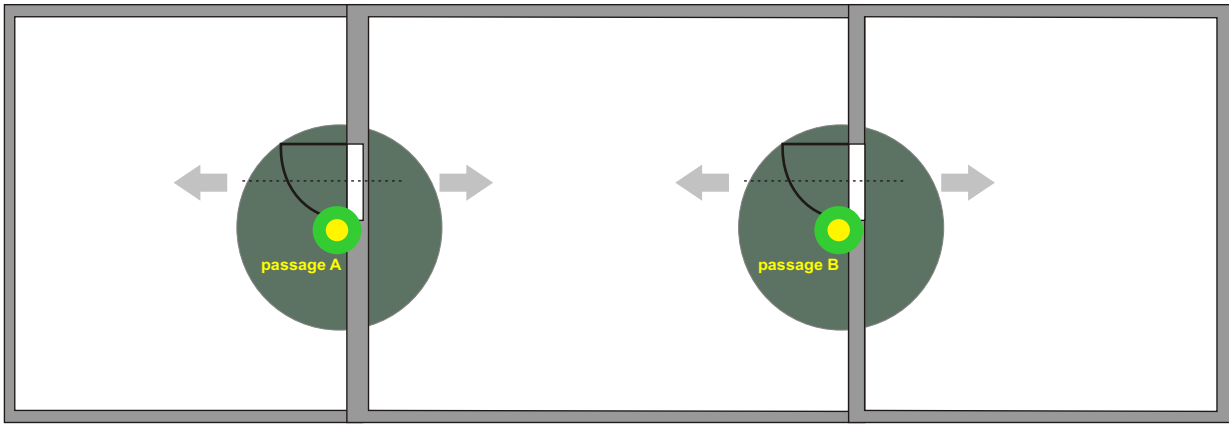
Display at screen





2. Option: monitoring of passage through key points

Installation - Location of RBT detectors



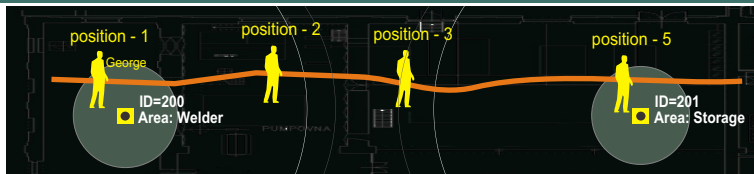
System can achieve high stability and information function by “memorizing” presence of tag in defined range of detectors. User ranges of detectors are usually quite small in this case and detectors are placed at key spots in building. System remembers last detector, where the person was and this person virtually stays in this area until it gets to area of another detector.

2.

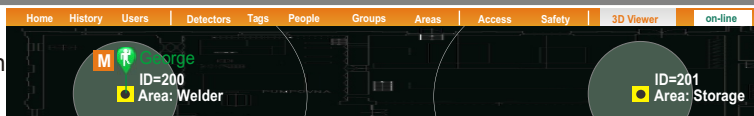
Option: monitoring of passage through key points

Reality

real state



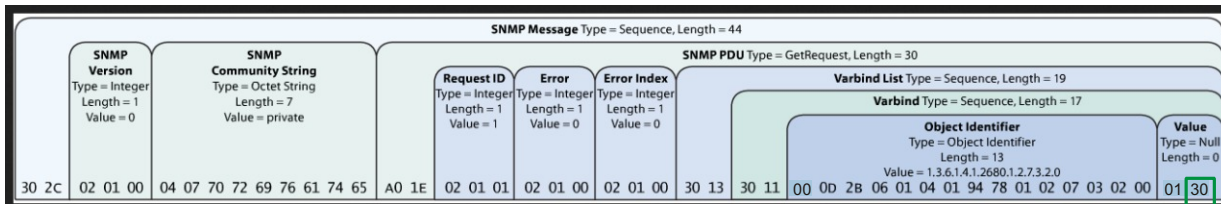
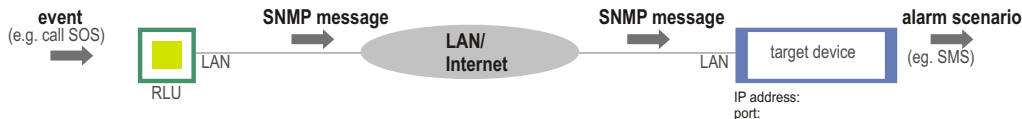
Viewing memorized
the position of a person in the area
of the last RBT detector.

position
1position
2position
3position
4

SNMP - communication between the RLU and the target device

SNMP

The central unit can within the LAN - Internet (without requiring the receiving party) sent to the specified IP address SNMP data messages at the moment when the (ev. stops) any event which configures the agenda I/O device. Max. SNMP possible number of outputs (messages) is 80.



Description of the datagram protocol SNMP

Merya RTLS software allows integration into other higher-level software systems. Communication with these superior systems provided directly by the central unit RLU, which has integrated configurable standard communication protocol SNMP-second The central unit RLU in real time sent detailed reports alarm events, such as the person is lying .: Immobility fall, SOS call, in person, illegal stay in the area, passage doors, pass incognito, etc ..). Some GPRS routers can accept these SNMP messages automatically forwarded as an SMS message to your phone.

On-line position of people in area

Merya RTLS: 0330 - Vitkovice Steel

Home History Users Detectors Tags People Groups Areas Access Safety RLU FLM FLE PTZ cameras 3D Viewer Close on-line

Configuration

Surname: Dvořák

Name: Filip

Personal ID: PE 0042

Tag ID: 12 502



Person

show following form:

Edit tags

ON-LINE state of tags

on-line state of people

Operating states
Technical states

Number of shown records: 10
 ▶
⏸

ID	Type	Person	WorkGroup	In the area	Authorization	Time	Movement	Lean	Alarm	
12 501	RLH-06	Joshua Davies	Hardeners	Storage A	ok	25 min	ok	ok	ok	
12 502	RLH-06	Thomas Smith	Hardeners	Foundry	ok	85 min	ok	ok	ok	
12 503	RLH-06	Eric Clapton	Hardeners	Office	unauthorized	5 min	ok	ok	ok	
12 504	RLH-06	Pelan	Hardeners	-	-	24 hours	ok	ok	ok	
12 505	RLH-06	Kalandra	Founders	-	-	2 hours	ok	ok	ok	
12 506	RLH-06	Joseph Brown	Founders	Storage B4	ok	25 min	ok	ok	SOS	
12 507	RLH-06	Sam Williams	Founders	outside	ok	85 min	immobile	lying	ok	
12 508	RLH-06	Sophie Evans	Founders	Storage B7	ok	12 min	ok	ok	ok	
12 509	RLH-06	Maria Wagner	Founders	Foundry	ok	61 min	ok	ok	ok	
12 510	RLH-06	Kubista	Founders	-	-	-	-	-	-	

fig. 14 - User part - on-line screen

History listing

System stores many events into its history (technician can choose by configuration, which types are stored). It is also possible to select whether the history read from the hardware of the central unit or whether the database (after he has this data in the past from the central unit has been read out (in this case can also be off-line).

Merya RTLS: 0330 - Vitkovice Steel

Home History Users Detectors Tags People Groups Areas Access Safety RLU FLM FLE PTZ cameras 3D Viewer Close on-line

Filter: from: 2011-03-15 5:00 to: 2011-03-15 15:00 Step: 5 minut

Category: history H1

Read from module to database
Read from database

Date	Time	Status	Category	Event	User	Area	Detector	Authorization	Note
2011-03-15	6:00	#	detection	presence in area	Daniel Walker	entrance "A"	10 205	yes	by RSSI
2011-03-15	6:01	#	detection	presence in area	Daniel Walker	hall "A"	10 209	yes	by RSSI
2011-03-15	6:10	#	detection	presence in area	Daniel Walker	working area - "welder"	10 220	yes	by RSSI
2011-03-15	7:35	#	detection	lying person	Daniel Walker	working area - "welder"	10 220	yes	by RSSI
2011-03-15	7:40	#	detection	immobility	Daniel Walker	working area - "welder"	10 220	yes	by RSSI
2011-03-15	12:01	#	detection	presence in area	Daniel Walker	hall "C"	10 216	yes	by RSSI
2011-03-15	12:40	#	detection	presence in area	Daniel Walker	outside - south open space		yes	by GPS
2011-03-15	14:33	#	detection	presence in area	Daniel Walker	outside - south-east open space		yes	by GPS
2011-03-15	14:35	#	detection	presence in area	Daniel Walker	outside - containers		no	by NFC

fig. 15 - History listing of movement and states of Daniel Walker on 15.3.2011

Akustická indikace systému

(v software Ronyo Server)






Ve všech agendách programu Ronyo Server je k dispozici **stavové pole událostí**. Zde se textovou formou zobrazují Bezpečnostní alarmy, poruchy, sabotáže. Tyto události jsou doprovázeny také akusticky z interního reproduktoru počítače, na kterém dispečer pracuje s programem Ronyo Server.

Počet současně probíhajících událostí (alarmů) je odlišen počtem pípnutí reproduktoru v periodické znělce. Po ukončení příčiny alarmu se akustická indikace změní na libozvučné tiché tóny, které lze umlčet **Tlačítkem potvrzení proběhnuvšího alarmu**.

Vysvětlení:

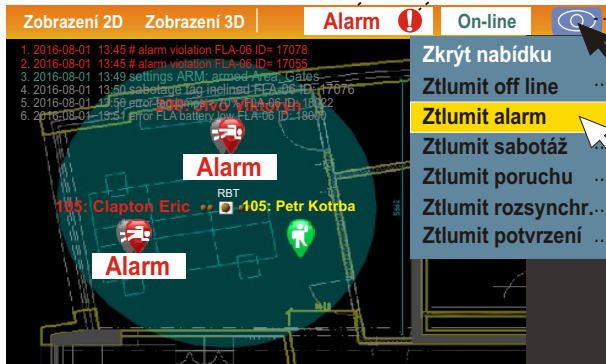
- stavové pole událostí
- tlačítko potvrzení proběhnuvšího alarmu
- tlačítko nabídky umlčení



-  1 alarmová událost 
-  2 alarmové události 
-  3 alarmové události 
-   paměť proběhnuvšího alarmu

Akustické umlčení systému

(v dohledovém SW Ronyo Server)



Akustickou indikaci událostí (alarmů) lze uživatelsky umlčet - ztlumit reproduktor- pomocí **tlačítka nabídky umlčení**. Uživatel má možnost výběru, kterou kategorii událostí chce umlčet. Tento seznam kategorií se otevře po kliknutí na tlačítko umlčení. Uživatel může umlčet akustickou indikaci buď **trvale** (to v případě, že umlčení provádí v klidu) a nebo jen **dočasně** - do doby než nastane další událost stejné kategorie (to v případě, že je umlčení prováděno v okamžiku právě probíhajícího alarmu). Všechny volby se zavřením projektu v programu Ronyo Server anulují.

Vysvětlení:

stavové pole událostí
tlačítko potvrzení proběhnuvšího alarmu
tlačítko nabídky umlčení

- 1 Ztlumit alarm umlčí indikaci bezpečnostních **alarmů**
- 2 Ztlumit sabotáž umlčí indikaci **sabotáží** v systému
- Ztlumit poruchu umlčí indikaci **poruchových** událostí
- Ztlumit rozsynchronizaci umlčí indikaci výpadku **synchronizace** perimetru
- Ztlumit potvrzení umlčí indikaci **paměti** alarmu (v případě, že nebyl potvrzen)

Trvalé

Příkaz k **trvalému** umlčení akustické indikace alarmů si vynutí tento dialog s uživatelem.

Chcete zahájit trvalé umlčení?

OK

Zrušit

indikace:

Ztlumit alarm

Dočasně

Příkaz k **dočasnému** umlčení akustické indikace alarmů se provede ihned .

indikace:

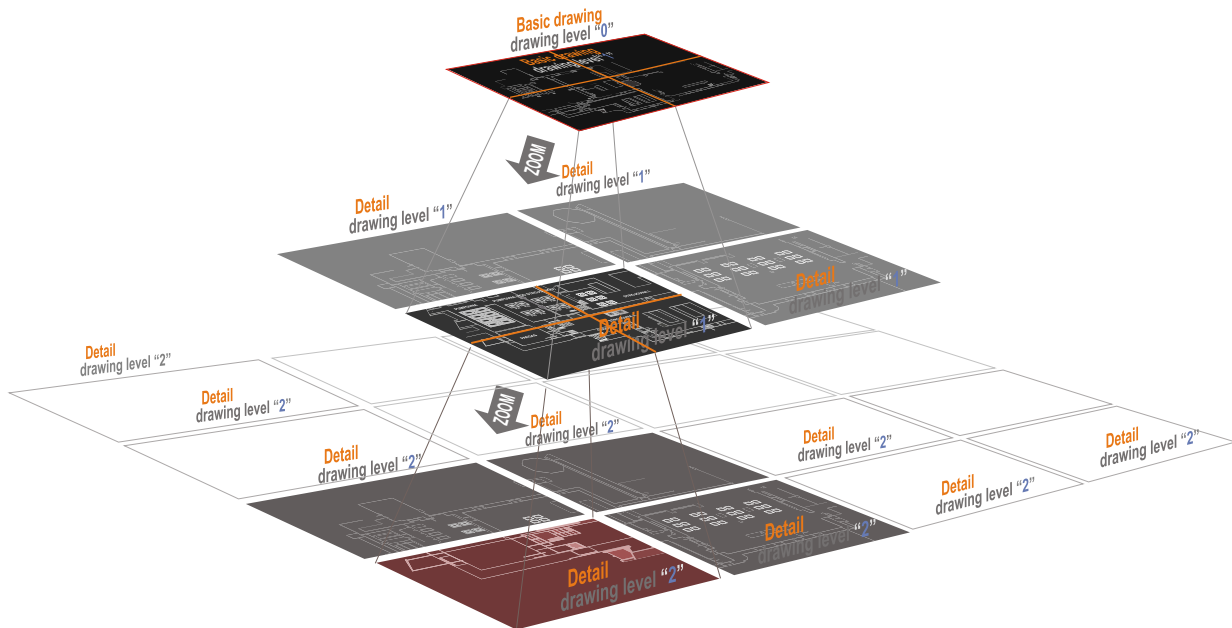
Ztlumit alarm



Preparation of drawings for possibility of zoom with higher details

Structure of drawings in three levels

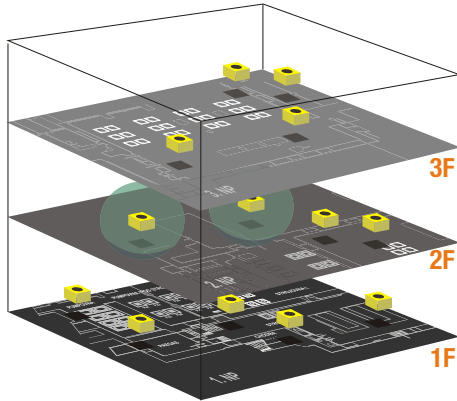
Drawings cutting



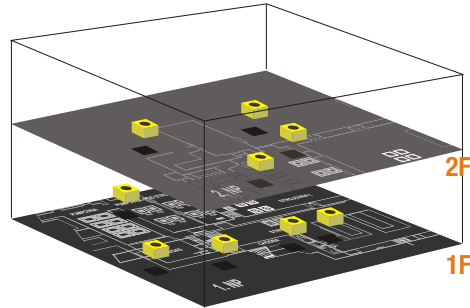


Visualization in individual floors of building

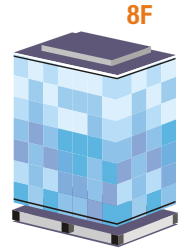
In case, there is single safety alarm situation (SOS, immobility, etc...), floor, in which the alarm occurred, is automatically shown.



building A



building B



building C



Historie bezpečnostních alarmů v 3D Zobrazení

V agendě 3D Zobrazení lze v levém horním rohu on-line zobrazovat historii alarmů v systému. Jedná se zejména o bezpečnostní alarmy. Díky tomuto nástroji obsluze dispečinku neunikne ani krátkou dobu trvajících alarmová událost, např. volný pád. a pod. Délka tohoto seznamu je konfigurovatelná.

The screenshot displays the Merya RTLS 3D visualization interface. At the top, there is a navigation bar with the following tabs: home, historie, uživatelé, Detektory, Tagy, Osoby, Skupiny osob, Oblasti, Zobrazení 3D, and on-line. The 'Zobrazení 3D' tab is currently selected. Below the navigation bar, on the left side, there is a list of alarm events:

- 1. 2016-08-01 13:45 # alarm volání SOS RLH-06b John
- 2. 2016-08-01 13:48 - alarm volání SOS RLH-06b John
- 3. 2016-08-01 13:49 # avízo leží RLH-06b John
- 4. 2016-08-01 13:50 # alarm leží RLH-06b John
- 5. 2016-08-01 13:50 # avízo nehýbe se RLH-06b John
- 6. 2016-08-01 13:51 # alarm nehýbe se RLH-06b John

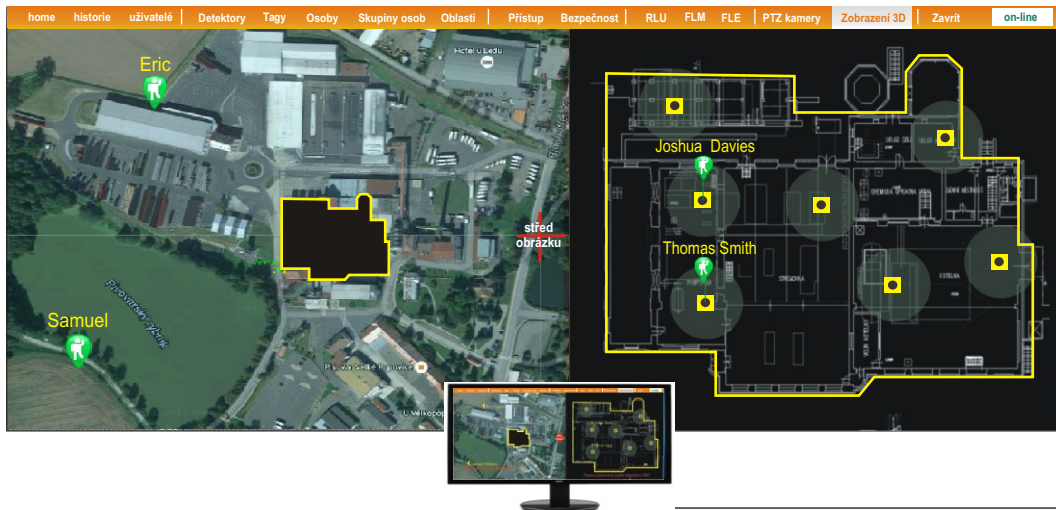
The main area of the interface shows a 3D floor plan with three detectors labeled 'Detektor A', 'Detektor B', and 'Detektor C'. A person named 'John' is shown in a red icon near 'Detektor B', and another person named 'Nicholas' is shown in a yellow icon near 'Detektor B'. The interface also includes a status bar at the bottom with the following elements: 'Hala B' (dropdown), '2. NP' (dropdown), 'Rádio' (dropdown), 'Základní pohled', and two checkboxes: 'Poslední události' (checked) and 'Zobrazit detaily' (checked). The 'Poslední události' checkbox is highlighted with an orange border.

Brewery Velké Popovice, Czech Republic

reference

Required functions from customer:

- on-line monitoring of revision technician, who is going through whole brewery alone
- area size 200 000 square meters
- monitoring both outside and inside without GPS signal
- detection of immobility, man down, free fall, SOS call
- mobile phone Samsung SM-G388F (1 piece)
- bypass safety guarding with NFC tags
- 79x **RBT-02** a 3x **RBT-03** detectors inside buildings
- if alarm occurs, system automatically call phone number
- one screen with hybrid 2D/3D visualization

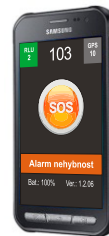
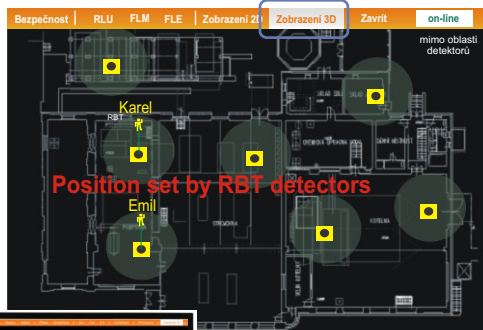


Brewery Prazdroj Plzeo, Czech Republic

reference

Required functions from customer:

- on-line monitoring of revision technician, who is going through whole brewery alone
 - area size 600 000 square meters
 - monitoring both outside and inside without GPS signal
 - detection of immobility, man down, free fall, SOS call
 - Samsung SM-G388F mobile phones (4 pc)
- bypass safety guarding with NFC tags
 - 115 pc **RBT-03** detectors (battery powered) in buildings
 - if alarm occurs, system automatically call phone number
 - two operational monitors: 2D+3D visualization. One monitor displays the position of people outdoors, second monitor displays positions of persons inside buildings



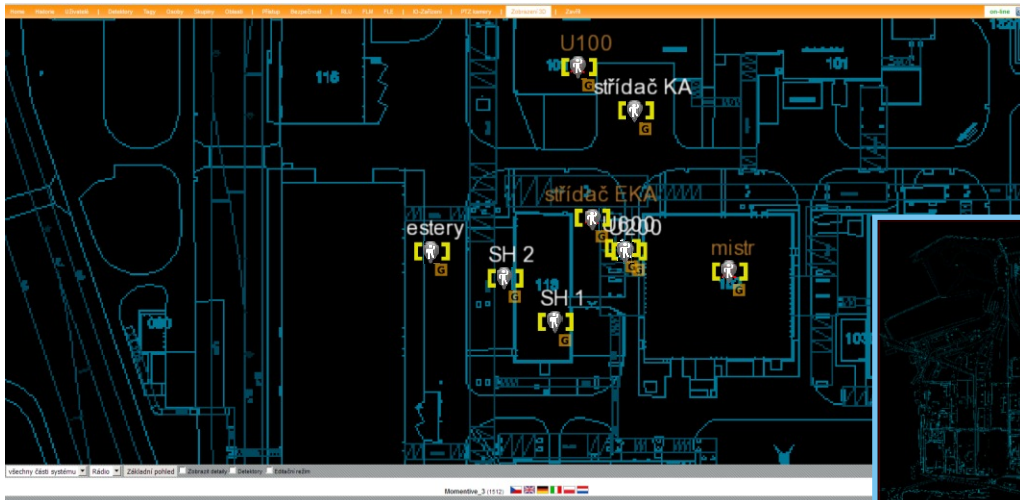


Chemical factory Sokolov, Czech Republic

reference

Required functions from customer:

- on-line monitoring of technicians, who walk along through whole factory, area size 10 000 square meters
- monitoring outside by GPS signal
- detection of immobility, man down, free fall, SOS call
- monitoring in explosion environment **EX**, class II.
- mobile phones iSAFE-Innovation-2 (9 pieces)
- bypass safety guarding with NFC tags
- without detectors
- alarms are displayed on screen
- one screen with 3D Viewer





Thank you for attention



Hi-Tech manufacturer of RFID technology

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