

RFID Infrastructure

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Trimble Navigation

5/7/12

Trimble

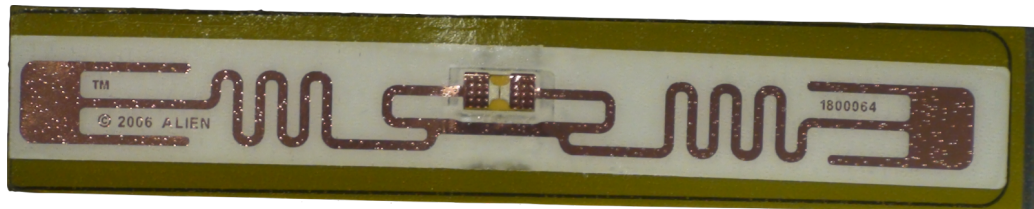
- Large part of the value Trimble offers is to increase productivity through efficient use of location information
- Historically Trimble has used the GPS infrastructure to provide very accurate outdoor location
- Trimble has added many other technologies including lasers and inertial
- The focus has been to improve solutions to fit customers needs
- Now Trimble wants to do this indoors and has looked at many technologies including RFID

UHF RFID

- EPC Class 1 Gen 2
 - RFID version of UPC barcodes
 - Internationally approved
 - North America Europe China Korea
 - 860-960MHz, depending on country.
 - 1W transmitter, reads data in modulated backscatter
 - 10 to 15m read range
- Global wireless protocol

RFID Infrastructure

- Through involvement with the construction industry Trimble sees adoption of RFID in all parts of the construction process
- Building materials will contain RFID tags
- Buildings will be a cloud of RFID tags
- Retrofitting buildings is low cost



Reverse RFID

- By repurposing existing RFID tags and supplementing with inexpensive RFID tags we can create a localization infrastructure capable of 1m accuracy
- The infrastructure is passive, requires no power and minimal maintenance
- The infrastructure contains all information needed for localization
- No cloud based data required for position calculation
- Assumes the user has an RFID reader
- Access to RFID tag data can be controlled

Trimble Reverse RFID Indoor Location Calculation

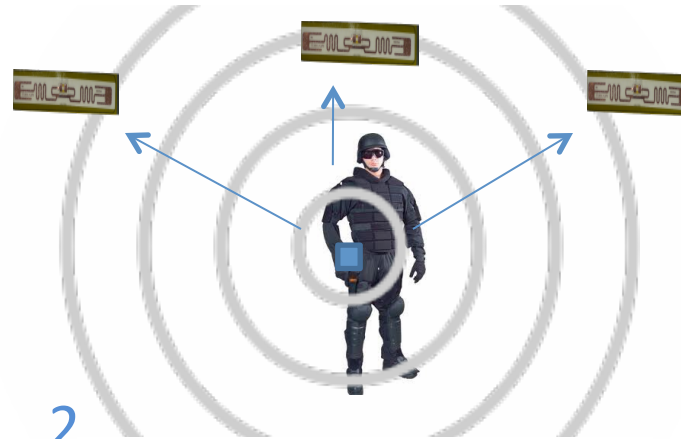
UHF RFID Tags
 X_1, Y_1, Z_1

X_n, Y_n, Z_n

X_2, Y_2, Z_2

RFID Tags are programmed with their position

UHF RFID Reader + GPS + Data Radio



RFID Reader Excites and reads passive tags up to 50 feet away

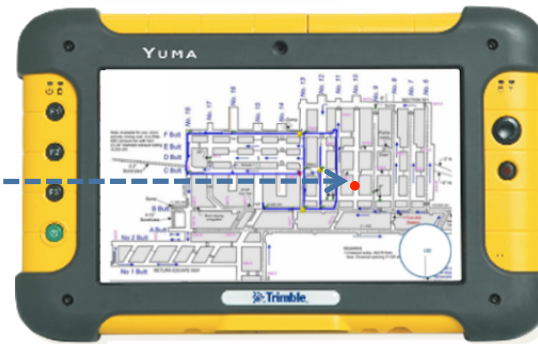
1

2



RFID tags back scatter data to the RFID reader

Position is calculated locally and available via Data Radio

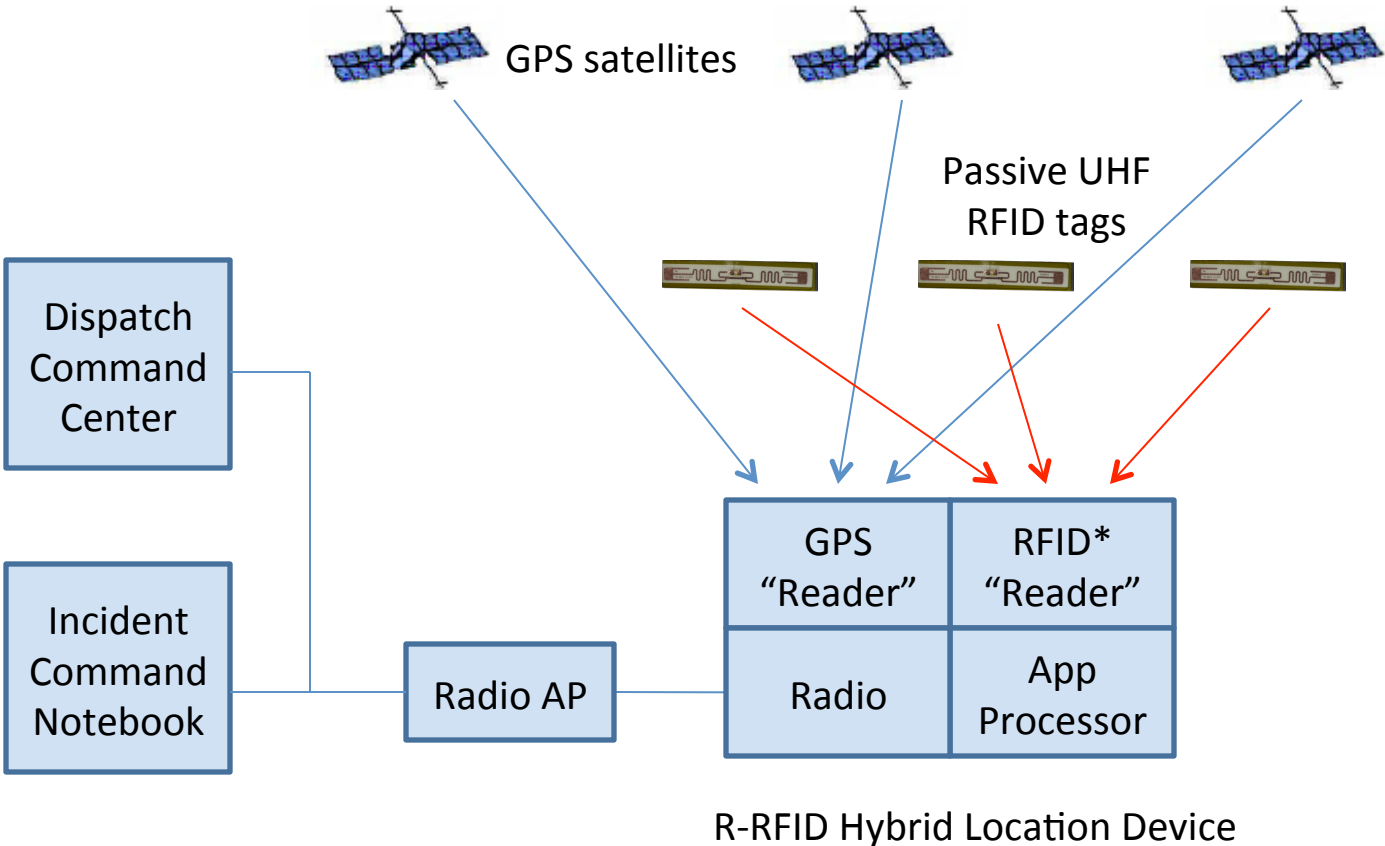


Trimble SW displays tracking data

3

4

Trimble Reverse RFID “R-RFID” - System Diagram (Integrated GPS for Global Outdoor Location)



*RFID technology provided by Trimble’s ThingMagic division

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