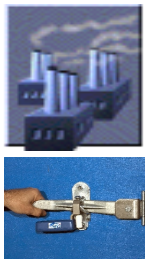




Transportation – Homeland Security and Savi Technology



The US government is funding projects related to the tracking of containers that are shipped to the United States from countries of suspect. Containers are being electronically sealed with an RFID tag bolt seal, which is placed on the back doors of the container, and tracked throughout the supply chain at each choke point along the way, from international shipper to US retailer. This process will feed tamper and suspect data to US Customs, allowing containers to be 'green-lighted'.



1. Manufacturer/Consolidator

- Associate manifest with container and seal ID
- Verify user and electronically secure container
- Automatically record departure (optional)
- Transmit data to TSS



2. Port of Loading - Arrival

- Automatically record container arrival
- Automatically verify security status at entry gate

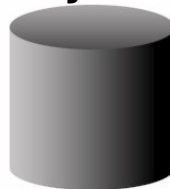


3. Port of Loading - Vessel load

- Verify clear for loading status
- Automatically verify security status at quay cranes



Transportation Security System Platform



- Transmit documentation and updates to Customs
- Provide alerts if container deviates from plan
- Provide reports and other analytics for supply chain and security inefficiencies
- Maintain audit trail of accountability
- Provide web access to users



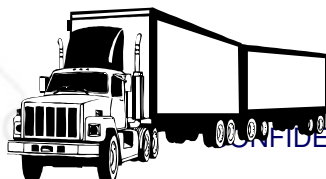
7. Deconsolidation center

- Automatically record arrival (optional)
- Automatically verify security status
- Verify user and unseal container
- Transmit data to TSS



6. Port of Discharge - Departure

- Automatically record departure
- Automatically verify security status at exit gate



5. Port of Discharge - Vessel Unload

- Verify clear for unloading status
- Automatically verify security status at quay cranes



4. Vessel Departure





Case Study: Thomas Built Buses A Move to Lean Manufacturing

North America's leading school bus manufacturer, Thomas turned to RFID tracking in order to improve scheduling, transfers, and location management in yards.

▪ Business Issue

- Manual recording and processing of inventory and movement information creates errors, introduces unnecessary steps, and delays tracking of finished goods
- Need to better track the movements of buses through production and into the finished goods area in order to
 - ◆ Reduce time spent on labour intensive activities such as recording inventories and verification
 - ◆ Increase visibility of bus locations to help handlers better coordinate movements and minimize wasted transfers

▪ Solution

- Individual RFID tags are used to track each bus through assembly to finished goods. Bus locations are also recorded once the bus is moved to the finished goods lot
- Oracle database: Transactions are automatically generated whenever a bus moves into a station, showing the station, date, time, and tag identification

▪ Benefits

- Reduced time spent monitoring production activities
- Reduced errors during bus assembly
- Reduced time tracking buses in the finished goods yard
- Reduced labor delivering buses to customer locations
- Improved inventory management due to automatic back-flushing
- Improved customer service





Case Study: Club Car Automating Tracking and Customization Saves Time

Golf Cart maker Club Car produces 100,000 vehicles per year from its Georgia plant, and now does so in 48% less time, saving costs and improving their ability to respond to production changes more effectively.

▪ Business Issue

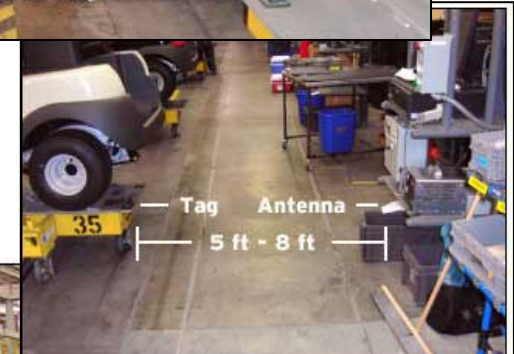
- On the eve of launching a new model, Club Car needed a way to speed up production, while accommodating continued customization of vehicles

▪ Solution

- Readers at each of 46 workstations record the location and status of each vehicle as it moves through the final assembly line
- Screens at each station indicate the work to be performed as well as the tools and parts to be used for the particular configuration
- 916.5 MHz Active Tag system with PCI card readers

▪ Benefits

- Individual vehicle production time decreased from 88 minutes to 46 minutes, a 48% drop!
- Previously separate assembly lines for gas and electric powered vehicles are merged into one
- Customization of vehicles with any combination of over 100 options is now performed during the initial production run as opposed to building basic cars and bringing them back from storage for customization
- Elimination of manual reading processes saves 3 seconds at each station directly providing a 6.5% increase in capacity





Case Study: Harley Davidson Giving the world a better motorcycle!

The name Harley-Davidson commands an almost iconic status among motorcycle riders worldwide, a reputation that is based on an unmatched degree of quality and reliability.

▪ Business Issue

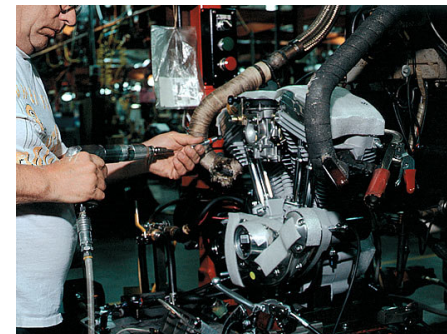
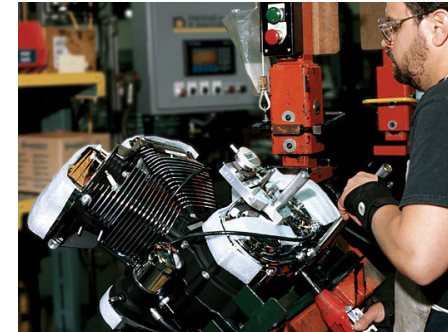
- In an effort to maintain an edge over competitors, Harley-Davidson was looking for a solution that would improve quality during the engine manufacturing process. The company needed to track unit location and status during production, as well as collect information that could be used to trace quality issues back to specific units and components.

▪ Solution

- Industrial PCs with touch screen monitors at each station which direct and monitor engine assembly operations
- Stationary RFID readers at each station which
 - read unit tags and ensure the appropriate instructions are displayed on the PCs matching the required operations
 - write to tags to indicate location and production status
- Passive tags mounted on each engine uniquely identify the individual unit model, serial number, and operations required

▪ Benefits

- Eliminated 90% of assembly related errors by automatically displaying proper instructions at the right station
- Increased repeatability and manufacturing efficiency
- More refined processes based on data collected
- Improved designs based on feedback from tracking quality issues





Case Study: Volkswagen Long Range Tracking of Vehicles

On June 1, 2000 VW opened a new customer presentation and delivery centre dubbed the Autostadt (Auto-city). The facility houses 10,000 vehicles which have undergone meticulous preparation and completed a quality control check on their way to display.

■ Business Issue

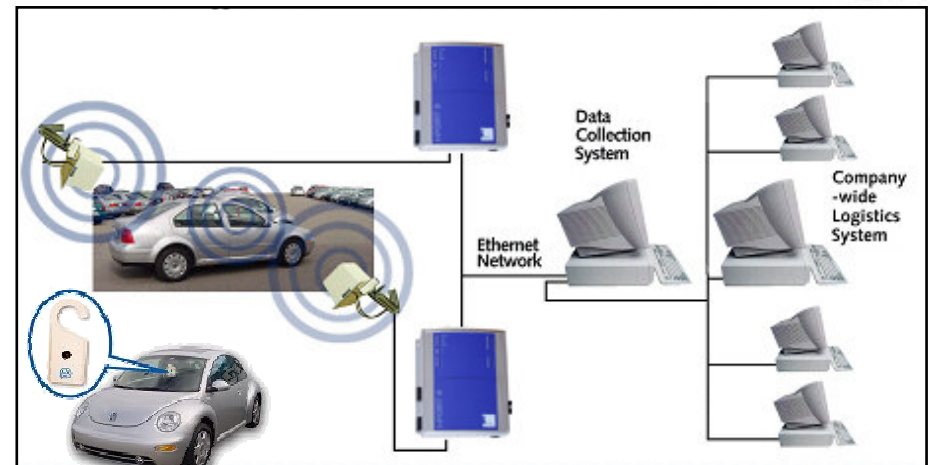
- VW needed to locate vehicles in the finished goods lot and to further track their progress through pre-delivery activities.

■ Solution

- Read/write stations are connected to antennae which communicate with long range active Tags temporarily mounted in each car and carrying individual vehicle information. Tags are reusable, minimizing cost concerns of active tags. These stations integrate into the corporate network and logistics systems.
- Handheld devices also allow the ability to read and write information to tags remotely.

■ Benefits

- Shorter vehicle delivery time due to locating vehicles faster - workers can typically retrieve **four times as many vehicles in the same period of time**
- Improved vehicle processing due to **automated electronic routing and status updates** after each pre-delivery task
- **Improved processing and speed** even when re-work is needed - required repairs are tracked electronically and automatically updated when work is completed
- **Improved quality control** due to real-time physical tracking of vehicles throughout the delivery process
- **Improved customer service** by delivering the right car to the right customer -- every time





Distribution - Case and Pallet Tracking Wal-Mart / Pacific Cycle

- Pacific Cycle, the largest bicycle supplier in the U.S., has installed portal readers as part of an RFID pilot program designed to create greater efficiency internally as well as to comply with the supplier mandate from Wal-Mart that requires RFID case and pallet tagging compliance by 2005.



▪ **Business Issue**

- Pacific Cycle required to comply with Wal-Mart's RFID Case and Pallet Mandate
- Bicycles are packed one item per case, so in effect, item-level tracking is done, as well

Pacific Cycle is a prime example of how companies can now see how to build a good return on investment from the RFID tagging mandates by finding ways to use the technology to create efficiencies in their own operations.

▪ **Solution**

- SAMSys MP9320 UHF portal readers installed in their Olney, IL warehouse at each dock door
- Integrated stack light giving fork-lift drivers visual indication that a pallet or case has been read successfully



▪ **Benefits**

- Increase Sales by Tracking at Retail Store-Level to Eliminate Out-of-stocks
- Reduce Manpower in Shipping and Receiving Operations
- Improve Shipping Accuracy

▪ **Future Benefits**

- Lower warehouse costs
- Provide more accurate inventory management
- Increase sales in retail stores
- Plans to tag products at all of its off- shore manufacturing sites, providing the ability to automatically receive products as they move into the warehouse.





Security Access - FedEx



- Federal Express delivers approximately 3.2 million parcels daily and operates a fleet of more than 42,500 vehicles worldwide. FedEx couriers have one less thing to keep track of these days – their vehicle keys.

- **Business Issue**

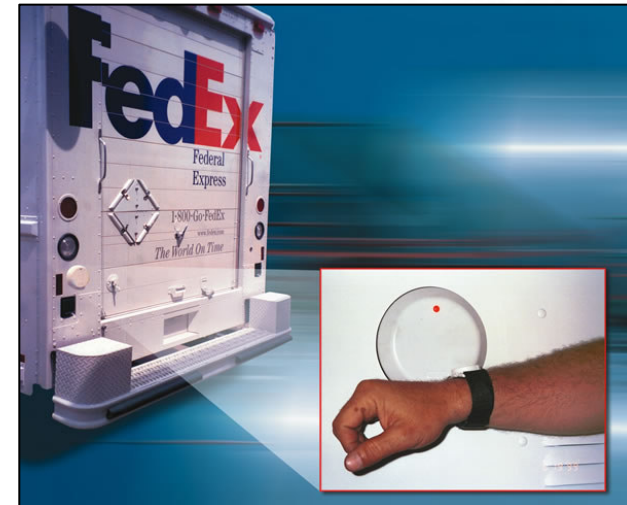
- ◆ Drivers spend precious time searching for keys to lock and unlock doors
- ◆ Keys are misplaced, causing them to wait for spares and the vehicle to be rekeyed at over \$200 per incident

- **Solution**

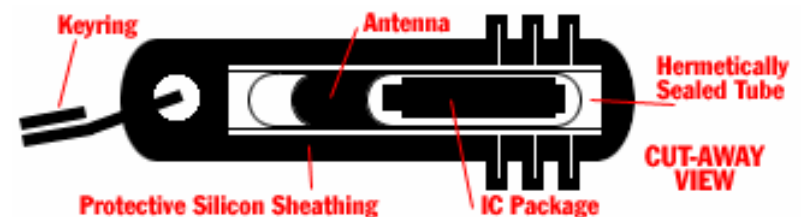
- ◆ An automatic keyless entry and ignition system
- ◆ TI RFID transponders embedded in a velcro wristband (LF 134.2KHz – less likely to cause interference)
- ◆ TI readers / transponders mounted at each of the doors and at the ignition switch

- **Benefits**

- ◆ Security and time savings on each delivery
 - No more fumbling with keys
 - Automatic unlocking of doors (only the door required)
 - Immediate re-programming of ignition if wristband lost



Alternate keyfob form factor





People Tracking

- **Many types of industries are using RFID to track people. It is unobtrusive, and provides real-time location tracking ability, and stores other data pertinent to the application.**

- **Military tracking wounded GIs in Iraq**

- ♦ Track the status and location of patients
- ♦ RFID-enabled wristbands to identify patients
- ♦ Write status and location information to tag
- ♦ Store medical and treatment protocol information digitally
- ♦ TI-Rfid Tag-it smart label inlay / handheld RFID readers from ACC Systems
- ♦ Track movement of animal in case of terrorist assault on food supply



- **Tracking prisoners**

- ♦ Wristbands containing tamper-proof transmitters that communicate with readers installed throughout prison
- ♦ Protection for guards and reduce prison violence

- **Kidspotters in LEGOLAND**

- ♦ Rent a wristband and parents can leave your worries behind
- ♦ When lose sight of child, parent sends an SMS message
- ♦ Receive message back with name of park area and map coordinate of child's position



- **Newborn tracking in Hospitals**

- ♦ Anklebands are placed on newborns
- ♦ Real-time tracking of baby's location
- ♦ Alert notification if baby leaves approved room / location
- ♦ Theft prevention is main driver