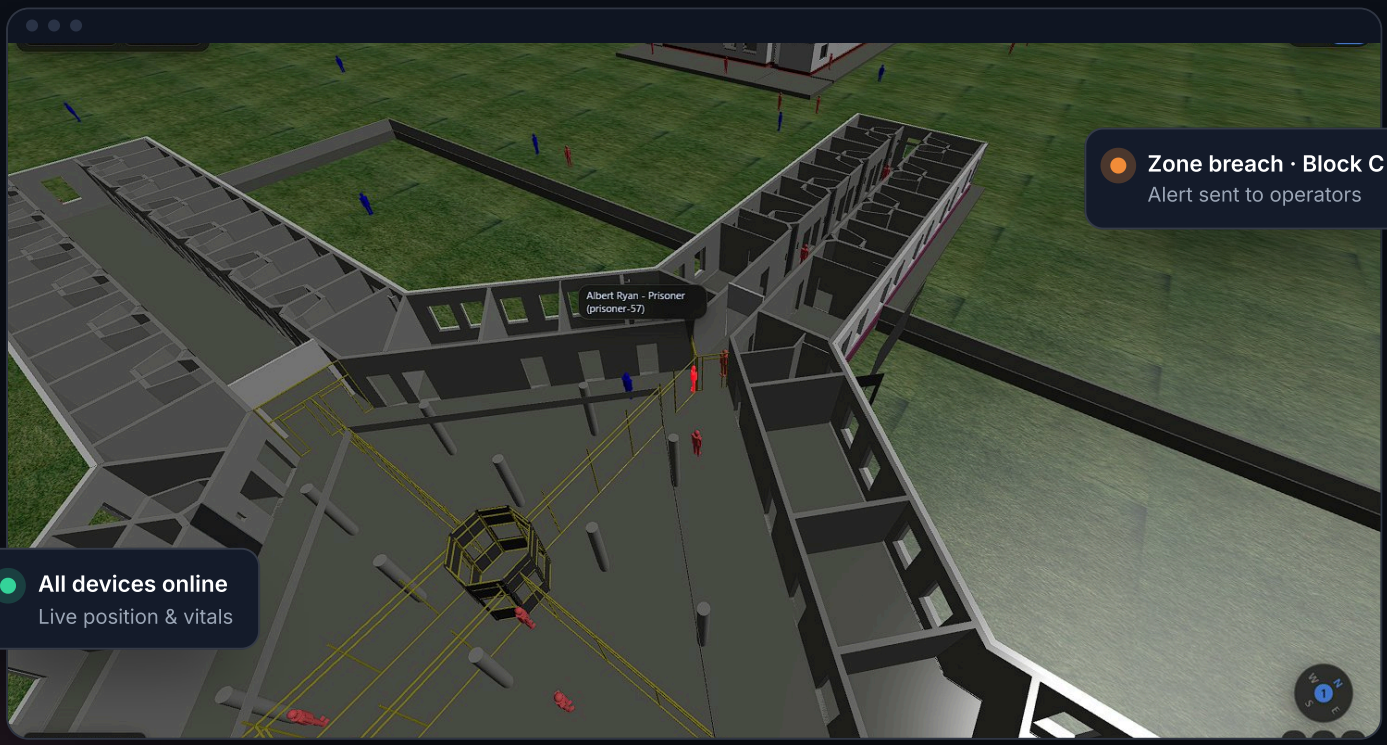
WISETRACX

Technical Brochure
Version 2.0 · September 2026

Real-time position tracking & vital-signs monitoring

A complete security system for correctional facilities, high-priority institutions and restricted areas, running entirely offline on your own closed network.

- Devices + Software + Services
- 100% offline, on-premise
- In-house 3D engine
- 5-year device warranty



WiseOwl Engineering LLC · SmartSolutions Engineering Kft.

WHY WISETRACX

One system, from assessment to long-term support

WiseTracX combines smart wearables, Bluetooth receivers, data collectors, an on-site server and 3D control software into one integrated system. We design, supply, install and support every component ourselves.

All-in-one

From assessment to installation: we survey your facility, provide the devices, develop the software and install the system on-site.

Leading innovation

Few systems like this exist. WiseTracX represents your entire facility as a fully 3D virtual world, built on our own engine.

Long-term support

We offer a 5-year warranty on our devices and expand the system as your needs grow.

Customization made simple

We meet unique requirements and integrate with your existing security and management systems.

KEY FIGURES

1–2 m Indoor positioning accuracy	**1 s** Data recording resolution, fully replayable	**2.5–3 mo** Bracelet standby time per charge
150 Receivers per RAX subsegment	**3 yrs** iBeacon battery life	**0** Cloud or internet dependencies



The WiseTracX ecosystem

At the core lies the WiseTracX ecosystem (orange circle): hardware devices and software elements that together form a unified security and surveillance solution.

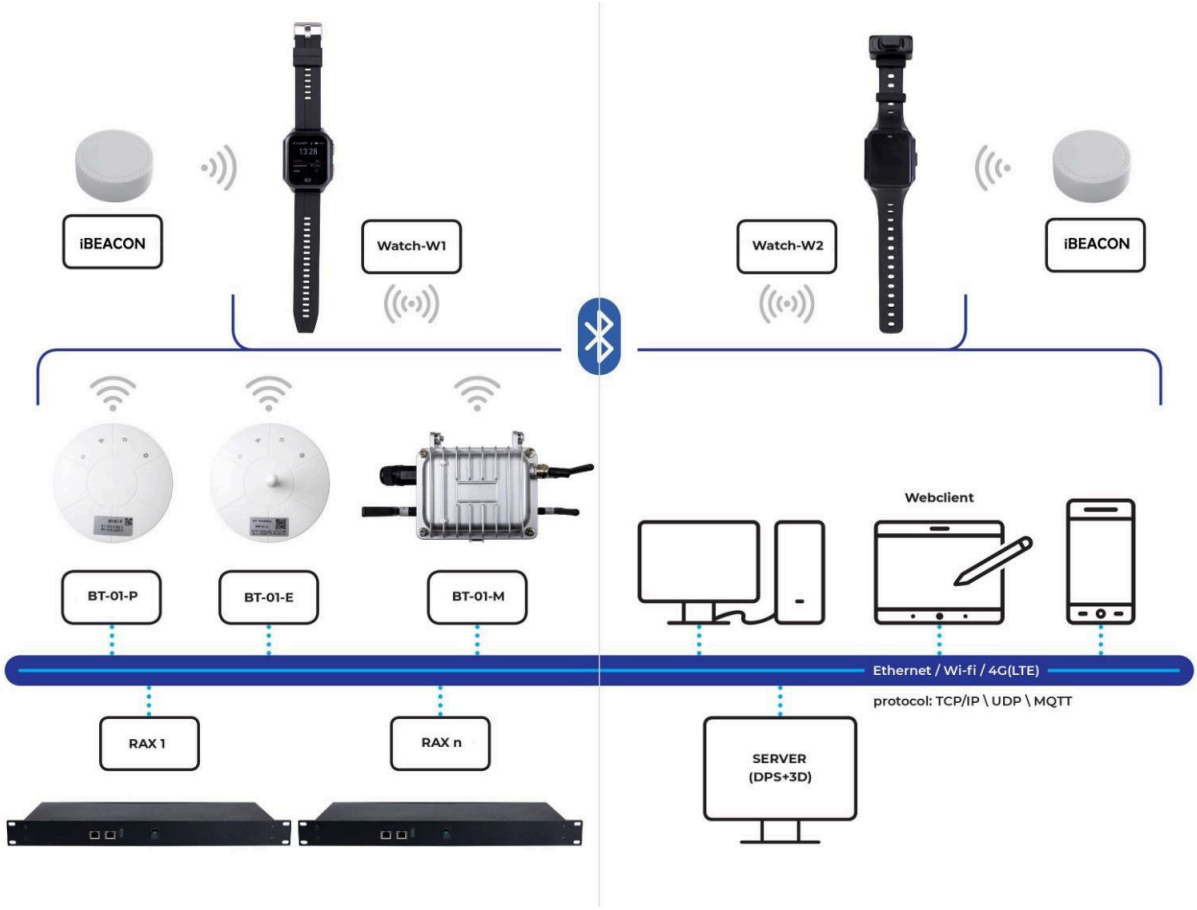
The system operates with its own dedicated databases, which also store the personal data of monitored individuals. This data can be populated through integration with external management software, or manually via the built-in administration interface.

Around it, WiseTracX can connect to your existing security, surveillance and IT management systems.

SYSTEM ARCHITECTURE

From the wrist to the control room

Wearables broadcast their position and sensor data over Bluetooth. Receivers pick it up and pass it over Ethernet, Wi-Fi or 4G to the RAX data collectors, which feed the on-site server. Operators work in the 3D control software from any client on the local network.



Protocols: TCP/IP · UDP · MQTT. Transport: Ethernet · Wi-Fi · 4G (LTE).

01

Watches

Wearable transmitters for real-time location, status and vital-signs monitoring.

02

Receivers & beacons

BT-01 receivers (AP/GW) collect and transmit watch data; fixed iBeacons refine positioning.

03

RAX

Data aggregation and relay. Primarily delivered as software, optionally as a 19" rack unit.

04

Server

Central on-site backend for data storage, processing, analytics and the operator web server.

05

Clients

Operator workstations, tablets or phones on the local network, using any Chromium browser.

Offline

No cloud needed

Every component runs on your own closed network. No data leaves your premises.

TRANSMITTER DEVICES

Smart bracelets W1 & W2

A specialized smartwatch that continuously monitors the wearer's vital functions. It replaces the panic button and can also be used for authentication in automated access control systems.

The devices were designed to be modern and lightweight for both supervisors and inmates. Because inmates wear them 24/7, we selected non-irritating, skin-friendly materials: silicone, rubber and stainless steel for the straps, and special high-hardness plastics for the cases.

All models are modular, so communication units (such as GPS or LoRaWAN) and sensor types can be exchanged to suit the customer's needs and application area. The watches broadcast two types of encoded messages at regular intervals, containing the sensor data and the current status of other watch functions.

For access control, the watches include passive RFID. Optionally they can be equipped with common NFC (13.56 MHz) solutions such as NTAG and MIFARE (Classic, Ultralight, Plus, DESFire), with DES or AES encryption, enabling wallet functions and many other applications.

Thanks to 600–700 mAh Li-Polymer batteries, the watches reach a standby time of 2.5–3 months per charge, depending on configuration. Firmware can be updated over the air (OTA). Different bracelet models can be chosen to suit each environment.



W1
Staff / guards



W2 · W2/D
Inmates

FEATURE	W1 (STAFF)	W2 / W2-D (INMATES)
Connectivity	BLE; GPS and LoRaWAN optional	BLE; GPS optional (W2-D)
Angle of Arrival (AoA)	Optional	Optional
Display	Yes: time, pulse, temperature, steps	W2: no display · W2-D: display
Case & strap	Skin-friendly strap and case	Vandal-proof case, special magnetic strap lock
Sensors	Heart rate, blood pressure, blood oxygen, body temperature, steps, activity	
Alerts	SOS, strap cut, sabotage, low battery, high / low heart rate	
Battery	600–700 mAh Li-Polymer · 2.5–3 months standby	
Charging	USB-C to magnetic 2-pin cable	USB-C cable and power-bank charger
Access control	Passive RFID; optional NFC 13.56 MHz (NTAG, MIFARE, DES/AES)	
Updates	Over-the-air (OTA) firmware updates	

RECEIVER MODULES

BT-01-P / E / M gateways

Three variants, two indoor and one outdoor, that collect data from the watches and forward it to the RAX. A single gateway handles hundreds of watches simultaneously.



BT-01-P · Indoor

Accurately determines presence in a room.



BT-01-E · Indoor

External antenna for efficient coverage of larger areas and more accurate positioning.



BT-01-M · Outdoor

Robust, weatherproof metal housing with far greater range and sensitivity.

All three models have their own power supply units and can also run on PoE. They support UDP, TCP and MQTT. Over MQTT, the gateways can also communicate back to the watches. Physical connection is Ethernet or Wi-Fi, with optional mobile network access.

Built-in power and low-noise amplifiers let the gateways cover relatively large distances even with metal obstacles and concrete walls. They are configured through a user-friendly, web-based menu in the customer's chosen language(s).

Depending on the amount of interference, each area can be covered with a P or an E gateway. Outdoors, the BT-01-M covers a range orders of magnitude larger than the indoor units.

BT-01 KEY SPECIFICATIONS	
Power	Own PSU or PoE
Network	Ethernet (RJ45), Wi-Fi, optional 4G
Protocols	UDP · TCP/IP · MQTT (JSON)
Modes	Access point or gateway
Capacity	Hundreds of watches; GATT with up to 8 at once
Via GATT	Set time & date, send messages to W1, OTA updates for W1 & W2
Configuration	Web UI, custom language and logo



POSITION TRACKING MODULE

iBeacon

A compact, long-life Bluetooth beacon powered by a CR2477 coin battery, offering up to 3 years of operation at 0 dBm and a 1 s broadcast interval. Device name, MAC address, UUID, Major, Minor and RSSI are configurable via a mobile app. Range up to 100 m in open space. Available in connectable and non-connectable versions, with IP68 waterproof protection.

DATA COLLECTION

RAX: Remote Access [Data] eXchanger

The RAX collects and organizes data in the network. It runs an MQTT broker that the receivers connect to as clients, groups the wristband signals by specific criteria and forwards them to the server.

The RAX divides the receiver network into subsegments of 1 to 150 receivers each. This speeds up processing and makes large installations simpler to administer and maintain. An MML (Man-Machine Language) menu supports statistics, debugging and maintenance of the receivers in each subsegment.

It operates synchronously or asynchronously with the server and connects to the server's DPS module over TCP/IP. Additional network-specific services can be developed on it to meet customer requirements.

Two deployment options

- ✓ **Software (primary).** Runs on your own server or virtualized infrastructure. Minimum OS: Windows 11 or Windows Server 2022.
- ✓ **19" rack unit (optional).** Embedded hardware for standard 42U rack cabinets.



Optional 19" RAX hardware unit

PROCESSING

The on-site server

The server has two main components: the **Data Provider Server (DPS)**, which receives information directly from the RAX units, and the **Data Recording & 3D Visualization** system, which records the prepared data as a stream with 1-second resolution. A specialized coordinate system also places GPS signals in the 3D space. A single high-performance server with adequate storage ensures stable operation for years.

Data Provider Server (C# .NET): key functions

- Receives real-time data directly from RAX units
- Assigns unique IDs and links entities to their devices
- Computes real-time coordinates and geofencing from raw telemetry
- Collects device alerts and forwards them in real time
- Settings secured by multi-tier authentication
- Optionally retrieves personal data from external systems
- Updates the data recorder whenever personal data changes
- Forwards normalized sensor data to recorder and visualization
- Routes talkback text messages from the UI to the devices

DATA RECORDER & 3D VISUALIZATION

Everything your operators need, on one screen

A modular, browser-based platform that collects, stores and visualizes sensor and personal data in real time, in 3D. Services run in containerized Linux environments (Node.js, React, MongoDB, GraphQL, Socket.io) on your local network.



Data collection & storage

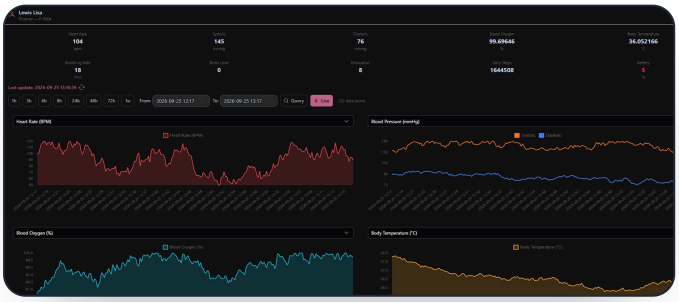
- Separate services record sensor and personal data
- Every event is timestamped and replayable
- Playback with fast-forward

Web interface

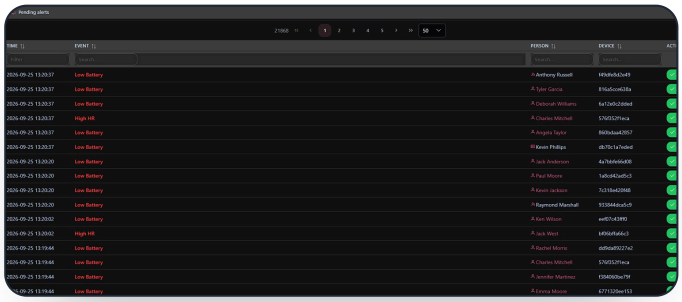
- Roles: guard, operator, doctor, admin
- TOTP login with 6-digit code
- Role-based data access and editing
- Manage, categorize and search records
- Timeline-based alert review
- Text messages to devices (talkback)

3D visualization

- Movement inside a 3D building model
- Split-screen or full-screen camera views
- Real-time or replay mode
- Follow mode with automatic floor selection
- Focus mode during interactions
- Alerts trigger camera focus, playback and sound



Vital-signs dashboard: heart rate, blood pressure, SpO_2 and temperature, live and historical



Alerts & acknowledgement: every event logged with person, device and operator

SMART CORRECTIONAL & PRISON FACILITIES

A new dimension of corrections

Continuous 24-hour monitoring of inmates and on-duty staff supports crime prevention, protects health and life, and makes daily schedule management easier.

WiseTracX delivers real-time, meter-level positioning and vital-signs monitoring for inmates, prison staff and visitors alike. Additional features can be configured beyond the core solution to meet each client's requirements.

Such a system enhances the sense of security and comfort for both prison staff and inmates.

What a modern system should offer

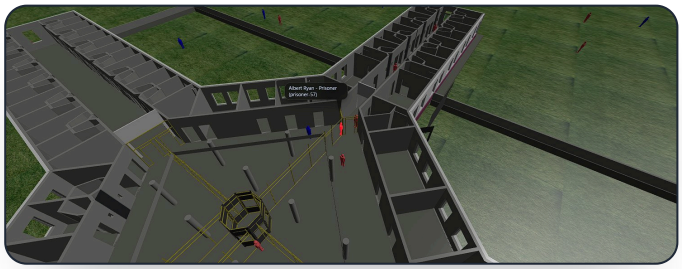
- Position tracking
- SOS alert
- Vital signs: heart rate, blood pressure, temperature, steps
- Detection of prohibited interactions
- Escape-attempt alerts
- Event playback



Example of the operator interface after customer customization: entity list, four synchronized 3D camera views and live tooltips.



2D floor plan view with live positions



3D live tracking inside the facility model

SMART HEALTHCARE

Hospitals, sanatoriums & nursing homes

Caring for elderly loved ones at home is often difficult to organize, so many families choose sanatoriums or nursing homes with qualified staff available 24/7.

Continuous vital-sign monitoring and tracking adds another level of comfort for families and residents. It detects emergencies such as signs of impending illness or a sudden fall.

Disoriented residents who go missing within the grounds can be located almost immediately, so they receive professional care as quickly as possible. Valuable medical equipment can be tracked too.



SMART EDUCATION

Schools & kindergartens



Parents want to know that their child is safe. A system installed in the kindergarten or school monitors every child's movement in classrooms, group rooms and on the playground. In an emergency the child can send a panic alert, and continuous tracking with vital signs allows rapid, targeted help.

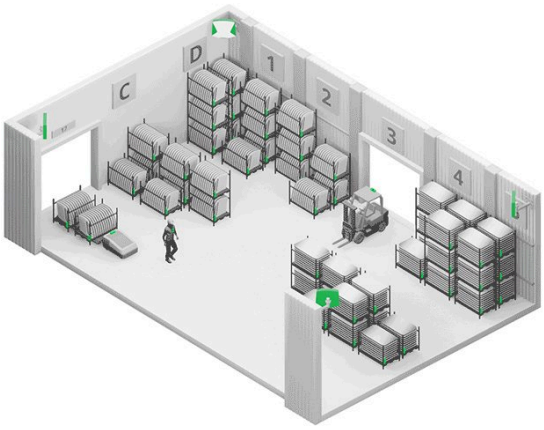
Staff are notified immediately if a child enters an unauthorized area or needs preventive medical attention. In the event of an attack, law enforcement can locate students and teachers, see who needs medical help and prepare an effective rescue plan. Daily routines and social integration can also be followed.

SMART FACTORIES & WAREHOUSES

Preventing workplace accidents

Most accidents in warehouses and factories result from inattention caused by fatigue or carelessness. In Hungary alone there are more than 20,000 workplace accidents every year, around 70 of them fatal, and about 30% of the fatal accidents occur in warehousing and manufacturing.

With installed devices and smart wristbands, the system immediately shows the location of a potential accident with 1–2 m accuracy, together with real-time health data of the people involved. The same continuous tracking helps supervisors intervene in time to prevent accidents.



ALSO USED IN

- Military facilities
- Construction & mining sites
- Data centers & labs
- Corporate campuses
- Logistics hubs

SECURITY BY DESIGN

Built for secure & sensitive environments

- **Fully offline.** Runs on your closed network and servers; no cloud, no internet.
- **Your data stays on-site.** Dedicated databases on your own infrastructure.
- **Two-factor login.** TOTP with 6-digit codes for every user.
- **Role-based access.** Guard, operator, doctor and admin levels.
- **Proprietary technology.** In-house 3D engine and firmware, no vendor lock-in.
- **Open integration.** Standard protocols to ERP, BIM, IoT and management systems.

1
Assess
On-site survey of your facility and needs.

2
Design
Device mix, 3D model and integration plan.

3
Install
Deployment, fine-tuning and training.

4
Support
5-year device warranty and updates.

WISETRACX

Don’t wait for tomorrow. Request a live demo now.

Tell us about your facility and we’ll show you WiseTracX in action, with an indicative quotation for your project.

CONTACT

business@smartsolutions.hu
adam.papp@wiseowltechnology.com
+36 20 420 5069

WEBSITES

wisetracx.com
wiseowltechnology.com
smartsolutions.hu

SCAN · WISETRACX.COM

WiseOwl Engineering Teaching & Consulting LLC · 5342 Clark Rd. Ste #1117, Sarasota, FL 34233, USA
SmartSolutions Engineering & Teaching Consultancy Services Kft. · Petőfi Sándor utca 48., 2724 Újlengyel, Hungary

© 2026 WiseOwl Engineering Teaching & Consulting LLC and SmartSolutions Engineering & Teaching Consultancy Services Kft. All rights reserved.
Specifications are subject to change without notice.