

What does the future of *indoor positioning* look like?



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Indoor positioning is seen as the next major technological breakthrough.

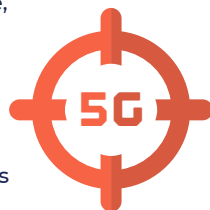
Indoor positioning will ensure that things will not go missing, work is more efficient and people can live safer lives. How can we make this useful technology a part of our daily lives? COO Esa Viljamaa and CTO Jukka Kämäräinen from Iiwari Tracking Solutions Oy shed light on the current developments and future possibilities regarding indoor positioning.

From retail to smart offices, mines and hospitals, the indoor positioning market is growing globally within several industries. Of different alternative positioning methods, solutions based on UWB technology have proven to be the most promising due to their highest accuracy.

5G will bring new opportunities for all indoor positioning solutions

5G networks are now being installed at a rapid pace throughout Finland. – *We can also see many clear synergy benefits in the spreading of positioning networks,* Viljamaa says.

5G networks offer a broader frequency range, which allows for higher amounts of data, while transmission distances will become shorter. Because the frequencies associated with 5G technology have a shorter range than previously used frequencies, 5G requires significantly more base stations.



As 5G base stations will be built and brought physically closer to users, this will also provide an opportunity to install a UWB network, which is needed for indoor positioning, at the same time. The integration of a UWB network would not increase the installation costs of 5G, but simply more telecommunication networks could be deployed in one installation with less effort. In order for this to work, however, there needs to be cooperation between operators and network suppliers, Viljamaa points out.

Next step: UWB positioning in mobile phones

Incorporating UWB technology into mobile phones will make indoor positioning accessible to everyone and enable accurate navigation in large and diverse interior spaces such as shopping centres, exhibition halls, hospitals and other public spaces. When everything you need is easy to find and there is no longer a risk of getting lost, customer satisfaction will also improve. In addition, companies will benefit from, for example, receiving more accurate positioning data, which they can use for customer analytics and more competitive product placement. Positioning will also make product collection linked to e-commerce, for example, more efficient.



Data security, a highly important factor in positioning solutions, also increases when positioning is carried out via mobile phones, as users can choose whether to make their location data available to end-user applications or not.

We will need new efficient solutions as the amount of available positioning data is growing exponentially.

Our patented indoor positioning algorithm to be run on devices is scalable, Kämäräinen says.

When positioning is determined from a mobile phone, it does not matter whether there are one or a thousand items to be located, as the positioning task will be distributed between users' main devices.

What does the future of *indoor positioning* look like?



**Positioning data is growing exponentially
– Iiwari's patented algorithm is scalable**

Integration is the way forward in indoor positioning. Mobile applications, standardization, and base station battery usage will enable the next big leap.

Standardisation and positioning network operators will enable the next big leap

Outside, satellites provide the necessary positioning infrastructure for all GPS-enabled applications. For indoor positioning, this kind of common open interface is still missing, which is why commonly agreed standards are currently being developed for both Bluetooth and UWB.

Standardisation means that once a positioning network is built, all devices used in its area will be able to take advantage of the positioning information. The goal is that indoor positioning applications on mobile phones will work on any network regardless of who designed it.



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Integration, hybrid applications, IoT and base station battery usage

Integration is the way forward in indoor positioning. According to Viljamaa, already now, and more so in the future, it will be possible to use the same solutions and equipment to perform both outdoor and indoor positioning in addition to transmitting other types of information. It should also be possible to transfer information from third-party IoT devices, including heat, humidity, and motions measured by sensors, to the Internet through positioning systems. The integration of positioning data with other sensor data will also open up new possibilities in the field of data analytics.

Roughly half of the investment in indoor positioning solutions comes from installation and cabling costs. The real indoor positioning revolution will take place when positioning networks can be completely wireless. This is what many companies are currently aiming for.

Developments in battery technology and our own work regarding algorithms will enable us to develop battery-powered base stations, which will minimise both installation costs and the price of the entire investment, Viljamaa states.

Iiwari Tracking Solutions Oy, a pioneer in indoor positioning, has its roots in the Technical Research Centre of Finland Ltd (VTT) and long-term UWB research. Iiwari innovates in cost-effective network solutions and products based on UWB technology aimed at increasingly accurate and reliable indoor positioning.