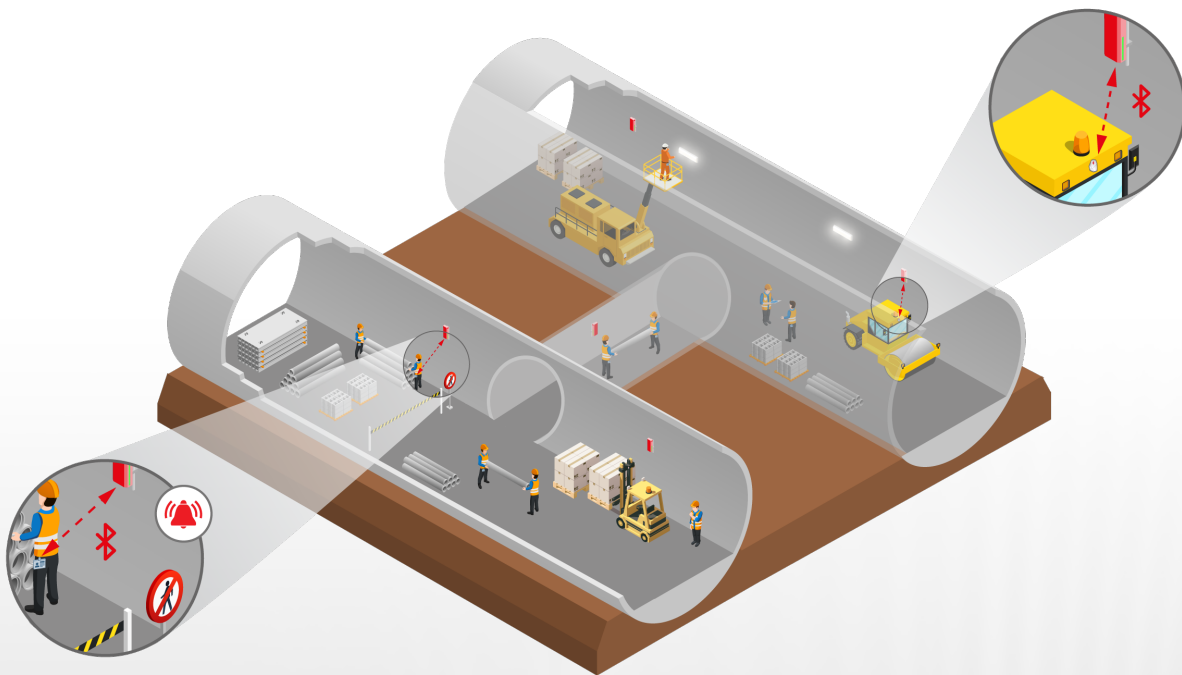# Asset and Personnel Tracking in Tunneling

AT A GLANCE

- real-time localization of persons & goods
- location overview on digital map
- improved safety due to emergency tracking & gas detection

PROBLEM DEFINITION

The construction of underground tunnels is characterized by high risks during project execution. Workers face many dangers since they are working under reduced light conditions, with difficult or limited access and egress, and with the risk of fire. In emergency situations, locating employees in a timely manner is crucial in order to be able to evacuate them safely.

An ongoing challenge is also the planning and coordination of resources (personnel, material and vehicles). Each tunnel project is a highly complex process in which all the individual steps require precise planning. If disturbances or alterations crop up during the project execution phase, management often struggles to react efficiently and in a timely manner.

SOLUTION

A tracking system provides real-time information on which zone individuals and assets are currently located in. The continuous monitoring of the construction progress at every stage enables highly efficient process control.

The reporting of personnel times and locations within the tunnel can facilitate big improvements in the effective and efficient deployment of personnel. It is possible to ensure that workers are only assigned to areas or undertake tasks for which they have sufficient induction and authorization. Tasks and alerts can be automatically generated and transmitted to a worker's smartphone if desired.

In an emergency, the tracking system enables to quickly locate personnel, which ensures safe and thorough evacuations, and supports fast and targeted search and rescue operations. Furthermore, the workers' beacons can respond to gas leakages, making a commitment to protect the workers' health.

TECHNICAL IMPLEMENTATION

The tracking system uses strategically placed infsoft Locator Nodes that detect Bluetooth Low Energy (BLE) beacons in order to monitor personnel and assets underground. The beacons are carried by workers – either in the safety helmet or integrated into the ISO card – or are attached to vehicles and other equipment. For presence monitoring, one Locator Node per tunnel section is sufficient, and there is no need for mapping or calibration, which results in minimal installation work.

In order to realize atmospheric monitoring, the beacons can be equipped with additional sensors that measure any gas leakages.
It is also possible to protect hazardous areas. If a beacon is detected in the area, an alarm is triggered so that evacuation or rescue measures can be taken.

All relevant data are consolidated in real time

and can be evaluated with graphics and dia-
grams by infsoft's Analytics engine at any time.