

Making
RFID work
for you

An Industry Roundtable

Hosted by Texas Instruments
at NACS-Tech '98

Open Forum

TIRIS Technology by
Texas Instruments™

The retail refueling and convenience store industry recently gathered at NACS-Tech'98 to explore new strategies to prepare for the turn of the century. As part of that exchange, retailers and their technology partners joined Texas Instruments for a discussion on radio frequency identification (RFID) payment systems and their impact on the future of retailing.

Moderated by Tom Agan of Kurt Salmon Associates, the roundtable was comprised of leading industry journalists including Pete Hisey of Credit Card News, John Callanan from the Journal of Petroleum Marketing, Jay Gordon of Convenience Store Decisions, and Kally Fraser representing Petroleum Equipment & Technology. Responding to their questions were Rick Ellison of Mobil Corporation, Robert Randelman from Verifone, and Joe Pearson of Texas Instruments.

The results raised some interesting questions, presented some new challenges and helped illuminate how RFID technology will contribute to the changing role of retailing.

Session Moderator



Tom Agan
Principal
Kurt Salmon
Associates

Industry Panelists



Rick Ellison
*Marketing, pricing
and technology
manager*
Mobil Corporation

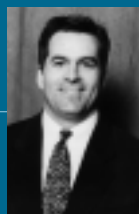


Joe Pearson
*Retail program
manager*
Texas Instruments



**Robert
Randelman**
*Director of marketing
and business
development*
Verifone

Media Panelists



John Callanan
Publisher
Journal of
Petroleum Marketing



Kally Fraser
Editor-in-chief
Petroleum Equipment
& Technology



Jay Gordon
Editor
Convenience Store
Decisions



Pete Hisey
Editor
Credit Card News

Introduction

Just last year radio frequency identification (RFID) technology burst onto the retailing scene, offering customers a faster and more convenient way to purchase gasoline — and giving retailers a new tool to build customer loyalty, drive market share and boost revenues.

Today, more than a million consumers at 2,500 service stations nationwide are using TIRIS™ RFID technology from Texas Instruments to “gas-and-go.” This technology standard is now available from major dispenser manufacturers. And oil companies both here in the U.S. and Europe are conducting field trials that promise to accelerate the industry adoption of this new and powerful retailing tool.

So where is this technology taking us? What kind of innovative consumer services are on the horizon? How will the retail gas and convenience store industry harness RFID to create customer loyalty and expand market share? What impact will a new in-store RFID POS reader, available later this year, have on joint gas and convenience store sales? And what kind of cross-marketing, cross-industry benefits will accrue as consumers come to rely on a single, hands-free automatic payment system?

These are some of the issues that a recent roundtable session at NACS-Tech in Chicago addressed. The following pages summarize this exchange, answer many questions about the technology, discuss standardization across the industry, and forecast the impact of new RFID in-store payment systems. The session challenged some conventional thinking and raised new and interesting questions. We hope you enjoy this thought provoking look at the future of retailing.

Tony Sabetti
Texas Instruments

Prologue

RFID in the battle for your customer

Tom Agan, principal

Kurt Salmon Associates

World War III is underway in convenience store retailing. From WaWa's now selling gasoline to the new free-standing CVS drugstores on the corner across from your petrol c-store. New Star Marts in Bangkok now offer greater product assortment and Quix-Mobils in Australia are selling hundreds of "grilla" dogs per week. From the Tesco's in the UK selling gasoline to the Shells in Holland selling groceries, new retail battles are charging forward in c-stores worldwide.

Thirty years ago, reasonable gas prices, a quick wash of your windshield, a check of your oil, and maybe a free drinking glass was all it took to be a leading edge gas station. Back then capital investment was low, operators were mom and pop, the sites were small, the stores were nonexistent, and the gasoline brand reigned supreme.

Today it takes so much just to keep up, and even more to succeed in this environment. The gasoline brands coexist, often times uneasily, with supermarkets, fast food chains, dry-cleaners, banks, bakeries and even video stores. The business is no longer about pumping gasoline alone. It's about offering a compelling mix of food, general merchandise and services in addition to gasoline.

Why are we at war? It's because the consumer wants to spend their dollars on the corner closest to where they live and work.

The first factor driving this war, fueling the flames so to speak, is time poverty. The expansion of dual income households, as well as single income and single parent households means that people simply do not have as much free time as they used to. Our consulting firm's research consistently shows that year in, year out, people are spending less time shopping and less time cooking. That's driving them to the corner to do their shopping and to buy their fast food.

A second factor fueling this warfare in c-stores is greater congestion in urban areas. People simply don't want to drive as far to do their shopping. Thirdly, and the factor driving the host of new entrants into this industry, is a mature, slow-growth retail environment. Retailers once content to remain separate from petrol are now

The consumer wants to spend
their dollars on the corner closest
to where they live and work.

seeking to embrace it in a struggle to regain revenue growth.

CVS drug stores, which I mentioned earlier is building free-standing stores next to petrol c-stores, offer a larger product assortment than the petrol c-store, and with more service. So how long do you think it will be before CVS installs gasoline pumps?

The response from the petrol-based c-store industry is a global retail technology arms race. From EPOS to pay-at-the-pump, from bigger stores to category management, from buying out independents and offering an ever widening assortment of food, merchandise and services — everyone is investing in new weapons to keep up and hopefully gain the advantage.

What makes for a good weapon in this arms race? First, it must deliver a real tangible benefit to both the consumer and to the retailer. Second, it has to be practical. It must be cost effective, it has to be implementable and it must be sustainable.



NAC attendees listen to an
overview on new RFID technology.

The latest weapon in the c-store war, RFID technology, can capture credit card transactions at the pump and may soon be inside of your store.

RFID clearly shows promise. Mobil, prior to today, has made public that they are experiencing increased customer visits because of RF. My own admittedly nonscientific discussions with friends, colleagues and people on the street indicate that they too like RF, whether it's zipping through a toll plaza on the way to work or buying gas.

While this is an established technology, applications that we are discussing here today are relatively new. Among the issues that are coming to light surrounding RFID at the pump: What is the reaction of consumers? What are the cost benefits and ROI of the system? What's the impact on the competition?

Taking a step further into the store, should this technology be unleashed to include in-store transactions? Will it require some form of supplemental authentication? If not, then can fraud be managed to an acceptable level? What is the potential for one device to be used for different retailers? Does this diminish or enhance the value of the technology for the individual retailer?

And what is the future of this technology? What enhancements are expected? Will upgrades be backward compatible with existing installations?

These are all worthy questions. They are issues that must be addressed and resolved as RFID technology moves forward. Regardless of the outcome, the underlying trend remains the same. The c-store industry will continue to seek out and adopt new technologies and processes that are economically justified and that will add to their arsenal of retail weaponry.

RFID

automated
payment—
one year later

Mr. Agan Joe, to what degree has RF penetrated the c-store industry in the last six months, and how much further do you think that penetration will go in the next six months?

Mr. Pearson Simply put, automatic refueling has been the fastest growing and largest consumer application of RFID in history. Within the last ten months, more than one million consumers are now experiencing the benefit of hands-free automatic payment at the pump. According to analyst reports, that's three times the number of smart cards in use today. In only ten months this technology is giving retailers a new relationship with their customers and building new brand loyalty. We believe with more than a million customers using RFID tags at more than 2,500 retail sites that a market standard is emerging. At TI we're committed to serving this market.

What's new about this RFID application is the ability to accurately identify the vehicle and a person as they come into a multi-dispenser court and to make sure you're always giving the customer what they expect — easy and accurate payment.

Where is it headed? The next step for this application we see is the move from the pump to inside the convenience store. With the benefits of speed and convenience, RFID payment and loyalty systems will create traffic for c-store and other indoor and drive-thru retail settings.

Mr. Agan Rick, do you want to comment about where you see this going in the next couple months, six months even?

Mr. Ellison Well, let me first talk about the benefits and why we got into RFID. Our top customer priority is the need for speed and convenience. Our research indicates there's an opportunity to make the purchase transaction easier, faster and magical to the consumer. RFID technology really gives us the opportunity to do that. We're happy with where we've seen it go. Our drive over the next couple of months, and even into the next year, is increasing the number of locations that have RFID capacity, as well as the number of transponders out there in the market.

We think RFID is a loyalty builder. We think it's a brand builder. We think it's

It's something that helps differentiate us
in a very strategic area—
consumer speed and convenience.

Mr. Ellison *continued* something that helps differentiate us in a very strategic area — consumer speed and convenience.

Mr. Callanan Have you done any research or tracked any information as to who the typical RFID customer is? Do they skew more toward the frequent fueler?

Mr. Ellison We do a lot of customer segmentation studies to understand what our customers' needs are. Across the board the thing that comes out is the ease of use. It scores very high in terms of value. We're very happy with the results that we've seen regarding ease of use.



The audience included oil company and convenience store representatives.

Mr. Gordon I'm wondering, now that RF is still in the competitive advantage stage, does it allow you to be a high-end retailer price-wise?

Mr. Ellison Pricing is a brand issue. It's not one particular thing versus another. It's how the customer views you and what your total value is. The market and franchises determine what the retail price is.

Mr. Callanan I guess an obvious question is, how much does it cost? And then maybe Rick, if you could talk a little bit about return on the investment.

Mr. Pearson Well, I can talk from the technology perspective. We provide RF tags directly to the oil company, and reader systems through leading dispenser manufacturers like Gilbarco and Wayne Dresser. The vehicle tag, which is a new technology specific for this application, is under \$15 and the key ring is under \$5.

Mr. Callanan What about the equipment on the site in terms of what has to go into the dispenser?

Mr. Ellison A typical four pump location is in the \$14,000 range from an installation standpoint. On an overall basis we've been very pleasantly surprised by the customer response and with the amount of media attention. It's been a good hit. So in terms of the overall look at things, it's exceeded our expectations.

This technology is giving retailers a new relationship
with their customers and building new brand loyalty.

Building a standard

Mr. Callanan Do you see an opportunity to have RFID available across multiple brands in addition to multiple types of retail? I know it's a customer loyalty driven item right now, but is that something that may go away at some point?

Mr. Randelman I think when you look at any technology advancement in our marketplace, there's a period of time where it's a competitive advantage. Think of pay-at-the-pump back in '89 and '90. Pay-at-the-pump was a tremendous competitive advantage. It then became kind of a competitive necessity. Now it's a competitive standard. And I think you'll see the same thing from RF.

Folks really need to think through "What's my business advantage here?," "What am I going to get out of it?," "What are my goals?" Mobil's done a terrific job bringing in new technology and providing quick and easy service to the customer.

Mr. Ellison Just to add to Rob's point, at the end of it all it's the customer who will drive this. If they're saying that "hey, we want things to be easier, we want more cross usage with this thing," then that's going to drive the decisions in the end.

Ms. Fraser Would you tell us a little bit about the standardization efforts that are going on now?

Mr. Pearson Well, TI has been involved with standard committees for RFID since we went into this business. But to take a single standard for a particular industry and say "Okay, this is the standard," really isn't practical. It's somewhat limiting because there's going to be future applications, future developments.

It's not a simple matter of saying, "Okay, this is our data format," or "This is how bar codes should be lined up." You're talking about technologies that are always emerging and new developments that are always happening.

The key question is what technology can serve the business case and meet the requirements of the application? Our experience tells us that RFID standards

**What technology can serve the business case and meet
the requirements of the application?**

**Mobil's done a terrific job bringing
in new technology and providing quick
and easy service to the customer.**

Mr. Pearson evolve when a particular technology meets the requirements of a business application.
continued With TI's key ring and vehicle transponders proven at more than 2,500 retail sites, we think that this is where the emerging retail RFID standard is going to be found.

Ms. Fraser Are there any challenges in terms of the frequency, for instance in Europe, that you're facing at all?

Mr. Pearson The laws about what frequencies are available for different applications vary from country to country, as you know. The very low frequencies that TIRIS uses for key rings are usable everywhere. To meet the tough requirements for a reliable vehicle tag, TI combined low and high frequencies into one tag in a patented approach that works great. The high frequency is in the 900 MHz range which is endorsed for vehicle applications in North America. For European installations, we have brought our high frequency signal down to the 868 MHz range for vehicle applications in those countries.

As you know, Shell in Europe is piloting TIRIS technology. When they get ready to deploy, they will use the new TIRIS ETSI transponder.

Mr. Callanan Do you all foresee the auto manufacturers weighing in at some point on this with a built-in transponder or something?

Mr. Pearson Yes, part of TI's strategic intent is to be integrated into vehicle platforms. Worldwide more than 16 million vehicles use TIRIS technology for parking access, security and logistics. In fact, the key ring tag we use for refueling applications comes from our work with automobile anti-theft systems for companies like Ford, Chrysler and Toyota. We're working on that front with our partners in the auto industry. We're also working with factory-installed and after-market products that will connect our automatic refueling technology with remote door openers and home security systems. It's all one seamless integration.

Ms. Fraser As other oil companies adopt what you have at TI, will it all be in the same transponder? If, for instance, I want to go to Mobil one day and I want to go to another gas station another day, can I use the same transponder in the future?

Mr. Pearson From a technology perspective, absolutely, but ultimately that will be driven by the industry. From a business perspective, you have to look at how it might eventually be used between competitors. Our goal is to become the de facto standard. If that's a requirement to meet industry needs, we'll make that happen.

From the pump to the c-stores

Mr. Gordon Can we talk about how to transition this technology from the pump to inside the store, where we're going with that?

Mr. Ellison Yes, we are looking at that. A lot of what we're doing at this point came out of the research from the gasoline purchase side. Do you pick up speed if RFID is inside? That's going to be our first step really. We also will be working with folks on how to integrate RFID into the point-of-sale system.

Ms. Fraser If I have a transponder, an RFID transponder in my car, what is my impetus to go into the store? I can understand it in terms of the key ring, but not as much in terms of it being located in the car.

Mr. Pearson When credit cards at the pump were first introduced there was the same kind of argument. What you find is that people who want to drive up and get gas quickly are going to do that regardless of the payment method.

The bottom line is empowering people to come into your station to do what they want to do — whether they simply drive up, fuel and drive away, or if they go inside with a key ring transponder to make a purchase. For both retail fueling and for other retail and service applications, we see a lot of value in having both a vehicle and hand-held RFID key ring.

Mr. Randelman I think Joe's on target. Part of it is very similar to ATMs. Originally when ATMs first came out, you couldn't use your ATM card in the store. But now ATM card transactions are available through most of our pin pads just about everywhere.

I think you'll see the same kind of events happening in RFID technology as it catches on. As RFID-equipped customers want to make transactions in stores, there will be technologies to make that happen. Certain frequencies are a lot easier to implement in the store than others because of FCC issues and things like that. But if the business driver is big enough, you can surmount those. The worst frequency problem you have is a CRT. We handle that all the time.

**The bottom line is empowering people
to come into your station.**

Mr. Callanan Are there any specific challenges to putting the system in the store versus outside at the dispensers? Do you need other frequencies within the store with other peripherals?

Mr. Pearson From a technology perspective, it's actually easier to install an RFID reader inside.

Mr. Gordon Why is that?

Mr. Pearson Because, the hand-held technology used in a store is a standard technology. And whether it's an in-store reader for a c-store or for other service-related applications, we're very experienced with that type of product. It still needs to be integrated into a POS terminal, but from the RFID technology perspective, it's pretty straightforward.

Mr. Callanan Can you offer any specifics as to how RFID reading will physically be done in the store? Will there be another Verifone unit on the counter?

Mr. Randelman My guess is it's going to look very similar to the pin pad with a "sled" underneath it. You'll have the same pad functionality as you have on the pin pad. It might tie in the same way. Customers readily accept the pin pad as a device for customer entry. In fact they keep the credit card in their hands and don't give it to the clerk. So it becomes a customer entry device.

Mr. Gordon Joe, can you address some of the site characteristics? You mentioned doing it inside is a lot easier than doing it outside. What are some of the site characteristics that would affect operation systems at the pump?

Mr. Pearson Our design process involved working closely with Wayne Dresser, Mobil and other industry players to capture all their "care-about's." Called quality function deployment, this process looks at all kinds of requirements and environmental characteristics from geographic variations in weather and creating precise read zones based on driving patterns, to eliminating interference from pump motors, fluorescent lights, even cell phones. When we rolled out the vehicle tag in more than 20 markets across the country, it worked like a champ because of the rigorous predesign efforts that went into it.

**As RFID-equipped customers want to make
transactions in store, there will be technologies
to make that happen.**

The RFID, credit card and smart card mix

Mr. Hisey I'd like to follow up and maybe look a little further into the future. From the credit card industry's perspective, the major issue is how do we penetrate cash? In what ways is RFID going to change our computer credit card? We're already looking at smart cards coming in. But I can see a lot of things like self-checkout where RFID would give you a big competitive advantage and would eat into that cash market.

Mr. Pearson In all of our engagements with the major credit card companies so far, they've expressed a real excitement about RFID, especially if they can capture some of the cash transactions that exist in traditional restaurants or other retail cash settings. How fast that will go really depends on how quick and how obvious the business case is. Within a year we'll see several pilots using RFID, either in cooperation with credit card companies and retailers, or simply by retailers taking the initiative to evaluate RFID.

Mr. Hisey What did the card companies see as their basic plus? Getting the cash is good, but is this going to make that card more valuable to the consumer and easier to use? Is it strictly a loyalty thing? Where do they like this technology?

Mr. Randelman Pete, I think you're exactly on target. Unless you provide a value proposition for the consumer, once you get over the ease of use, then it becomes "What else can I do?" If I provide a strong enough value proposition, it's going to replace other forms of payment. As a lot of us know in the industry, the cash customer is extremely fickle. There's a lot of reasons why they use cash. It might be that they went to their own bank, or it may be they like the anonymity of nobody knowing who they are. It may be the simple fact that dropping a ten spot on the counter is a lot quicker than doing anything else.

Mr. Hisey Could I follow on that? Looking again at the broad spectrum of the general purpose credit card and private label cards, where do you guys fit in? What's your advantage over competing products?

**TI's producing the only technology that
meets the requirements for drive-up applications.**

Mr. Pearson Our biggest competitive advantage is that we're producing the only technology that really meets the requirements for drive-up applications. Pull up in front of a dispenser and you're only being read by that dispenser. And you're being read every time. With more than a million tags being used at over 2,500 locations, we're the first and only technology available.

Where do we fit into the credit card mix? We've never considered RFID a replacement technology, but in those settings where consumers want speed, convenience and confidence, RFID offers credit card companies a new alternative. We've already seen both MasterCard and American Express launch joint promotions with SpeedPass.

Mr. Agan Rick, you must have gone through a lot of these debates internally for smart cards versus RFID. How did you sort through the technology maze and decide on TI?

Mr. Ellison We looked at how we could deliver something to enhance our payment technology and program strategy. We found Texas Instruments' technology could be integrated to our pumps and could be brought out to the market with speed. And we felt it was something that a lot of people would accept.

The smart card is an area I won't speculate on where it's going or how fast it will be adopted. But we did see RFID as a technology available immediately, and if we did the right things in terms of marketing and installation, we felt that it could be a real success for us.

Mr. Gordon Quick follow-up to that. Rick, could you address whether Mobil has found the technology to be robust across all the different site patterns and site layouts that you have?

Mr. Ellison Yes, we found the technology very robust. When we first brought out the key ring technology into ten metropolitan markets, we found the technology to be very good, very reliable. Consumers are telling us it's very reliable. We're scoring very high marks on it. It's not just Mobil saying, "Hey, this thing works." The customers are saying that. And when we came back in November and integrated the vehicle tag, now in 20 markets from Maine to California, the technology, again, was really good.

We really position the car tag and the key ring as a choice product, depending on what you're after. You have ultimate speed with the car tag. And there may be



**Editors ask the panel about the next phase
in RFID retailing.**

In settings where consumers want speed,
convenience and confidence, RFID offers credit card
companies a new alternative.

Mr. Ellison drive-through applications with the car tag down the line. But inside the store,
continued the key ring will be most useful. I think it's definitely a choice product.

Mr. Randelman I think it's also a little bit of a value — there are two kinds of value propositions out there. One value proposition recognizes the car. There are a lot of unique things I can do with the car and drive-thrus such as maintenance records and quick lubes and all that kind of stuff. I might piggyback the vehicle tag on things like parking. It's a car-based value proposition.

There's a separate proposition based on the person. Visiting a supermarket, Blockbuster Video or movie theater, much of it depends on where that value for the customer is driven. If it's in the car and it's quick and easy then the car tag is great. If it's related to payment technology or loyalty kinds of things, clearly I want an individual tag.

A secure transaction

Mr. Gordon Have there been any issues regarding security where someone steals the tag and uses it at the pump? Has security been addressed?

Mr. Ellison We're really pleased with the security measures built into the system. We feel it is secure because of the encryption of the numbering system that's within each transponder.

Mr. Pearson TI developed a highway toll system that was a major enabling capability for us to develop this application quickly. So we know a lot about what it takes to put an RFID system into vehicles. And we really haven't found physical theft is a problem at all. Of course, we also have built-in encryption technology to prevent the data from being captured via airwaves.

Mr. Agan Thank you very much to the panel for your participation and for this very interesting exchange. There's been a fair amount of coverage in business journals about how technology is being adopted at an increasingly rapid pace. If that theory holds true, then RFID technology may be something that's coming a lot sooner than we think.

Ultimately, that decision will be determined by those technology leaders and retailers who push the technology forward, as well as the demand created by consumers pulling the technology into the marketplace.



Panelists: Rick Ellison, Mobil, Rob Randelman, Verifone, and Joe Pearson, TIRIS.

Additional copies of this roundtable report are available from Texas Instruments Inc. by calling (972) 917-1457 or (617) 742-7270. For more information on how TIRIS technology can support your retailing strategies please call (972) 917-7547 or contact us via our Web site at <http://www.ti.com/mc/tiris/>

