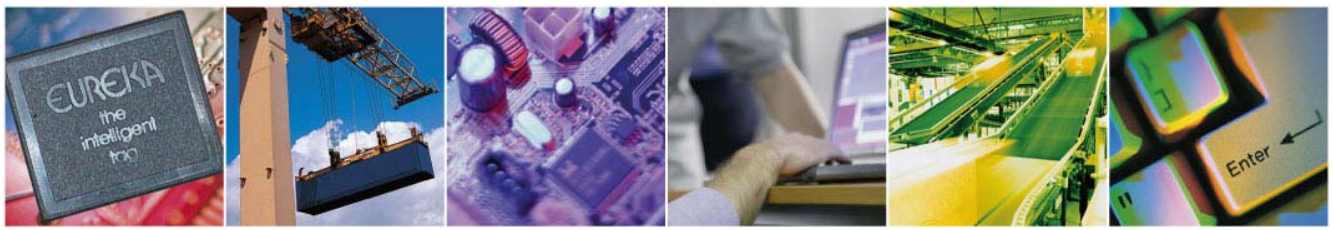
EUREKA® | innovative Identification



solutions to **identify**
and **manage**

avonwood™
Avonwood Developments Limited

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RFID For Inventory Control & Security

Presented By:

Avonwood Developments Ltd.

Avonwood Developments Ltd.

- Innovative products and services for identification and asset management under the brand name Eureka®
- Extensive experience in RFID (Radio Frequency Identification) and other complementary electronic engineering technologies.

EUREKA®
Innovative Identification

solutions to **identify** and **manage**

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RFID Solutions

- Asset/Inventory Control
- Equipment Tracking & Security
- Vehicle Identification & Tracking
- People Tracking For Safety & Security
- Production Line Tracking & Process Control
- Safety & Security
- Bespoke Solution Design
- OEM Products

EUREKA®
Innovative Identification

solutions to **identify** and **manage**

Inventory Control & Security Customers

Security Key Tracking:
- Hands free Access Control
- Movement Tracking
- Secure Area Monitoring

Production Line Process Control:
- Parts Tracking
- Inventory Control
- Process Control

IT Equipment Tracking
- Real Time Equipment Tracking
- Equipment Security Systems
- People and IT equipment Tracking

Plant & Tool Control
- Asset ID and Condition Logging
- Location Monitoring
- Safety Inspections

Vehicle Identification:
- Site vehicle location
- Hands Free access
- Site based Vehicle ID

Safety and Security
- Safety Control for Personnel
- People Location Systems
- Operator Identification Systems

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RFID Technologies

- Passive Tag Solutions (without battery).
- High Performance Active Tag Solutions (with battery).
- Frequency ranges available: 125kHz, 132kHz, 13.56MHz, 433MHz, 868MHz, 2.45GHz.
- Current & emerging ISO Standards for passive RF tags.
- Specialist proprietary systems for active tags.
- Eureka RFID systems cater for all RF frequencies.

Principles of RFID

- **The Tag**
  Passive, Active, Read Only & Read Write versions programmed with a unique identifier or programmed data from the host system.
- **The Reader/Decoder**
  This is used to generate the RF signal, read the data and interface to the host system.
- **The Antenna**
  The point at which the RF field is generated to read the tag, this is often remote to the main reader.

Solution Design

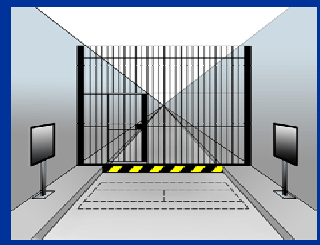
- The requirement will dictate the RFID technology
  - Lower Cost Passive
    - Shorter range from proximity to three metres
    - Slower read rate
    - Higher reader power
  - Active Tags
    - Longer range seven to two hundred metres
    - Fast read rate
    - Less reader overhead

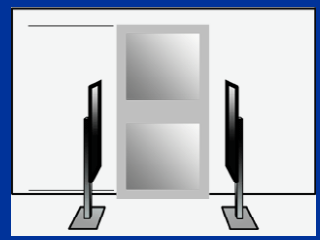
Solution Design

- The requirement will dictate the frequency
  - Longer range will require a higher frequency
  - A water laden environment will probably require an LF solution
  - A fast read requirement will probably require an HF solution
- The requirement will dictate the silicon chip choice
  - Multiple tag reads will dictate an anti-collision tag protocol
  - Memory requirement: read only, read write, high memory
- The environment will dictate packaging & frequency
  - A metallic environment will require special packaging and RF Shielding
  - Electrical noise considerations
  - Tag orientation to antenna, fixed orientation, changeable

Case Study - Security

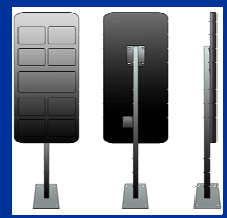
- Client – UK Home Office
- Application – Security Control
- Project – Key Tagging
- Environment – Demanding
- Tag Orientation – Random
- External Influences – Metallic
- Considerations – RF Control





Project Objectives

- Stop the inadvertent removal of keys from high security prison establishments
- 100% read rate required, a missed read would be costly
- Read random orientation of tag in a Prison Officers pocket
- Instant read and alarm of tag in a ‘No Go’ zone
- Interface to a PC control system and Prison security systems



Technology Choice

- Eureka 411 Low Frequency Active Tag
  - Low Frequency gives local control of RF Fields
  - Active tags have better performance in required areas
    - Less orientation problems
    - Better transmit / receive capabilities
    - Less susceptible to external RF interference
- Some Drawbacks
  - RF Tag unit cost higher than passive
  - Battery has a finite life (5-7 years)
  - Larger tag construction

Case Study – Inventory Control

- Client – Bristol Water
- Application – Inventory Control
- Project – BA Tank Control
- Environment – Wet / Cool
- Tag orientation – Fixed
- External Influences – Low
- Consideration - Cost

Project Objectives

- Improve traceability of BA tanks.
- Provide a comprehensive database of:
  - Tank history
  - Service details
  - Air sample details
- Enable field engineers to update database with a PDA reader
- Improve health and safety records
- Provide robust asset labelling

Technology Choice

- Adaptation of Eureka Safety First / AssetBase product ‘COTS’ Product = lower risk.
- 125kHz Passive tag:
  - Durable in wet environment
  - Lower unit cost for higher volumes
  - Operates in damp conditions
  - Protected from physical damage
  - Useable as proximity read on metallic surfaces
- iPAQ PDA with RFID reader readily available
- Pocket PC Software

Conclusions – Case Study

- Each RFID application needs to be considered from the users fundamental requirement.
- The specification should be approached with the technology limitations and benefits in mind.
- Consider, but don’t specify on tag performance – just because the tag has Read/Write capability doesn't mean you need it.

RFID Capabilities

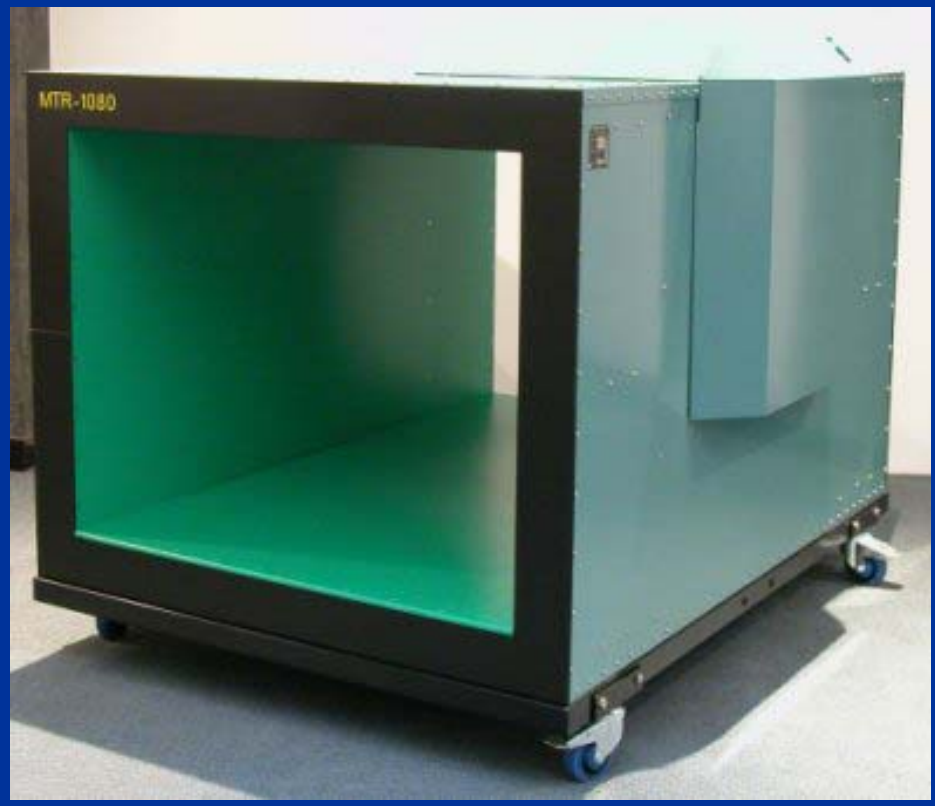
- Faster reading higher memory tags are now available.
- Last two years have seen greater developments with the larger projects being rolled out.
- Retail developments and implementations have increased the investment into RFID technology.
- New frequency allocations have enabled increased scope for performance.
- New RF power levels have enabled increased performance.

Bulk Reading Multiple Tags

Bulk Reading

- Many tags read in close proximity
- Used for bulk reading of many items
- Speeds up reading and reduces handling of product
- Possible Applications
  - Bulk reading of blood bags
  - Bulk reading of sample bottles
  - Bulk reading of files

High speed read at any orientation



High Speed Read

- 13.56MHz Label tags
- Improved efficiency over barcode systems
- Allows hands free and error free conveyor reading
- Applications Include
  - Factory Automation
  - Clean rooms
  - Power and free conveyors
  - Auto routing systems

People Tracking For Safety & Security

- Tracking and identifying people within certain environments.
- RFID based tracking solutions, which can be simply installed into the existing building fabric.
- Real time tracking which may include secure or hazardous areas in the workplace.
- Track movement from zone to zone.
- Secure and alarm exit points of a building.
- UHF Active Tag system.

Eureka® RFID Location System

Asset Protection & Personnel Location Solutions For Safety & Security

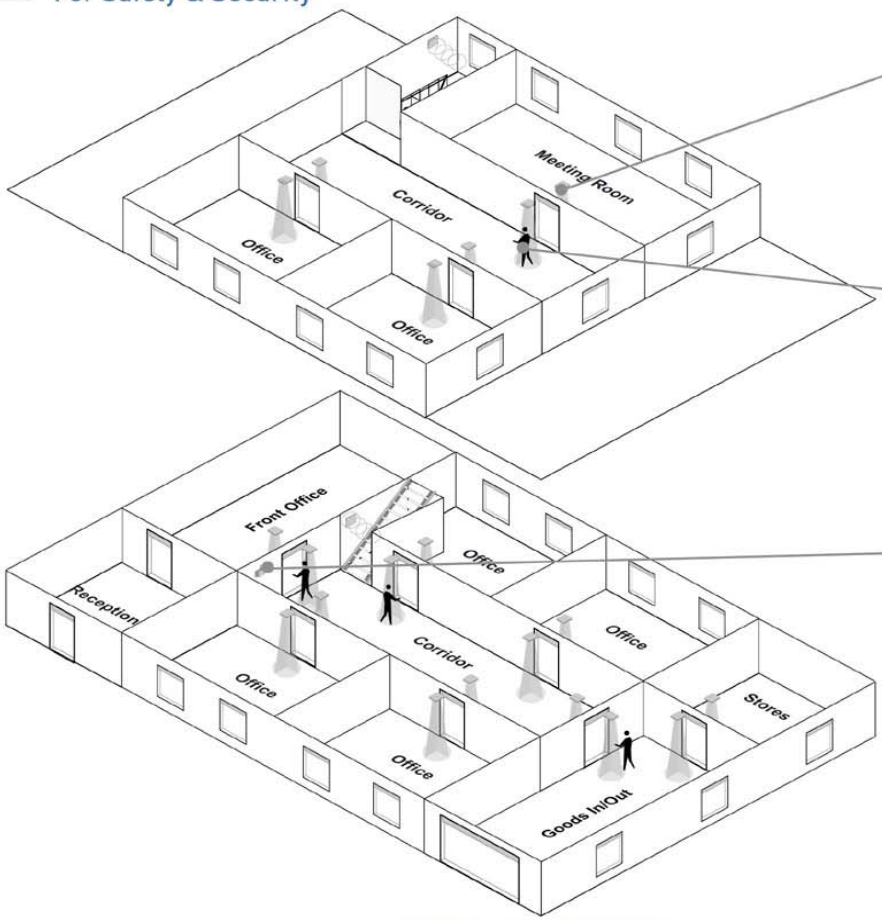
The Eureka Location system operates using two radio frequencies to monitor the movement of people or assets from one zone to another in real time.

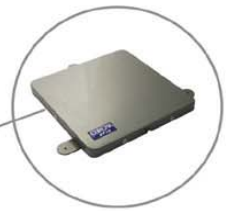
The system operates by using a UHF transmitter which is woken-up by a series of antennas at strategic points around a building.

The software in the host system monitors the transmissions from the tags that includes a unique ID, location data and direction of travel. The host system then determines which zone a person or asset is in. This is typically split into individual rooms and corridors. By using the same multiple wake-up antenna arrangement, movement between levels can be achieved.

Increasing the number of tag Wake-up units around a building can achieve more accurate location data. The level of this accuracy is determined by the customers requirements.

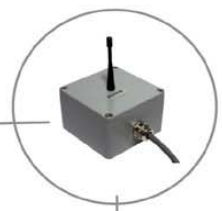
The modular nature of this system allows customers to expand the monitoring capabilities in line with their operational needs.





Wake Up Antenna
These are located at either side of doors, ends of corridors and stairwells to zone a building.

Location Transponders
The Location Transponder automatically communicates with the receiver unit when it is in the field of a wake up antenna. It is capable of transmitting its ID, location and direction of travel.



Receiver Unit
Receives & Decodes data from a location transponder and verifies the signal, forwarding the information to the host system.

Host Computer
Provides a graphical user interface for the system. Capable of forwarding information and interacting with other systems such as hand held radios and CCTV.

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Innovative Solutions

Conclusions

- Can it be done with a barcode?
  - Bulk reading = no
  - Harsh Environments = no
  - High Speed = no
  - True hands free = no
- Consider the application carefully, don't over specify.
- RFID is less predictable than barcode, the benefits can be great so can the cost of failure – Keep it simple and real.
- New RFID technologies and better understanding has opened up many new benefits and improved the payback potential.

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