

## ANALYSIS OF LOGISTICS FLOWS THROUGH LOCALIZATION TECHNOLOGY

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<https://doi.org/10.37904/clc.2022.4535>

### Abstract

This poster deals with the current issue of industrial localization using RTLS technology, which is now widely introduced in the logistics industry and thus creates a number of opportunities for the possibility of process optimization. This poster highlights the specific use of this technology in logistics flows, which now needs to be thoroughly researched. The result of this research are analyzes of the movements of workers, forklifts, but also the condition and location of material in warehouses. RTLS localization technology offers a wide range of possibilities for creating a digital image of individual companies and thus the ability to be competitive.

**Keywords:** RTLS, localication, logistics flow

### 1. INTRODUCTION

Process analysis is essential in logistics due to the dynamism of this environment. The ever-changing environment requires constant analysis and solutions that deliver optimized processes at reduced costs, increased quality and reduced times. RTLS systems are a comprehensive tool suitable for analysis and optimization of logistics processes in companies. With the current trend in logistics, where the decisive factor is the speed of satisfying customer needs, it is necessary for companies to use progressive technologies to optimize logistics processes, which are part of the concepts of Industry 4.0 and Logistics 4.0.

### 2. POSSIBILITIES OF USING RTLS LOCALIZATION IN LOGISTICS PROCESSES

The logistics industry requires high reliability and accuracy in the field of position monitoring, as well as the complexity of monitoring technologies. The complexity of localization technologies is significant because the diverse processes in the logistics industry form chains and cooperate with each other. It is also necessary to pay attention to the interaction of active and passive elements of these chains. RTLS technology from Sewio, which is also located at the Department of Industrial and Digital Engineering, Faculty of Mechanical Engineering, Technical University in Košice, is a specific localization solution that meets these requirements. From the above, it can be clearly stated that RTLS localization has a wide application across entire logistics flows. It enables the tracking of employees, property, means of transport, replaces the traditional Kanban digital eKanban, provides the possibility of cooperation with the Digital Twin and reduces the time needed to meet customer needs globally.

#### 2.1. Employee tracking

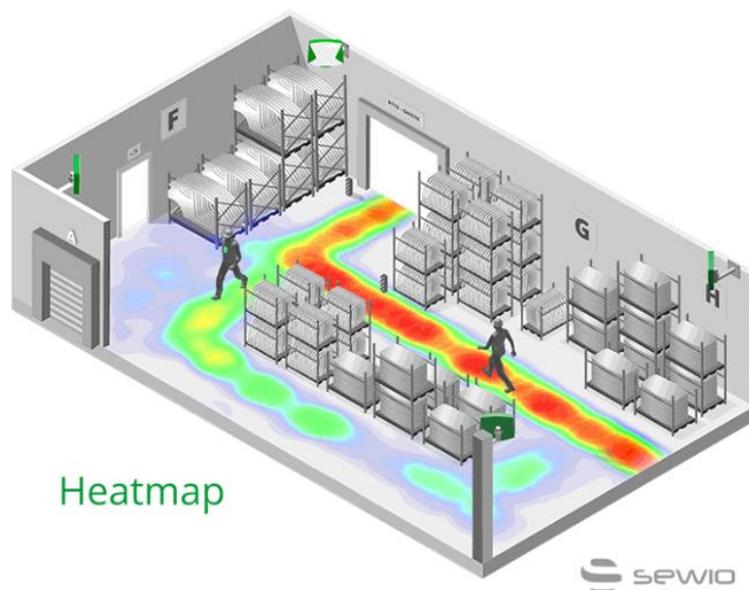
Employees are a core element of every company, so it is important to pay attention to their safety and improve their working conditions. In case of emergency situations such as fire, leakage or explosion of gas or other conditions endangering the health of employees significantly reduces the time required to save them due to their familiar location. With virtual zones, you can easily identify which people are in safe zones and who are still at risk. This element is especially important in large buildings with several floors. Location tags are also

equipped with an emergency button, which allows employees to quickly call for help in the event of an accident or nausea. The tag sends a notification with information about the current location to the dispatcher, and then help is sent. During evacuation drills, it is possible to verify the permeability of evacuation routes and predict the behavior of people during a real threat. Virtual zones can have different sizes, so it is possible to set danger zones for specific machines with an accuracy of up to 30 cm. If an employee enters such a zone, he may be alerted by a light board with an activated IO line, or the operation of the machine may be restricted. The dynamic zones feature sends alerts when there is a risk of a collision between two closely moving entities. This is mainly used in the event of a pedestrian colliding with a forklift in areas with high and opaque racks.



**Figure 1** Virtual zones

The tags can be equipped with a group of different sensors, thanks to which the conditions in the workplace are constantly monitored. The temperature, pressure, concentration of carbon dioxide in the air or the level of radiation can be monitored. The system also allows you to pair tags with smart watches and mobile devices.



**Figure 2** Heatmap of employee movement

## 2.2. Material tracking

In manufacturing companies, the fact applies that the location of the object within the production also determines its production phase. An example may be e.g. assumption that if 2 parts are located in front of the welding zone, they are 2 separate pieces. However, if they are located behind the welding zone, we can assume that these parts have been welded and already form one unit. Placing an asset in a specific zone can then automatically trigger the subsequent required operation. An example is the automatic material reservation required for the next operation. Zone Watch, the advanced creator of Sewio RTLS virtual zones, provides flexible configuration and control of logistics logic definition without the need for programming.



Figure 3 Material tracking

## 3. CONCLUSION

There are a number of other applications in logistics in the use of RTLS localization systems, with which we can optimize various aspects of logistics. For example, it could be eKanban or creating a connection with a digital twin. This localization technology has great prosperity in the future, not only to increase the competitiveness of companies but also to create a better overview of the operation of the manufacturing company.

## ACKNOWLEDGEMENTS

*This article was created with the support of projects VEGA 1/0438/20 Interaction of digital technologies to support software and hardware communication platform of advanced production system, KEGA 001TUKE-4/2020 Modernization of industrial engineering teaching to develop skills of existing training program in a specialized laboratory, APVV-17- 0258 Application of elements of digital engineering in innovation and optimization of production flows, APVV-19-0418 Intelligent solutions to increase the innovative capacity of the company in the process of their transformation into intelligent companies. VEGA 1/0508/22 Innovative and digital technologies in manufacturing and logistics processes and systems.*

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