

RFID in EUROPE

INFORMATION CONCERNING RFID IN EUROPE FEBRUARY 2017

RFID
in EUROPE

FEBRUARY 2017

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ONE OF THE WORLD'S LEADING RFID PROJECTS SCA/SWEDISH TRANSPORT ADMINISTRATION



CONTENTS

1 ONE OF THE WORLD'S
LEADING RFID PROJECTS
SCA/SWEDISH TRANSPORT
ADMINISTRATION

4 SERVO ASSISTED GLOVE

8 WINNER OF
THE GOLDEN TAG AWARD 2016
RFID / RTLS USING UWB
TECHNOLOGIES FOR
INDUSTRIAL APPLICATIONS

10 RFID I EUROPE

It started small-scale, just like any other project. Today, the Swedish Transport Administration and LearningWell's work has won awards worldwide, and has become a de facto standard for the European rail network. SCA has now taken over the baton, while other actors in the forestry industry applaud the project enthusiastically.

The Swedish Transport Administration had an idea. If Sweden's freight train rolling stock were fitted with RFID tags, all stakeholders would benefit. The advantage for the Administration was the contribution the technology could make to lowering maintenance costs for track and rolling stock. Furthermore, healthy profits beckoned for freight customers. If they were able to continually monitor where their wagons were, and what goods they were





LearningWell are now building, the expectation is to improve quality and secure virtually all information, even at terminals that store up to 100,000 cubic metres of timber.

“Naturally, I’m proud that we’re driving this initiative,” says Jonsson. “I like that LearningWell is hands-on, and very easy to work with. Whenever we make a decision and start something, everything goes very quickly. They’re focused on solving issues for us here and now, rather than coming up with something that works in 10 years’ time.”

A MULTI-AWARD WINNING PROJECT

In comparison to rival solutions, RFID tags are easier to use and cheaper. Reading is automatic and works even when trains are travelling at high speeds. Furthermore, it has become a de facto standard for rail networks across Europe.

There are currently some 240 RFID readers installed in Sweden and around 4,000 wagons that use the technology. This means that around a quarter of Sweden’s freight rolling stock are fitted with RFID and can be tracked all over the country. The Administration and goods shippers across Europe see considerable advantages with the project. Evaluations are currently underway to also use the system on trucks.

To date, the solution has won the Golden Tag and the Mini Tag at the European Tag Awards. The Mini Tag went specifically to LearningWell for “significantly contributing to the successes” of the project. Prior to this, the system won the global standardisation organisation GS1’s prize for the world’s top project – all categories. And it was one of three finalists in the RFID Journal Award Best Implementation category.

Want to know more?
Tord Larsson-Steen, CEO West
tord.larsson-steen@learningwell.se /
 +46 70 577 61 33

transporting, they could save valuable time on loading and deliveries.

Initial testing showed that accurate timing to final destinations, and concise information about trains’ wagon order could save freight operators an hour’s work during unloading.

//
When we were appointed as strategic advisors at the end of 2008, we could see that the Administration had a great idea, but that they had missed some basic points, //

says Gunnar Ivansson, who has been LearningWell’s RFID expert on the project ever since. We quickly concluded that they should expand their horizons beyond Sweden’s borders because the majority of freight traffic in Sweden originates from the continent.

SCA HEADS DEVELOPMENT OF FORESTRY-SWEDEN

Lars Jonsson at SCA says that he came across the Administration’s project by chance. SCA had carried out its own tests, but had not yet identified a satisfactory solution. When he heard about the new system, he called the Administration immediately to find out more about it.

He explains that the project SCA now runs together with LearningWell is widely talked about in the Swedish forestry sector, and that there is a great deal of interest in how the project will perform.

//
The entire sector is focused on making time savings, and it’s in this area that the solution will save substantial sums of money when it’s fully implemented. //

All actors in the forestry sector face a common problem. A key challenge is keeping track of information about timber, from felling to delivery to customers. With the system SCA and

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SERVO ASSISTED GLOVE

When Volvo Powertrain in Skövde, Sweden is shipping engine-and gearbox assemblies, they normally use a base frame to which they then add various supports and fixtures. This is necessary due to the many different variants the assemblies may take, in order to meet customer specifications from the many countries Volvo serves.



< TRANSPORT FRAME AND VARIOUS SUPPORTS

When the frames and supports are returned to Skövde, they arrive in a total mix-up and need to be sorted, inspected and subsequently returned to stock. Some of them may need to be de-painted and repaired before they go into stock, all depending on how many turns they have done.

Pictures by AMCHB

RETURNED GOODS FOR SORTING >

To facilitate the sorting, we equipped each of some 50 000 components with an RFID-tag and registered them into a database. We then developed a wearable RFID-reader and a thumb attachment with integrated RFID-antennas. The reader transferred the tag-ID to a PDA via Bluetooth. The PDA in turn would then transfer all data collected to the main computer via WIFI.





Pictures by AMC HB



RFID-TAG IN SPECIAL HOUSING

THE RFID-EQUIPMENT USED IN THE SYSTEM

Many of the components would weigh 10 kg and more, so the possibility of being able to identify the component, yet gripping it with both hands was a welcome system feature.

Researchers at the NASA Johnson Space Center in collaboration with General Motors have designed and developed Robo-Glove, a wearable human grasp assist device, to help reduce the grasping force needed to operate tools for an extended time or

for repetitive motion tasks. This wearable device allows the user to tightly grip tools and other items for longer periods of time without experiencing muscle discomfort or strain.

THE ROBO-GLOVE >

Research shows that continuously gripping a tool can cause fatigue in hand muscles within a few minutes, but initial testing of the Robo-Glove indicates the wearer can hold a grip longer and more comfortably. For example, an astronaut working in a pressurized suit outside the space station or an assembly operator in a factory might need to use 15- to 20 pounds of force to hold a tool during an operation but with the robotic glove they might need to apply only five to 10 pounds of force.

Bioservo Technologies AB is a leader in soft exoskeleton technology and combines medical know-how of people's needs with modern robotics technology to create innovative, strength-enhancing products.

Recently we were asked by the Swedish company Bioservo to take this technology a bit further and try

Pictures by GM-NASA



to integrate RFID into their Servo Assisted Glove called SEM "Soft Extra Muscle". The SEM is the result of a license agreement between Bioservo and GM-NASA as well as a long term development work carried out by both of these companies.



THE SEM GLOVE >

Pressure sensors are incorporated into the fingertips of the glove to detect when the user is grasping an object. Then the synthetic tendons automatically retract, pulling the fingers into a gripping position and holding them there until the sensor is released.

The SEM glove can be used as a rehabilitation aid, as well as helping people with impaired or limited arm and hand muscle strength, to enjoy a better life. Since there are many instances in industry where an operator has to grip a hand tool for a long period of time, the SEM can help reduce the risk of repetitive stress injury.

Initial tests incorporating RFID into the SEM glove showed very promising results. We first made some small V-grooved wheels which we fixed to a plastic plate. We draw up the contours of a hand and fixed the wheels at each position where a direction change of the antenna coil copper wire was needed. We then wound the coil to the inductance required and connected it to an RFID reader.

Our fear that the antenna fields in each finger would interfere with each other proved to be unfounded. We had perfect readings over the entire field. Next step was to attach the coil to the SEM glove. We provisionally stitched the coil to the glove so that we could test when an object was gripped and the fingers bent. Also during these tests we had complete success with the readings. Now the plans are to continue refining the application.

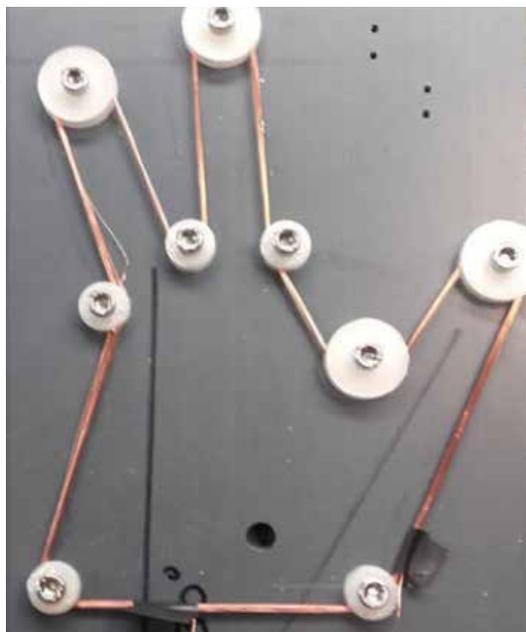
For more information pls. contact:
Bob Forslund
AMCHB
e-mail: bobsan@bahnhof.se
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Picture by Bioservo

THE CONTROLLER

Pictures by AMC HB



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WINNER OF

THE GOLDEN TAG AWARD 2016

RFID / RTLS USING UWB TECHNOLOGIES FOR INDUSTRIAL APPLICATIONS

Researchers (inventors: Z. Zou, C. Zhai, and L. Zheng) at KTH invented and developed wirelessly-powered / battery-assisted RFID and real-time location systems (RTLS) for fast identification and precise positioning for industrial internet-of-things (i-IoT).

Lucas Åhlström is delighted to propose that WSN Institute Sweden AB should be listed as a user of the above technology and a strong candidate for the RFID Nordic 2016 golden tag award. WSN is using such a solution in their the application of valuable and sensitive assets management in smart warehouses.

The technology exploits ultra-wide-band radio (UWB) as uplink transmission with Time-Difference-of-Arrival (TDoA) technique, facilitating fast identification and precise positioning with accuracy better than 10 centimeters. In the downlink, standard UHF RFID or 2.4-GHz radio is used to support existing RFID or short range

wireless standards. Such an innovation asymmetric link avoids the implementation of power-hungry and complex UWB receivers on tags, while remaining compatible with the most popular RFID or 2.4-GHz industrial radio wireless interfaces. Thanks to the ultra-low-cost and low-power UWB transmitter on the tags, the system provides fast identification (up to >1000 tags per second) and accurate positioning in centimeter level (up to 10 centimeter), without complex hardware and additional cost. The specified operation flow and communication protocol enables the deterministic multi-tag management with reliable identification and fast position updates in the large-scale

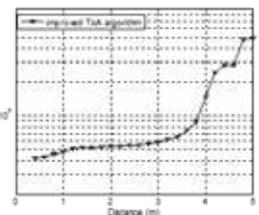
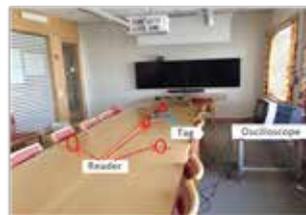
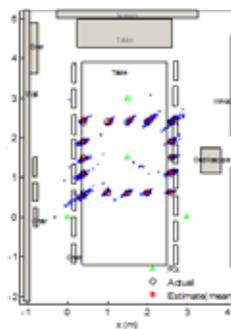
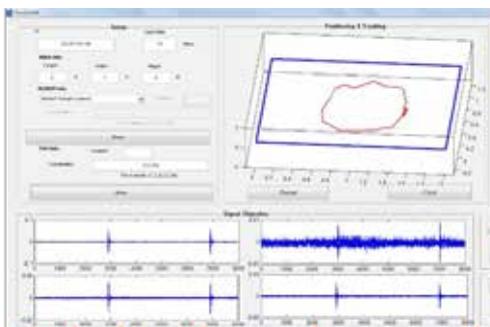
multi-site environments. The system is consisting of a reader network with more than 4 reference receivers and 1 coordinator, meanwhile the tags can be configured as the battery-less (passive) one or the battery-assisted (active) one. The passive tag can be wirelessly-powered as traditional UHF backscattering tags yet an UWB transmitter powered by scavenged RF energy from the reader is used. Active ones in more sophisticated scenarios, consisting of a commercial 2.4-GHz transceiver and a customized Application-Specific Integrated Circuit (ASIC) UWB transmitter (Tx) is able to achieve up to 3 years battery life at 1600 tags per position update second with 1000 mAh battery in one cluster.

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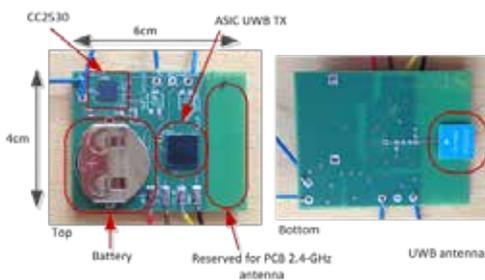


Compared to exiting RFID based RTLS, the proposed solution offers significant improvements in terms of positioning accuracy whereas can be 10x more cost-efficient than dedicated UWB ranging / positioning systems. The core technology has been filled for patent, and the solution is now under commercialization process with pilot trails or evaluation including

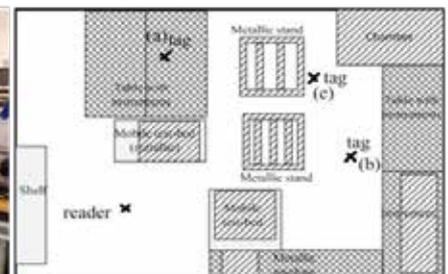
- WSN Institute Sweden AB for the application of assets management in smart warehouses;
- Patient tracking and motion detection (e.g., falling down), with Ambigua Medito AB
- Localization and communication in industrial environments, with DeLaval



SDR PLATFORM FOR READER NETWORK



3-YEARS BATTERY LIFE OF TAG



DEMO OF INDOOR TRACKING

*This work was recommend by
Lucas Åhlström
lhlstrm5@gmail.com*

*Inventors:
Zhuo Zou, Chuanying Zhai, Lirong Zheng
zhuo@ieee.org*



WHAT IS RFID IN EUROPE?

RFID in Europe AISBL is a not-for-profit organization established in 2012. RFID in Europe's principle goal is to promote the adoption of Radio Frequency Identification and related technology solutions enabling small and medium sized organizations throughout Europe to gain competitive advantage through their best use. RFID in Europe connects with European end-users, operators, solution providers, universities, research establishments, nongovernment and government organizations and all other European stakeholders through own initiatives and promotion of national projects via our international network. RFID in Europe is an extension of a European Commission FP7 Thematic Network called RACE networkRFID initiated in 2009. RFID in EU also supports EU National RFID Organisations and related events including: RFID Nordic, DKRFID, ID World and EC IoT Week, in addition to industry initiatives including RFID & U with Marks and Spencers.

OUR MISSION?

Promote the adoption of RFID and related technology solutions across European end-users, operators, solution providers, universities, research establishments, including governmental and nongovernmental organizations.

MAIN ACTIVITIES IN 2017?

- RFID in Europe Magazines with exciting updates www.is.gd/rfid_mag
- Annual general assembly (see the RFID in Europe website for updates)
- Academic engagement - Call for papers / proposals
- Hosting RFID in Europe networking events
- Development of RF identification technology (RFID, NFC, IoT, etc.) roadmap documents outlining current "state of the art" and future market trends.
- Direct engagement with European Commission and EC funded research initiatives
- Conducting European wide surveys to evaluate RFID implementation, highlighting common pitfalls, outlining general recommendations including interest and perceptions.



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