POLAR BEARS IN SVALBARD:

USING RFID-TAGS IN MONITORING OF THE POPULATION

Polar bears are on the top of the Arctic food chain, they are well adapted to the hostile environment in the Arctic and they are specialists in hunting seals in ice covered ocean areas. The close association to the marine environment has given the polar bear the Latin name Ursus maritimus; the sea bear. Currently there are about 25,000 bears divided into 20 populations throughout the Arctic.

The biology of the polar bear is closely associated with sea ice, which the bears use as a platform for movement and from which they hunt seals. Ringed seals and bearded seals are the main prey species for polar bears and both of these are also closely tied to sea ice. Both species give birth and nurse their pups on the ice, in addition to using sea ice as a resting platform. The importance of sea ice for

CONTENTS:

February 2007

Norsk Polarinstitutt, N-9296, Tromsø, Norge

the existence of polar bears has made them vulnerable to climate change involving an increase in temperature and subsequent decrease of sea ice in the Arctic. Additionally the diet of polar bears also has proved to be a potential hazard to the wellbeing of the species. Anthropogenic pollution is transported to the Arctic by wind and ocean currents and is concentrated up the food chain. The compounds are fat-soluble and are found in high concentrations in the favorite food of polar bears, namely the thick fat layer of seals.

Research on polar bears is now being conducted throughout the Arctic, with particular emphasis on what pollution and climate change does to the populations. The Norwegian Polar Institute has been conducting polar bear research in Svalbard for close to 40 years. Our main task is to gather knowledge about the polar bear population in the Svalbard area and Barents Sea, to give the Norwegian Authorities the best foundation possible to make sound management decisions.

The research is based on mark-recapture methodology, meaning that bears are being tagged and then are being recaptured one or several years later. The data collected are valuable and gives us the

opportunity to monitor important population parameters. Being able to identify individual polar bears are crucial to the method. That is why we use three different means of tagging, the bear gets a plastic ear tag, a tattoo on the inside of the upper lip and a RFID-tag placed under the skin behind the left ear. When the tag is in place it is read and the number entered into a database. All captured polar bears are scanned, and often we see that the RFID-tag is the easiest way to identify a bear, especially if the ear tags have been lost and the tattoo is hard to read.

Currently there are about 1000 polar bears in Svalbard carrying a RFID-tag, and they are small but important parts of the scientific equipment needed to run the monitoring program. Each year a great effort is made in Svalbard to ensure that the Management Authorities have updated information on the status of polar bears for the best possible management of the population.

Tags Texas Instruments LF 134,2 kHz and handheld terminals from Electrona-Sievert AB.

For further information please call Gunnar Ivansson, Electrona-Sievert +46 8 447 31 10

# PREMIER FOR TOMORROW'S CHECK-OUT SYSTEM WITH RFID

Interest was great January 26, when the check-out system SHOP-ON was demonstrated for the first time at Svensk Handel (Swedish Trade Federation). This paying system is based upon RFID (Radio Frequency Identification) system from Electrona, Sogeti and RBS. The benefit is that the customer can shop fast and easy which matches today's life style. By integrating RFID in the goods and a reader at the counter, the shopping time is reduced. The store can be more effective and the personnel can be more productive.

The customer place their basket or bag with goods on the counter. Articles selected are displayed on a screen along with the total sum of the purchases. Then the customer draws the credit card, feeds in the pin code and the purchase is approved. An alternative is to use a dual interfaced credit card and touch the screen for approval. Using the Pay-Pass credit card eliminates the normal card routine of drawing the card.

With the SHOP-ON option even the self-checking counter can be integrated with the credit card solution that contains RFID. Then, it is not possible to shop quicker. The biggest advantage is with the quality and quantity of information that is registered with the etiquette code, for example, manufacturing date. This eliminates the need for a receipt when exchanging goods. The customer is always right with the RFID system.

An additional feature with SHOP-ON solutions is that it is possible to control a gate, bar or door once the purchase is complete.

For more information
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Svensk Handel
08 762 78 28
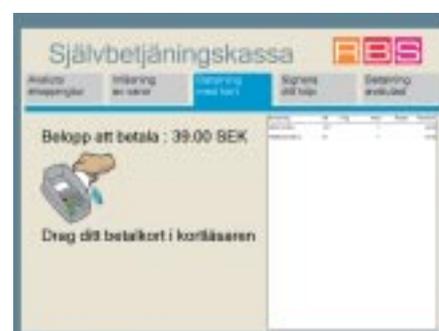
UPM RAFLATAC'S RFID TAGS REVOLUTIONIZE WAREHOUSE MANAGEMENT AT TOSHIBA EUROPE

UPM Raflatac, announces today that it has been selected by high-tech computer manufacturer TOSHIBA to develop one of the largest Gen2 RFID supply chain solutions in Europe. The integrated solution combines the expertise of UPM Raflatac and leading business partners TOSHIBA TEC, vendors of RFID label printers and ADT Security/Tyco, supplier of RFID reader hardware.

TOSHIBA Europe, which handles the customer-specific configuration of every TOSHIBA laptop destined for the EMEA region, will implement an RFID system using Rafsec tags by UPM Raflatac that will unblock warehouse bottlenecks and increase worker productivity at its plant in Regensburg, Germany, by an estimated 57 per cent.

Previously, when the pallets with 36 laptop PCs arrived at TOSHIBA's warehouse for storage, handling staff would book in the delivery by scanning the barcodes on each box individually. Only then could the pallet move on. Now that each boxed laptop is fitted with a Rafsec G2

ShortDipole tag from UPM Raflatac, the entire pallet can be processed instantly by passing it through an RFID reader gate at the entrance.

When the implementation will be up to speed, TOSHIBA expects its warehouse to handle 15,000 PCs a day compared with the current 9,500, with an expected peak capacity of up to 30,000 units a day. With one RFID label per laptop, that means nearly 4 million RFID tags per year.

"We're extremely proud to play a key role in this exciting new project which is one of the biggest RFID-based supply chain systems in Europe," comments Christer

Härkönen, Senior Vice President at UPM Raflatac. "The success of this roll-out underlines not only the advantages RFID can bring manufacturers in terms of streamlining operations and increasing transparency in the delivery process, but also our expertise in the design and manufacture of UHF RFID tags."

For further information please contact:
Mr. Christer Härkönen, Senior Vice President, RFID, UPM Raflatac, mobile +358 50 569 3342
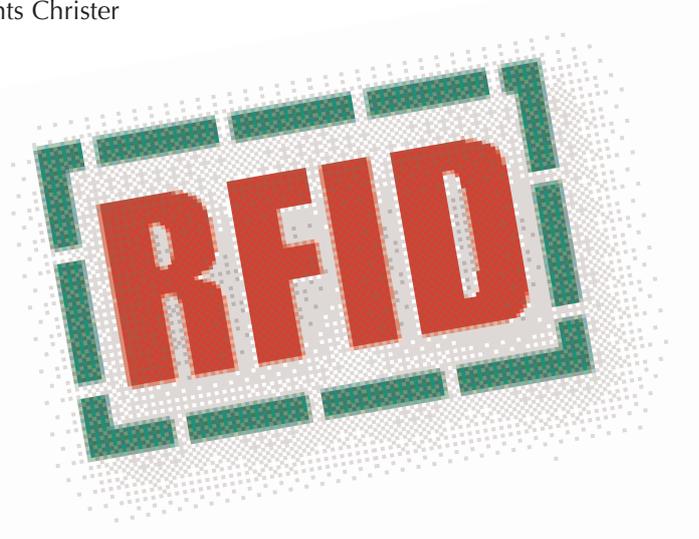
THE SIX NOMINATED SELECTIONS FOR THE GOLDEN TAG 2006

MEATTRAC BREEDER

TracTechnology has developed a new solution for the meat producers based on RFID (Radio Frequency Identification) marking of cattle. The development was done in co-operation with Leif Andersson, owner of Sojdungs Gård (farm). Leif will invest in modern technique which gives safe and rational handling , but also gives a clear marking of the origin of the meat for the consumer. MeatTrac provides this possibility.

The animals are marked with a bolus-transponder or ear tagged and registered for general information with a digital radio instrument. Later, the information (about the animal, farm and supplier) is transferred to a PC then to a web applications database. Frequent weighing is then done fast and rational. Individual following of growth gives full control over production. The system signals if an animal's growth curve differs from the norm, thus giving the farmer time to investigate and correct the problem.

MeatTrac Breeder not only reduces the handling, identification and sorting of the animal, but also eliminates the risks around mature cattle. Controlling the motor-driven gates also makes possible the sorting of the animals.

For more information, contact Henrik Österlund:
Tel: 08 – 55693403
E-mail:
henrik.osterlund@tractechnology.se

LOGISTIC CONCEPT FOR HOSPITAL UNIFORMS

We, Texi A/S are a small development company in Trondheim which has developed an unique RFID (Radio Frequency Identification) concept for the handling of personnel uniforms in hospitals.

The first installation is at the St Olavs Hospital in Trondheim. St Olavs hospital is a regional hospital with about 1350 beds and 7,100 employees.

It works like this, a RFID transponder is sewn into the uniforms of the employees. All uniforms are stored in a special wardrobe with a built-in RFID antenna on each shelf. Even the door lock is controlled by the RFID.

DESCRIPTION:

When a nurse needs a new uniform (coat and pants), that person goes to the nearby wardrobe and opens the door with their ID badge (RFID-card) then picks out the uniform. After the door closes, the RFID unit starts an inventory of the wardrobe. Any difference from the last inventory is reported and debited to the last person that entered and closed the wardrobe door.

Refilling of the wardrobe is the exact same procedure. The employee opens the door to the wardrobe with an ID badge and refills the uniforms. A new inventory begins once the door is closed.

The used uniforms are moved via a transport band through an opening in a wall to a special room. As the uniforms fall into a return container the RFID tag is read and the respective employee is credited.

When the return container is full, the laundry service automatically receives an indication to pick it up. At the laundry the information is read on the uniforms and they are sorted for the correct washing. During the entire process the RFID chip controls the uniforms for (color, size, type, etc.).

The hospital wardrobes continue the inventory process and automatically inform the laundry service when refilling is necessary. Thereafter, the laundry service packages the uniforms with the information marking and they are returned to the wardrobe. The circle is now closed.

What are the advantages?

∑ St Olavs hospital has saved 40 million NOK (Norwegian kroner) in just local costs where the alternative method demanded much more space.

■ The waste has been reduced with nearly 100%.
■ Every department receives a correct accounting.
■ Hygiene has increased dramatically at the hospital because personnel change uniforms more often due to the availability (closer and no delay).
■ The laundry service can optimize production depending on the usage.
■ Transport space is greatly reduced as the uniforms are packaged and not "hanging" in the transport truck.
■ Administration for each employee is reduced because the hospital central computer system can control the size and supply of the uniforms.

SUMMARY

There are only winners: Hospital, laundry service, patients and suppliers.

Texi A/S Trondheim– Concept and Program Developing

RFID HORSE OAT-OMAT

Horses are hungry animals – which appears to be the most important moment when food is served. However, they do not have any table manners and must learn at each meal time to not fight with their neighbors. The food automatic called OAT-omaten (Oat-food), which is installed at the stud farm Menhammar on Ekerö, offers many advantages. One advantage is that it provides a sophisticated and elegant feeding method for all the expensive animals that grow up at the stud farm.

It is all made possible, naturally, with technical equipment based on RFID technique and a specially developed method to portion out the food in tasty and healthy amounts. Also this technique gives veterinarians and owners a chance to follow up the progress of the animals.

RFIG Sweden AB has developed the concept for GALAXIA who is the manufacture of the entire automated system. Lars Lindström is the initiator at GALAXIA and has a indebt knowledge about the different types of automatic feeders. The goal for Lars is to have a RFID and communication solution along with the mechanical parts.

In the summer of 2006, RFIG started with the first unit which was driven by solar charged batteries. The unit was placed out in the pasture for the summer season. Each horse had a personal identity which was a RFID badge mounted on the halter. The equipment functioned according to the specifications which was an "intelligent" unit with a database information and individual bank that controls and registers the horses on a individual basis.

The unit also controls the RFID equipment that reads and identifies the four different sensors (one for all four sides) that give the correct amount of food for the right moment. This is based on the diet list for each horse that is provided by the veterinary. How long did it take for a RFID marked young horse to discover the automatic feeder? It took about five minutes for the horses to understand that to receive food they must go to the automatic feeder. They even learned which opening to use. Of course, there was some fighting for the first portion. However, after a short time the herd of about 15 horses learned the new feeding system and the table

manners improved resulting in a calmer meal time. One of the big advantages of the system is that statistically each horse can be followed. That means that an individual horse can be fed according to need and health.

RFID - technique, electrical supply with solar cells and the automatic control has given the personnel at Menhammar a better workplace without the stress and incidences during feeding.

The system has even been used on grown horses with the same good results. Now the system is being designed and expanded for use in the entire stud horse branch.

We think that Lars Linkvist with GALAXI deserves a Gold Tag, but we also think other individuals should receive honor. For example, Johan Hellander has been a big instigator of the system and a real help in the practical application at Menhammar: Bon Apetit!

For more information
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CHRISTIAN SKOV OF DENMARK'S FISKERISTYRELSE (FISHERY BOARD)

Christian has, with enthusiasm and drive, introduced RFID into fish research in Scandinavia. Even other European countries have been affected by Christian's eagerness.

With RFID marking of different species of pike, perch, roach, pike-perch, etc. in the large fresh-water lakes, Christian has created a whole new view of the behaviour of the fish during different seasons.

As a guest researcher at Lund University his first project was Krankesjön (Kranke Lake) in Skåne where he marked 5,000 fish. Also, the project has generated much good

publicity about RFID in the technical press, radio programs and several TV programs.

Using a double reader and antenna over the streams, with and against the flow, the direction of the swimming fish is measured. Also measured are the speed and the time when the antenna is passed. All data is collected in a log for later analysis.

Back in Denmark, Christian has succeeded in establishing several large RFID projects for fish research. He also has been the initiator for several projects in Sweden together with Kalmar Tekniska Högskola (Technical

University) to study perch and pike in brackish water.

SUMMARY:
Christian has introduced the term RFID into natural science research and has also received positive publicity concerning RFID. He is a new thinker who dares to challenge and test in an intelligent way. Totally, Christian's efforts have resulted in the marking of about 20,000 fish in different projects.

Gunnar Ivansson,
Electrona-Sievert AB
+46 8 447 31 10

BO SVENSSON WITH SVENSK HANDEL (SWEDISH FEDERATION OF TRADE)

Bo has in a determined way launched RFID in the organization Swedish Trade Federation with the concepts of Shop ON, Shop Sec and Shop Info. Shop ON is the first demo system that in a simple and clear way describes the possibilities with RFID for future stores. As an added achievement, the equipment has been placed in the Swedish Trade Federation's reception/entrance for general testing and viewing of the public.

Fill a basket with products, turn on the RFID and information comes directly to the self-service counter display. With a dual interface card (RFID+smart chip) the customer can pay just as fast. Really exciting!

In the concept SHOP ON is SHOP INFO which is an interactive information terminal based on RFID marked products. SHOP INFO makes possible product information with clear text, pictures, video sequences or verbal information, print-out, etc.

The possibilities with this product are endless and will drastically improve the information for the customers.

There is even an environmental aspect in that product information can be stored and retrieved, in different languages, via the terminal. Shop Sec is the third part of the "Shop Family" that in a smart way utilizes RFID for the marking of capital

goods such as clocks, jewelery, antics and many other things. Even here, Bo has contributed in a constructive way to product development.

SUMMARY:
Real enthusiasts will be awarded because Bosses efforts for RFID within commerce will open the eyes of many. He has created a platform for RFID. But most of all; he has the ability to play down the technical aspects and instead feature the functions and possibilities.

Gunnar Ivansson,
Electrona-Sievert AB
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SAFETY RAISES WITH RFID

With the RFID system OIS-U raises safety In SKB:s underground laboratory,Äspö laboratory outside of skarshamn.

WHY RFID?
SKB chose the RFID system OIS-U fromBaumer Ident AB after demanding tests of different systems on the market. For example,can a bus with 30 persons pass a zone at 60 km/h within a 30 m distance and get 100% reading and the zone will be clear? The software shall show the registered object in real time with a maximum 10 second delay.
The result is shown in a layout over the facility to quickly orientate the rescue workers. Also, the software is flexible so that it can be used for other functions.
One example is that the system can be used To save energy. Another

example is to control the ventilation system after the flow activity in the underground installation.
Other uses can be to follow the transports into the facilities, the traffic system, the personal alarms and more. This is done by supplying all vehicles and personnel with RFID-badges. In this way the individual vehicles and persons can be located with a strategically placed antennas. Everyone that enters the controlled area is registered automatically.
Thereafter, they are observed as they move within the area. The information is used to localize the persons in the event of an accident.

Work above ground can also be more effective by eliminating the manual handling of the in and out going personnel.
The system is called OIS-U and can

identify several objects at the same time which is a requirement from SKB.
This means that when a vehicle passes the entrance to the underground laboratory then the vehicle, driver and passengers are registered at the same time.
The system can even indicate in which direction the vehicle passes and OIS-U communicates about the authorization. At Äspö laboratory research is being conducted about the permanent storage of nuclear wastes. The start of the operation is calculated for 2017.

For more information
Anders Boman, Identec Solutions +46
36 13 94 30

RETAIL GIANT METRO GROUP SELECTS UPM RAFLATAC GEN2 RFID INLAYS FOR GROUNDBREAKING PILOT PROJECT IN CHINA

UPM Raflatac, announces that it is taking part in the largest retail RFID pilot project in China. The company has been selected by retail giant METRO Group to supply its Rafsec G2 ShortDipole RFID inlays for an innovative pilot scheme that will see products tracked along the supply chain from China to Germany.

UPM Raflatac will provide its EPC Gen2 UHF tags for the METRO Group's pioneering project

"Advanced Logistics Asia". The inlays, converted into four-inch by six-inch labels by RFID Systems and Supplies Limited (RSS), will be tested at package level using different product categories. The RFID tagged packages will be monitored as they are shipped from the consolidation center in China to METRO operations in Germany.

"This is a very exciting time for us," comments Edward Lu, UPM Raflatac's

Business Development Director, Asia. "Although only at the pilot stage, the potential of this project for us as a company is clearly evident. Being chosen by METRO Group emphasizes both our expertise in supporting large-scale projects and the undeniable quality of our RFID inlays."

The METRO Group is leading the way in its use of RFID technology to streamline and drive down costs in its supply chain management processes. The retailer now wants to extend the use of the technology to where the supply processes begin – the manufacturer.

UPM Raflatac will work alongside RSS, METRO Group and ADT Hong Kong, Tyco Fire & Security to ensure the China tests are successful.

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Mr. Edward Lu, Business
Development Director, RFID, UPM
Raflatac, tel +65 9173 0884*

COMBINATION OF THE ADVANTAGES FROM LONG RANGE RFID WITH PRECISENESS OF SHORT-RANGE SYSTEM

The identification of a wagon or vehicles is based on an Intelligent Long Range® (ILR®) Transponder, which is mounted on the lower side of the wagon, an ILR marker in the track line and an ILR reader/antenna unit at each entry/outlet. As far as the wagon passes the marker in the track line, the transponder starts sending out its identification.

The reader/antenna unit picks up the identification information of the surrounding wagons and tracks. This data is now available for transfer to the station building based on Ethernet/TCPIP or GSM/GPRS, WLAN/UMTS

The requirements from customer are real time:
■ train/wagon localisation and identification
■ which train is at which segment of the tracks
■ track assignment
■ direction detection
■ planning of available wagons
■ wagon order
■ process visibility
■ which wagon got loaded/unloaded
■ circulation time of the wagons
■ maintenance and inspection cycle

LONG READING DISTANCE
Together with the tag identification, marker identification also will be sent out. The specific track can be determined from the marker ID. Optionally, a second marker can be installed in the track. Based on the sequence of the two marker IDs, the direction of the wagon movement now can be determined. The wagon order can be determined from the chronology of the marker's time stamps. The wagon information (tag ID, marker ID, time stamp) is part of an event message, which can be requested, for example, by a central data unit at the station building, based on Ethernet/TCPIP, GSM, GPRS, WLAN, UMTS.

Due to the excellent range achieved by ILR technology, it is also possible to monitor all the wagons in the station and to determine exactly which tracks they are located on.

COVERING EXTRA LINES
Extra lines can easily be covered by adding just one additional marker at the tracks. The existing antenna can cover many tracks. This factor generally makes the concept very useful for railway applications.

MOBILE APPLICATIONS
Additionally, with the ILR technology it is possible to build up mobile RFID applications based on Handhelds with an integrated ILR reader in PCMCIA II / CF Card format. Such ILR-enabled Handhelds are fully compatible with the ILR transponder proposed here. This allows people to Identify wagons and/or to search for a specific wagon by passing by with such a Handheld.

FORTS NÄSTA SID

CUSTOMER BENEFITS

■ Overview of which train is on which track and in which station

■ Optimum dispatching of wagons – which one is loaded/unloaded, which one is available

■ Increase of wagon usage and reduction of downtime

■ Planning of maintenance due to available history of data

■ Memory on the wagon

■ Data can be stored on the wagon (electronic delivery note)

Contact:
Identec Solutions
(former Baumer Ident)
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IDENTEC SOLUTIONS

STRUCTURE

PRINCIPLE
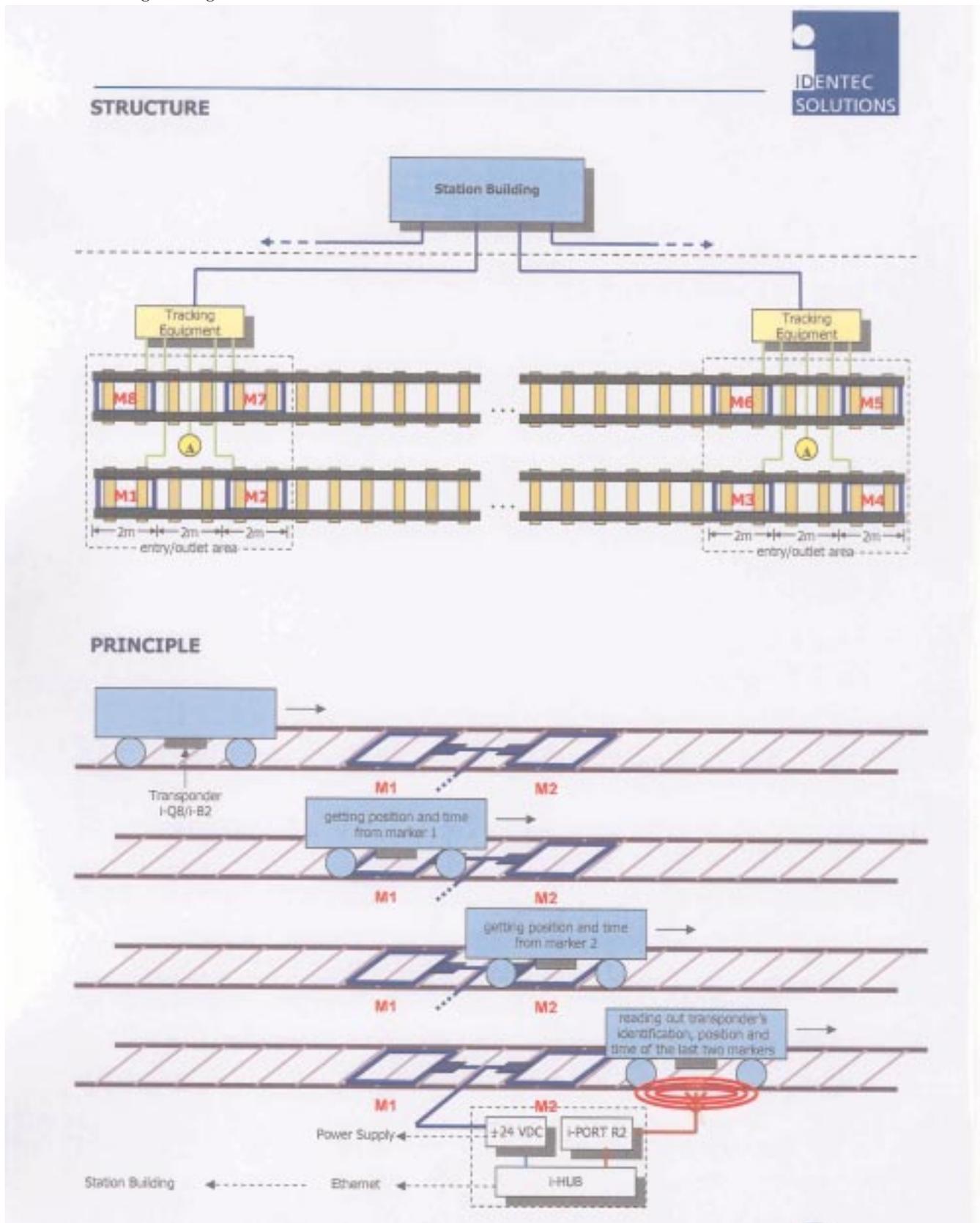
AUTOMATIC IDENTIFICATION AND MONITORING OF METAL POWDER CONTAINERS AT HÖGANÄS AB, SWEDEN

Höganäs AB is a world leader in metal powder for industrial use, and is basing its production on proprietary and very advanced technology with high demands on quality. Metal powder is used in engines, drive systems and different kinds of tools, as well as in additives in a multitude of materials that is used in the chemical industry.

In August 2006, Scirocco IRID (InfraRed IDentification) was delivered for installation in one of Höganäs' automatic factory lines. After three months of successful operation, the company decided to extend the installation to still another line and now plans to install the system also at their metal melting plant in Halmstad.

The powder material is handled in large containers, some of which are transported on a truck from Halmstad to Höganäs. The containers need to be identified on the truck when filled, as well as in the warehouse when stocked. Other containers are circulated internally in the Höganäs plant by means of automatically guided vehicles, and then need to be identified e.g. when they are to be filled with different additives. The quality requirements are high, the plant has to operate non-stop and with a minimum of maintenance, and the production planning has to be optimised for perfect utilisation of the different raw materials.

It is therefore necessary to at any instant know exactly which material that is filled into or emptied out from the containers, and to monitor the status for the valves that are part of each container as they are opened and closed when the containers are being filled, transported and emptied.

Höganäs has solved the identification problem by using Scirocco IRID, a system that has sufficient reading range to identify containers on a truck platform. The core of the system comprises passive data tags with both a programmable memory and a sensor interface to monitor electrical contacts. The tag can consequently sense the status for position switches in the motor-driven valves in the container and therefore, in addition to providing a container identity to the reader, also verify that a valve has been closed or opened as expected.

The tags have no batteries, and are instead powered, read and written with infrared light from the read/write units.

The infrared signals also carry information about the valve status from tag to reader.
The Scirocco IRID product family furthermore includes a handheld reader for convenient reading and wireless communication with a central data bas via WiFi and internet. It is for instance possible to just walk up to a stored container and confirm that its content is as expected.
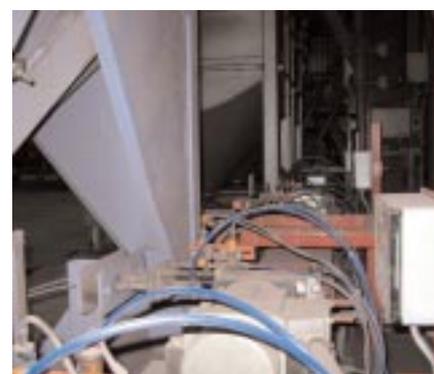
The installation at Höganäs AB has shown that Scirocco IRID is well suited for registering and control of advanced manufacturing processes.

For further information please contact:
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ADAGE EQUIPS THE STEEL SHUTTLE WITH RFID

Adage Solutions has signed a contract with Swedish Steel AB. The steel shuttle between Luleå, Borlänge and Oxelösund will be equipped with intelligent Rfid tags, integrated in an advanced system for easier logistics handling.

Active Rfid tags are mounted on the railway cars for iron ore transportation, where the tags carry information about identification of the cargo, position and movement. The tags are automatically read through fixed mounted readers placed at strategic locations along the railroad. The product is prepared for integration to already existing IT systems for easy handling and high security.

The steel shuttle between Luleå and Borlänge includes 8 trains that transport 2 million ton iron ore annually between the two cities. A similar system runs between Oxelösund and Borlänge, a system that equally is included in the Rfid project.

The project is a step towards making old technology obsolete, such as bar codes and other identification sys-

tems. The intelligent Rfid-tag manages to identify the shipment, and at the same time carry information about the products, positioning, movement and measured data. The technology is not sensitive to humidity, harsh conditions or temperature, which makes the system more reliable than traditional systems. Railroad cars and goods can be identified, positioned and handled in a simpler manner.

The core of the system is built around power conservative components and an extensive knowledge within signal conditioning technology. Adage has developed a number of platforms and has today 10-12 different products with emphasis on logistics, identification and maintenance systems for the industry.
Adage's Rfid-products are sold in complete systems including tags, rea-

ders and software. Each system is adapted to each customer's specific needs and can easily be integrated to existing IT systems. The system is easy to expand from a few tags to several of thousands of tags, fixed and/or mobile readers, GPS/GPRS, software and integration. The system is module based and new types of modules with new specific functions are continuously being developed.

The Adage systems are today found within logistic heavy companies, heavy industry, waste treatment and military applications. The systems are advanced and front edge technology, a fact that has been noted internationally. The focus for Adage during 2007 will be to create an international platform for future international expansions where the target is to establish a global presence within a few years.

BAGGAGE TAGGING AT HONGKONG INTERNATIONAL AIRPORT

Intermec Inc. has been selected to provide the Gen 2 RFID bag tag printer system for the Hong Kong International Airport (HKIA) in Hong Kong. The 2 printers will be installed at check-in counters to further enhance the existing RFID baggage sorting system, which was first installed in 2005. HKIA is the first airport in the world to implement an end-to-end RFID baggage tagging/sorting system.

Intermec Inc. has been selected to provide the Gen 2 RFID bag tag printer system for the Hong Kong International Airport (HKIA) in Hong Kong. The 2 printers will be installed at check-in counters to further enhance the existing RFID baggage sorting system, which was first installed in 2005. HKIA is the first airport in the world to implement an end-to-end RFID baggage tagging/sorting system.

The Airport Authority has selected RFID Gen 2 chip. The bag tags will be attached to all check-in baggage, which then will be sorted and loaded according to the RFID data. Intermec will install and provide service for the new printer system, as well.

Award-winning Hong Kong International Airport is the world's fifth busiest international passenger airport and runs the world,s busiest air cargo operation. Almost 41 million air passengers traveled through HKIA in 2005. Known as Asia,s „superhub"

HKIA hosts more than 80 airlines, linking Hong Kong with more than 140 destinations around the globe.

„HKIA is committed to upholding our core values of safety, security, operational efficiency and service excellence, said Howard Eng, Airport Authority,s Airport management director. „Looking forward to a continuous growth in air traffic, we have earmarked $4.5 billion for a series of facility and capacity enhancement projects at HKIA. In view of these expansion projects, the new RFID bag tag technology will be a timely improvement of our existing baggage handling system so as to enable us to provide an even higher service standard, hence ensuring our passengers a worry-free and pleasant journey. "

ABOUT THE RFID-ENABLED EASYCODER PF2I BAGGAGE TAG PRINTER

The Baggage Tag Printer can print bag tags, external fan-folded tags, credit-card size tickets or boarding passes. Its RFID module is available in a number of geographically specific UHF RFID frequencies.
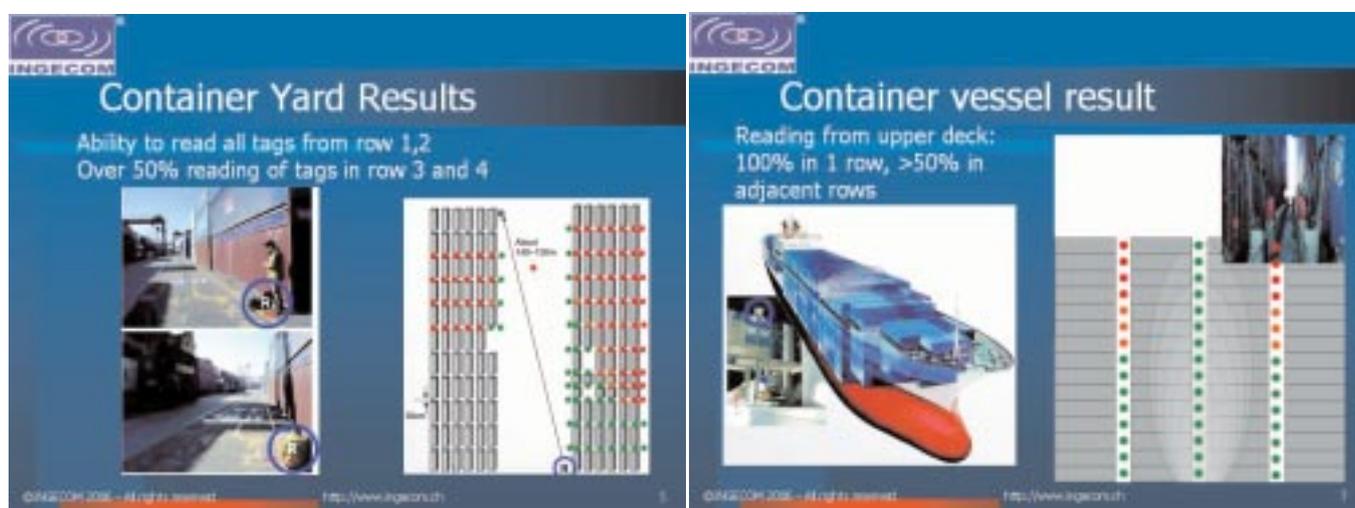
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thorbjorn.sporre@intermec.com

NEW EXTRAORDINARY RF RESOLUTE IN THE CONTAINER TRACKING AREA

RFIG Sweden AB (Radio Frequency Ivestment Group Sweden AB) partner Ingecom SáRL from Switzerland has tested the advanced 2.45 GHz system in an extremely difficult area for RFID equipment, the system that RFIG Sweden AB is trading in a new market segment.

The system was tested in a harbour container yard as well as onboard a container vessel full of containers. The outcome of the test is beyond all the requirements that the user's specification requested, and hence is going to helps them saving a good deal of money.

The User had a list of requirements, stated the expected reading distance and performance for the test. The test equipment had to comply with the rules stated in the document.

The new active tag systems, that were used in a real working environment in the yards as well as on the vessel, did give the user a great advantage over all the "old fashion" RFID technologies available. An other advantages of the system is that it can be used in all countries round the globe as is do not violate any restrictions in the frequency used.

Due to the result of the test, we are sure that this system will enhance the level of container tracking internatio-

nally and would be suitable in any usage to track containers in harbours as well as onboard vessels.

Any request regarding this system can be forwarded to lucas@rfig.se Radio Frequency Investment Group Sweden AB (www.rfig.se)

RFID STOPS SMUGGLING

American authorities have high demands on shipping ports that seek approval for direct transport to American ports. The Container Port in Göteborg is certified according to CSI (Container Security Initiative) and StairSec (Stairway Security Programme). This means that the Göteborg port is certified. However, only the interior areas of the port are approved and not the roads leading in.

The automotive industry will guarantee that the transport to the port goes so fast that smuggling is not possible. In other words, there is no time to lift, open, close or break the seals. When this is reached then the transport will fulfil the requirements of SCI and StairSec's specifications. That will make customs, the port and the automotive industry happy!

Under international competition, a contract has been awarded to

Datema/Artimas for the core system for the Göteborg Port. This system will identify and register the different movements. Advantage for the port is that this robust system will function under all weather conditions and have a long life.

A RFID (Radio Frequency Identification) system, operating at a frequency of 134.2 kHz, is used for surveillance.

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GEN 2—THE DEFINITIVE, MYTH-BUSTING, ITEM-LEVEL SOLUTION

Bringing the benefits of UHF Gen 2 to item-level tagging enables a single, world-wide RFID infrastructure

RFID has been around a long time. But things have changed rapidly in the last two years, and new opportunities abound. Older formats use relatively low frequencies, whereas a resurgence of interest in RFID has attended the use of ultrahigh frequencies (UHF). This technology has made operation over phenomenally long ranges possible, opening up entirely new applications in supply chain management.

The question is can long- and short-range operation coexist? Certainly there are applications in which one or the other must dominate. The answer is a resounding yes: for the first time, and enabled by the physics of RF propagation at UHF, RFID tags can be made to serve multiple masters.

GEN 2—THE RFID STANDARD THAT COVERS THE APPLICATION SPECTRUM WORLDWIDE

UHF Gen 2 was designed from the ground up to 1) solve the well-known problems associated with incompatible, poorly performing, functionally-compromised, and proprietary RFID standards, and 2) advance a single, worldwide standard that would actually make possible practical and economical proliferation of RFID throughout the supply chain. Thankfully, both goals were achieved. In putting forth a truly robust protocol, Gen 2 also greatly expanded the potential of RFID systems by providing such features as dense-reader mode, significant-

ly higher data rates, greater security, a means for worldwide operation, as well as special inventory-enhancing functions including "select" and "sessions," and the flexibility to tailor the system to meet the demands of its operating environment. Furthermore, the single standard means that for the first time, interoperability among competing Gen 2 providers is also possible. All of the foregoing factors combine to make Gen 2 the most economically viable RFID solution available both now and going forward. And, we now know that Gen 2's many benefits readily extend to item-level tagging applications. With that assertion, let's explode a few myths. But first, a few words about the way RF behaves will lay the groundwork for the discussion that follows.

PLAYING THE FIELD

Simply stated, there are two components of the RF wave: magnetic and electric. Generally speaking, HF RFID (13.56 MHz) relies on the "near-field" magnetic aspect of the field, while long-range UHF RFID (860-960 MHz) exploits "far-field" radiation (which consists of both electric and magnetic components). Both elements are present regardless of the frequency of operation. But just which part of the RF emanation a tag responds to depends on two things: the tag antenna, and its distance from the reader.

Because the magnetic component of the wave diminishes greatly in

strength over a relatively short distance, it is characterized as near-field; that is, its effective range is limited by antenna geometry to about one or two wavelengths. And because HF tags rely on inductive coupling to this magnetic component in order to receive power, the HF tag antenna is made up of an inductive, coil-like structure that requires additional layers, considerable conductive material, interconnects between layers, and the associated manufacturing complications. Fortunately HF tags have no corner on the item-level market; with the right antenna, UHF tags can just as easily harvest the same near-field magnetic energy—and do so more efficiently and cost-effectively.

THE SEVEN THINGS THEY SAID YOU COULDN'T DO WITH UHF

With apologies to George Carlin, we'll borrow his infamous tag line (pun intended) to expose the fiction inherent in the UHF/HF battle of the airwaves. Much has been said and published regarding the merits of HF for ILT, yet much of the widely disseminated information concerning UHF has recently been demonstrated to be misleading, incomplete, or just plain wrong. Here are seven examples:

MYTH #1: GEN 2 TAGS ARE JUST TOO BIG FOR ILT APPLICATIONS

Tag antenna design is concerned with managing a number of practical tradeoffs—the desired mix of size, cost,

orientation, and range—for the application at hand. Some might be optimized for a particular frequency band, while others might be tuned for good performance when attached to materials with particular dielectric characteristics (cardboard versus glass, for example). Others still might be more general purpose in scope, working reasonably well across the entire UHF spectrum, in free space or affixed to an item. And, for purposes of this discussion, they may also be designed to be sensitive to either the near-field or far-field component of the reader's radiating energy.

Now, a Gen 2 tag designed for a warehouse application that requires both long read/write range and orientation indifference is, necessarily, a large tag; a typical example measures 80 mm square (see Figure 1). Yet the same Gen 2 chip fitted with a near-field antenna can be as small as 9 mm round—considerably smaller than the vast majority of HF tag offerings! The notion that Gen 2 UHF tags are too large for ILT is, therefore, completely unfounded; they can, in fact, be much smaller than the typical HF solution, and exhibit better read reliability in the bargain
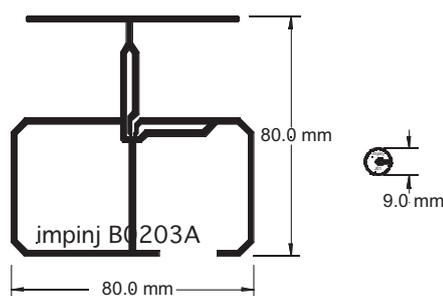

Figure 1 Impinj UHF antenna designs for long-range, multi-orientation warehouse applications (L) and near-field item-level tagging applications (R). The drawings are shown at scale.

MYTH #2: HF'S 13.56 MHZ IS THE TRUE WORLDWIDE RFID FREQUENCY FOR ILT

While the 13.56 MHz frequency may be in common use, the communications protocols for HF are certainly not universal. A number of compe-

ting, and therefore non-interoperable, standards vie for dominance in the HF space, while UHF enjoys a single worldwide standard that has been ratified by EPCglobal™, endorsed by every major commercial concern, and adopted by ISO in the form of its 18000-6C specification. There is one global standard for RFID, and it is Gen 2. And while generally targeted to long-range applications, because it represents a superset of RF capacity, there is plenty of room for short range, item-level applications to come under the same big Gen 2 tent. Furthermore, Impinj has designed its Monza™ tag silicon for high performance in every region of the world. In fact, assuming properly designed tag silicon such as Monza, designing a tag antenna to cover all the worldwide frequencies is straightforward. With a single standard and tags that work everywhere, UHF is indeed the true worldwide frequency for RFID tagging of items, cases, and pallets.

Finally, any discussion of frequency comparisons would not be complete without a reference to Faraday's law, which proves that the effect of magnetic coupling is intensified as the frequency increases (theoretically, for the lower limit of the UHF band, the magnetic coupling strength could be as much as 63 times greater than that of HF!). This is a fundamental advantage of UHF Gen 2 (860-960 MHz) over HF (13.56 MHz), one result of which being the ability to use a very small, single turn, single layer loop antenna that can be printed with low-cost conductive ink. Contrast this to HF's requirement for complex, multi-turn coils that must be etched from aluminum or copper, and support an extra feedthrough layer that doubles the manufacturing complexity of the inlay. In terms of cost and performance, the UHF frequency range is a clearly superior solution, and therefore, the best choice on which to build a worldwide standard.

MYTH #3: UHF GEN 2 WON'T WORK ON LIQUID-BASED PRODUCTS

It is true that UHF's short wavelengths

tend to get absorbed by liquids, close proximity to which alters the performance characteristics of the antenna, effectively detuning it, and reducing its range. However, these considerations apply only to UHF's electric far-field component—not the magnetic near field. In near-field practice, a Gen 2 tag works on liquid-based products just as well, if not better than, HF solutions. To prove the point, Impinj designed a Monza tag silicon/antenna combination that works exceptionally well when applied to a liquid-filled vial—and reads just as reliably when placed inside the vial, completely submerged in liquid (see Figure 2)! The fact is, item-level applications that emphasize magnetic field coupling—whether HF or UHF—are completely unaffected by liquids.

Figure 2 Monza-driven item-level tags read even inside a water-filled vial.

MYTH #4: UHF GEN 2 WON'T WORK ON METALLIC PRODUCTS

It is also true that UHF's short wavelengths tend to get reflected by metals, but again, this trait comes into play only when considering its far-field performance; near-field UHF performance is quite another matter. Because a properly designed UHF tag antenna is able to exploit the near and/or far field, it can actually use to its advantage the metal to which it is attached! This is something that cannot be said of HF tags, which lack the means for electric field coupling.

MYTH #5: UHF GEN 2 WON'T WORK ON ITEMS IN VERY CLOSE PROXIMITY TO EACH OTHER

UHF tags, with their simple structure and single loop design, result in much less magnetic shielding than the dense coils of HF tags. And less shielding allows greater "visibility" to all the tags in the field—especially those that are further away from the reader (see Figure 3). Accordingly, for stacked goods such as DVDs (see Figure 4) and video games, UHF ensures much higher read reliability. What's more, Gen 2's anti-collision algorithm is far superior to the HF protocols when it comes to dealing with large populations of tags placed in close proximity, a scenario typical of retail shelf applications.
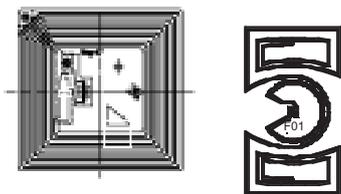

Figure 3 Typical HF tag antenna (L), featuring a dense copper coil layout that results in magnetic shielding of adjacent tags. Impinj's UHF equivalent tag antenna (R) is both smaller and more structurally open. This antenna also exhibits both near-field and far-field performance characteristics.
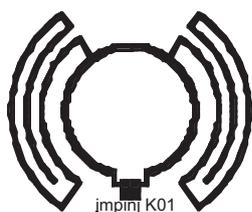

Figure 4 UHF tag antenna designed for DVD.

MYTH #6: UHF GEN 2 TAGS HAVE TOO GREAT A RANGE FOR ILT APPLICATIONS

It is true that a defining characteristic of UHF Gen 2 tags is long-range read/write performance. But once users understand that UHF tags can also exploit the near field just as easily as HF tags, this argument is closed. The fact is a UHF tag antenna can be tailored to be sensitive to only the near field, the far field, or both! As such, no other RFID solution can offer this level of flexibility: only UHF Gen 2 allows a user to dial-in the optimal range for the application at hand. HF tags, on the other hand, are incapable of far-field operation.

MYTH #7: UHF GEN 2 TAGS ARE MORE SUSCEPTIBLE TO NOISE, INTERFERENCE, AND ENVIRONMENTAL CONDITIONS THAN HF TAGS

While Impinj's Monza-powered tags exhibit an extremely high level of receptivity (enabled through a patented combination of high sensitivity, or range, and interference rejection), this characteristic is of interest primarily in far-field operation. Once again, in near-field scenarios, it's a non-issue. In fact, where the near field is concerned, HF offers no noise immunity advantage over UHF.

These seven myths persist only because critics of UHF Gen 2 for ILT have simply not taken into account UHF's outstanding near-field performance. This one, fundamental omission is at the root of arguments that look to favor HF over UHF. Typecasting UHF to play only in warehouse applications cuts users off from the deep, wide benefits of Gen 2, unnecessarily complicating deployments, and needlessly impacting ROI. Leveraging the advantages of UHF Gen 2 to ILT

applications is a strategy that will simultaneously accelerate deployment success, make a significant contribution to ROI—and explode a few myths along the way.

ONE SIZE FITS ALL

The perfect RFID world: a single infrastructure that operates flawlessly in all regulatory environments, leverages a single reader and tag silicon solution, and can be easily tailored via application-specific tag antennas and reader accessories for maximum performance across pallet, case, and item-level applications. That's the promise of Gen 2—and the result delivered by Impinj's GrandPrix™ RFID solution comprising Monza tag silicon and the Speedway™ reader.

As a highly adaptable solution that exhibits both longevity and extensibility, Gen 2 also makes good business sense:

■ High volumes and ease of manufacturing converge to drive costs down
■ A robust protocol delivers the industry's highest read reliability
■ Data rates as high as 640 kbps support large tag populations
■ A technology roadmap that builds upon the existing Gen 2 standard so that your future RFID deployments will grow with you without the risk of infrastructure obsolescence
■ Multi-supplier availability offers freedom from being locked into a proprietary RFID system

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