

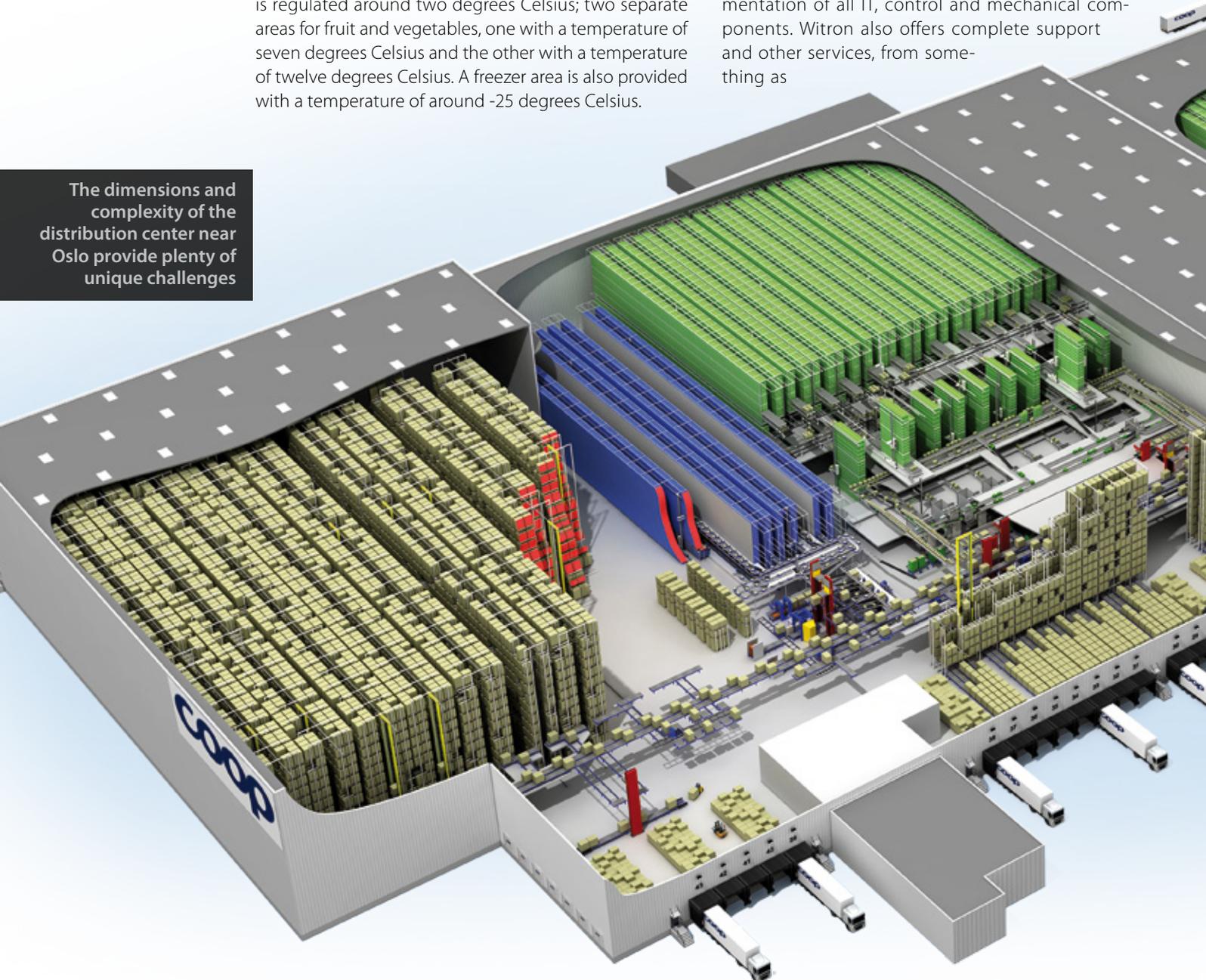
Good Neighbors

With the construction of a distribution center for COOP in Norway, Turck and Witron demonstrate that UHF-RFID can also be used for short distances.

The new distribution center of the grocery retailer COOP Norge Handel AS, with headquarters near Oslo, is the size of approximately seven soccer pitches, or to be more precise: 50,000 square meters. It is therefore good that workers in the logistics center near the Norwegian capital don't have to cover the long routes in the halls on foot, let alone beyond the four main areas of the distribution center. The automated distribution center is divided up into: a dry area with a normal temperature of 18 Celsius; a chilled area that is regulated around two degrees Celsius; two separate areas for fruit and vegetables, one with a temperature of seven degrees Celsius and the other with a temperature of twelve degrees Celsius. A freezer area is also provided with a temperature of around -25 degrees Celsius.

The distribution center was planned, developed and built by Witron Logistik und Informatik. The very name of the company, based in Parkstein in the Upper Palatinate of Germany, indicates its specialization: As a general contractor for logistics and information technology, and all other services required for planning, implementing, servicing and operating large logistics centers, Witron offers all the key elements of the project from a single source. The range of products and services provided by Witron also covers the planning and implementation of all IT, control and mechanical components. Witron also offers complete support and other services, from something as

The dimensions and complexity of the distribution center near Oslo provide plenty of unique challenges



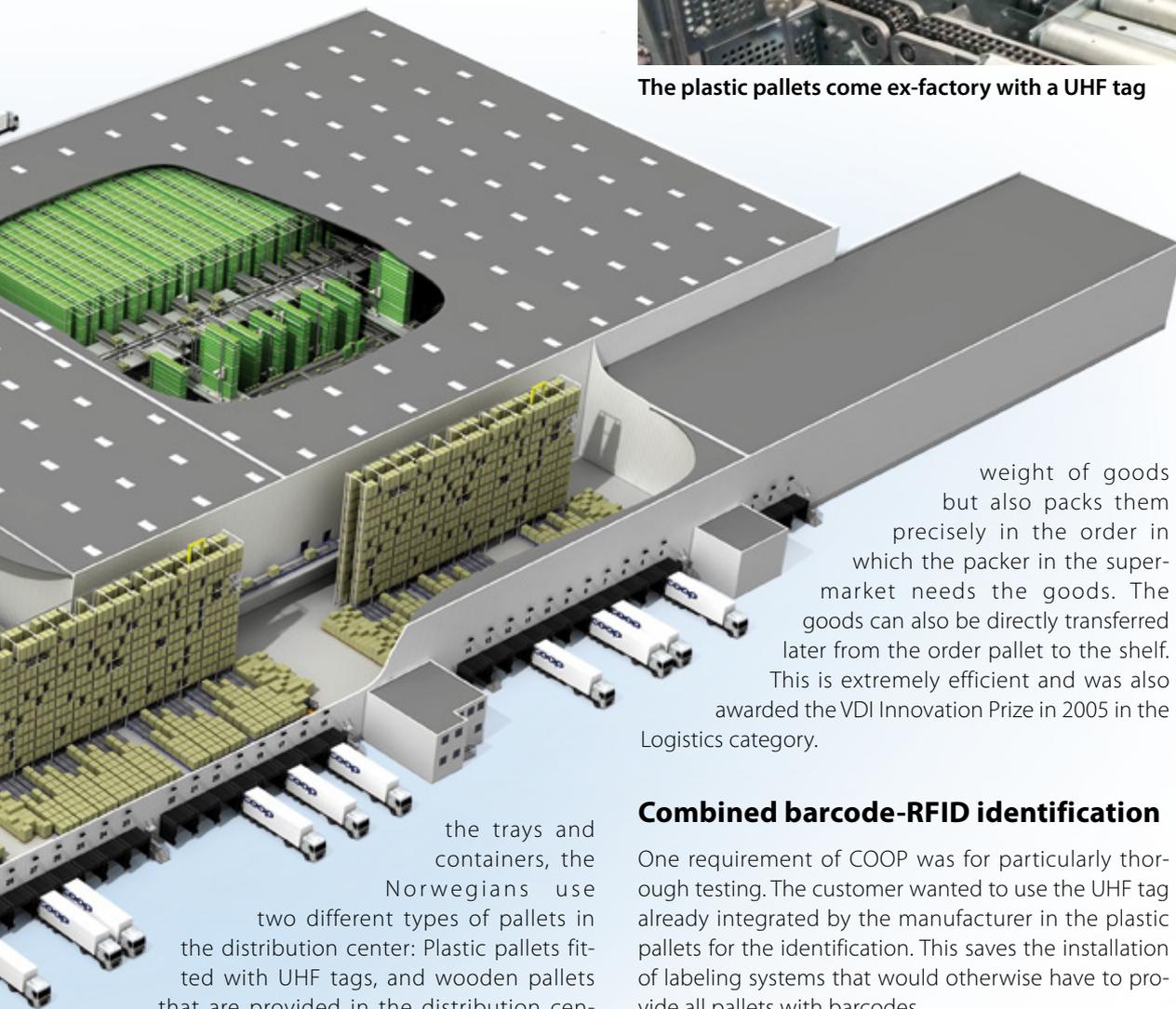
simple as a help hotline to more complex services such as warehouse management. Several large trading and logistics companies, particularly in Europe and the USA, appreciate this comprehensive approach and the flexibility of the company.

The distribution process

Goods arrive at the goods-in bays of the “COOP-Logistikcenter” on pallets. The pallets are unloaded here and temporarily stored in the pallet store. The unmixed pallets are then depalletized fully or semi-automatically and transferred to trays or containers. Besides



The plastic pallets come ex-factory with a UHF tag



the trays and containers, the Norwegians use two different types of pallets in the distribution center: Plastic pallets fitted with UHF tags, and wooden pallets that are provided in the distribution center with a combined barcode-UHF label. The barcode is used to identify the carrier as a wooden pallet. The trays and containers are likewise identified by their barcode.

The system conveys and sorts the goods automatically, takes them in and out of the warehouse and picks them for orders of all sizes without any personnel. Witron is well ahead of its competitors when it comes to the order-related picking of pallets. The central part of the OPM order picking machinery is known as COM, which stands for “Case Order Machine.” The system optimally combines pallets and packs them together. COM not only takes into account the volume and

weight of goods but also packs them precisely in the order in which the packer in the supermarket needs the goods. The goods can also be directly transferred later from the order pallet to the shelf. This is extremely efficient and was also awarded the VDI Innovation Prize in 2005 in the Logistics category.

Combined barcode-RFID identification

One requirement of COOP was for particularly thorough testing. The customer wanted to use the UHF tag already integrated by the manufacturer in the plastic pallets for the identification. This saves the installation of labeling systems that would otherwise have to provide all pallets with barcodes.



“For us the project was proof of our mastery of UHF technology. This certainly goes for Turck as well.”

Christian Fuhrmann,
Witron

▶ Quick read

The new distribution center of the COOP grocery retailer in Norway, planned and implemented by intralogistics specialists Witron, is one of the most modern distribution centers in Scandinavia. The sheer size of the warehouse and the complexity of the identification technology used are the benchmark in the sector. Witron implemented a combined barcode-RFID identification system using Turck's UHF-RFID technology. With the concentrated know-how of both companies, even the crosstalk that occurs when several neighboring UHF antennas are in operation could be prevented. Benefit for the customer: COOP can make use of the UHF tags that the company has already integrated.



UHF read/write heads, 250 in total, are installed at all crossing points in the pallet conveying system

During the planning phase the specialists at Witron closely examined the possibility of implementing UHF identification. The system required a UHF read/write head at each incoming goods area as well as each crossing point in the pallet conveying system – 250 in all.

Witron programs the controllers for its logistics systems itself using a Step 7-based system. The proven RS485 twisted pair fieldbus is normally used for connecting auto-ID systems. The stations are connected in a so-called “daisy chain.” In this configuration the individual stations are not linked to the controller in a star structure but are connected to the controller along a line, hence the term “daisy chain.” This network topology makes the use of gateways or other distribution points unnecessary.

RS485 interface and controllable antenna required

Besides the need for the RS485 interface, another requirement eliminated the possibility of using a large number of different UHF read/write heads for the appli-

cation: “The controllability of the antenna was a very important selection criterion for us because we had to implement a great deal of near field communication in the plant. Apart from a few other suppliers, this feature was primarily offered by Turck,” explained Christian Fuhrmann, who is responsible for the control technology development.

RSSI filter prevents crosstalk

Each new application is thoroughly checked in advance from top to bottom at the Parkstein factory. Witron noticed that there were read errors on UHF tags at specific locations despite the controllable power of the UHF antennas. This crosstalk occurs if an antenna energizes a tag that it is not at all meant to read. This tag can then also be energized by a read/write head in close proximity and thus achieves a range that exceeds its actual maximum range. This means that read/write heads receive data from very distant tags which their antenna output power should not allow them to see. “In this case we were able to prevent this by setting different parameters on the read/write head. RSSI filters can



The LED indicates the status of the read/write head directly on the device

be used or you can restrict the number of read operations that the read/write head performs," Fuhrmann explains. The RSSI value specifies the strength of a signal. It is used to estimate the distance of a target. By setting filters, objects at a particular distance can be excluded from read operations.

This application makes it clear how different UHF is from HF-RFID. With UHF: Every application is different. The joint solution to the challenges that presented themselves during the implementation of the application was worthwhile for both companies. Turck provided Witron with the technical support needed to match the RFID systems and could offer and extend its application know-how in real conditions. In the incoming goods area, for example, mechanical shields were fitted to the labeling systems for wooden pallets in order to prevent crosstalk and read errors resulting from the high density of antennas.

Address card developed

Another unanswered question was the assignment of network addresses to the individual read/write heads



Neighbor conflicts excluded: Both read/write heads only read the pallets directly in front of them

in the fieldbus. Witron needed a so-called address card for this, which is actually a type of tag. Each read/write head reads in its address card and thus provides the controller with a unique network address on the bus. Turck was able to draw on the expertise of its development partner Deister electronic for the development of the card.

Christian Fuhrmann expresses his delight with the collaboration. "For us the project was proof of our mastery of UHF technology. This certainly goes for Turck as well. The project was extraordinary in terms of its requirements and size. Together, we were able to effectively solve any questions and difficulties that arose and we achieved very good results in the end."

Equipped for Industry 4.0

The UHF technology now enables the customer to implement with one tag a seamless identification system for the entire production and supply chain. For example, the entire cold chain from the manufacturer to the supplier to the individual retailer can be documented seamlessly on one tag. The great benefit of the UHF technology is the ability to use the already integrated tags in the pool pallets. ■