Multi-year Expert Meeting
on Transport,Trade Logistics and Trade Facilitation:

Transport and logistics innovation towards the review of the Almaty Programme of Action in 2014

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Radio Frequency Identification (RFID)

by

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Importance of RFID in Logistics

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MAJOR RFID PROJECTS

- Using RFID technology to optimize distribution operations (3 years sponsored research)
- Good practice for adopting RFID technology in the English healthcare (3 years sponsored research)
- Using RFID to add value in warehousing operations
- Using RFID in door production (KTP project)
- RFID feasibility projects: UAV Engines and jewellery Merrell Casting
- RFID safety features on excavators
- Safety vest – mining industry

CHALLENGES

- To Save time and fight counterfeit
- Inaccurate data causes expensive manual interventions
- To cut costs in the supply chain
- Better options for serving customers
- Visibility and traceability
- Better customer services
- Accurately quantify carbon emission

Radio Frequency Identification

RFID

What is RFID?

- RFID - Wireless automatic identification technology that identifies objects and gathers data without human intervention or entry of data.
- Transfer Data with no physical contact
- It does not require line of sight

BRIEF HISTORY

Decade	Event
1940 - 1950	Radar refined and used, major World War II Development effort. RFID invented in 1948.
1950 - 1960	Early explorations of RFID technology, laboratory experiments.
1960 - 1970	Development of the theory of RFID. Start of applications field trials.
1970 - 1980	Explosion of RFID development. Tests of RFID accelerate. Very early adopter implementations of RFID.
1980 - 1990	Commercial applications of RFID enter mainstream.
1990 – 2006	Emergence of standards. RFID widely deployed. RFID becomes a part of everyday life.

RFID USES

- Retail & Distribution
- Contactless Payment
- Keyless Entry
- Livestock Tagging
- Pharmaceuticals
- Logistics Assets (containers, trailers)
- Pet Identification
- Secure document application e.g E-passport

BENEFITS OF RFID

Visibility

- ✓ Prevent theft
- ✓ Misplaced and lost
- ✓ improve security

Automation

- ✓ Reduce human errors
- ✓ Saves time

Authentication

- ✓ Product recalls
- ✓ Fraud and counterfeit

RFID USES

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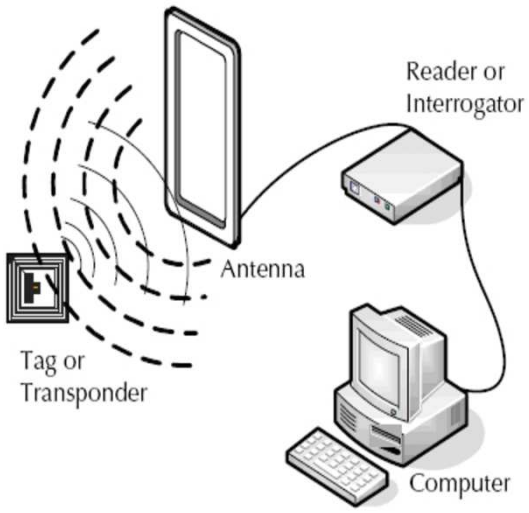
BENEFITS OF RFID FOR SCM

- Product visibility
- Reduce supply chain Errors
- Reduce out of stocks
- Anti counterfeit (product recall)
- Automatic data entry
- Capacity to handle increased volumes of goods
- Increased throughput with savings in time and without increases in staffing
- Provision of time and attendance management

BASIC OPERATION OF RFID

- Tag enters RF field of reader
- RF signals power tag
- Tag transmits ID and data
- Reader captures data
- Reader sends data to computer
- Computer sends data to reader
- Reader transmits data to tag



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TYPES OF TAGS

TYPES OF TAGS

- Tags can be attached to anything
- Pallets or cases of product
- Company assets
- Personal items such as apparel
- Luggage and laundry
- Livestock , pets and people
- Computers, TVs, camcorders etc …

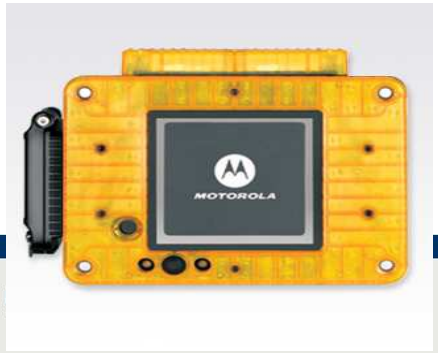
Tags

TYPES OF READERS

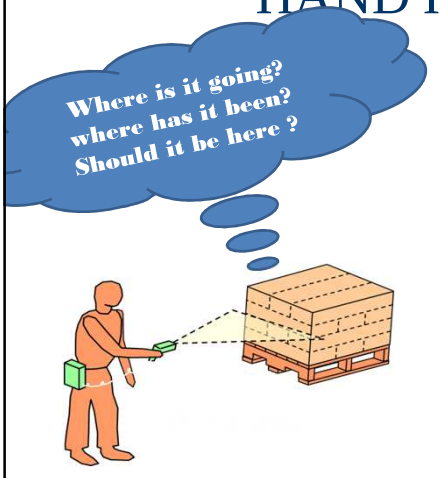
- Readers also called interrogators
- Fixed - Doorways, portals or entrance /exit
- Handheld - Portable ergonomic design
- Wireless - Have capability to communicate with external networks such WIFI
- Mobile - Used by employees or mounted to forklifts

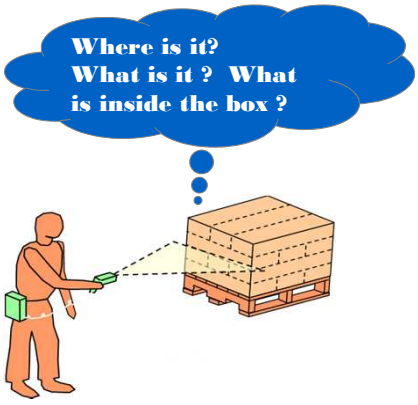
TYPES OF READERS

RFID Readers (examples)

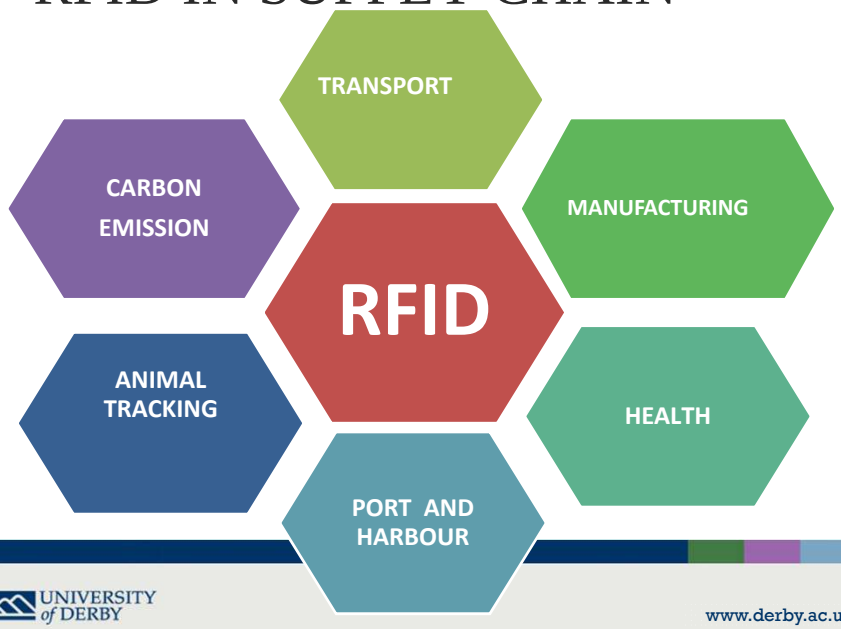


HAND HELD READER





RFID IN SUPPLY CHAIN



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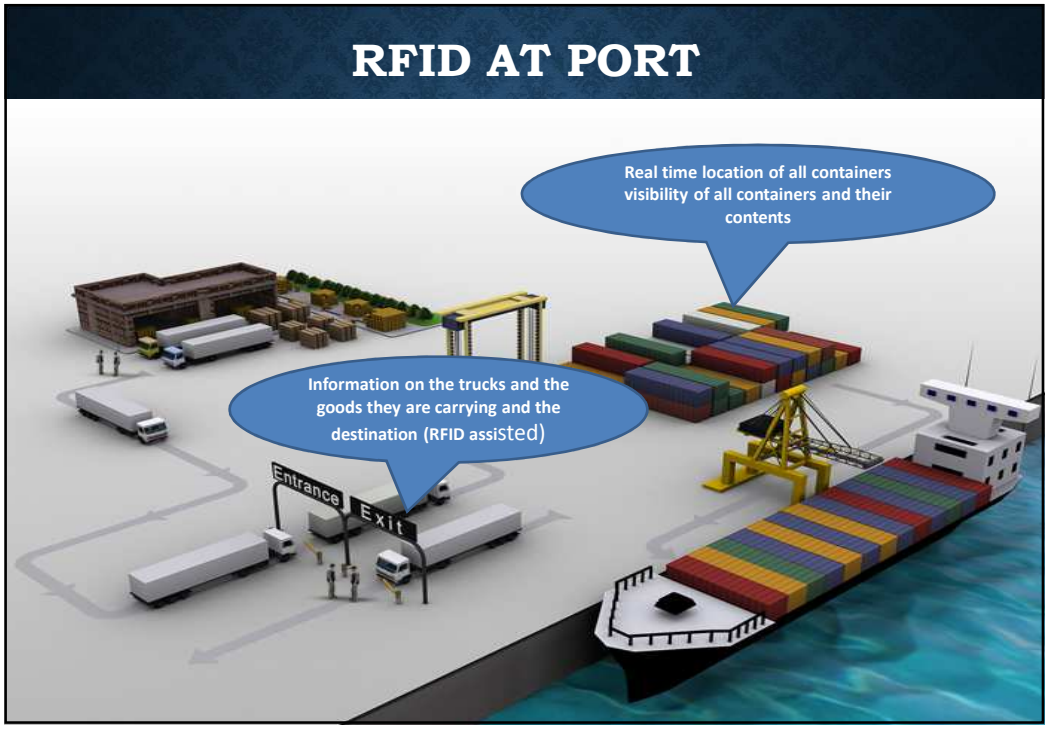
RFID AT PORT



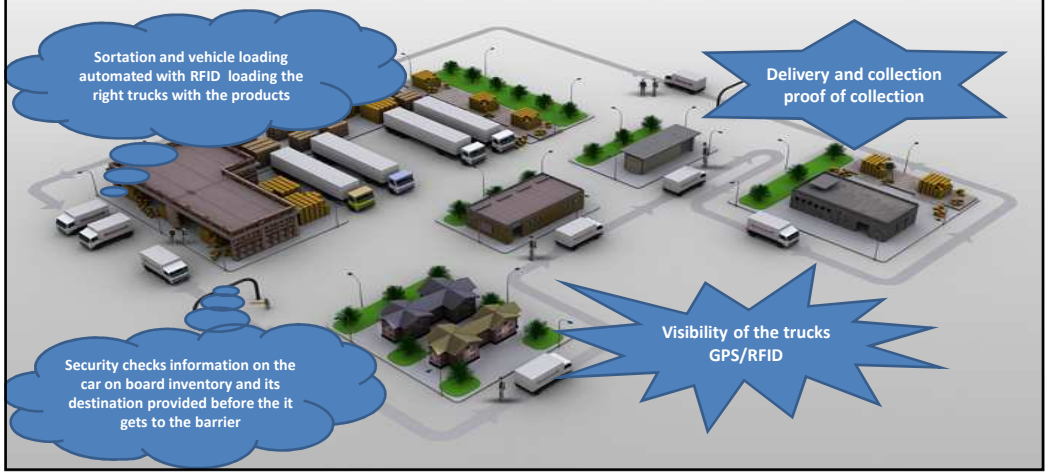
RFID REDUCES TRAFFIC DELAYS AT ADANI PORT HARIZA CONTAINER TERMINAL INDIA

- Challenges
- No rail facility :The trucks provides the only means of moving cargo onto or off of ships
- Traffic management (trucks spent much time to load or unload)
- Managers strives to prevent backups in which trucks operators wait to load and or unload
- The terminal has only 600 meters (1,970ft) wharf to accommodate all vehicles

BENEFITS

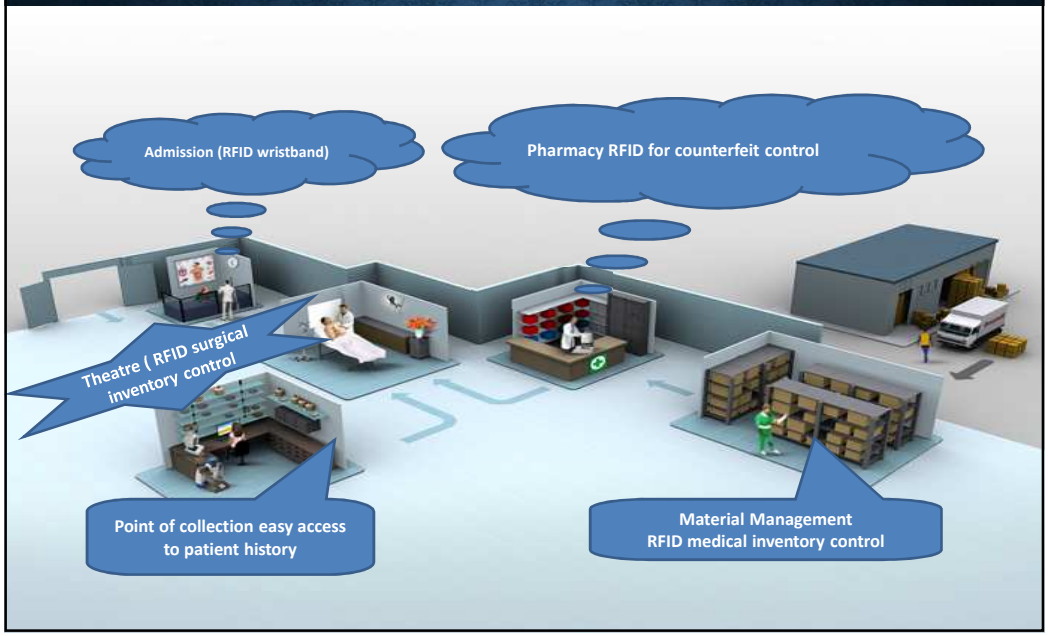
- Real time location of truck
- Decreased trucks waiting times and labor cost
- Automate the gate entry process for vehicles
- Provides better location data in the shipping yard and the wharf
- Ensure vehicles is at the proper location
- Saved the terminal about £112,000 (6.7millions lahks) in labour cost

RFID FOR COLLECTION AND PICKING



RETAIL RFID

RFID HEALTH



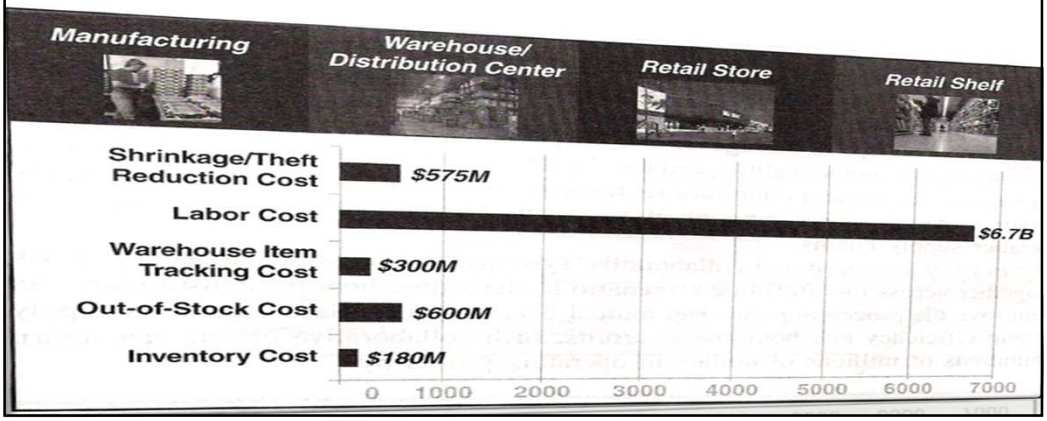
HEALTH CARE SOLUTION

- Drug supply chain
- Patient tracking
- Waste Material handling
- Hospital RTLS
- Medical devices
- Surgical operation

RFID IN LIBRARY

Benefits of RFID application for SCM:

- Cost Reduction
- For example
- Wal-Mart
- Invested $3 billion in the system.
- Save approximately $8.35 billion annually



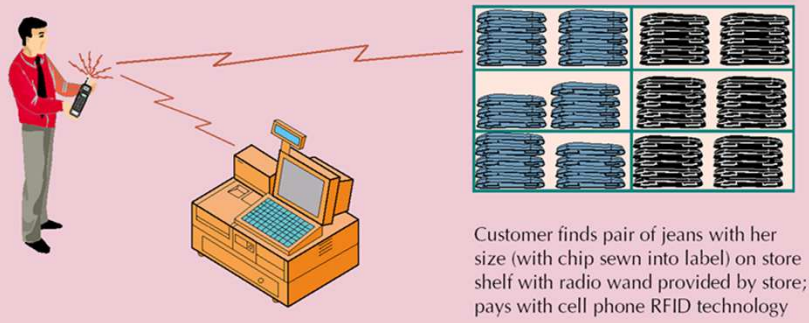
RECOMMENDATION

1. Offer research opportunities through funding towards RFID awareness, education and adoption at Universities, research institutes and industrial organisations
2. Provide incentives or benefits to early adopters through recognition, compensation and tax/duties reduction, etc.
3. Enforce or regulate RFID adoption policies in relevant areas in order to promote its use by indicating benefits as ROI
4. Provide shared assistance in vendor market to adopters and other consumers, e.g. share price of RFID project piloting leading to a complete installation

THANK YOU

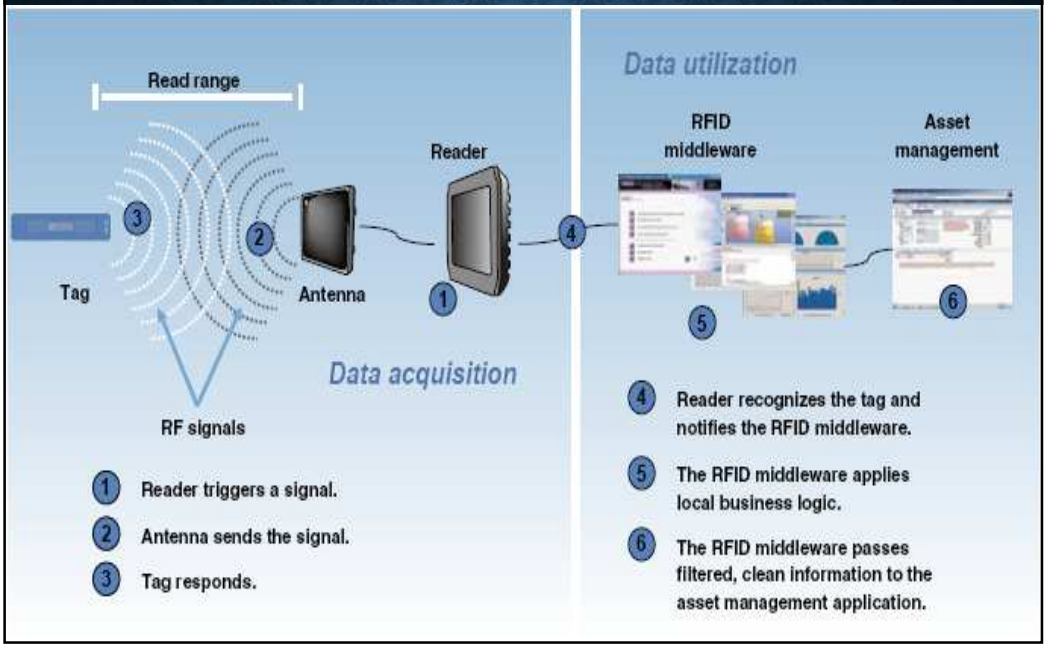
RFID CAPABILITY

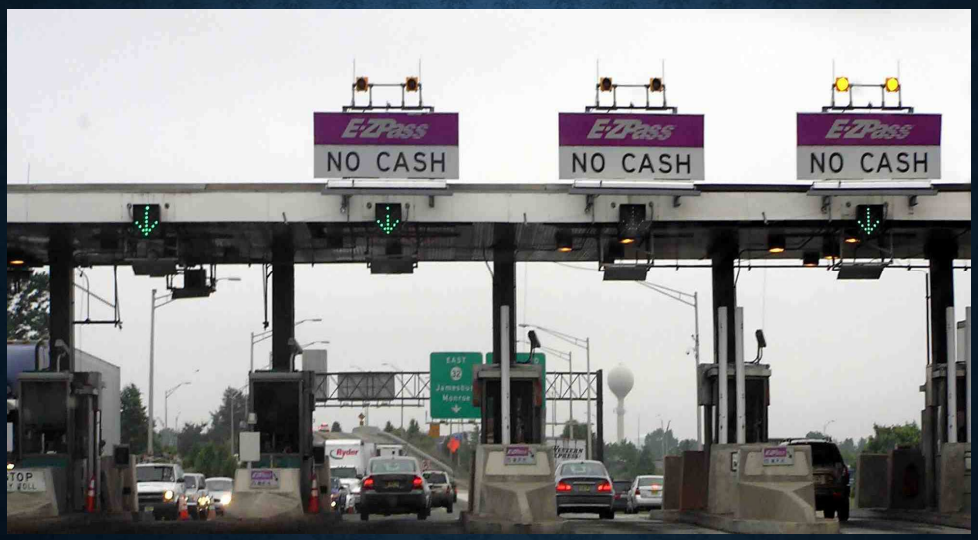
RFID keeps track of items on ships and planes leaving global ports or coming into U.S. for security



Customer finds pair of jeans with her size (with chip sewn into label) on store shelf with radio wand provided by store; pays with cell phone RFID technology

RFID IN SCM





FREQUENCY CHART

Low Frequency (LF)
Frequency: 125 - 134 kHz
Typical Use: Animal ID, race time, access control
Range: < .5 or 1.5ft
Benefits: works well around water
Drawback: short read range

High Frequency (HF)
Frequency: 13.56 MHz
Typical Use: NFC, smart cards, tickets, and DVD, library books,
Range: Near contact up to 30 cm.
Benefits: Low cost of tags

RFID

Ultra-High Frequency (HF)
Frequency: 433 MHz & 856 - 960 MHz
Typical Use: pallet tracking , parking lot access, electronic toll collection
Range: 3m or 9ft

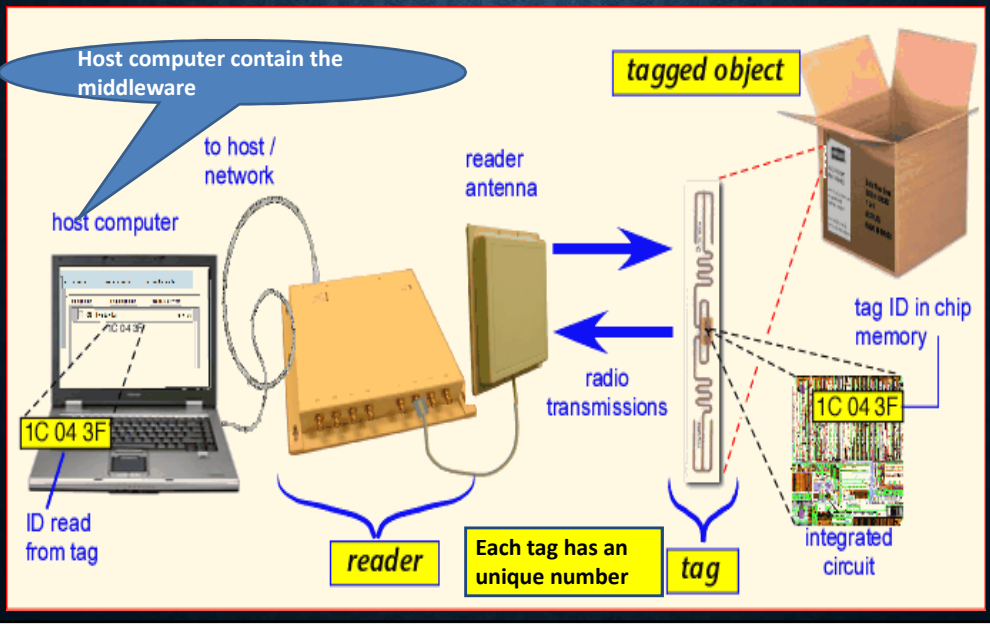
MICROWAVE (UHF)
2.450 -5.8GHz
Use : airline Baggage
Electronic toll collection

CARGO MANAGEMENT

BY INJIMG AT ADANI PORT INDIA

http://www.impinj.com/Applications/Case_Studies/Improving_Cargo-Management_Efficiency_with_RFID__Adani_Port.aspx

COMPONENTS OF RFID



DIFFERENCES BETWEEN RFID AND BARCODE

	RFID	Barcode
Line of Site	Not required (in most cases)	Required
Read Range	Passive UHF RFID: - Up to 40 feet (fixed readers) - Up to 20 feet (handheld readers) Active RFID: - Up to 100's of feet or more	Several inches up to several Feet
Read Rate	10's, 100's or 1000's simultaneously	Only one at a time
Identification	Can uniquely identify each item/asset tagged.	Most barcodes only identify the type of item (UPC Code) but not uniquely.
Read/Write	Many RFID tags are Read/Write	Read only
Technology	RF (Radio Frequency)	Optical (Laser)
Interference	Like the TSA (Transportation Security Administration), some RFID frequencies don't like Metal and Liquids. They can interfere with some RF Frequencies.	Obstructed barcodes cannot be read (dirt covering barcode, torn barcode, etc.)
Automation	Most "fixed" readers don't require human involvement to collect data (automated)	Most barcode scanners require a human to operate (labor intensive)

DIFFERENT TYPES OF TAGS

Basic Types:

Active

- Battery powered memory
- Tag transmits radio signal
- Larger data storage and higher cost

Passive

- Reader powered
- Shorter range
- No battery
- Tag reflects radio signal from reader

TYPES OF READERS

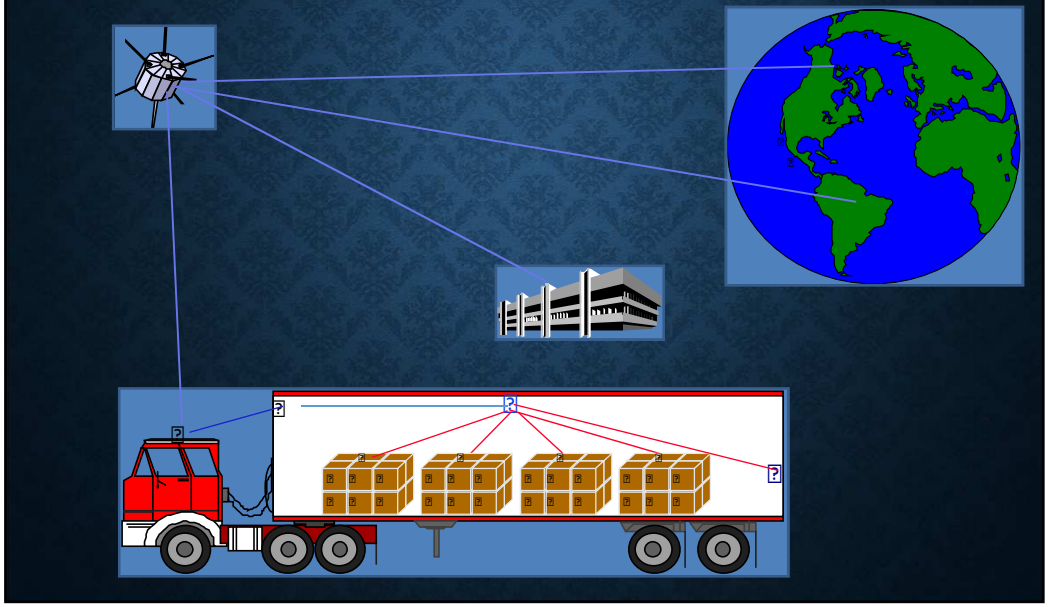
Readers also called interrogators

- Fixed - Doorways, portals or entrance /exit
- Handheld - Portable ergonomic design
- Wireless - Have capability to communicate with external networks such WIFI
- Mobile - Used by employees or mounted to forklifts

TYPES OF READERS

READER	READ RANGE AND USED
Passive UHF	Long read range up to 30 feet Faster than HF and LF Used in retail and supply chain
Passive HF	Read range of under 2 feet Works better around metals and water Ideal for factories
Passive LF	Read range of under 1 foot Best at scanning non metallic goods For fruits
Active	Battery on board, read up to 100feet Read range relates to tag power Very expensive Used for tracking

TRACKING OF INVENTORY



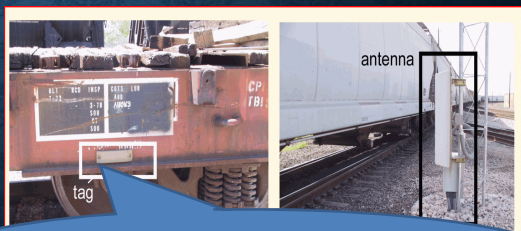
- INTRODUCTION
  - Brief history of RFID
- TAGS
  - Types of Tags
- READERS/INTERROGATORS
  - Types of Readers
- RFID IN SUPPLY CHAIN
  - Recommendation

TAGS

Cartons of produce identified with RFID

RFID tag on a truck trailer to provide near-real-time location information

New born baby with RFID tag



Automated Equipment Identification tag and reader antenna for railcar tracking