ILC technology in the Food Supply Chain

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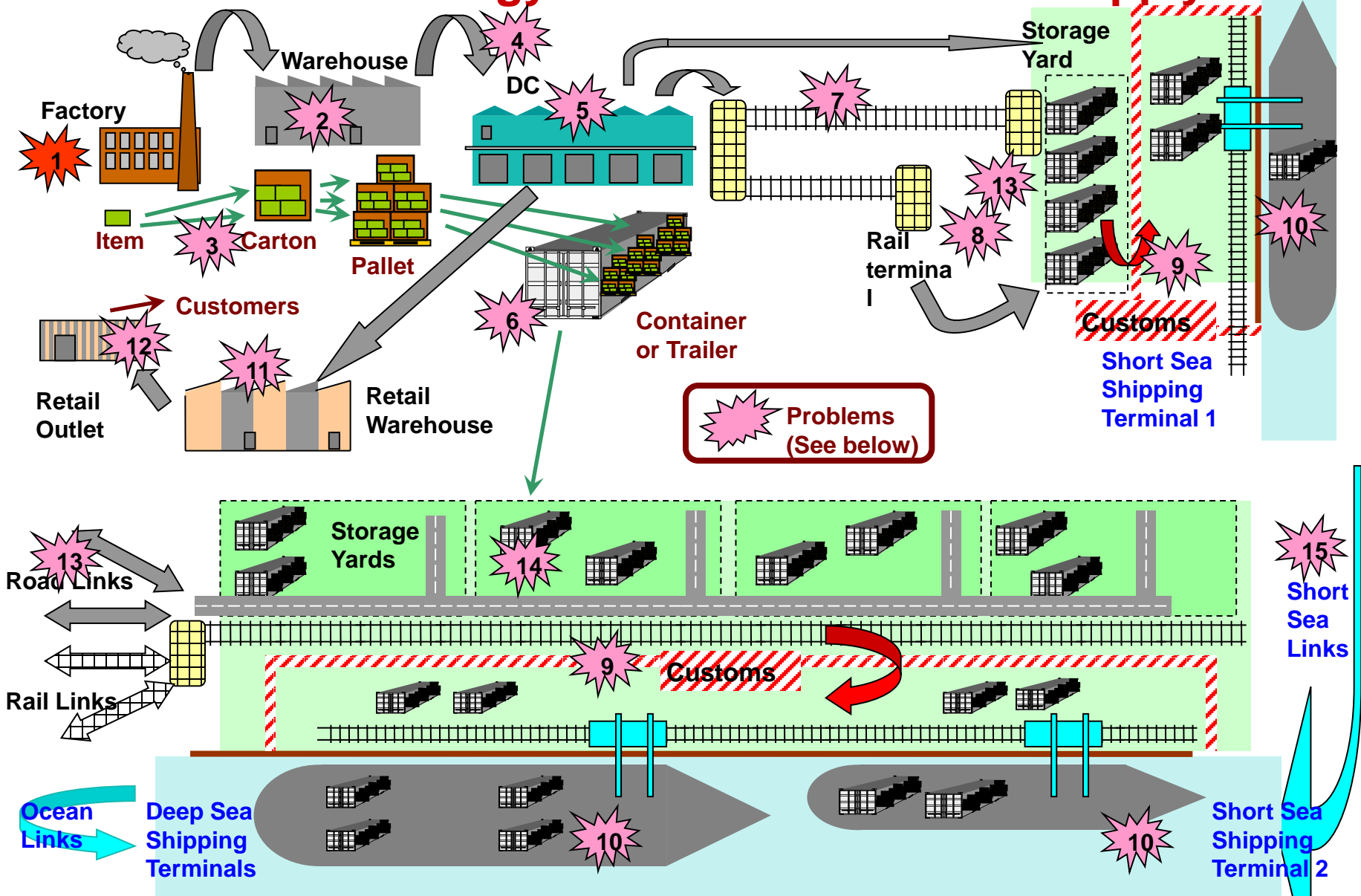**The Interreg IVB North Sea Region Programme**

OVERVIEW

- Food logistics and supply chains;
- Connected flows of data and goods
  - **The Internet of Things**;
- Identification, Location, Communication (**ILC**);
- Technologies and their limitations;
- Case studies and implementations;
- Summary and lessons to learn.

What is Logistics?

- **The right thing**
- **In the right place**
- **At the right time**

- **(Safely)**
- **(Securely)**
- **(and at appropriate cost)**

Potential Technology Benefits in a Generic Supply Chain

Factory

Warehouse

DC

Storage Yard

Item

Carton

Pallet

Customers

Container or Trailer

Rail terminal

Customs

Short Sea Shipping Terminal 1

Retail Outlet

Retail Warehouse

Problems (See below)

Storage Yards

Road Links

Rail Links

Customs

Ocean Links

Deep Sea Shipping Terminals

Short Sea Links

Short Sea Shipping Terminal 2

1) **Raw materials and components supply; Road transportation to factory; In-factory inventory control; Manufacturing QA.**

Identification, Location, Communication

Identification
Location / Positioning
Communication

Integration → *ILC Concept*

We do not always need all three
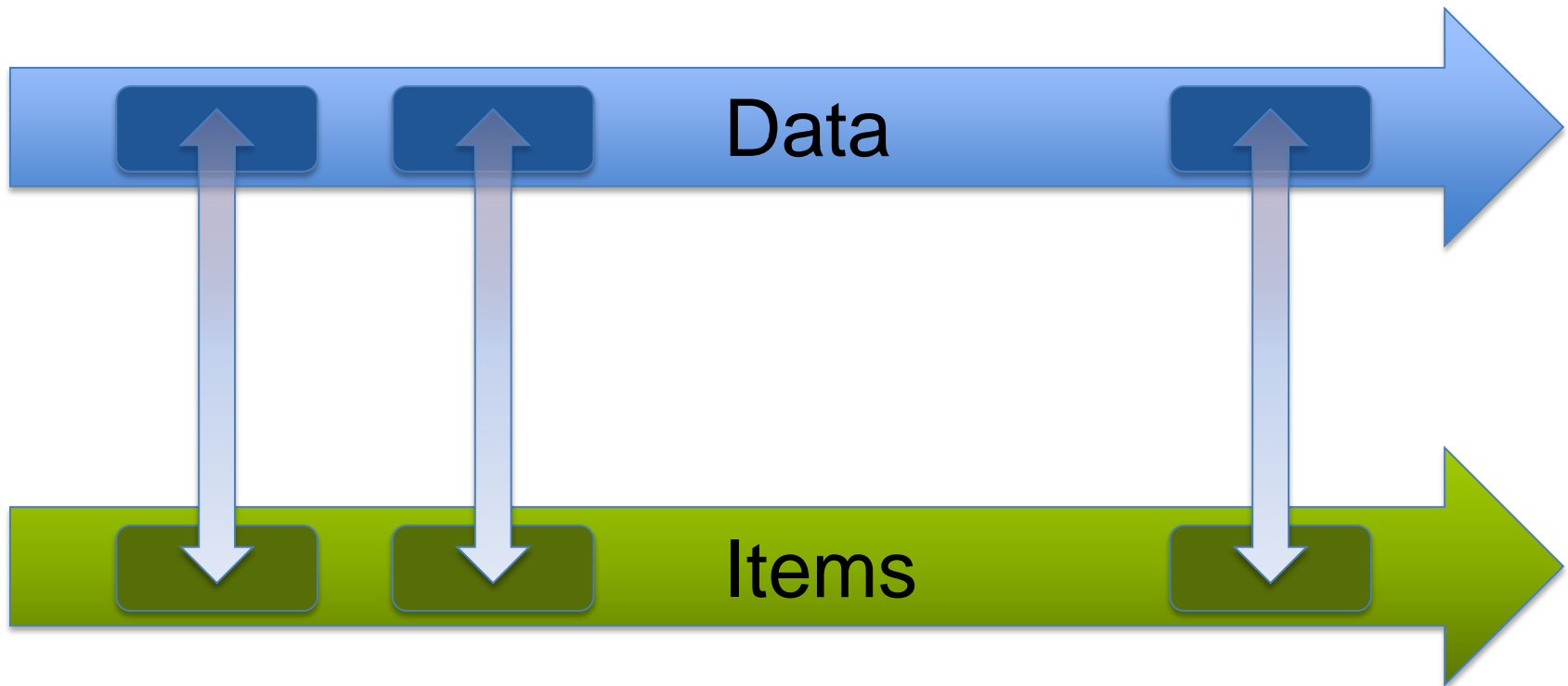Eg on a production line Position is usually known.

.. and often two or more are combined
Eg AIS for ship ID, Location and Communication.

System Integration and Data Flow are crucial.
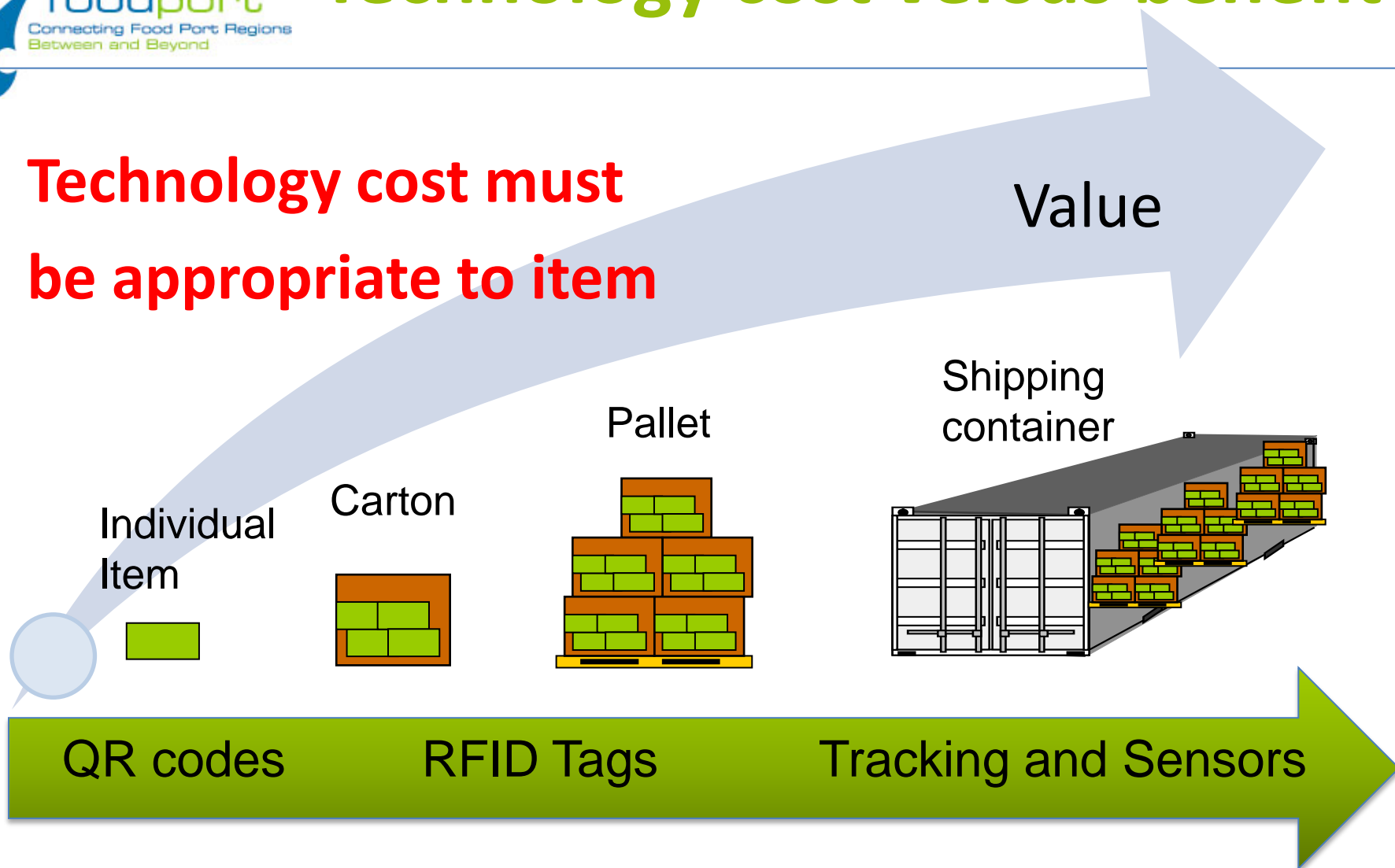
- Connected Item flows and Data flows

Logistics Technologies

- **Identification**
  - *Barcodes / QR Codes / RFID systems*;
- **Location**
  - *GPS / AIS / eLoran / WiFi*;
- **Communication**
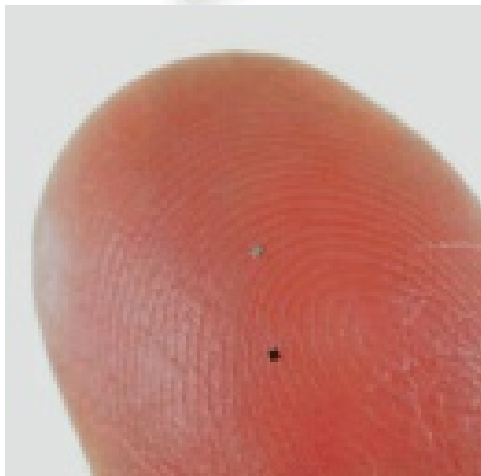 - *Mobile voice & data / WiFi / Internet / Satellite*.

Two important points to consider……….

Technology cost versus benefit

Technology cost must be appropriate to item

Value

QR codes   RFID Tags   Tracking and Sensors

Individual Item
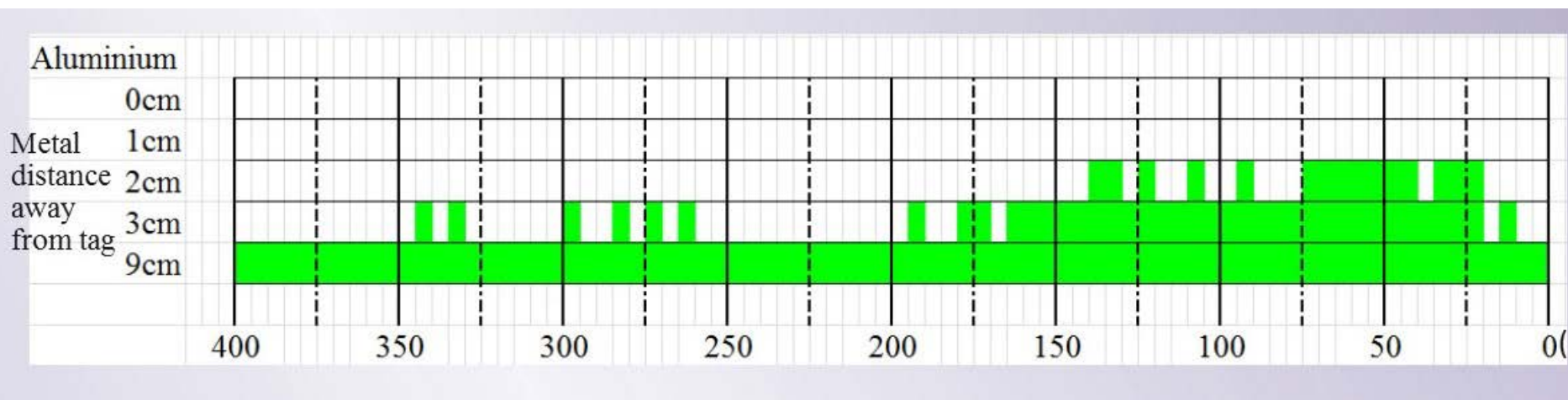
Carton

Pallet

Shipping container

Practical RFID range tests

Tests results below are taken in our laboratory

Conducting material within 9cm of tag severely restricts read range

- Fresh fish – several fish box trials unsatisfactory
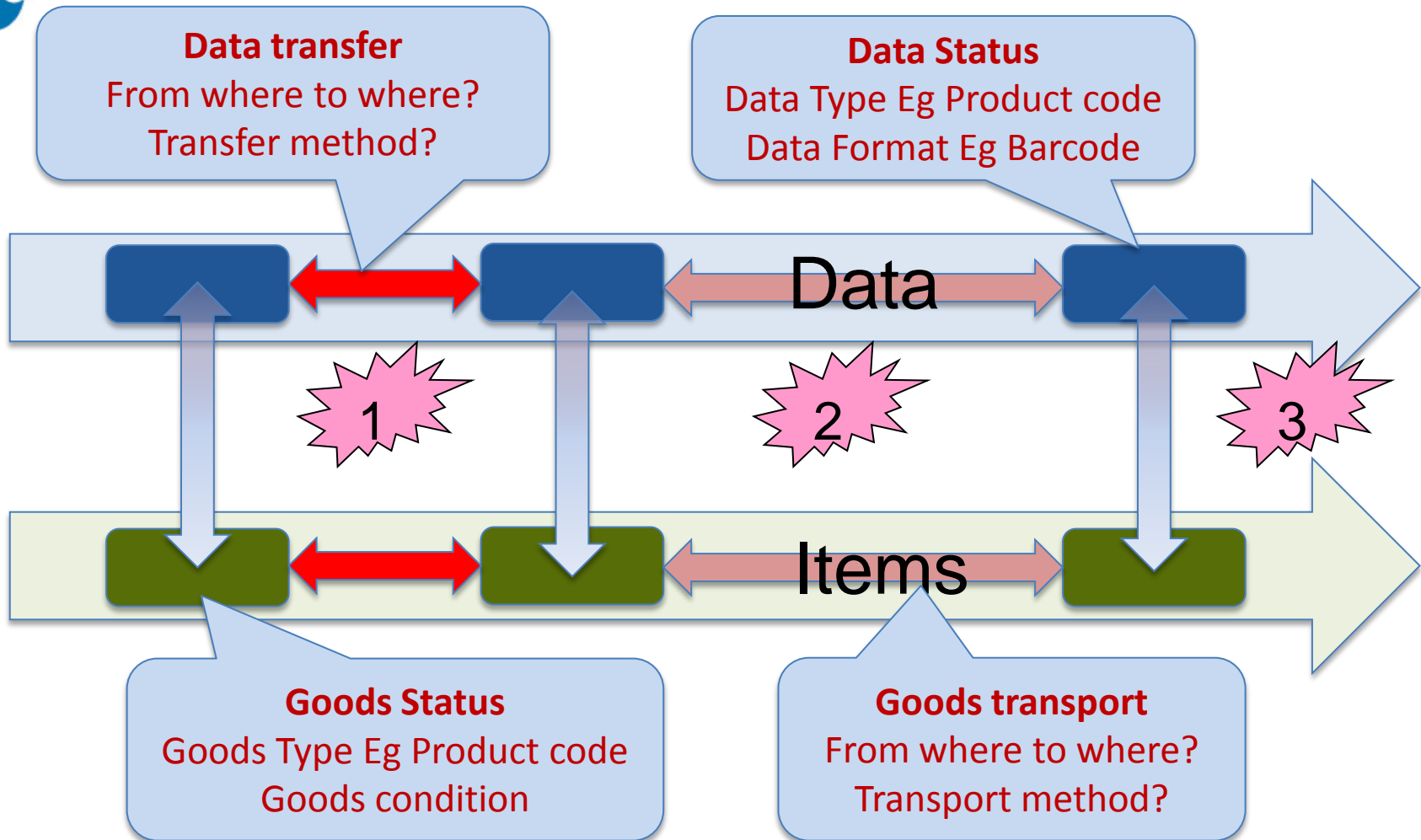- Fresh pasta
- Canned food / liquids etc

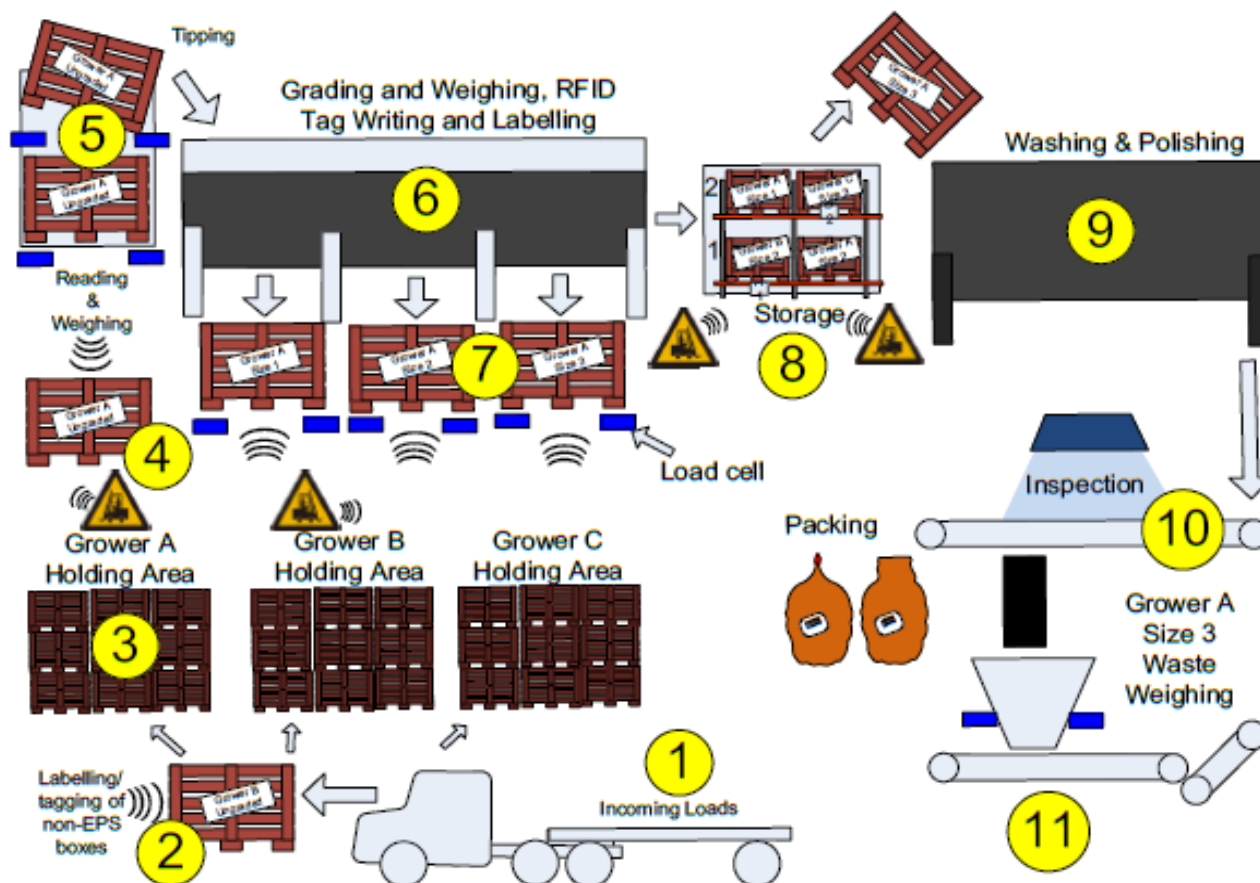RFID tags must be placed carefully to ensure RF visibility!

Five case studies

- **Whisky - ISOTANKS – See Frank's presentation**
- **Potatoes – Process map / RFID tests / feasibility**
- **Fresh fish – Very complex SC - Process map**
- **Fresh Vegetables – Low value items**
- **Manufactured food – Variety and JIT delivery**

Describe each case:

Data transfer
From where to where?
Transfer method?

Data Status
Data Type Eg Product code
Data Format Eg Barcode

Data

1

2

3

Items

Goods Status
Goods Type Eg Product code
Goods condition

Goods transport
From where to where?
Transport method?

Potatoes – proposed process

Other issues – waste monitoring
- Sub-standard potatoes
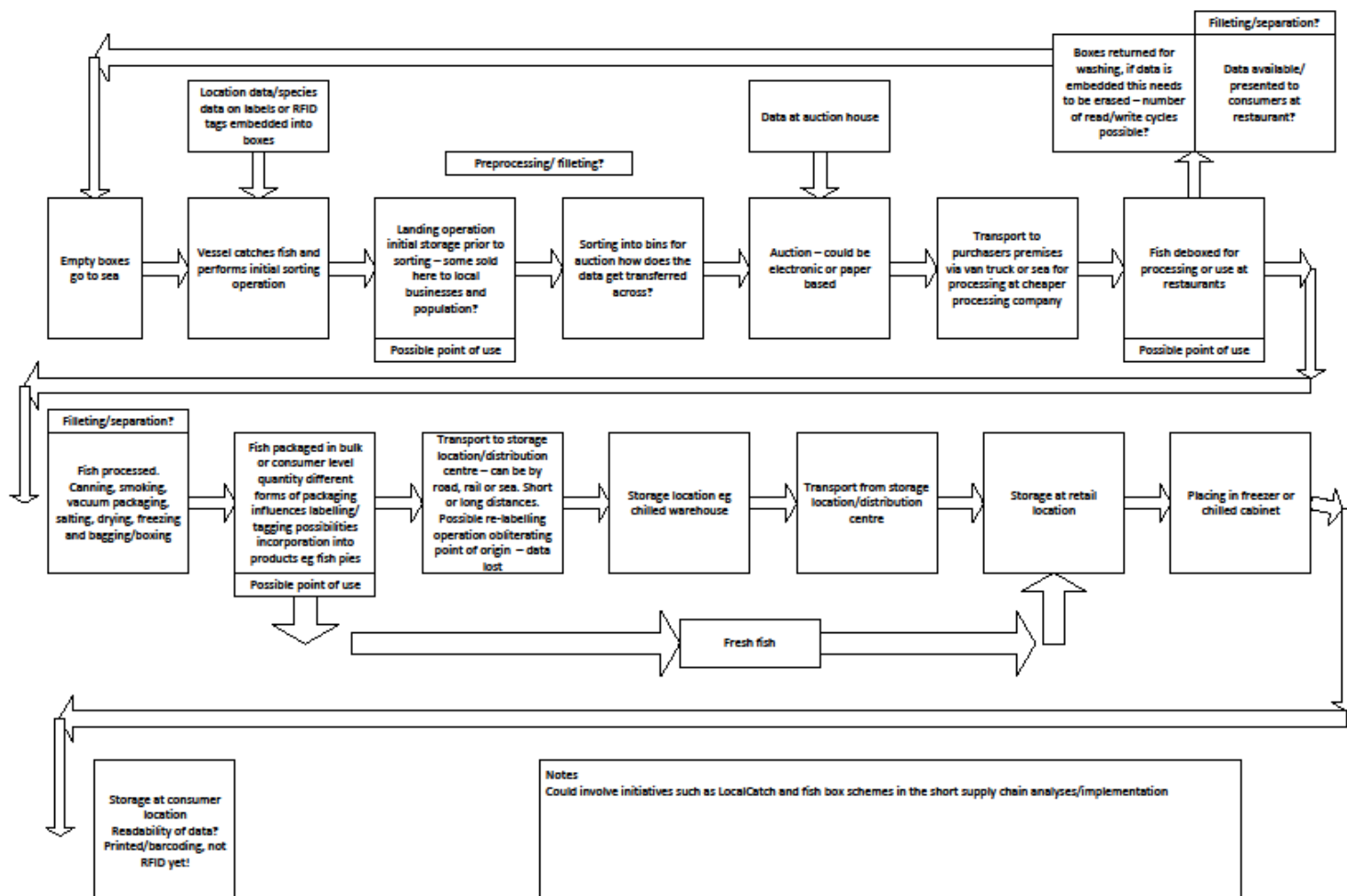- Stones and soil

Potatoes – practical tests

foodport
Connecting Food Port Region
Between and Beyond

E PARK & SONS LTD 2009

Test 2, Box full, tag mounted on short side

Vertical axis indicates distance of read from tag centre in centimetres

The red area near the origin represents the orientation of the tag, the tag is not to scale.

— Omni-ID
— Rafsec 'Dog Bone'
— Alien 'World Tag'

Box footprint
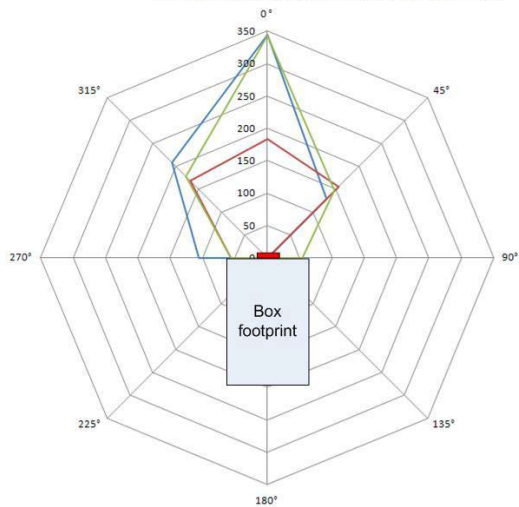
Fresh Fish case study…….

Fresh fish – process mapping

Real-time data input

Price results displayed instantly

Pack & Sea RFID Labelled boxes

RFID for Fresh Vegetables:
Case study – Vers Schakel (Fresh chain)
Packing centre to customer

RFID tagged trays used to track contents through supply chain to retail outlet.

Improved control and reduced waste

Summary - Lessons to learn

- Accurate mapping of the supply chain is essential;

- Data should be standardised and shared across partners in the supply chain;

- Technology choice must be appropriate to value of item and to potential benefit;

- Technology should be tested in the real world before large scale adoption;

- Reusable boxes / totes can improve the financial case for RFID.

Thank you! Questions?