

Search for:

- [Subscribe](#)
- [Search](#)

- [Subscribe](#)
- [Search](#)

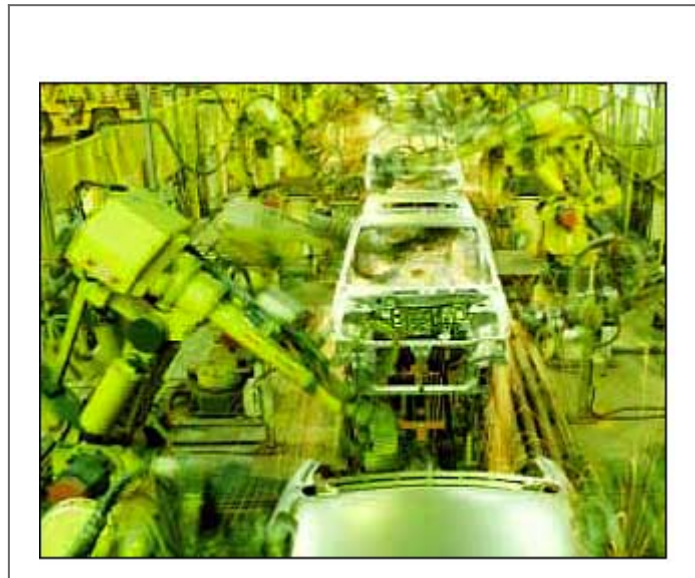
- [News](#)
- [Insights](#)
 - [Editor's Notes](#)
 - [Expert View](#)
 - [Trends](#)
 - [White Papers](#)
 - [Ask The Experts](#)
- [Industries/Topics](#)
- [Events & Resources](#)
 - [Events](#)
 - [Event Recordings & Videos](#)
 - [Get Started](#)
 - [RFID Journal Glossary](#)
 - [RFID Journal Awards](#)
 - [Magazine Archive](#)
 - [FAQs](#)

Select Page

Driving Change in the Auto Industry

One of the most challenging tasks in the business world is manufacturing millions of automobiles and getting them to market. With millions of parts, thousands of assembly processes and the intricate logistics of delivering custom orders to specific locations, it's easy to understand why

profit margins are so slim. Today, the pressure to cut costs and boost efficiencies is so critical that many automotive companies are looking to harness RFID technology to shift production and distribution into high gear.



During the past decade, automotive manufacturers have turned to sophisticated hardware and software to manage factories and supply chains. Behind the high-profile enterprise resource planning, supply chain and e-commerce systems, RFID has emerged as a powerful supporting player. Automakers are primarily using active, or battery-powered, RFID systems to automate and improve an array of manufacturing and supply-chain management activities (see An Active Role for RFID). The road ahead leads to greater efficiencies through the tracking of each individual part and to benefits for drivers through the use of RFID technology inside the car.

“Automotive companies are turning to RFID in a major way,” says Joseph Tobolski, an associate partner at Accenture Technology Labs in Chicago. “Although many companies are already using second- and third-generation RFID solutions, the technology and applications are becoming far more

sophisticated and complex all the time.”

To be sure, the auto industry has raced ahead of other vertical industries in moving RFID out of the lab and onto the shop floor. Despite all the attention heaped upon Wal-Mart and the retailing industry, market research firm Allied Business Intelligence reports that the auto industry now represents 46 percent of the total RFID market, with carmakers prepared to plunk down \$600 million more over the next several years. In fact, auto manufacturers spent 30 times more than the retail industry on RFID products in 2003.

Today, RFID tags and readers are simplifying inventory visibility, making it easier to customize vehicles and ensure that they receive the right paint and features, and allowing manufacturers to locate specific vehicles at a distribution lot with tens of thousands of other cars. RFID will also make it possible for a new generation of smart robots to find the correct parts in a bin and respond dynamically to changing events occurring inside a factory.

Manufacturing Results

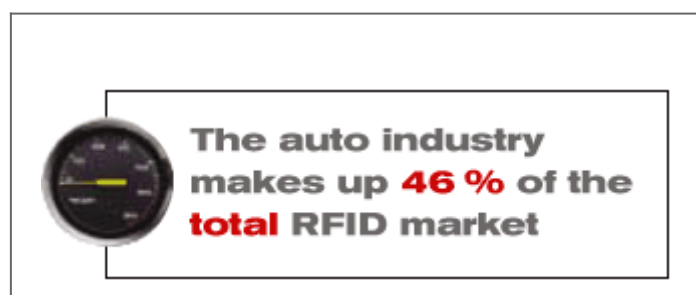
All this is only the beginning. Within a few years, auto manufacturers will rely on RFID to boost consumer convenience and safety. “There are enormous opportunities,” says Duncan McFarlane, research director for the Auto-ID Lab at Cambridge University’s Institute for Manufacturing.

One of the early adopters of RFID technology in the automotive industry was Ford Motor Co. It began using active RFID tags in the late 1980s to track vehicles through the assembly process. Today, Ford uses reusable RFID transponders on every vehicle at its manufacturing facilities in the United States. “We can identify every step in the process and ensure that each action corresponds to the specifics of a customer order,” says David Decker, manufacturing practice manager at Ford.

The benefits of this approach are clear. For example, when a car enters a painting booth, an RFID transponder sends a query to a database to find the correct paint code. The system routes the information to a robot, which then selects the correct paint and sprays the vehicle. The entire process occurs instantaneously and automatically.

Before adopting the RFID system, Ford handled the entire painting process manually, which was time-consuming and led to errors. Each vehicle carried a build ticket—a piece of paper with all the necessary instructions—along the assembly line. An operator had to scan through rows and columns of data on the build ticket to find the appropriate process, such as painting, as well as the correct color for a vehicle.

The RFID system also makes it easier for human operators to handle more complex tasks, such as adding decals to a vehicle. Because Ford builds Explorers and Rangers on the same assembly line, and each model has several variations, it is difficult for an operator to know which decals appear on a particular vehicle. Instead of requiring an operator to check a build ticket, an RFID transponder sends a signal that turns on a light above the bin with the appropriate decal. The operator pulls the decal and places it on the vehicle.



With hundreds of such operations across the assembly plant, RFID technology is radically changing the way Ford builds cars. "It is automating operations and improving quality while

reducing human intervention," says Decker. When Ford began using RFID for the decal operation, for instance, the process immediately dropped out of the top-10 list of quality problems. "It was no longer a concern," Decker explains.

Not surprisingly, Ford's J.D. Power quality ratings have steadily risen since turning to RFID. Quality-control specialists use an RFID reader to scan each vehicle before it leaves and can immediately check a database to see if any unresolved issues remain. Although Ford uses RFID products from a number of manufacturers, its primary suppliers are Escort Memory Systems, Rockwell Automation, Allen-Bradley and WhereNet. At this point, it uses mostly active tags. The problems with passive tags, Decker says, is that they don't have the read range that the automotive manufacturer requires, and most are too expensive and unable to survive harsh industrial processes, such as passing through paint ovens.

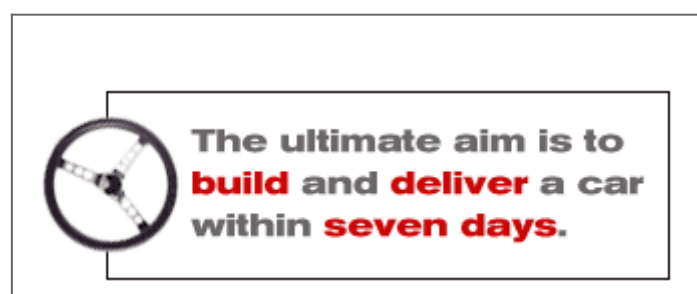
Other automotive companies are embracing active RFID technology in a major way. At BMW's engine plant in Steyr, Austria, the automaker uses Siemens' MOBY E identification system to help manage drivetrain and engine production across 26 automated stations, five inspection areas and 70 other assembly spots. Workers have access to real-time data at computers located on the assembly line, and they can view the contents of pallets and containers throughout the facility. The 13.56 MHz system reads and writes data to tags up to 100 meters away, speeds production and reduces errors.

Johnson Controls, a Milwaukee firm that specializes in the design and building of automobile interiors, uses RFID at its Livermore, Calif., production facility. The manufacturer builds and ships up to 1,500 car seats each day for New United Motor Manufacturers, a joint venture between General Motors and Toyota. If a shipment has the wrong seat or includes seats in the wrong order, it can wreak havoc with production. The company must stop the line and go back and build the seat immediately.

In the past, Johnson Controls used paper and pencils to manage the process. Although bar codes could provide some incremental improvement, RFID offered a more elegant solution. So the firm turned to a system from Escort Memory Systems. It allows Johnson Controls to produce multiple models of car and truck seats on different lines without worrying about the grouping or order until they have reached the final stages of the shipping line.

McFarlane, of the Auto-ID Lab, says that one of the emerging uses of RFID is to help industrial robots find the right part from a bin containing hundreds of different components. Today's robots can't see or think, so they are stuck handling preset routines and pulling all the same parts in a particular bin. But if a robot could "find" the right part, it would simplify and speed the assembly process. "It is far easier to reprogram a robot on the fly than retool an entire assembly line," says McFarlane.

The ultimate aim is to push the envelope on customization while building and delivering a car within five to seven days. For one thing, the faster a manufacturer can assemble a car, the lower the cost because there's less inventory to stock. For another, a faster turnaround time lets a customer receive a new vehicle more quickly, reducing the odds of a cancellation and boosting the satisfaction rate. "In today's auto industry, speed of manufacturing and delivery is everything," says McFarlane.



Supply Chain Gains

Revving up production capabilities isn't the only focus of the automotive industry. Over the past few years, companies have turned to both active and passive RFID tags to assist with supply chain management. "An automobile company must move millions and millions of parts a year through various warehouses. The logistics of managing trucks, trailers, pallets and parts is formidable," says Michael Lawrence, a partner in the National Automotive Industry Group at IBM Global Services. "Ensuring accurate reads is a huge challenge."

It's an issue that's attracting growing attention. In 1998, Ford began using a vehicle tracking and management system (VTMS) that takes advantage of active RFID technology from WhereNet to track materials within a 250,000-square-foot area of its Van Dyke facility in Sterling Heights, Mich. The facility produces more than 9 million components annually for Ford cars and trucks. Workers tag parts, components, containers and mobile equipment as they arrive at the facility.

At that point, low-power active tags and 802.11b and 802.11g wireless local area networks deliver tracking information and usage data to a computer. The system identifies the location of the tag within 10 feet of its exact position. Besides improving productivity and quality during manufacturing, the VTMS simplifies replenishment and materials availability.

Today, Ford uses WhereNet's active supply chain tracking capabilities at 35 North American plants. The 2.4 GHz system, with a 100-meter indoor range, has helped reduce the number of misplaced items, which can stall production and delay the delivery of products. It also has helped trim excess and

obsolete inventory. Although Ford hasn't released specific figures, industry observers say the technology typically leads to more than a 20 percent reduction in vehicle dwell time, around a 10 percent improvement in labor productivity and a 25 percent reduction in line stoppages due to parts shortages.

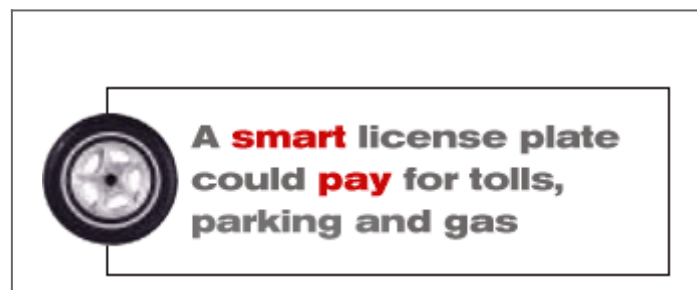
RFID is also moving beyond the warehouse and into distribution. In the past, pinpointing the location of a particular vehicle after it rolls off the assembly line was next to impossible. For example, at Volkswagen's Wolfsburg, Germany, distribution site, more than 15,000 cars sit on the lot at any given moment. Before turning to an RFID system from Identec Solutions, several workers had to physically canvass the lot to locate a particular car destined for shipment to a dealer or customer. In some cases, the process could take an hour or more.

Now, every vehicle receives an active tag on arrival, and more than 60 readers are positioned around the facility; the system transmits data as far as 100 meters. Instead of spending time searching for a new car that's ready to go to a dealer or consumer, an attendant can hop in a van and locate it immediately. The system also keeps track of the status of vehicles, allowing Volkswagen to ensure that cars are fueled, vacuumed and inspected before they're taken off the lot. Volkswagen uses nearly 15,000 reusable long-range active tags. The end result has been lower costs and about four times faster service. "Bottlenecks and delays have been virtually eliminated," says Gerhard Schedler, vice president of global sales and marketing for Identec Solutions.

But the action isn't only centered on active RFID tags. As the consumer goods industry adopts EPC technology, the price of passive tags will decline. This offers the potential for automakers to take their supply chain tracking from bins down to actual items. Accenture's Tobolski believes that it may take a while for the industry to move to item-level tracking because even at 5 to 10 cents each, the cost of the tags is

too high for many applications. “With thin margins, the incremental cost of the tag can present a challenge. A 5-cent tag on a 50-cent item makes it economically unfeasible,” he says.

Passive tags present other challenges. Most aren’t able to withstand high temperatures and other industrial hardships, including liquids and acids (fortifying the tags can double or triple the cost). They’re also not able to transmit far enough to function effectively in large automobile manufacturing facilities. In some cases, the enormous amount of metal interferes with the signals. While it’s likely that passive RFID will play a more prominent role in the future, especially as standards converge, it is unlikely to replace sturdier active systems for many years, if ever. Many active RFID units can include casings that protect them from heat, chemicals and pressure.



The Road Ahead

Tobolski believes that EPC is coming to the automotive industry. Although the final goal is to create end-to-end supply chain tracking, the most obvious applications center on parts tracking, parts authentication, inventory management and configuration management. What’s more, automotive companies might not want or need to tag everything. “Greater tracking ability is desirable but total tracking may not be necessary,”

says Tobolski. "It is important to track a pallet of bolts but probably not every bolt."

The final piece to the automotive RFID puzzle is the use of the technology in vehicles to improve performance and safety. The ability to monitor wear on tires and brakes, predict the imminent failure of parts, and automatically manage tolls and parking is alluring. And it's a scenario that's already becoming reality. Michelin has tested RFID transponders embedded in tires. The prototype device, which will likely hit the market in 2005, would store data about maximum tire pressure and the place and date the tire rolled off the assembly line. This could assist Michelin in any recall efforts.

Royal Philips Electronics has developed an RFID chip that monitors the temperature and pressure of each tire and transmits the data to a motorist via a light on the instrument panel. Other companies, including SmartTire Systems Inc. and Advantage PressurePro LLC, are developing similar products for original equipment manufacturers. SmartTire's sensors check tire pressure every seven seconds and alert motorists immediately when they detect a 3-PSI pressure loss in three to seven minutes.

Many of today's remote access systems already use passive RFID to authenticate a car's key and user, and more sophisticated systems that might use biometrics are in the works. Accenture Technology Labs has developed a prototype smart license plate that can pay for fees at tollbooths, parking meters and gasoline stations. It is also working on technology that will monitor driving speed and performance while offering feedback to motorists.

The ultimate goal, says Auto-ID Lab's McFarlane, is to develop life-cycle chips that reside within a vehicle from the assembly line to the junkyard. Not only would this reduce the cost of RFID technology, it would also offer manufacturers

greater flexibility and boost innovation. By using RFID to authenticate parts, manufacturers would make it difficult for crooks, counterfeiters and shady repair facilities to foist inferior goods on unsuspecting consumers. At the same time, hazardous-waste operators and recyclers would know what they have and where it came from.

Of course, any RFID life-cycle initiative would have to deal with privacy issues. "There is the potential for misuse and invasion of privacy," says McFarlane. "It is essential to find the right balance between privacy and collecting data that can improve performance, safety and efficiency."

For now, automobile manufacturers are steadfastly focused on how RFID can rev up business processes and accelerate efforts to become more efficient. "RFID is an enabler," says IBM's Lawrence. "The automotive industry recognizes that there is plenty of room to innovate and improve. Over the next few years, we will see many new and innovative solutions involving RFID."



- ABOUT
- ADVERTISE
- CONTACT

FOLLOW US ON

- Follow
- Follow
- Follow
- Follow



© 2024 Emerald X, LLC. All Rights Reserved

[ABOUT CAREERS](#) [AUTHORIZED SERVICE PROVIDERS](#) [Your Privacy Choices](#) [TERMS OF USE](#) [PRIVACY POLICY](#)