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SUB CRUCE LUMEN

RFID and Sensor Networks for Rural Environments

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Agenda

- Background on Auto-ID Lab
  - RFID
  - Sensors
- Conclusions

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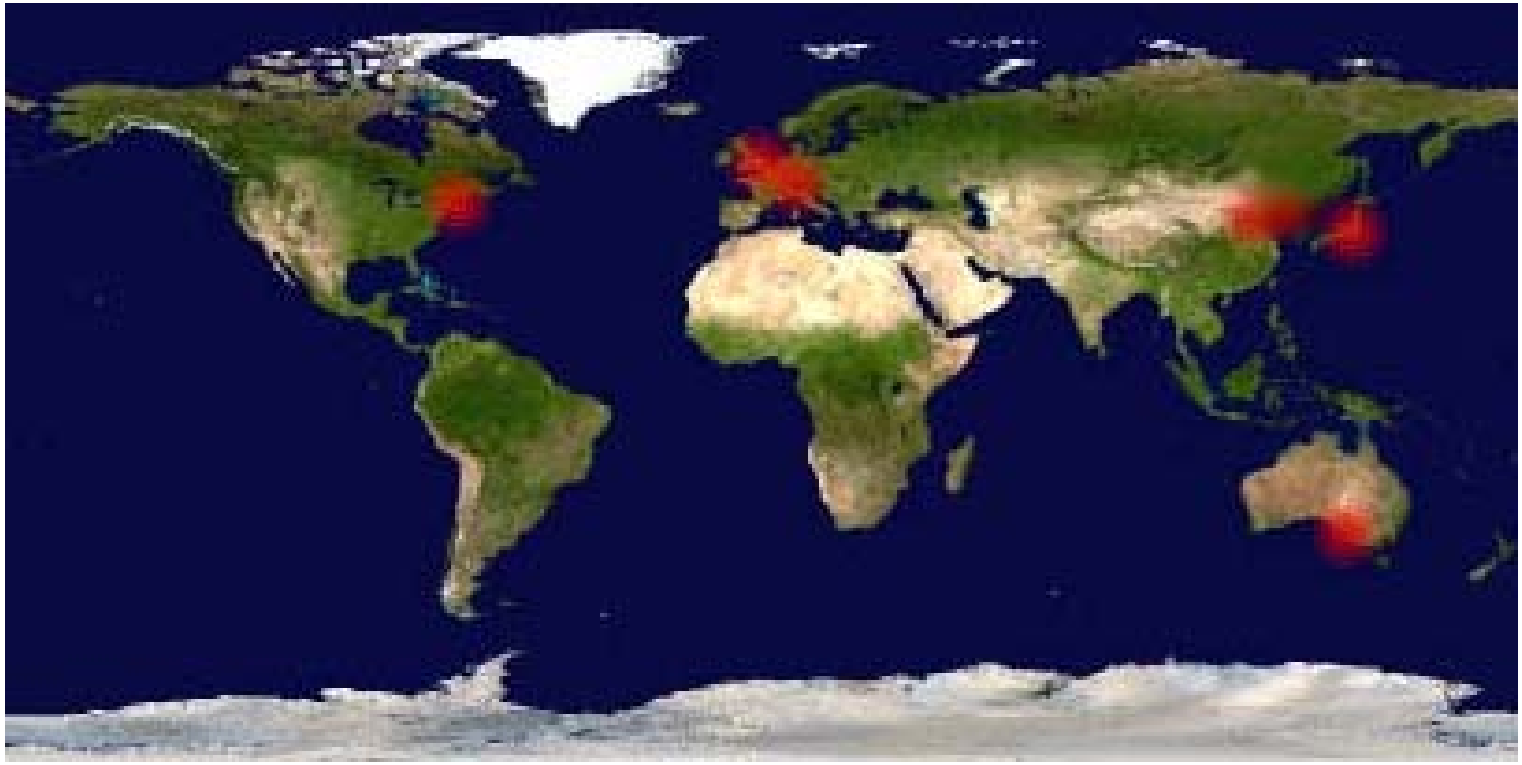
Adelaide, Auto-ID Lab

The Auto-ID Laboratories



Auto-ID Labs

- One of 7 Auto-ID Labs around the world
  - MIT, USA
  - Cambridge, UK
  - Adelaide, Australia
  - Keio, Japan
  - Fudan, China
  - St Gallen, Switzerland
  - ICU, Korea

Research Projects

- The design of cost effective and small footprint tag antennas, suitable for attachment onto metal surfaces.
- Interference studies in high density reader environments.
- Electromagnetic propagation studies applicable to European Regulations
- High security authentication tags
- Dual frequency tags, ones that employ UHF techniques for supply chain applications and then HF for item management applications.
- Passive RFID chip design (modules for implementation)
- Analysis and measurement of new forms of reader to tag signalling

Commercial Activities

- Undertake research projects outside the Auto ID Lab projects
- Since forming the Auto-ID Lab 2003
  - Eight consultancies
  - One Research Contract
  - Two Research Projects

Contract Research

- Separate from the EPCglobal funded work
- Commercial Infrastructure
  - Adelaide Research & Innovation Pty Ltd
- Intellectual Property Protection
- Pork CRC Research Contract

Auto-ID Lab Advantage

- RFID Lab has been operating for more than 3 decades
- Commercial successes in RFID Commercialisation
  - RFID in Library, vehicle (toll, access), rail, waste management
- International Collaboration
- ASIC design, development and implementation
  - Collaboration with ChipTec
- Security & Authentication
- Design of compact metal mount tags
  - Beer kegs, wine closures, animal tags
- Standards Experience
  - ISO and EPCglobal
- Intellectual Property
  - 21 patents
  - Know how

Editor of Security Book

- Prof. Peter Cole and Damith Ranasinghe
  - Joint editors of a Springer-Verlag book, published Nov 2007

  - Networked RFID Systems and Lightweight Cryptography: Raising Barriers to Product Counterfeiting.

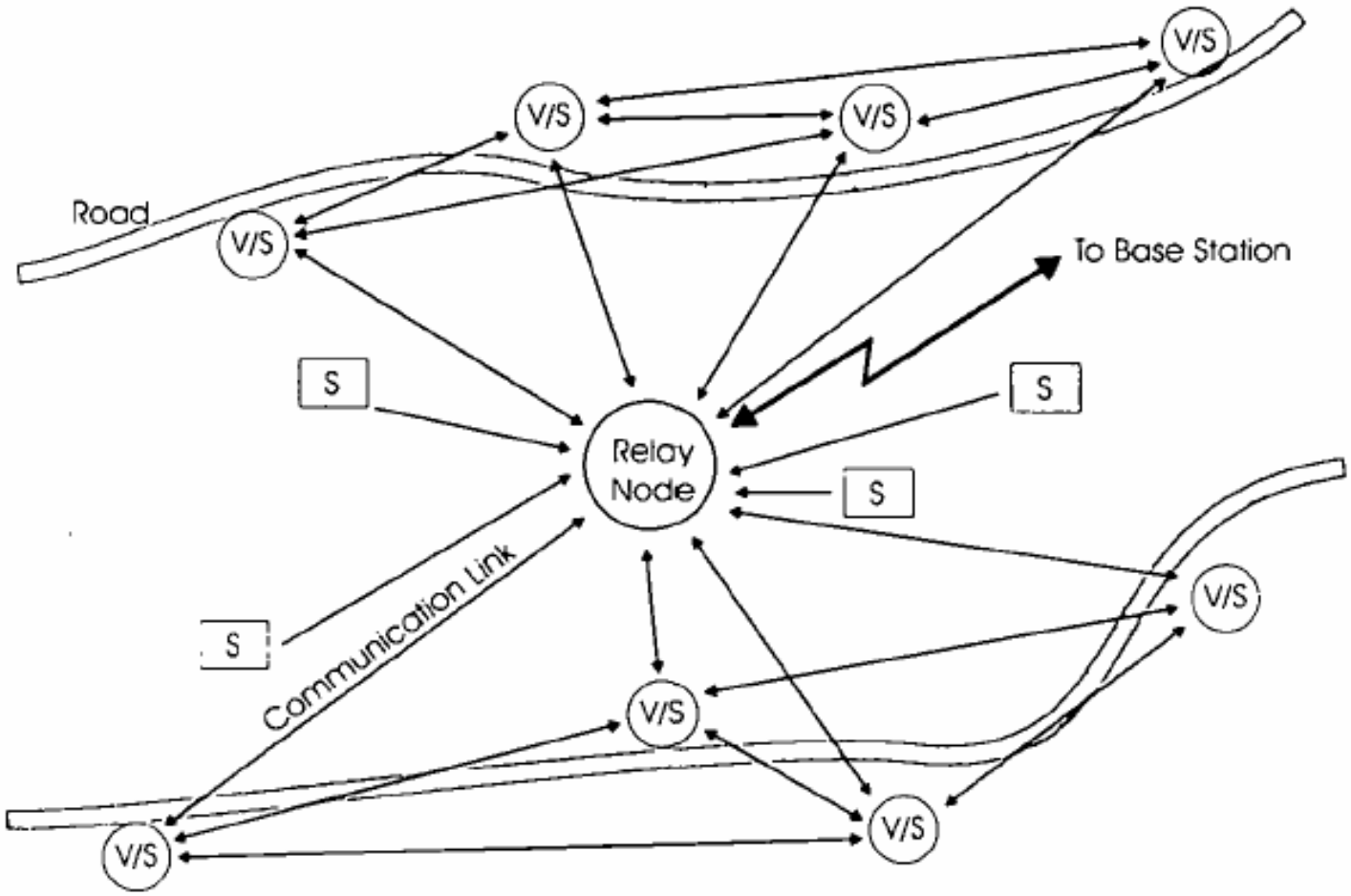
RFID's role

- Automatic Identification of assets
  - Returnable Assets (Pallets, totes, RTIs, etc)
  - EPCglobal => low cost tags US$0.08 Qty 10m
- Production monitoring
  - Automatic Identification of produce (based on RFID)
  - http://www.rfidjournal.com/article/articleview/3748/1/1/
    - Visibility to farm operations
    - Determine how long produce spends in any particular location
    - Provide traceability in the case of a recall
    - Analyse operational efficiency.
    - RFID temperature sensors
    - Monitor the time a product spends waiting outside a cooler
    - Track the volume of products being harvested, and send notification down the supply chain to better prepare transporters, distributors and retailers about the volume of product they can expect to arrive.

Sensor Work

- Preparatory research on distributed sensors
  - Ad-hoc sensor network distributed in rural environments
  - Zero quiescent power sensors circuits
  - Sensor Development
    - Sense parameters of interest
      - Type of sensors to be deployed to be determined
      - Some will need to be developed
    - Low power communication within ad-hoc network
      - Commercial sensors too much power, too expensive

Proposed Sensor Network



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Conclusions

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Conclusions

- RFID has low to moderate technical risk
- Auto-ID Lab commercial success in RFID developments
- Commercial Sensors too expensive, both in cost and power
- Significant research already undertaken in RFID and some applicable to sensors
- Experience ranges from user requirements definition, project planning and implementation to installation & commissioning

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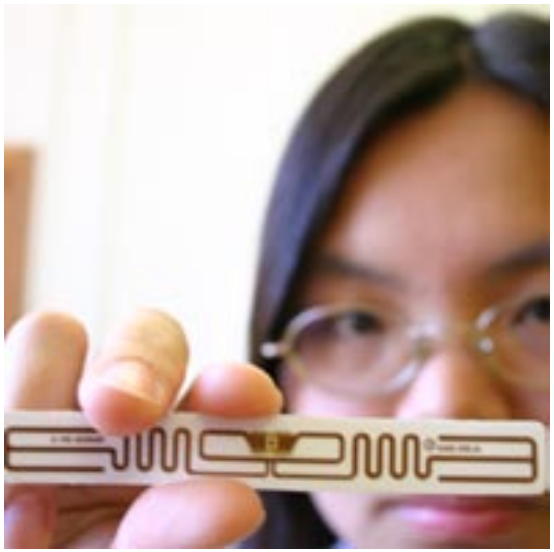
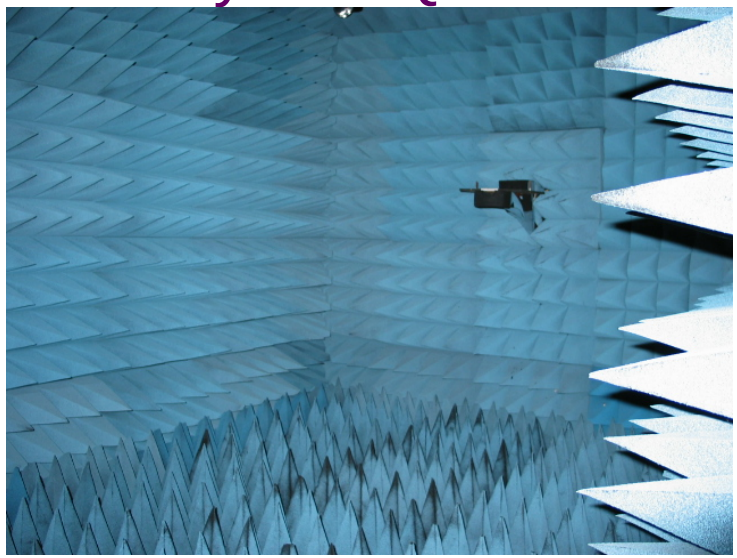
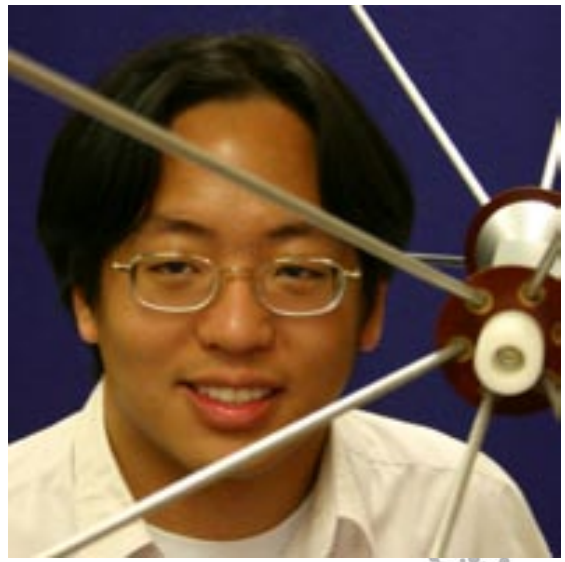
Thank you & Questions







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