TEXAS INSTRUMENTS

TIRIS™ NEWS

INTERNATIONAL NEWSLETTER OF THE TIRIS GROUP ISSUE NO. 17, 1997

Mobil® Speedpass™ Based on TIRIS™ Is Announced Nationwide

The fastest way to buy gas

On February 19, Mobil Corporation announced that it will introduce Mobil Speedpass using TIRIS technology to motorists nationwide. Mobil plans to introduce Speedpass at service stations in its key markets from coast to coast in 1997. Initially, the company's goal is to distribute one million Speedpass key tags to customers who sign up for the service.

Customers enrolled in the program will simply wave a TIRIS transponder attached to their key chain in front of designated gasoline pumps and will be able to immediately fill up and drive away without ever opening wallets or purses for credit cards or cash. Customers identify the credit card they want to use when they fill out a Speedpass application.

One million keys tags to be distributed to Mobil customers

> **"Our research tells us that customers are looking for the fastest and easiest way to fill up."**

During a six month trial in St. Louis at 55 stations, 10,000 customers valued both the increased speed as well as the convenience.

"Our research tells us that customers are looking for the fastest and easiest way to fill up," states Brian Baker, Mobil's Chief Operating Officer, North American Marketing and Refining. "Now, Mobil Speedpass simplifies the process even more, making gasoline buying even faster," he added.

Mobil will limit use to two tanks of gas per day, capping losses in case the device is stolen. Because it can be used only at Mobil stations, losing Speedpass would carry "much less drama than losing a credit card," said Baker.

Some of the markets in which it will be available this year are Boston, Chicago, Detroit, Los Angeles, Miami, Orlando, and San Diego.

Besides the key tag approach, Mobil will later introduce new formats for Speedpass, like a transponder that can be affixed directly to the vehicle and be automatically read when the car pulls up to the gas pump.

Tag affixed to vehicle will offer another choice for customers who want to use the Speedpass system.

The Wayne Division of Dresser Industries worked together with TIRIS to develop the system. Wayne Dresser is one of the primary gasoline pump suppliers to this industry.

"Working with major companies like Mobil Oil and Wayne Dresser, with their strong market presence, gives us the chance to realize a large-scale success. This application really takes advantage of the TIRIS competitive advantages," says Joseph Pearson, TIRIS sales representative for this project.

TEXAS INSTRUMENTS

Dave Slinger Is Named Vice President and Returns to Texas Instruments TIRIS As Worldwide Manager

Dave Slinger, formerly North American business manager of TIRIS, recently returned to manage the business on a worldwide basis. Mr. Slinger will manage TIRIS as part of his role as vice president, TI Europe, for Texas Instruments' Materials & Controls business.

Mr. Slinger was a part of TIRIS from 1991 to 1995 during which time he was responsible for creating several key relationships, such as, the TIRIS/MFS Network Technologies alliance for the electronic toll collection business. He was also involved in the early stages of business development leading to our current relationships with Ford and Mobil.

During his hiatus from TIRIS, Mr. Slinger was manager of the Materials portion of the Materials & Controls business, with headquarters in Attleboro, MA.

Dave Slinger

"This is a very exciting time for TIRIS, and an important point in its growth. The TI radio frequency identification (RFID) technology is moving into some mainstream markets this year that will mark an explosion in its use among not only industry but also among consumers," said Mr. Slinger. "And we are not stopping here, the future holds many more surprises," he added.

> "This is a very exciting time for TIRIS since we are moving into mainstream markets that will mark an explosion in its use."

Since joining TI in 1972, Mr. Slinger has held positions in sales, marketing and operations in the United States, Europe and Asia.

He received his Marketing degree in the United Kingdom, and is a member of the UK Chartered Institute of Marketing.

Loyally Yours

Will RFID technologies help win customer loyalty? We think so!

by Joe Pearson, TIRIS Retail Fueling Strategic Manager

How are companies keeping in touch with customers as they add technology to automate customer interface processes? Is there an opportunity to create loyalty and repeat business?

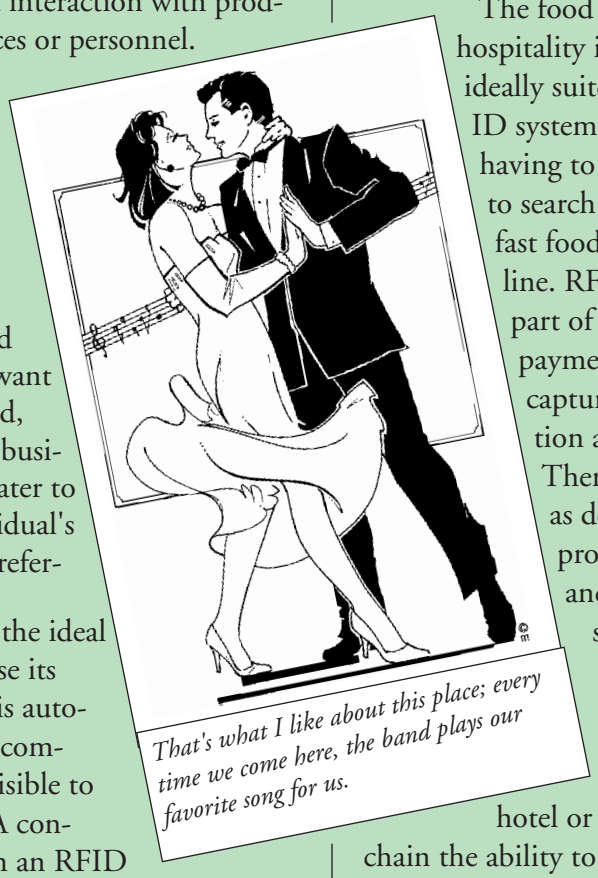
For companies identified as market leaders, new technologies which provide improved customer interface are seen as revenue creating opportunities. Technology applications that create quicker, friendlier and more convenient buying experiences for consumers are becoming a competitive differentiation.

Imagine your favorite table waiting for you at a restaurant. Or how about a retail store clerk who has memorized your size and color preferences and even tells you about the sale next week on suits made by your favorite designer? Does this service affect how you choose where to spend your money?

Surveys show customer satisfaction and retention depends, increasingly, upon the quality of the service received.

RFID Gives Customers TLC

In the struggle to balance new technology with a human touch, RFID can provide a crucial link with the consumer. Consumer ID systems based on RFID can personalize both automated and semi-automated interaction with products, services or personnel. Keeping track of the customers walking in the door, their likes, dislikes and how they want to be served, empowers businesses to cater to each individual's personal preferences.



That's what I like about this place; every time we come here, the band plays our favorite song for us.

RFID is the ideal tool because its operation is automatic and completely invisible to the user. A consumer with an RFID tag in a purse, pocket or wallet can be detected by reader systems at doorways. Readout antennas can also be in counters, in walls, and in floors.

The technology has the potential to tell retailers exactly who's in their store at any given moment while offering full purchase histories for each shopper. In addition, stores will know what the customer bought at their last visit and what they might need for accessories.

The food service and hospitality industries are ideally suited for personal ID systems. Imagine not having to take the time to search for money in a fast food drive through line. RFID can be a part of an automatic payment system that captures the transaction automatically. There are few areas as dependent on providing good and fast service to secure success as restaurants.

A personal ID system might give a hotel or restaurant chain the ability to provide preferred services to each customer. In a hotel, a guest's personal ID card might be tied into a network of automated systems ranging from hotel door locking and unlocking and favored room climate control settings to personalized voice mail.

Personal ID can also be a boon to data-intensive fields such as healthcare. Equipped with personal ID, medical personnel can instantly and automatically have the most up-to-date records and a complete medical history whenever a patient steps into a doctor's office or emergency room.

Personal ID systems based on RFID also allow automated systems to move past simple, static routine tasks and let systems react selectively (e.g. ATMs displaying your name, gas pump automatically accessing the customer's credit card account or computers that pass phone messages to any chosen terminal.)

Even in industry, such an approach could provide a custom machine interface to an employee--step-by-step user interface to the novice worker and expert mode for the more experienced.

With the help of RFID, companies now have the power to humanize new technologies in ways that are nonexistent today. Consumers are quick to accept things that make their lives easier or more convenient, as long as they feel they are still in control.

Luggage Backlogs Eliminated, Swiss Air Passengers on Time

If you fly Swissair out of Zurich your plane has an even better chance of being on time than in any other airport in the world. Why? Now, thanks to TIRIS and DIGI SENS, a Swiss firm specializing in weighing systems, the luggage trains you see pulling up to load your plane are no longer the reason for holding up your plane.

Balancing an airplane's cargo is critical to flight performance, safety and fuel consumption. Like many airlines, Swissair labels its freight containers and the small luggage wagons with the destination, flight number and net weight to help the ground crew load a plane for balance.

Until recently, the tagging process involved stopping each wagon in the train on a conventional floor scale. After identifying the type of wagon and its associated standardized tare weight, an employee had to manually key in that weight. Then the tare weight was deducted from the total weight shown on the scale to determine the net weight. Determining the tare weight was particularly difficult for repaired wagons whose weight may have changed after parts were replaced.

During peak hours, this procedure ensured a backlog for Swissair. Wagons queued up, while planes and passengers sat on the tarmac waiting for luggage and cargo loading.

Consistently rated in the Top 10 for providing exceptional customer service, Swissair took action. Well aware that its freight weighing system created backlogs and stressed on-time records, Swissair was also unhappy with the small but consistent inaccuracies of its weighing system. To eliminate inaccuracies and to speed up the process, Swissair, together with TIRIS and DIGI SENS AG replaced the existing weighing system with an automated, TIRIS RFID system that is unique in the airline industry.

With Swiss Air's new drive-on scale, luggage wagons are weighed automatically saving time and eliminating errors.

With the new drive-over-scale, luggage wagons are pulled over the scales without stopping and the weight is automatically registered. The tare weight and net weight are automatically computed.

Each wagon is tagged TIRIS. An antenna, in the floor reads the tag. The weight of a single axis is determined exactly by matching the axis weight with the appropriate tare weight. The net weight is then determined and printed on the ticket. The flight number and gate are added later.

The weighing and ID system, called DYWA, is connected to Swissair's LAN. The portable object-oriented code also permits special situations, such as when a wagon is hand-pulled in an emergency situation. The weighing technology is based on a vibrating gauge with a transducer that directly digitizes for faster measurement. The weighing system's computer, based on a Motorola 60832 chip that can quickly make calculations, has a serial interface to the PC that sits at the weighing station.

An overhead light notifies the operator when the system is ready for another wagon or when there is a problem. Swissair's printers, placed throughout the terminal for immediate access by ground crew, continue to output the latest information on luggage and plane assignments.

With the two new systems in place, Swissair is weighing and identifying cargo at a tremendous pace. Backlogs no longer exist and improvements are planned for loading and removing freight from the wagons to keep up with the speed of the new weighing system.

The savings in personnel costs alone were sufficient to pay back Swissair's investment in only one fiscal quarter. Three of the ground crew originally assigned to the weighing stations have been reassigned to other tasks. Because data entry is automated, data does not have to be re-entered.

Space is at a premium, especially at larger international airports. The DYWA system uses one-fifth the space as the older weighing system. This also means that less concrete is torn up to install and maintain the new system. The fact that the scales are digitized also means maintenance costs are lower than systems using calibrated weights.

DIGI SENS AG, located in Meyriez, Switzerland, plans to demonstrate the new weighing and ID system at Airport 97, the international airport supplier fair in Frankfurt, Germany to be held in September.

For more information, contact Martin Lustenberger, DIGI SENS AG, Tel: +41-26-672-98-76 and Fax: +41-26-672-98-79.

TIRIS Comes to the Web

If you haven't already, visit our web site. http://www.ti.com/mc/tiris/

Engage in an interactive tour of TIRIS at work in a variety of applications, including automotive security, logistics, highway systems, and sports timing. Walk–through information about all of the products, and see What's New!

USA

TIRIS Times 6700 Runners at Disney World Marathon

After successful use at the 1996 Boston and Los Angeles marathons, and the Atlanta Olympics, the ChampionChip sports timing system based on TIRIS was again on stage at the Walt Disney World Marathon held on Jan 5 in Orlando, Florida.

Sixty-seven runners took off from Epcot Center on a 26.2-mile race that wound throughout the entire park. The course is called "the most unusual, magical 26.2 miles in the world of road racing."

Transponders were threaded onto each athlete's shoe laces. A mat antenna at the starting line captured every code as the runners passed over, triggering the transfer of data to a central processor where all times were automatically entered in a secure database. The same sequence was repeated when runners crossed the antenna-equipped finish line.

The START saw runners take off accompanied by fireworks, music, and Disney World fanfare.

Advantages of the system include:

- Registering mass-volume times without error, and the ability to post the data on the Internet within minutes of verification.
- Runners get net times. So, there is no more need to push and shove to the starting line to be there when the gun goes off.
- Times can be collected at "splits" in the race, and all timing data can be communicated to the audience while the event occurs, such as, announcing the performance of elite runners.
- Reduced health risk to athletes who would normally have to stand in line at the finish to have their barcodes read. Now they can walk it off.

Recently, the U.S.A Track & Field approved this technology for use in road racing competitions, signifying official acknowledgement by a major governing body. An estimated 8.5 million competitive distance runners stand to benefit, as do race coordinators across the country.

At the FINISH, the crowd was there to cheer–in the weary marathoners.

CANADA

SIRIT Signs Agreement with Federal APD

Federal APD, Inc. of Farmington Hills, Michigan is a leading manufacturer of equipment for the parking industry. SIRIT's HandsFree Parking Access System is one of the leading TIRIS-based solutions for this industry. These two companies have joined in a distribution agreement through which the HandsFree System will be listed in Federal APD's product catalog and actively marketed.

"Federal APD, Inc. is pleased to have developed this relationship with SIRIT" said Tom Rollo, Vice President of Customer Services, Federal APD, Inc. Automatic Vehicle ID is gaining a foothold within the parking industry and we see this market growing rapidly over the next few years. After extensive evaluation, we found the SIRIT solution to have the best price/performance currently available," added Rollo.

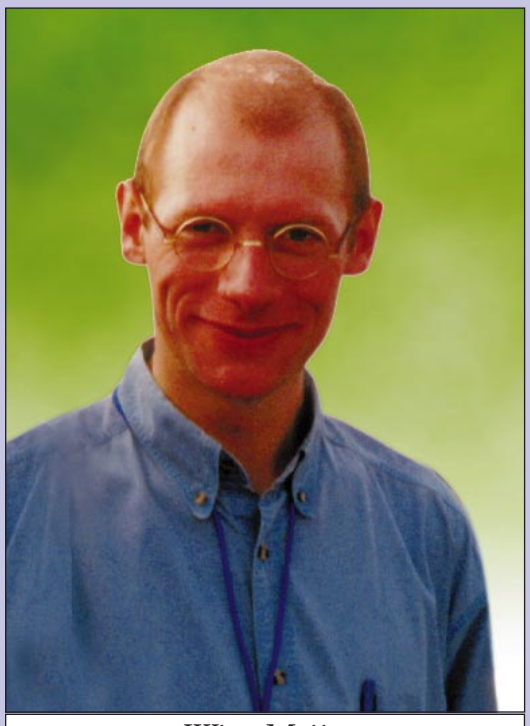
For more information, contact:
Tel: +1 905-940-4404,
Fax: +1 905-940-4405.

FROM A PARTNER'S PERSPECTIVE. . .

An interview with Wim Meijer, President of the Dutch company, ChampionChip, who has revolutionized roadrunning events worldwide with use of an electronic sports timing system based on TIRIS.

***TN:** Why is this system considered revolutionary?*

Mr Meijer: The system transforms the way a race is administered because it virtually eliminates most all manual actions. With previous approaches, bar codes, bib numbers, etc, at the end of the race, runners had to line up single file to input their ID's into the system. They don't have to do that anymore as the data gets logged automatically as they cross the finish line. They are free to walk around and cool off, which is much healthier anyway. Another major impact is that, at the start, some runners are backed up for many minutes before reaching the starting line. It is normal for the runners behind to push and shove their way to the front. Now, that issue is gone because no matter when a runner crosses the starting line, his time posted is his "net time". Results lists used to take a long time to put together. Now this is so accelerated that any shortcomings in the organization show up more, such as, how thoroughly the registration was done. Everyone has to get more efficient in their tasks.



Wim Meijer

TN: *Where do you hope this goes?*

Mr. Meijer: To a worldwide standard in sports timing. We are 2 1/2 years ahead of anyone else, so we can see the possibility of this happening. But, as with the introduction of any new technology, people have to gain confidence and adjust to new ways of doing things. The use of the ChampionChip system has grown exponentially. For instance, we started with the Berlin Marathon in 1994, and did 4 races that year. Every year after, the number of races that use ChampionChip has increased 10-fold. We will do 200 events in 1997 in Germany alone.

TN: *Within a short time, you have built a worldwide distribution network. How did you accomplish this?*

Mr. Meijer: We used our primary partner in Germany, who is considered the best timing company there, to help us locate and qualify the best partners in all the other countries. The idea is to make the effort to find the best in their field and sign them on as your partner.

***TN:** What are some of the barriers that you have to overcome?*

Mr. Meijer: Getting capital. As a small, start-up company we are unknown to those to whom we would go to to borrow money.

***TN:** As an entrepreneur building a brand new business around TIRIS, have you advice for others?*

Mr. Meijer: Don't think that it will be easy. It can change your life. Go for it at 100%. Never be satisfied with less. If you go for 80% then you'll fall short of that goal. It takes a lot of energy, but it returns itself in energy. If you are successful, it will heat up faster than you expect.

ITALY

Bologna Post Offices Adopt New Access System

Responding to a new Italian law, post offices in Bologna, Italy recently installed an innovative personnel access control system. Concerns about bombs, theft, and employee management prompted the passing of a law that requires all public offices to develop progressive measures for tracking personnel. The old way, which required each employee to sign in and out in the presence of another employee, has been replaced with a TIRIS-based solution developed by integrator Sintel van der Hoorn SRL.

Bologna has seven post office buildings, which includes the Emilia Romagna region Poste Italiane E.P.E. administrative office. In looking for a way to implement the new law, the regional office manager in Bologna, Ing. Donzelli, held a competition. Sintel van der Hoorn SRL based their winning bid on a similar application that the company had developed for the Italian Railways at the Termini Station in Rome. Says Donzelli: "The technology convinced us and we stayed within our budget!"

Postal worker logs into Bologna facility for his workday.

Each post office building in Bologna now has a dedicated server to track personnel. Servers are linked using a geographical switched line. The master server coordinates the information flow among the servers, updating regularly so that personnel can leave one building and enter another of the remaining post office buildings without being stopped.

The RFID-based system, called TRP (Terminali Rilevazione Presenze), not only controls access to the buildings, but also can detect the presence of an employee within a building. The system interfaces with proprietary personnel management software that tracks employee leaves, overtime, and of course normal working hours.

Since post office employees are salaried employees who are eligible for overtime, the new automated system calculates an employee's hours automatically. Before, the paper-based system used sign-in sheets at each of the seven offices.

TRP terminals are mounted on a panel that encases the RFID antenna. IN and OUT buttons are located beside the terminal's keyboard. Employees wear badges that include the RFID transponder. When either the In or Out button is pushed, the employee's badge is read. This information is stored and sent to the central computer on a periodic basis. The terminal keyboard also allows the employee to enter the reason for entering or leaving if different from normal hours.

The TRP system is a hands-free system that recognizes all types of post office employees and guarantees non-preferential equal treatment of all employees. Another benefit of the system is that fewer employees are required to maintain security and to manage personnel data. Not only can the Bologna Post Office track every employee while on the job, but management data and statistics are easily obtained.

The TRP system provides a fast, very flexible, and precise system for the Bologna post offices.

For more information, contact Sintel van der Hoorn SRL at
Tel: +39 49 870 3242,
Fax: +39 49 870 3262.

USA

Behind the Scenes TIRIS™ and FLUOROWARE Combine Efforts To Improve Chip Manufacturers' Yields

Behind the scenes in starkly lit, utlra-clean rooms, integrated circuit manufacturers, such as Motorola, SGS Thomson, and Wacker, are upping the ante in the highly competitive semiconductor industry by using TIRIS technology in a unique auto ID process control system developed by Fluoroware, Inc., a Minnesota firm that supplies material management solutions for the semiconductor industry.

Because lost goods and production downtime are very costly in the semiconductor industry, manufacturers in this industry face higher risks than in other industries. Fluoroware developed FluoroTrac®, a patented, turnkey RFID-based system to eliminate product misprocessing, improve operator efficiency and increase equipment usage.

The need to keep everything antiseptically clean makes the use of RFID ideal since no hands are needed to make accurate reads. Many auto ID tracking systems, such as bar coding, are not as effective under the harsh chemical, clean-room requirements that semiconductor manufacturers face.

Wafers are the heart of manufacturing integrated circuits. One 8-inch wafer, for example, can produce from 100 to 1000 chips, depending on the type of chip being manufactured. Many fabs average 5000 wafer starts per week. That can mean 500,000 to 5,000,000 chips per week per wafer.

If the retail cost of one chip is $100, then the retail value of the chips on one wafer is $10,000. Considering that wafer carriers normally hold 25 wafers and four carriers can be processed simultaneously, the retail cost of misprocessing those four carriers is $1 million. Obviously, the value of tracking each carrier to eliminate misprocessing cannot be underestimated.

Worker wears RFID tag on wrist under "bunny suit" where it can still be scanned to provide a valid ID to start a process.

In a fab clean room there can be as many as 800 places or "readpoints" where a wafer carrier is moved from one step to the next. On occasion, wafers are lost when attached to the wrong lot. Therefore, automatically tracking wafers, materials, and operators has clear financial benefits.

The FluoroTrac system verifies that the wafer lot, the equipment, the recipe, and the operator are all correct. If any one of these has the wrong ID, the equipment will not initiate the process, and directions to the operator are displayed.

By automatically identifying the product at each step, the FluoroTrac system eliminates operator intervention for scanning products or keying in an ID number or an access code. This eliminates a possible source of errors and saves time.

Because line-of-sight is not needed, operators can wear their RFID tag on their wrists underneath their clean room "bunny suits". The operator does not have to carry anything, such as a pen and chart or a hand-scanner to record IDs: The RFID system is linked to the manufacturer's host system and database.

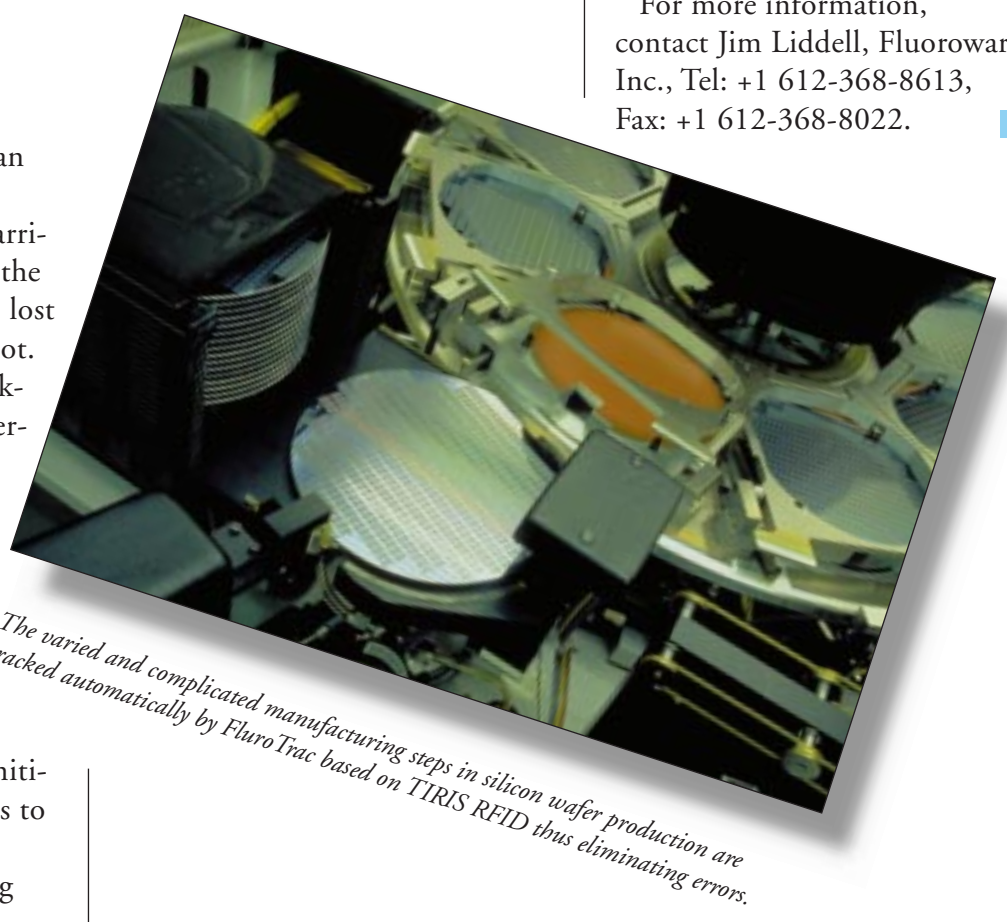
Processes are started when the operator passes his or her wrist over the read area and pushes a button. The system automatically recognizes the unique ID of the operator's wristband tag. If the operator's ID does not match that which is in the host computer system for the wafer carrier's next process, a warning signal emits from the FluoroTrac system. The equipment cannot be started until the correct wafer lot is installed. This protects against errors and miscoded lots. Tags are also attached to carriers, boxes, or transport modules.

Read points are located at output areas of process equipment, storage areas, and transport locations. This provides an infrastructure for total tracking of all wafer lots.

The FluoroTrac system is integrated with the host computer system, so equipment usage is increased. Information on equipment usage is generated by the FluoroTrac system so that management can more easily eliminate bottlenecks and smooth production flows.

Wafer yields are up at plants using the FluoroTrac system. Data is automatically captured and reported, minimizing paperwork and errors and providing substantial return on investment to manufacturers.

For more information, contact Jim Liddell, Fluoroware, Inc., Tel: +1 612-368-8613, Fax: +1 612-368-8022.



The varied and complicated manufacturing steps in silicon wafer production are tracked automatically by FluroTrac based on TIRIS RFID thus eliminating errors.

UK

Keeping Tabs on Coal Conveyor Belt with Tags

At Gascogne Wood, where 220,000 tons of coal are mined every week, the status of the conveyor belt is monitored using RFID transponders. Tags are implanted in the belt every 130 meters near to joints. "Identifying where the belt is in the tunnel at any one time provides us with a better carrying capacity. We constantly examine the conveyor joints for wear and tear, but spotting joints for known damage or belt change can be a time consuming job," said Paul Lowery, engineer. As soon as a problem is spotted the length of belt can be identified and stopped in exactly the right place in the surface repair station," added Lowry.

The solution was designed and installed by Davis Derby, who have achieved all the certifications to integrate TIRIS into hazardous environments.

RFID Can Provide a Defense Against Counterfeiting

by Chris Hook – *TIRIS Strategic Program Manager*

As the boundaries between countries, industries, and economies soften, counterfeiting and other types of fraud increase. The recent discord between the U.S. and China over the rampant counterfeiting of U.S. software and recorded music is just one example of the magnitude of the problem.

Fraud Escalates as Technology Grows

No country escapes the impact of fraud. It was estimated that in 1995 the recorded music industry lost about $2.2 billion in sales revenue through the sale of counterfeit CDs and tapes. In the UK, the Government recently declared annual lost revenue of $1.1 billion from unpaid excise duty on tobacco and spirits. This does not include the huge losses faced by the software industry to counterfeit CDs and floppy disks. Further, the value of a brand's image is diminished if counterfeit goods are known to be in circulation. While this value is rather difficult to quantify, periodically the marketplace makes an adjustment. The less valuable a brand, the less revenue goes to the brand owner.

While not illegal, product manufacturers suffer lost revenue when third parties replicate and sell consumables. By way of example, to maintain an image of high quality and ensure consistent output, the manufacturer of a laser printer also sells quality toner cartridges. To coat-tail onto the OEM's quality image, a third-party manufacturer will retail consumables for less than those of the original manufacturer's. When the consumer switches to the other brand, the original manufacturer loses the ability to ensure consistent, high-quality output - and sees a reduction in sales revenue.

As technology makes it easier for manufacturers to reproduce and distribute, so does it make it easier to counterfeit or replicate. Yet establishing a means of economically identifying a product uniquely and securely as it flows from the manufacturing plant to the consumer's hands is taxing the best minds in the world.

A New Generation RFID is Called For

Ultimately, economics will determine the cost and risk of circumventing any new security device. To provide a really secure means of uniquely identifying a product, the authentication device must be such that replication is put beyond the bounds of technical and financial feasibility, even for organised criminals. For example, an RFID tag contains a data-carrying silicon integrated circuit. To replicate such a device one would need a silicon foundry - a very expensive, complicated proposition.

Besides the need for low cost tags, a system throughout the supply chain must be well-established so that no illegal sales channels can corrupt the system. Fraud-checking operations must be rigorous. When any new technology is introduced into a mature market, such as retailing, it should work seamlessly with existing data management and stock control systems already in place. UPC (Universal Product Code) or other unique product identification codes can be stored in RFID tags, thus satisfying the requirement of easy integration into MIS environments.

Returning to the example of the laser printer manufacturer, an RFID tag can be embedded in the case of the consumable, such as the toner cartridge, which the printer can thereby recognize as an authentic part.

Why is RFID an Answer?

Because RFID tags:

- Are very difficult to replicate.
- Can be applied to products that have no "intelligence" or are never powered.
- Can have an ID mechanism that is completely independent from the product it's attached to or embedded in.
- Can link an attribute of the specific product to data stored in the transponder's memory.
- Can have a form factor that can be embedded in a thin product label.
- Does not require a line-of-sight. A tag can be completely embedded in a non-metallic object, integrated in such a way that if the object was tampered with to extract the tag, the tag would be destroyed.
- Can be programmed during the product manufacturing process, and locked unalterably; further data could be added at a point-of-sale (PoS), which could then act as an "electronic receipt".

RFID industry experts expect this new generation to be available soon. Says Mark David, editor of Automatic ID News, "This breakthrough is most likely to come from a company with extensive experience - and, probably, from a major semiconductor house. When it comes, we will see the major growth of RFID that we've been forecasting for years."

Largest UK Port Automates Several Operations with TIRIS

A major UK roll-on/roll-off dock terminal is using TIRIS for hands-free staff and vehicle access control and fuel management. The system was installed by JMW Systems Ltd at Immingham's Nordic Terminal, a $30 million super-terminal opened in 1985 to handle containerized and unitized cargo.

Immingham Dock and its near neighbor Grimsby Docks together form the largest single foreign trade port in the UK. They handle approximately 45 million tons of cargo per year, mostly on North Sea routes to Holland, Germany and the Nordic countries. Over 6 million tons of this trade is unitized cargo.

Continued on page 8

Port employee has hands-free access to dock facilities with TIRIS badge.

Tracking Terminal Equipment

In one application, TIRIS controls and monitors the movement of terminal vehicles each day. Transponders are mounted on vehicles such as tugs and fork lifts, and readers are placed strategically around the dock area to identify them. The vehicle transponders activate barriers that permit access to loading and other dock areas. The system accelerates handling times by automatically operating the barriers as the vehicles approach. Approximately 1,000 trailers and 50 container tugs are equipped with transponders. The trailers are used to carry the containers around the site.

Personnel Access

ID badges for 200 staff members provide hands-free access to offices and other areas on the site.

Automatic Fuel Management

TIRIS readers are attached to the fuel dispensing nozzles at the vehicle refueling station as part of a sophisticated fuel management system that only dispenses fuel to authorized vehicles, and also tracks fuel usage per vehicle.

If for any reason the nozzle is withdrawn from the vehicle during fueling, the pump is automatically cut off eliminating misuse or theft of fuel.

RFID tag mounted on truck activates barriers to permit access to loading and other dock areas.

TIRIS also manages what type of fuel the vehicles require, preventing vehicles from drawing the incorrect fuel type.

Unobtrusive and Expandable

According to John Phillips, Terminal Manager for Nordic Terminal Ltd at Immingham, the dock management system has opened up many new possibilities for improving operations. "As with any restricted site, it is important to control access but without hindering vehicles or staff," he said. "And with TIRIS technology we have been able to solve several problems using essentially a single approach for staff and vehicle control as well as fuel management. Once the transponders are in place, it is relatively simple to add new identification applications as they are required simply by placing readers where we need to gather information or provide access control."

Published Report Lauds RFID Shopping Cart/Trolley Tracking Systems

When British supermarkets installed Tigris Trolley Trak in their stores two years ago, they knew that the TIRIS-based tracking system would help prevent theft and costly "walkouts." What they didn't realize was just how many other benefits such a system could provide.

According to a technology report issued recently by British research firm Kleinwort Benson, RFID systems can also pare security costs, increase store efficiency, and even let store managers know when it's time to open a new checkout line.

Entitled "Techno Upside," the report described several RFID systems designed by Secure Solutions Ltd. Most of the U.K.'s largest food retailers are currently testing these systems, including Asda, Morrisons, Safeway, Sainsbury and Tesco.

Secure Solutions designed its systems in response to the increasing problem of "walkouts" - customers filling up their shopping carts with expensive goods and then simply walking out of the store without paying. The Kleinwort Benson report estimated that a supermarket could realize annual savings of $100,000 or more by curbing theft and simplifying security measures with systems like Trolley Trak.

Trolley Trak can also be linked to a checkout management system to predict the formation of lines at the checkout counters and, subsequently, help maintain the most cost-effective staffing levels. An important benefit singled out inefficient checkout management as a leading culprit in store-level revenue loss.

Since Trolley Trak automatically logs the movement of carts in and out of the building, it is simple to calculate the number of in-store shoppers at any time. Depending on how many customers are in the store, checkout staff can either be added, or reassigned to alternate tasks.

This gives management greater flexibility in terms of staffing, placing a premium on multi-skilled employees who can shift from task to task with relative ease. Ultimately, fewer cashiers are required, thereby reducing labor costs.

"As the initial cost of these schemes is relatively small, we anticipate that schemes such as Tigris (Trolley Trak) will be implemented in the short term and provide fast payback," Kleinwort Benson concluded.

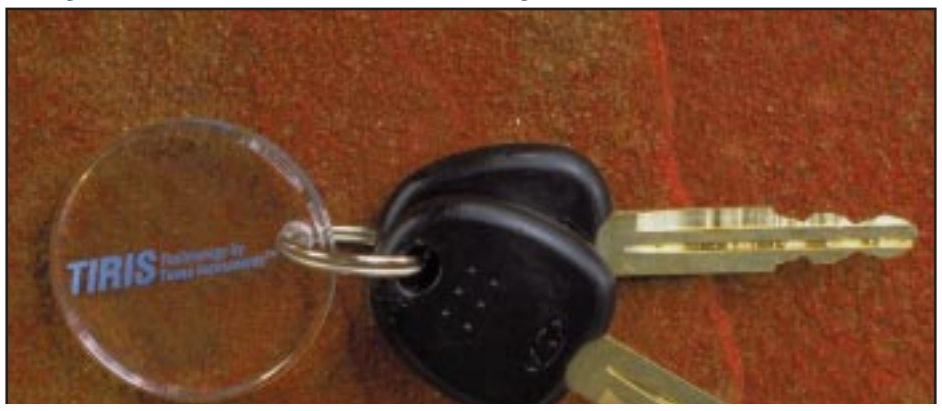
For more information, contact: Tel: +44 1925 444 835.

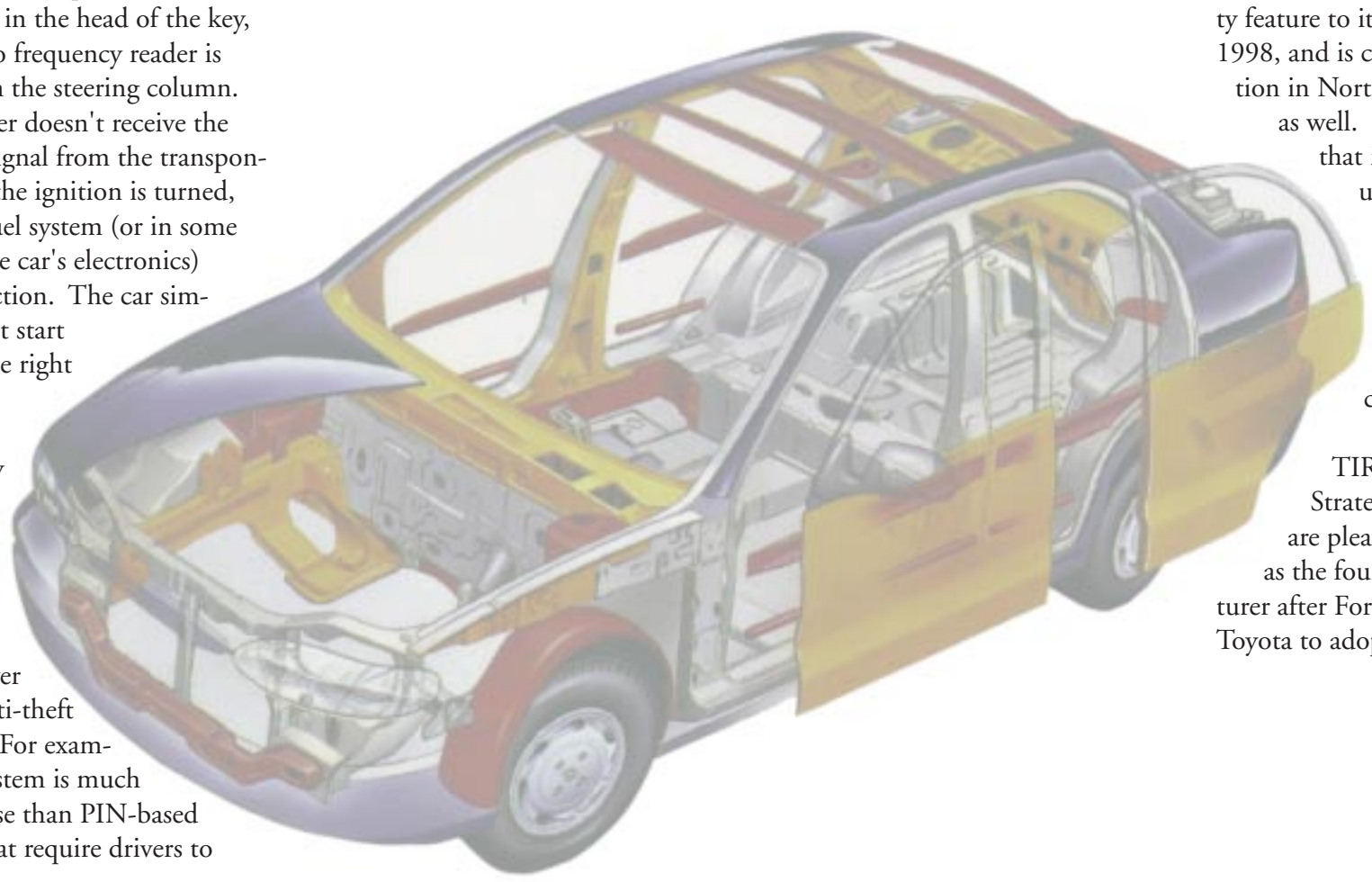
Hyundai Adds Anti-theft System to European Models

Hyundai recently joined the growing ranks of car manufacturers who have turned to TIRIS to prevent car theft. The Korean automobile manufacturer introduced the immobilizer system to its highend European exports. Now, the system is part of the standard package found on all Hyundai models shipped to Europe.

The system uses a TIRIS read-only transponder made of shock resistant plastic. The transponder containing a unique code is embedded in the head of the key, and a radio frequency reader is installed in the steering column. If the reader doesn't receive the expected signal from the transponder when the ignition is turned, the car's fuel system (or in some models, the car's electronics) won't function. The car simply will not start without the right key.

TIRIS technology adds a greater level of theft protection to vehicles over current anti-theft methods. For example, the system is much easier to use than PIN-based systems that require drivers to remember and punch in a code. Unlike infrared systems, the technology cannot be overridden. In addition, the use of passive, or battery-free, radio frequency technology eliminates the normal wear-





pany in 1995 have relevance in other countries as well:

- Cars with electric immobilizers (aftermarket-type) have a theft rate 5 to 10 times lower than cars with no immobilizer.
- Cars with electronically coded immobilizers (TIRIS-type) have a theft rate 10 times lower than cars with other immobilizers.

Discreet and reliable, the immobilizer has been well received by consumers, many of whom now consider it essential.

Hyundai plans to add the security feature to its domestic line in 1998, and is considering installation in North American exports as well. Projections suggest that if Hyundai continues with its plans, the TIRIS technology could be seen in an additional 400,000 vehicles by the end of the century.

Said Tony Sabetti, TIRIS Automotive Strategy Manager, "We are pleased to have Hyundai as the fourth major manufacturer after Ford, Mitsubishi and Toyota to adopt TIRIS."

Texas Instrument's RFID Group Poised to Capitalize on Semiconductor Division's ISO 9001 Coup

In the wake of the recent enterprise-wide ISO 9001 certification granted to Texas Instrument's Semiconductor Division, TI's TIRIS radio frequency ID (RFID) technology has quietly gained the ammunition to raise industry quality standards to a new level.

When TI established its RFID group in 1991, the industry received an immediate infusion of credibility. TI was the largest, and most formidable, company to hang its shingle in the RFID market. Five years later, TI continues to be an industry leader, largely due to its product innovations, commitment to quality, strategic business alliances and solid global infrastructure.

Currently, the RFID industry is dominated by a core contingent of companies that includes TI, Philips Mikron and Motorola Indala. Each is backed by an in-house semiconductor manufacturing unit capable of delivering chips that operate in perfect harmony with their respective RFID components. However, TI's TIRIS line now has added leverage becoming one of the first to integrate chips from an ISO-recognized source. "Our customers deserve and expect consistently high quality in our products," said Dave Slinger, worldwide TIRIS manager. "As a singular company, Texas Instruments has proceeded to take the precautions necessary to ensure that every component of every internally manufactured product meets established performance criteria."

In order to gain the prestigious enterprise-wide stamp of approval from the International Standards Organization (ISO), TI's Semiconductor Group had to submit to a series of rigorous audits. Through this investigative process, TI had to provide proof that appropriate quality-assurance guidelines were in place, that the guidelines were documented, and that there was strict adherence to mandated policy.

The Geneva, Switzerland-based ISO first published its set of three international standards on quality management and assurance in 1987. Over the years, the significance of obtaining ISO certification has grown to the point where it is now required to conduct business within the European Union realm.

Beyond the ISO 9001 distinction, TI has won the Deming Prize (TI Japan), the European Quality Award (TI Europe) and the Malcolm Baldrige Award (TI Defense Systems Group).

CHINA

China's Foshan City Uses TIRIS for Toll Collection

China's booming population and go-go economy are stretching the capacity of existing highways and bridges. A major city in the densely populated southern province of Guangdong, Foshan is in the heart of the famed Pearl River Delta, and just a short boat-ride from Hong Kong. The evidence that increased commerce requires increased mobility is quite apparent when driving on Foshan's highways: Trucks, cars, motorcycles, bicycles, and even people vie for the use of the same roadways. Add to this mayhem the many bridges in Foshan that act as traffic bottlenecks.

To impose sanity and increase vehicular throughput, Foshan city officials installed 23 TIRIS AVI systems for electronic toll collection (ETC) in 1996. TIRIS and partner -systems integrator MFS Network Technologies expects to install at least 17 more systems in Foshan by the end of 1997.

Because vehicles can be read in less than .5 millisecond with an accuracy rate of 99.95 at 150 mph, this high frequency RFID application is ideal for the non-stop congested traffic flow characteristic of Foshan toll roads. The success of the TIRIS systems is apparent when the number of installations is compared with the original plan to install only 18 systems. In addition to the existing 5,000 installed subscriber base, 20,000 more transponders have been ordered.

Electronic toll collection system reduces congestion at busy toll booths.

E.Z. Tech (U.S.) International Ltd., an American-based international engineering firm, evaluated six systems for Foshan officials. The TIRIS 915 MHz AVI system was chosen after extensive field testing with 3,000 subscribers. According to E.Z. Tech Marketing Manager John Tang, "Four of the six RFID systems simply had too many problems to warrant setting them up. Of the remaining two, the TIRIS system was by far the best solution for providing reliable, dependable reads."

Nevertheless, installing has not been the easiest task. The potential for cross-reads, double reads and signal interference is high in Foshan for several reasons. First, the ETC systems were installed in existing toll lanes, which provide a very narrow read area. Second, congestion, especially at the toll booths, is always high. Third, towers for transmitting cellular phone calls are relatively close. Finally, at several sites systems are hung beneath metal canopies that deflect and bounce RFID signals. TIRIS technicians found ways to work around all these obstacles.

Another difficulty in installation is that traffic gridlocks are created quickly. So quickly that highway officials decreed the roads cannot be shut down-not even for testing installations. Constant high temperatures and humidity further complicate installation and test the robustness of the equipment.

The TIRIS 915 MHz AVI system was chosen for these China projects after extensive testing and comparison to other available systems.

A transponder installed in each vehicle is read by an overhead antenna from a range of 20 feet or more when the vehicle passes under the antenna. The toll charge is automatically deducted as the vehicle passes under the TIRIS antenna. The read/write transponders are reprogrammable so that a subscriber's account can be adjusted with new deposits. The system uses a simple traffic light to inform travelers of their account status: green for a healthy account balance, yellow for an account with a low balance, and red for a negative balance.

Two of the biggest industrial cities in China are Shanghai and Guangzhou. In Shanghai, two TIRIS-based ETC systems were recently installed and are currently undergoing extensive testing and evaluation.

Another two demo systems that are being installed in Guangzhou are similar to those installed on California's SR91 automated toll collection highway. Unlike the Foshan and Shanghai projects, the tolls collected from the Guangzhou trial are from vehicles on an open highway traveling at high speeds.

With the installation of these and other TIRIS-MFS Network Technologies systems, China has a firm grip on improving its highway infrastructure to allow its booming economy unheeded access to the marketplace.

For more information, please contact, Bill Spurgeon, TIRIS, (972) 917-1483.

USA

Raytheon Integrates TIRIS For Personal Rapid Transit System

High tech pioneer Raytheon Company, typically associated with the U.S. Defense Department, just recently unveiled yet another example of how its innovations are clearly not limited to military application.

Raytheon, in a collaborative effort with the Northeastern Illinois Regional Transportation Authority (RTA), has developed what many surmise to be the future of public transportation, the Personal Rapid Transit (PRT) 2000.

Raytheon now boasts a fully operational PRT 2000 guideway at its Marlborough, Mass., facility. Designed to provide on-demand, 24-hour, non-stop, origin-to-destination service, the PRT 2000 differs markedly from earlier PRT incarnations and all other current modes of transportation.

The climate-controlled, electronically powered cars each move independently along the guideway, shuttling up to four passengers per trip at a maximum speed of 30 miles per hour. A position locating system, which uses TIRIS technology, allows each car to be self-directed by tracking its own coordinates.

Mounted on the guideway at regular intervals are TIRIS read-only, transponders. Two TIRIS reader units, one a back-up, are located in the computer console of each car. Hooked to the readers are Raytheon-designed antennas. These long, durable antennas are secured to the car's undercarriage, where they run parallel to the guideway and within read-range of the transponders. As a car travels along the guideway, its reader unit gathers the transponders' codes and relays them to an on-board computer. Using a guideway map, the computer is then able to match codes to precise transponder locations and verify the car's position.

The first PRT 2000 installation is on the horizon. Raytheon, the RTA and the village of Rosemont, Ill. have reached an agreement to integrate a PRT system into Rosemont's existing transportation infrastructure.

New Side-Mount Antenna for Outdoor Environments

The side-mount antenna (ANT-G04E) has been designed to be visually light yet structurally strong and resilient. It works very well in combination with the slimline windshield-mount tag for vehicle access applications where the resulting read range can reach five feet. It can be either mounted to a wall or attached to a freestanding pole.

GO4E side-mount antenna is ideal for parking access systems.

The antenna measures approximately 1.6 feet wide by 3 feet tall, and is made from environmentally safe plastic. It has an added swing-away feature in the event that it is impacted by a vehicle.

Cable connections can be accessed through a rear "knockout" to allow direct routing into a mounting pole or through a wall. It has a hatch into which to fit the antenna tuning box that works in conjunction with the remote antenna RF Reader.

RESELLERS ADD VALUE

Access Control Reader Offered in Three Different Models

Sunion Enterprise Corporation of Taiwan has developed three TIRIS-based reader models for personnel access control systems. The readers have a built-in antenna, a numeric keypad, an IR sensor to wake up the reader when someone approaches multi-drop communication capability, plus more.

The three models are: DS-1000, DS-2000, and DS-3000. The first model is a stand-alone reader with 2K bytes of memory and can support up to 200 users.

The DS-2000 can be part of a multi-reader system that can include up to 248 readers linked together. Both the DS-2000 and DS-3000 have 128K bytes of memory.

For more information, contact Teddy Fu, Sunion, Tel: +886-2-7609688, Fax: +886-2-7467290.

Installation Made Easier with Remote Antenna RFID Reader

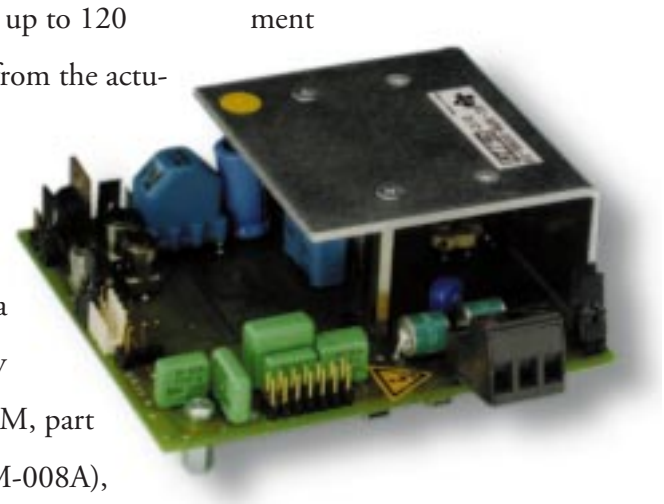
TIRIS recently introduced a radio frequency ID module that allows reader equipment to be positioned up to 120 meters (400 ft) from the actual readout antenna. With the TIRIS Remote Antenna Radio Frequency Module (RA RFM, part number RI-RFM-008A), readers can be safely protected in a climate controlled area while antennas are located remotely in harsh application environments. As a result, applications in all markets can be performed with greater ease and flexibility.

Antenna tuning box located at readout antenna.

A four-channel multiplexer for use in conjunction with the RA RFM is also available. The multiplexer allows up to four antennas and tuning boxes to be connected to each RA RFM. Multiplexers are a cost effective solution for installations with multiple read points.

The RA RFM system does not require special cable, so standard off-the-shelf cable (twinax), known as the feeder cable, can be used. Installations can have multiple feeder cables in one conduit.

Multiple readers can be placed in the same equipment cabinet in an installation. Placing all readers in a single enclosure requires only one power outlet and saves money on power supplies and enclosures. Servicing the system is easy since all of the equipment is stored in one spot. The RA RFM also allows reader equipment to be stored close to the host computer, which keeps the data cable short.



Remote Antenna RFM (RI-RFM-008A).

The RA RFM supports from low to high antenna inductance levels, which provides flexibility in custom antenna design, particularly when developing large, in-ground loops. Also, each antenna can be at a different inductance level when the multiplexer is used. Another advantage is that the TIRIS system can be completely transparent at the antenna site since the reader is located remotely. The system Antenna Tuning-Box does not require A.C. or D.C. power, so no power supply is needed at the antenna location.

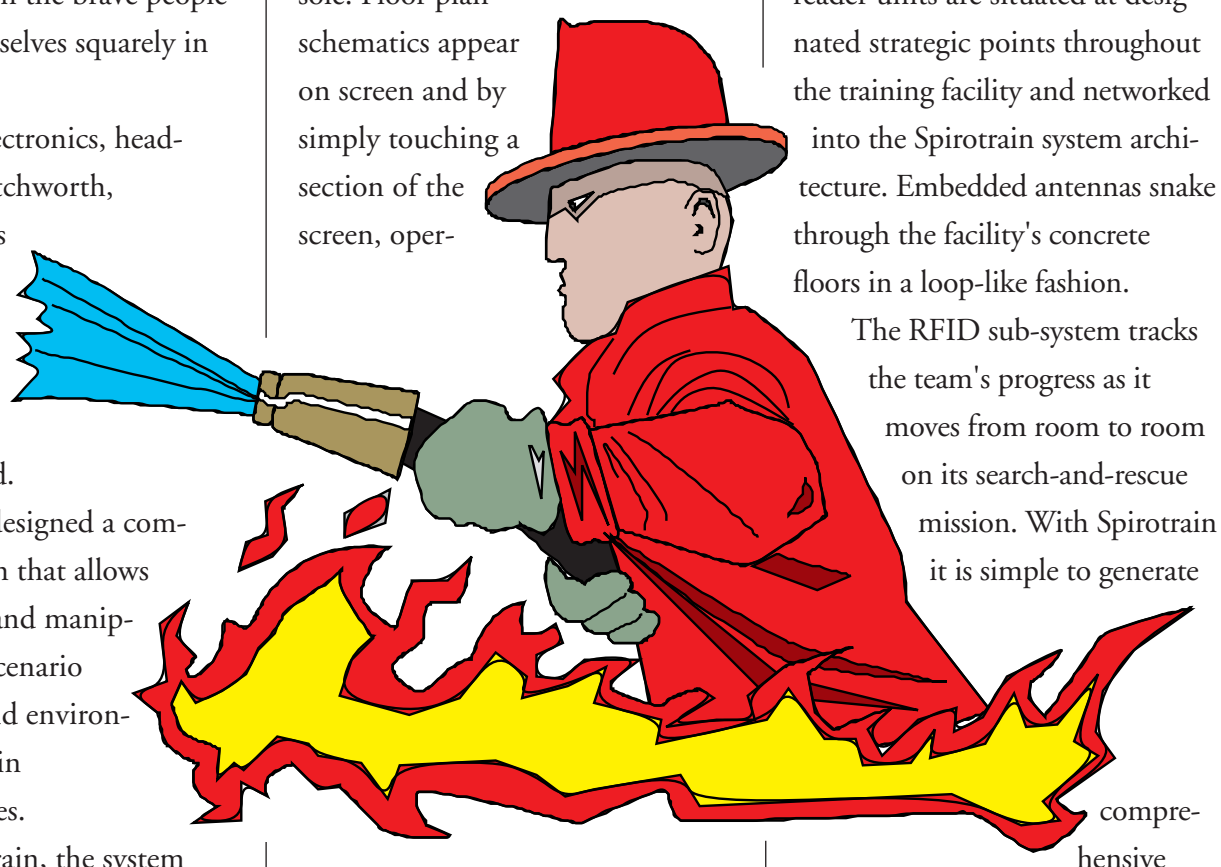
Applications seemed impossible can now be performed with ease and take advantage of the benefits of RFID technology.

UK

Leading-Edge Firefighter Training

Fighting fires is a dangerous and difficult proposition, but technology is making it safer and easier than ever to train the brave people who place themselves squarely in harm's way.

Threshold Electronics, headquartered in Letchworth, Hertfordshire, is one company revolutionizing the way firefighter training is conducted. Threshold has designed a computerized system that allows the simulation and manipulation of fire-scenario sound effects and environmental hazards in training facilities.



Called Spirotrain, the system also integrates two-way audio communications, real-time and time-lapse video recording, thermal imaging and a TIRIS RFID sub-system that tracks virtually every step made by trainees during exercises.

A touch-sensitive Super VGA monitor allows operators to control the system from a remote console. Floor plan schematics appear on screen and by simply touching a section of the screen, operators are presented with corresponding options such as: zoom in, create/modify drills, reset special effects, and even observe trainee progress through a given room.

During exercises, trainees are paired together, with one member wearing a transponder-equipped ankle bracelet. Up to 30 TIRIS reader units are situated at designated strategic points throughout the training facility and networked into the Spirotrain system architecture. Embedded antennas snake through the facility's concrete floors in a loop-like fashion.

The RFID sub-system tracks the team's progress as it moves from room to room on its search-and-rescue mission. With Spirotrain it is simple to generate comprehensive reports for post-exercise debriefing sessions and trainee evaluation.

Spirotrain is marketed in the U.K. by Interspiro Ltd. There are currently five training facilities in the U.K. using it.

SWEDEN

Money Transport Company Uses TIRIS to Secure Deposit Transactions

Sambox Norrkoping is a money collecting agency jointly owned by a number of Swedish banks. It receives after-hour cash deposits from clients, such as retailers. Sambox counts, safeguards, and delivers these deposits to its clients' banks. The traditional process was manual with records kept on paper. With the help of system integrator, CS Dataprodukter AB, Sambox devised a more secure solution based on RFID.

Each money bag contains a TIRIS disk transponder that is read by an antenna located in the deposit machine. When the ID is authorized, the money drawer unlocks and opens. The client drops the bag in where another antenna reads the ID tag again and finally a receipt is printed. The machine also dispenses a new ID tag for the next deposit.

The new system heightens security throughout the process by eliminating many areas in which errors can be made either by accident or on purpose.

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