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RFID enabled Solutions

TYRE MANAGEMENT

Why RFID …

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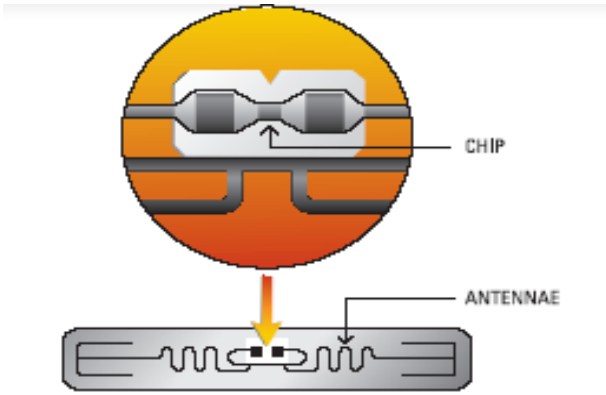
Bar Code	RFID
Requires Line – of - Site	Does not require Line – of – Site
Requires correct orientation	Does not require orientation
Easily obscured by dirt	Not affected by dirt
Easily scratched or damaged	Unaffected by scratches (encapsulated)
Contents cannot be modified	Can modify data stored in tag
Can only read one label at a time	Can read multiple tags at once



YOU CAN'T MANAGE WHAT YOU CAN'T MEASURE

Active vs. Passive

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ACITVE TAGS	PASSIVE TAGS
Active tags have an internal power source, such as a battery. They have longer ranges and larger memories than passive tags and usually operate at 455 MHz, 2,45 GHz, or 5.8 GHz and have a reading range from 20 to 100m	Passive tags have no internal power supply and are instead activated by the reader. Passive tags have read distances ranging from 2mm through to 4.6m, depending on the frequency of individual tags. Passive tags can operate at low frequency (LF), high frequency (HF) and ultra high frequency (UHF).

Typical System Architecture

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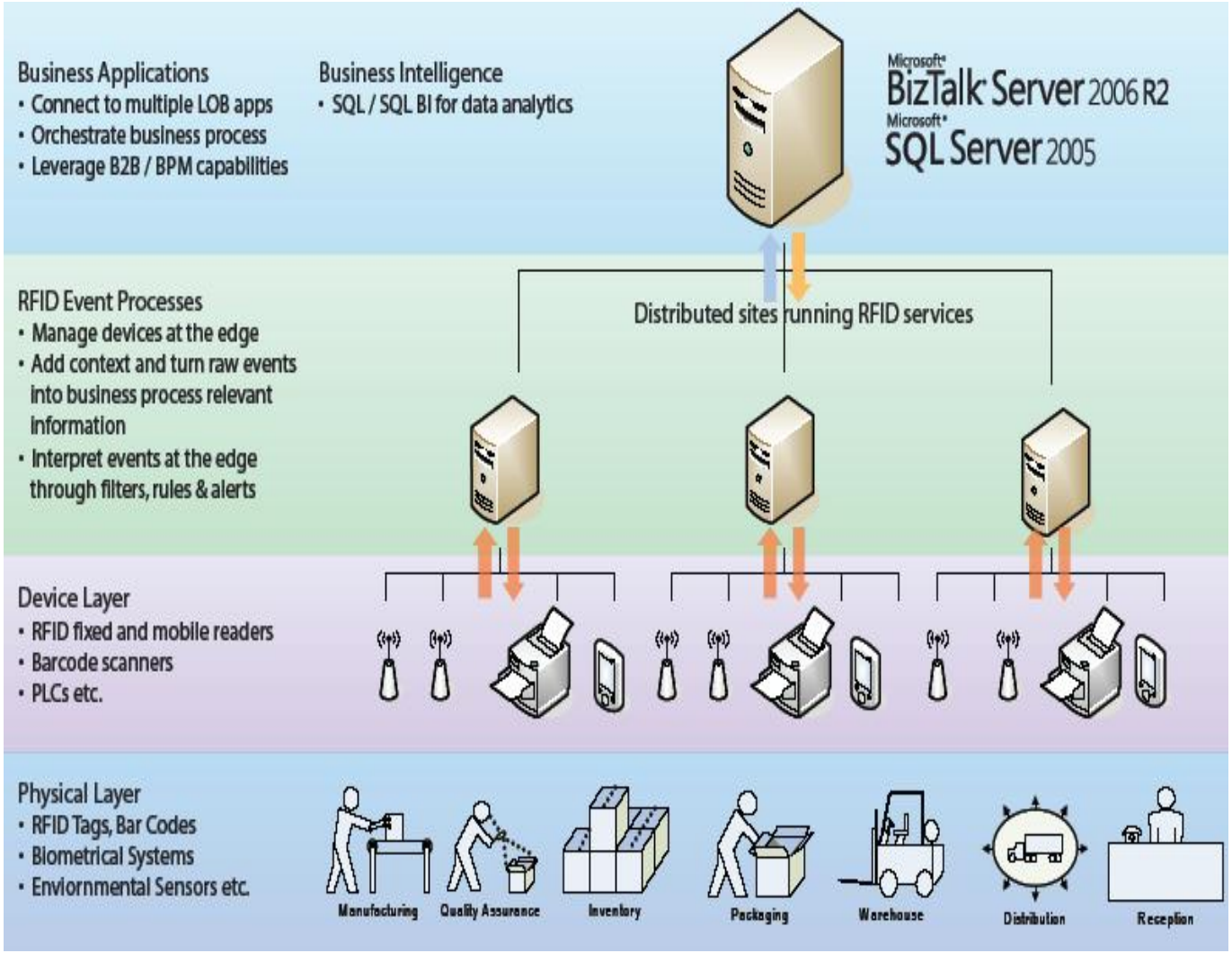

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Typical Project Approach

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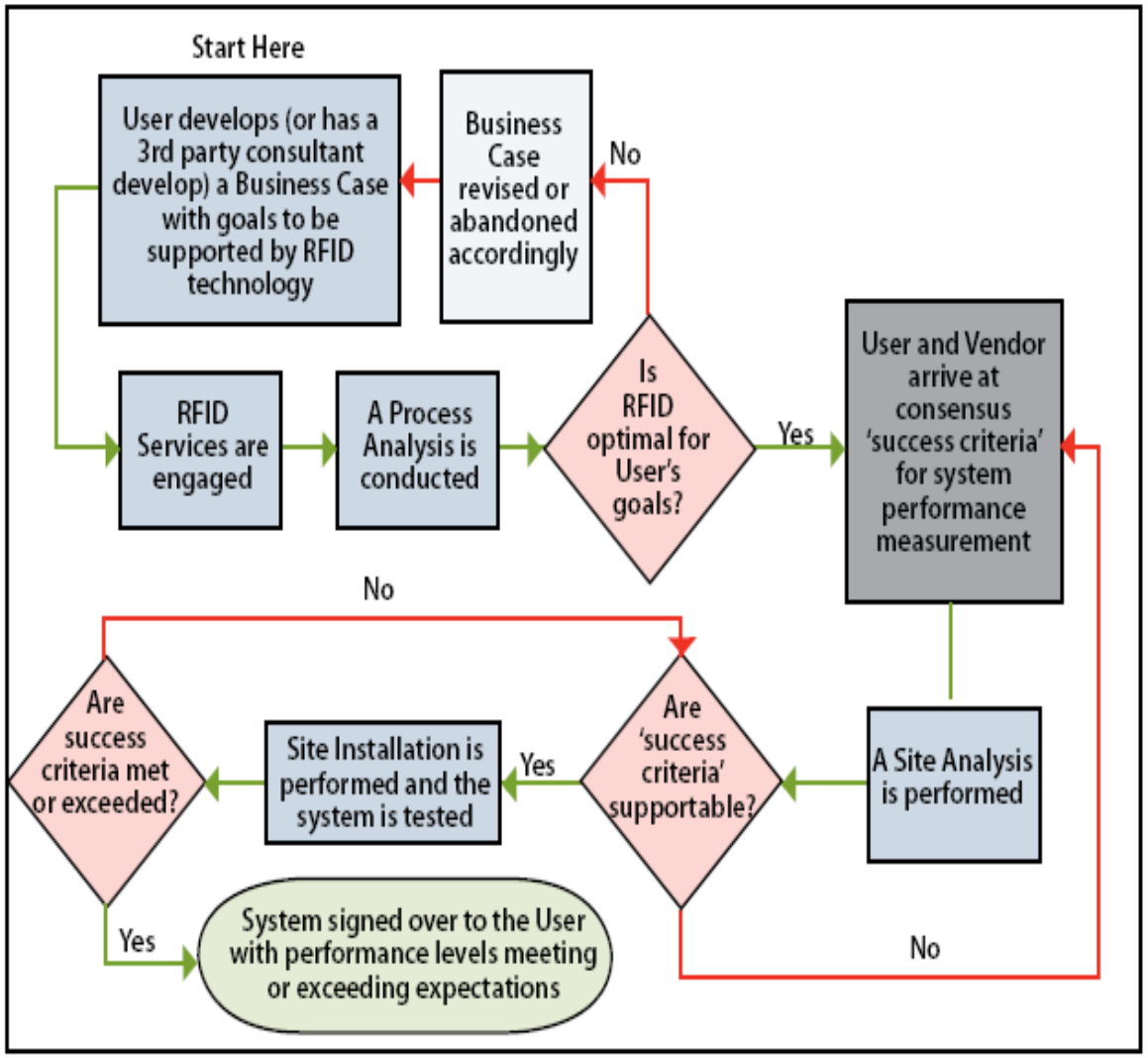

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Typical Read Stations

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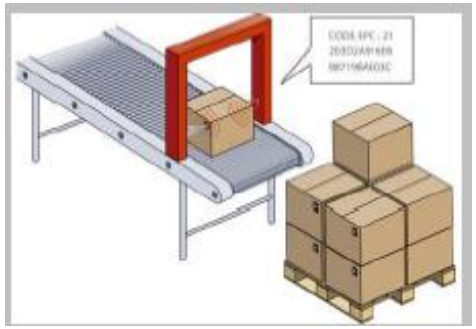
GATE / DOCK DOOR

PORTAL

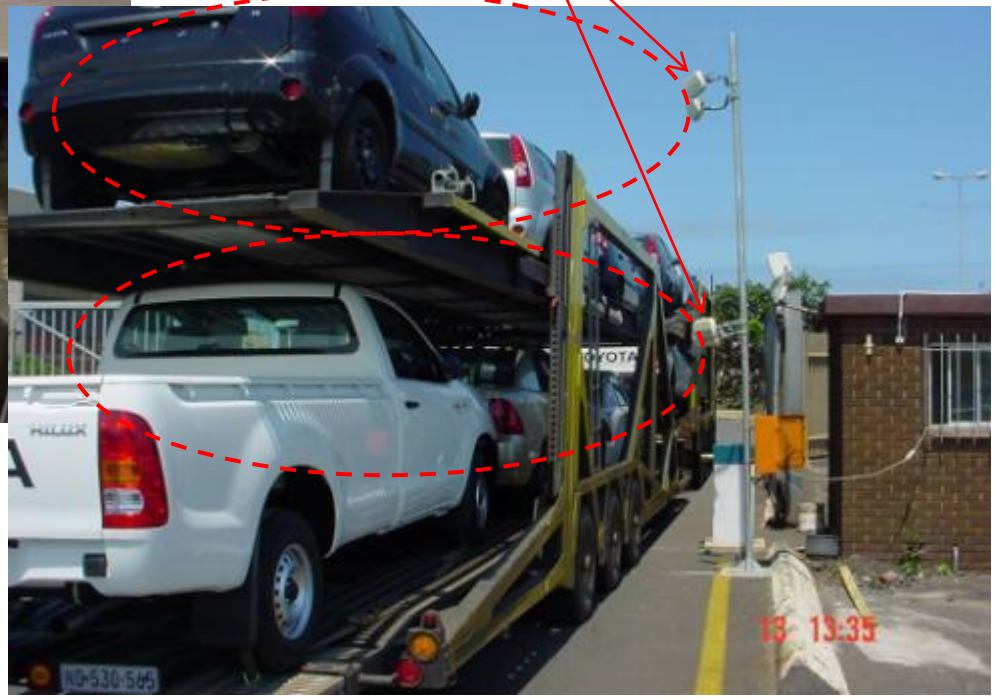
HAND HELD

CONVEYOR



RFID Label

Antenna



UHF Passive Tags

Tyre Registration

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Asset Register logs all tyres tagged

Host Server

Note: Each RFID Tag has a unique Non erasable ID.

Tyre Dispatch

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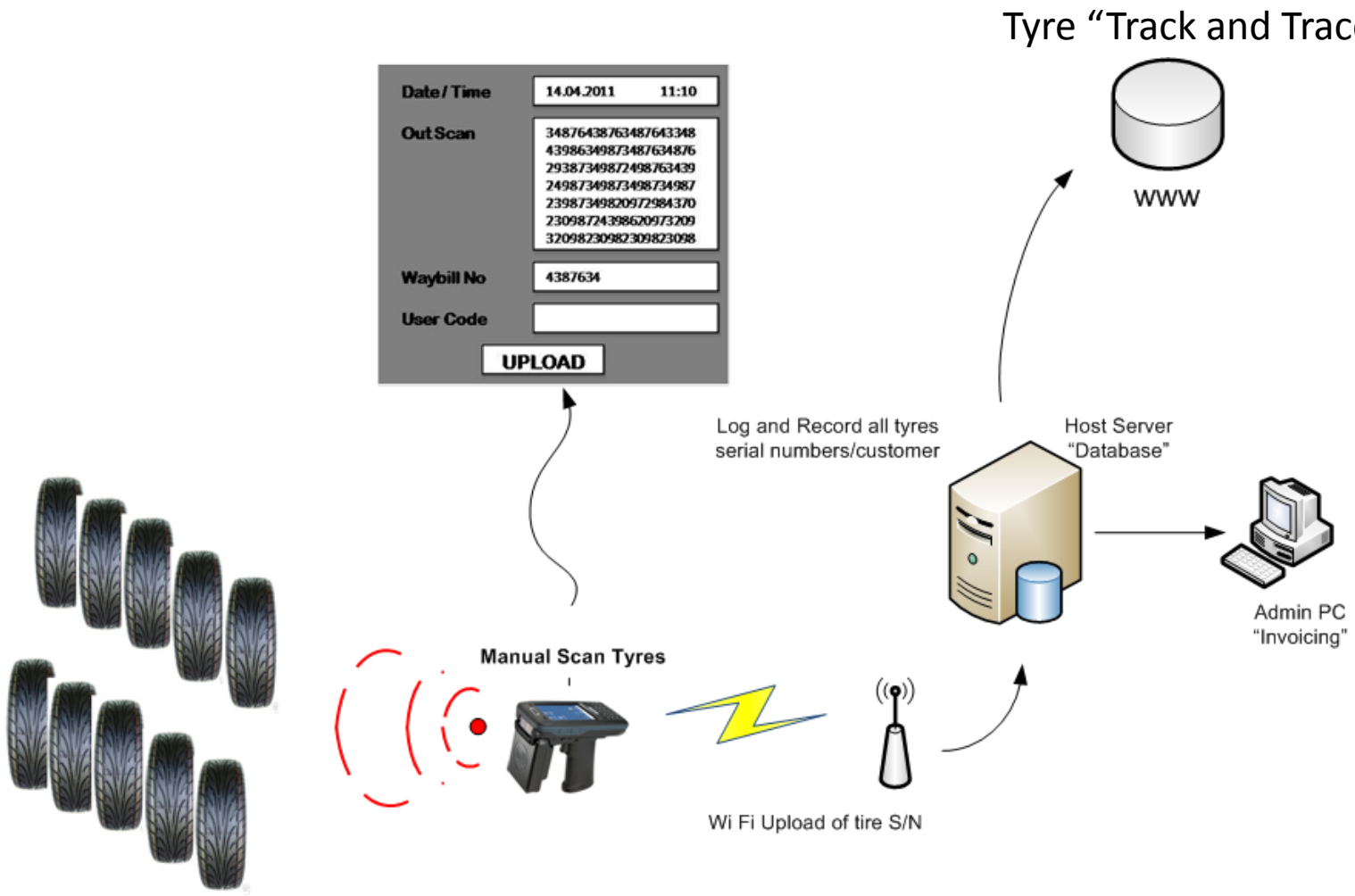

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Customer

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Local Database server

Scan tyres upon receiving;

- Verify POD against goods sent
- Log and record – ownership (Tyre Asset Register)

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Customer

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- Enter Truck VIN
- Enter Tyre Position
- Scan Tyre RFID S/N
- Scan Wheel S/N

Tyre / Wheel Management System

Add on benefit to End User

Development Criteria

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The main development criteria was not purely focused on the ability to track a "tyre" but to determine and evaluate :

- the method of dispersing the Tags
- the volume of Tags required per site
- the properties of the tyres
- the behavior of a Tag within a tyre
- the read percentage accuracy of tyres at reader locations
- The survival rate of Tags throughout the tyre manufacturing process

Tyre Management

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Tyres can extend their life by retreading processes. However, their identification has long been a tedious and dirty job, not to mention the tracking process of multi-thousands of tyres moving in and out of the retreading factories.

Each RFID provides an unique ID and storage memory for saving useful information such as manufacturers, production date and expiry date.

RFID System can capture the RFID tag information automatically, and since each ID is unique, the history can be used for preventive maintenance or tyre replacement plan.

The RFID Solution on Tyre Management can automatically visualize and keep track on the flow of tyres, moving in/out of the retreading factory and Km usage on vehicles. The whole history of the tyres can be linked with the vehicle ID and even which side it is being mounted onto.

Benefits :

- Better Management
- Cost Reduction
- Quality & Safety
- Environmental

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Tyre Management

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RFID uses are extensive and varied with new and innovative applications being created daily. Their main uses include, asset tracking, personnel safety and registration, stock control (from livestock to freight containers) and even vehicle tolling/ licence control.

Assets are only assets when you have information about them, such as, where they are, what they do, where they have come from and where they are going. Effective stock and asset control using RFID can assist in implementing a structured and reliable solution to track, trace and audit products during all phases of its lifecycle.

Stock and asset control is vital for profitability but is also time consuming. Automated RFID systems provide a valuable cost effective performance improvement.

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- There is a range of RFID tags, patches and readers to suit every requirement for the unique identification of truck, OTR and passenger tyres.
- RFID tagging greatly improves the traceability of the casings throughout their complete lifecycle (new, re-grooved, retread and (scrap) without the adhesion and replacement issues associated with traditional bar-coding and branding.
- RFID technology allows for relevant data such as, make, size, pattern, phase to be written and stored within the microchip. This data can be retrieved with any reading device and used to track and record its current status and whereabouts. This can assist in controlling theft, stock audits, tyre inspections, and legacy reporting.

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The RFID enabled system for fleet, truck, trailer, bus and passenger tyres, make the tyre inspection process easy, accurate, fast and enables instant reporting.

Tread depths and pressure are captured automatically and electronically transmitted via Bluetooth to a hand held computer (PDA, Smartphone or tablet PC). Other supporting information on phase, dimensions & patterns, tyre defects and required actions are also recorded during the inspection process.

Benefits

- Life cycle management of tyres
- "Real" data acquisition
- Electronic "Best Practise"
- Common tools and process
- Accurate data, captured once, multiple uses
- No paper, no manual errors
- Inspection & service at the vehicle

Tyre Fitment

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Manufacture stage

The tags are fitted in the tyre's sidewall during original manufacture or bead to bead retread, and are therefore protected against tampering and outside elements.

Retrofit

Retrofit RFID tag is encased into a rubber patch and is fitted in exactly the same way as a repair patch. The RFID patch is applied to the inside wall of tyre using a cold, chemical or heat cure process.

All tags and patches can withstand the temperatures endured during multiple retread processes and stay with the casing for its complete lifecycle.

Tyre Pressure Monitoring System

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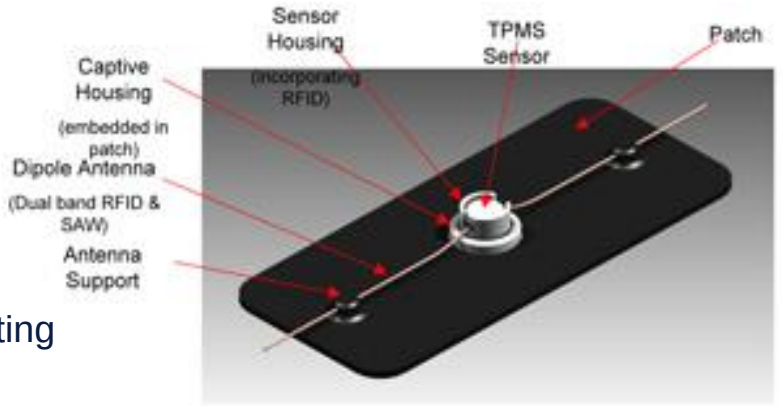
The single greatest cause of tyre damage and failure is incorrect tyre pressure.

- TPMS enables tyre temperature and pressure readings to be transmitted during inspection using UHF readers.
- TPMS Sensor & RFID are passive devices and do not require batteries TPMS sensor is completely hermetic, impervious to liquids and chemicals that may be present in the tyre.



- RFID may be embedded in the patch creating a "TPMS Ready" RFID patch as a standard product
- RFID may be included within the TPMS sensor housing. External antennas provide improved read range and reduced sensitivity to tyre compounds and construction
- TPMS sensor (and RFID if within TPMS housing) is a field replaceable unit that does not require specialist tools
- Used in conjunction with OTR Probe

Tyre Pressure Monitoring System

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Our tyre management software solutions allow fleet operators and tyre service providers, to obtain precise information regarding the tyre operational conditions and how this can affect the performance and costs.

We enable our clients to make informed tyre purchase and maintenance decisions based on the accurate data captured during the inspection process.

Our tyre management solutions can be adapted to any customer site, existing software and data reporting environment.

Our Tyre Management Software Provides:

- Complete tyre lifecycle management (cradle to grave)
- Tyre tracking throughout all operations
- Tyre projections and legacies
- Stock control & maintenance
- Performance analysis
- Fully integrated data reporting
- Real time communications
- PC based and Web based architectures

Tyre Pressure Monitoring

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We offer various "field-ready" PDA's and protective cases to receive and manage the captured data.

Features

- Fully integrated wireless tyre inspection solution.
- Wireless hardware for electronic measurement of tyre tread & pressure.
- Rugged design for outdoor use.
- Automatic real time reporting.
- Internet centric data management.
- Bluetooth wireless technology.
- Worldwide compatibility.
- Easily integrated into existing business and software systems.

Tag Features

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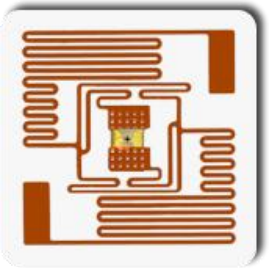
- UHF Passive (No Batteries)
- Unique non erasable ID
- Read / Write capabilities
- Survive harsh environment
- Customised – Shape, Size (25mm +), Density (SG 1.0 – 4.4) and colour
- Non Contact / No line of site required



Tag Memory Structure

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Tag Identifier (UTID) – Permanently Locked Data

IC Manufacturer	Chip Version	64-bit Factory Programmed Unique ID
E200	3412	0614 1411 0073 4886

EPC Memory (up to 496-bits)

Header	Filter	Partition	Company Prefix	Item Reference	Serial Number
48	3	5	0614141	100734	203886

USER Memory (up to 512-bits)

Extended User Memory
9064 6431 2073 4836 0604 2471 9073…4883

Planned Maintenance

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Application	Function	Benefit	Rand Value
Planned maintenance	❑ In combination with Asset register / management ❑ Correct identification of asset for maintenance ❑ Asset maintenance history	Costing per asset is more accurate Improved planning and scheduling Correctly identify when equipment has reach economical repair point	Yes

Asset Management

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Application	Function	Benefit	Rand Value
Asset management	❑ RFID tag positioned on asset ❑ RFID tag number links to asset register in ERP ❑ Tag can contain history of asset and other relevant information	Increase: Asset register accuracy Update frequency Asset control	Yes

Improved Accuracy of the Fixed Asset Registers

Equipment & Employee Tracking

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Application	Function	Benefit	Rand Value
Tracking relevant equipment and employees	❑ Multiple tags linked to equipment or employees ❑ Employees linked to equipment or directly to a tag ❑ One system to track material, rolling stock, men, stope monitoring, pegs	Improved employee control Better control of organisation teams Enabling improved half level costing	Yes

Better Compliance to Safety Legislation

Tyre & Process Waste Management

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Application	Function	Benefit	Rand Value
Tyre and process waste management	☐ Tags added to waste at waste chutes ☐ Waste is tracked to stockpiles ☐ Process system flags if waste is reprocessed	Reduced processing Accurate recording of contractor production Improved plant efficiency	Yes

Improve tracking of waste materials – improved processing efficiencies

Electronic Waybill

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Application	Function	Benefit	Rand Value
Electronic Waybill system	☐ Track equipment to and from repair agents ☐ Track Major Spares from Stores to Workplace to Repair Agents ☐ LP gas bottle and fire extinguisher tracking	Improved Audit Trail Automatic Surveillance Improved Inventory Control and Turn around Time Management	Yes

Reduction of Theft and Control over Repaired Assets

Logistics Management

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Application	Function	Benefit	Rand Value
Logistics management	❑Receiving, Issuing of stock ❑Stock taking ❑Material handling with material carts to mining section	Improved accuracy of stock receiving and issuing Reduced stocktaking timeframe Material handling accuracy improvement of 925%	Yes

Improved Materials Handling