SIEMENS

Background information
Simatic RTLS

Nuremberg, April 5, 2018

Wireless locating solutions enable innovative, more flexible production and logistics concepts

- **Real-Time Locating Systems (RTLS) automatically supply the "what's where and when" for any relevant asset in production and logistics**
- **New applications and concepts: from the breakup of continuous flow production through automatic guided vehicles and robots to automatic tool deployment documentation**
- **Complete range from transponders through to customized solutions**

With effect from March 29, 2018, Siemens has taken over ownership of the company Agilion GmbH based in Chemnitz, a leading supplier of Real-Time Locating Systems (RTLS). RTLS represents a significant addition to the Siemens Digital Enterprise offering, as this newly acquired technology opens up scope for whole new production and logistics concepts.

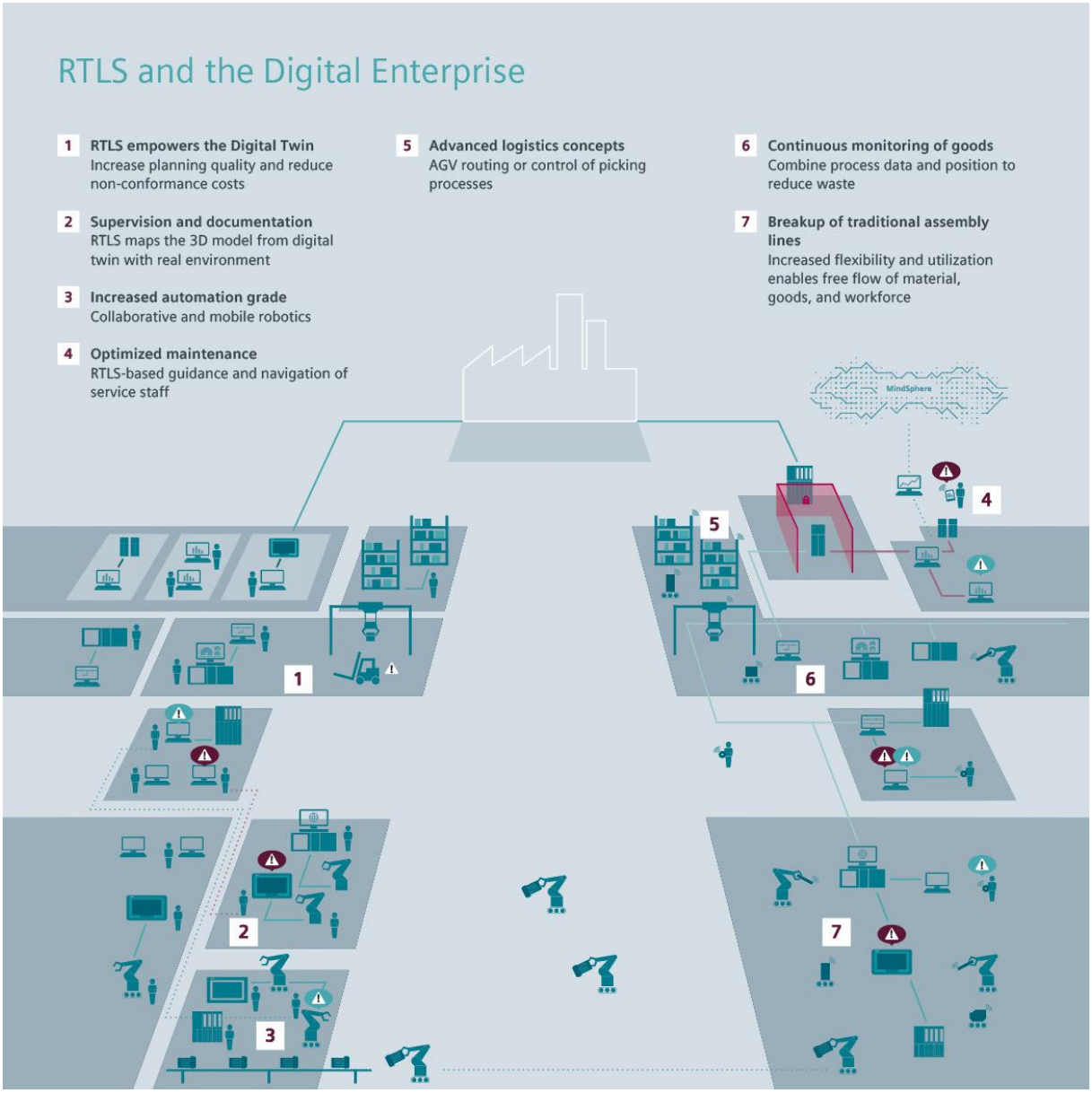
Faced by continuously growing competitive pressure, industrial enterprises are being forced to respond by driving down their costs still further while at the same time developing an ever more distinctive product offering to address specific customer needs. These pressures are posing new demands on tomorrow's production. To keep abreast of this rapid pace of development, it is no longer enough simply to incrementally improve quality and productivity. What are called for in many cases are concepts which will totally revolutionize work processes as we know them.

Traditional continuous-flow production, for instance, is set to be replaced by a dynamic self-organizing production concept which enables improved utilization of machine fleet capacity while at the same time increasing flexibilization of the production range. Greater automation in the assembly of large-scale products (such as vehicles, aircraft, machines and plants) using collaborative mobile robots is a key driver helping manufacturers to expand their

competitive lead. Ultimately, innovative logistics and material flow concepts are called for which will eliminate costly search and assignment processes.

These concepts call for a complete “digital twin” of all assets of relevance for production such as tools, materials and products – which is able to provide an answer to the question “what’s where and when.” This information is supplied by Real-Time Locating Systems (RTLS). For a mobile robot to be directed over the optimum route, for instance, it needs to be provided continuously with data relating both to its own position and that of the product being processed. The same applies to Automatic Guided Vehicles (AGVs) which no longer follow fixed tracks but are able to navigate freely within a dynamically changing production environment. Monitoring and documenting individual production steps also calls for a continuous comparison between the position of a tool (such as a screwdriver) and the digital 3D model of the product in order to correctly specify, monitor and document parameters such as the torque for a specific screw. Ultimately, an RTLS delivers the required information about “what’s where and when” as it occurs in real time for every asset of relevance across applications in production and logistics.

At the same time, RTLS can help make user support processes leaner and more efficient. In the maintenance sector, locating assets for servicing can be simplified by automatically comparing the position of service personnel with the digital model of the plant. Areas of application include the chemical and pharmaceutical industry, where it can be used to simplify the maintenance of mobile assets, or equipment (such as containers, mobile units or vehicles) in airports or the depots of public transport networks. Here, RTLS can reduce the need for time-consuming searching and consequently minimize costs.

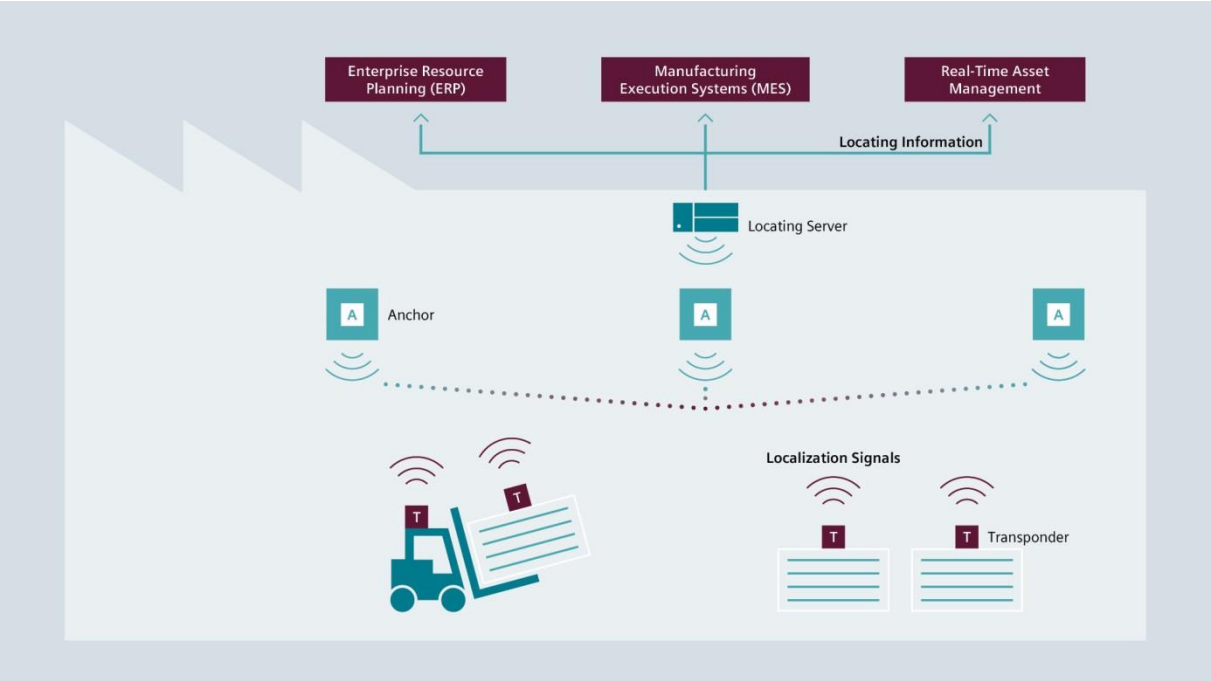


RTLS: one of the technological foundations for a digital infrastructure

Real-Time Locating Systems (RTLS) consist of active transponders attached to toolholders, tools, AGVs, robots or also products. Over the locating infrastructure, made up of what are known as anchors and a locating server, the transponders can be automatically located within fractions of a second, and their position transmitted to the control systems. Ultra Wide Band (UWB) technology has a decisive role to play here. It uses comparatively weak radio signals whose low transmission level prevents them interfering with other systems, but which have a comparatively large frequency spectrum (3-7 GHz). This allows extraordinarily high locating precision and also makes for particularly simple installation.

The active transponders emit a radio signal at defined intervals which is received by at least three anchors, each synchronized with the other. The anchors transmit the collected data

together with the transponder ID number and the receiving time, measured with ultra-high accuracy, via a gateway to the locating server. This software calculates the position of each transponder by a method called Time Difference of Arrival (TdoA). Accuracy is increased still further using flanking measures such as automatic correlation of RTLS position data with the 3D model of the product and production environment stored in the digital twin.



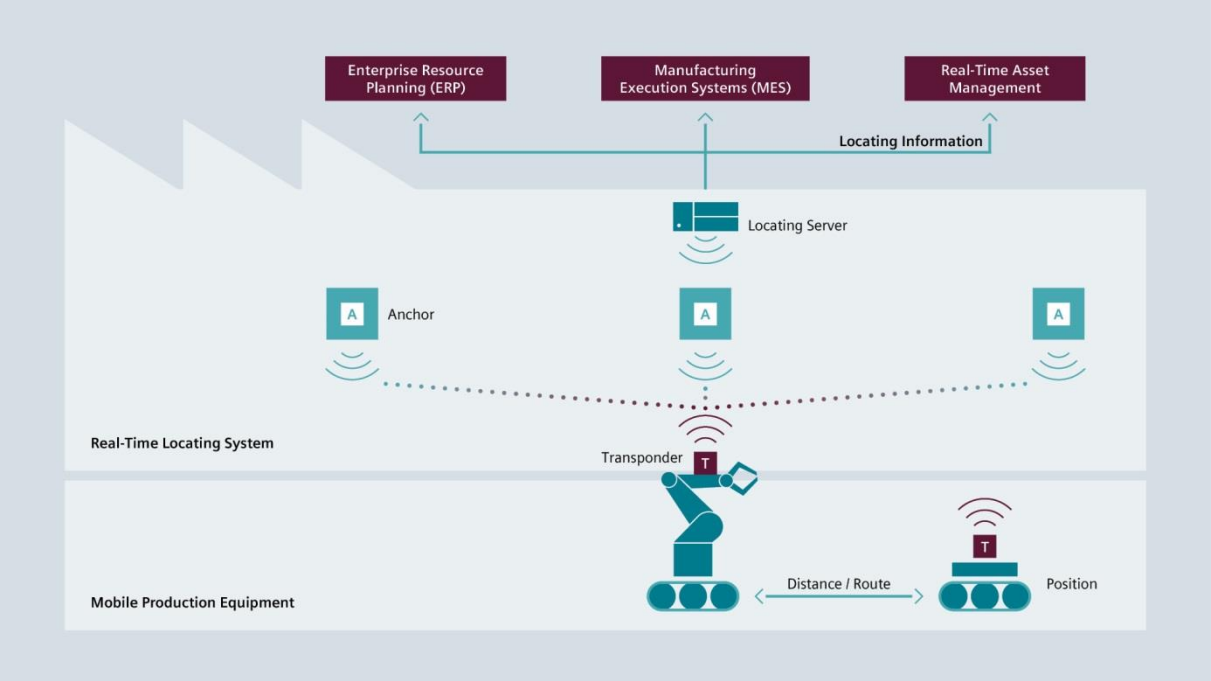
The data is then transmitted on the basis of defined rules by the server to different target systems ranging from Programmable Logic Controllers (PLCs), Manufacturing Execution Systems (MES) and other IT systems through to cloud-based applications based for instance on MindSphere.

The use of UWB and TDoA allows the accuracy of RTLS systems to be increased to within just a few centimeters in production environments. At the same time, it allows the costs for the required components as well as for commissioning and operation to be reduced to a level which makes the technology affordable across a broad-based range of applications. Using TDoA also helps significantly extend the life of transponder batteries, providing the assurance of reliable function over several years. Using UWB, transponders can also be equipped with a data interface and combined for instance with the robot controller, making the location information available not only over the higher-level system, but also directly to the robot itself with only a negligible delay.

Application in the Smart Factory

In the “Smart Factory” of the future, RTLS systems will supply the essential foundation for the use of intelligent production units, involving the cooperation of different production facilities such as transport vehicles and mobile robots with machines and plants. At the same time, the actual location of a machine or robot will become a variable factor, meaning that an autonomously controlled, highly efficient work flow can only be organized with knowledge of the current spatial configuration of the factory.

Unlike RTLS solutions in use today, in the future wireless location will become an infrastructure available to wide-ranging different applications and scenarios. UWB-based RTLS solutions permit a complete production hall and countless thousands of assets to be equipped, taking RTLS technology out of the niche role it currently occupies and making it available to serve as an infrastructure for multiple applications. Material flows can be navigated, mobile robots controlled, the use of components monitored and product assembly fully documented – all using one and the same infrastructure.



This development is on a par with the transformational success of wireless LAN: while data radio applications were initially used only to perform specific dedicated tasks, a modern industrial WLAN can be deployed for an array of different applications simultaneously – from communication with mobile production facilities through to augmented reality used in the field of maintenance.

From the transponder to the finished solution

The new Simatic RTLS offering from Siemens encompasses all the components and services required to engineer, deliver and commission a locating solution. This includes different types of transponder, anchors and gateways, alongside the locating server (locating manager), which can also be configured for redundancy. All the necessary services required to set up an individual customized solution ready for operation can also be executed by Siemens if required. At the same time, Siemens will provide training and certification for existing and future integration partners keen to execute RTLS projects independently.

“With RTLS, from now on Siemens will be providing a vital addition to our existing services in support of industrial customers on their way towards achieving the Digital Enterprise,” says Herbert Wegmann, Head of the Industrial Communication and Identification business segment. “Together with other elements of our portfolio – ranging from industrial communication networks to MindSphere – we’re now in a position to supply and engineer a complete infrastructure for digitalization and implement it on a practical level in our customers’ projects,” continues Wegmann. By taking over Agilion GmbH in Chemnitz, a foundation has been created which will enable industrially scalable solutions to be delivered within a minimal timeframe. UWB-RTLS will also be creating the basis for innovative new production concepts in Siemens’ own factories.

Agilion is a technology leader in the field of UWB-RTLS, and already has a number of flagship projects with renowned key accounts to its name. “We consider ourselves to be in a

leading technological position when it comes to industrial applications," explains Sven Sieber, one of Agilion's Directors. "For us, this takeover is the ideal step towards the rollout of efficient and high-precision RTLS solutions on a large scale," explains Andreas Werner, another of Agilion's Directors. "Together we'll be able to assume a leading position in the market for flexible automation solutions, by linking the RTLS expertise developed by Agilion with the strengths of Siemens in the field of digitalization and automation."

Agilion GmbH was established in 2004 has equipped about 150 projects worldwide with its RTLS solutions. At the Chemnitz location, a workforce of 60 takes care of component development and production including software, as well as engineering and executing customer solutions. With effect from March 29, 2018, Agilion has become a fully owned subsidiary of Siemens and integrated into the Process Industries and Drives Division's industrial communication and identification business. The directors will continue to drive forward the development and marketing of RTLS solutions under the Siemens umbrella. The parties have agreed not to disclose the purchase price.

You will find a press release and press pictures at
http://www.siemens.com/press/PR2018040214PDEN

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