

27 - 30 August, University of Bremen, Germany

# *Reengineering and simulation of an RFID logistics system*

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# Agenda

## Introduction

- RFID Lab at the University of Parma
- Global RF Labs Alliance network

## RFID warehouse project

- Process reengineering and simulation

## Future activities

- RFID Logistics pilot project

# The Lab – the origins

2000 - 2002

- **RFID Lab** at the University of Parma stems from long lasting research activities carried out at the Industrial Engineering Department of the University of Parma. Research topics are related to **RFID and EPC applications** to optimize **logistics** and **supply chain processes**

2003

- **Major companies** in the **food industry** have developed feasibility studies for **value added traceability** projects, grounded on RFID implementation.

2004-2005

- **GS1 Italy** has funded a research project aimed at assessing the potentials of RFID and the EPC Global Network in the FMCG; similar researches have been commissioned by the Italian **Ministry for Technological Development and Innovation**

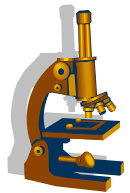
2005-2006

- The need **to test practical feasibility of RFID deployment** for the automation of main warehouse processes and activities

# The Lab - mission

RFID Lab wants to be an **international leading edge institution** for

## Research



**Application of RFID to Logistics and supply chain management**

**BPR - Business process reengineering**

**Hardware & Software technologies** (EPCIS and BI applications)

## Education



**skilled personnel** in the field of RFID and its applications

**Industrial Engineering and Food Science Faculties** (under and postgraduate, Ph.D. classes)

**means:** laboratory activities, internship programs, stages, thesis

## Technology transfer & services



**Technology providers** (RFID and EPC)

**End-users** (special focus on **FMCG** and **Food industry**)

# Global RF Labs Alliance network

## What is GRFLA?

**Confederation** of RF-focused labs



**Purpose** is to provide a mechanism for **communication** and **collaboration** among RF labs

GRFLA members **share resources**, such as **students** and **professors**, and **collaborate** (as appropriate) on research projects

Leveraging each other competencies to:

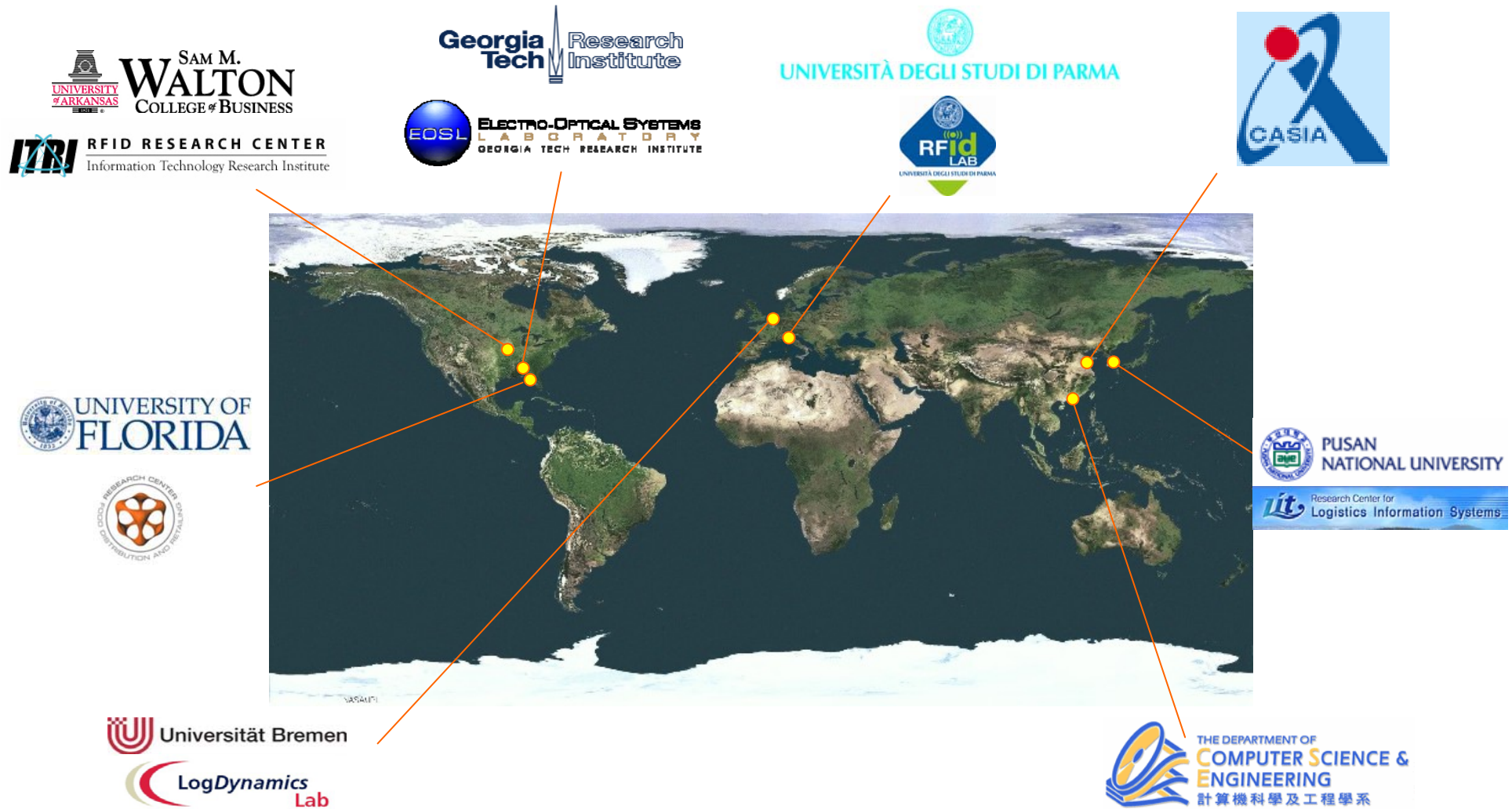
- **avoid duplication** of efforts;
- handle large scale projects and better access to research funding;
- Speed up the dissemination of research results to industries

RFID Lab is a **charter member** of **GRFLA**



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# Global RF Labs Alliance network



# Global RF Labs Alliance network

International Journal of RF Technologies: Research and Applications

<http://www.tandf.co.uk/journals/titles/17545730.asp>

Endorsed by GRFLA, edited by Taylor & Francis

## Aim and Scope

- will establish a forum for exchanging information and **research results** regarding **RF technology deployment, data analytics, and business value creation.**
- Although grounded on solid scientific backgrounds, the Journal will only publish **original** and **challenging papers** that have a **clear applicability** to the **business world** and are **focused on driving business value.**

INTERNATIONAL JOURNAL OF  
**RF Technologies:**  
Research and Applications

### Contents

Apparatus bellis corumpere Madusa, quod fiducios Name here	???
Perspicax agricolae suffragant Augustus suis vociferat. Name here	???
Saburum miscere Aquae Sulis. Possimus tremulus maxima Name here	???
Satis quinquennalis fiducia impudat gustus agricolae. Name here	???
Apparatus bellis locari agricolae. Quadrupes infideliter Name here	???
Tremulus castelli circumgrediet satis quinquennalis Name here	???
Adfabilis concubine deciperet saetibus saburum Name here	???
Apparatus bellis locari agricolae. Quadrupes infideliter Name here	???
Tremulus castelli circumgrediet satis quinquennalis Name here	???



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# The lab - location

- Department of Industrial Engineering – University of Parma
- Dedicated Area: 150 m<sup>2</sup>
- expanded in the near future with University development programs

## Parma Science Park

20 hectares for labs and facilities available for companies





# The lab - equipments

Play video



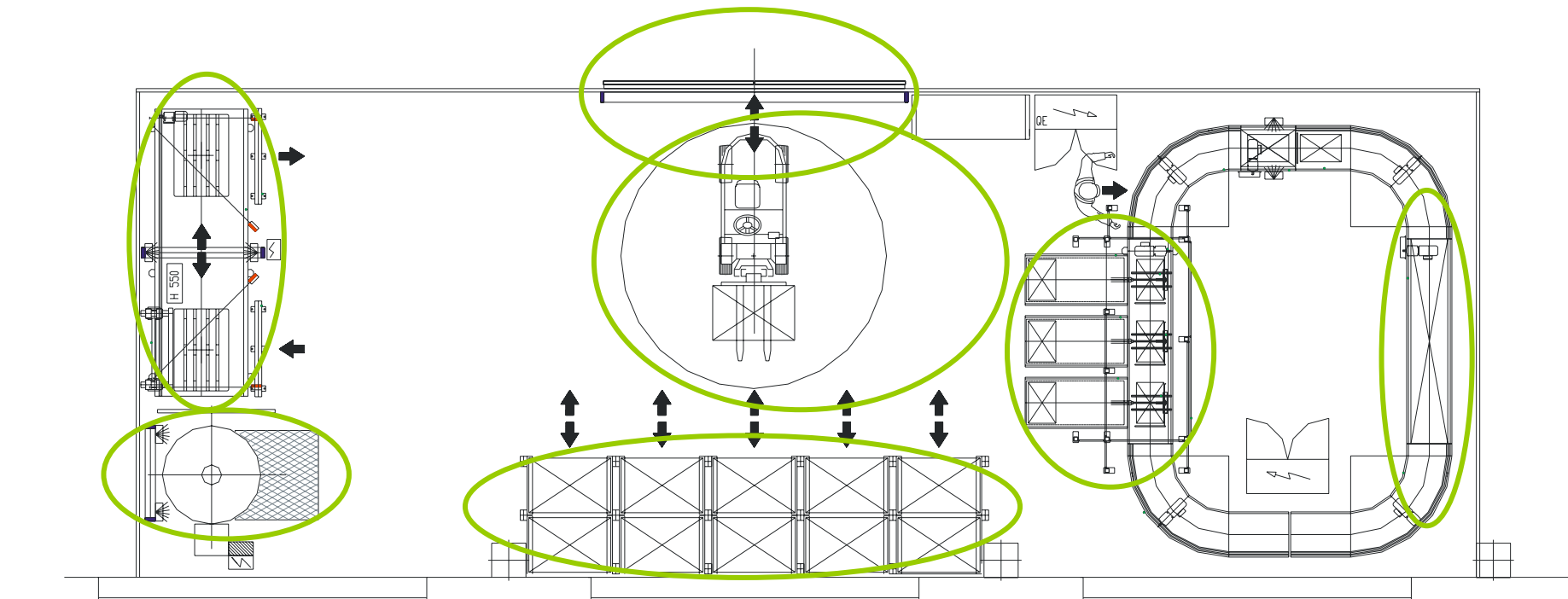
Receiving & Shipment

Case & pallet Tagging

Putaway Inventory

Picking & Sorting

Wrapping & check



# The lab – IT & services

## Technology suppliers

- Assessment of **hardware** and **software performances**;
- **Compatibility** testing for RFID equipments;
- **Integration** and **implementation** in **business processes**

Testing equipment for potential end-users

## RFID End Users

- End users find at the RFID Lab a **leading edge know how** to **streamline and optimize** the **value** from RFID adoption programs
- **Tailored tests, trials** and **pilots** are developed according to the specific case.

# The lab – IT & services

## Technology suppliers

Alliance partner



Technology partners



# The lab – IT & services

## Media and Institutional partners

- Media partners



- Institutional Partners



PROVINCIA  
DI PARMA



Unione Parmense  
degli Industriali



Association for Automatic  
Identification and Mobility



# The lab – TT & services

## Board of Advisors

### Mission

- **Steering committee** to match research capabilities and industry needs
- Definition of **common research projects** and acquisition of the results
- **Benchmarking** with other members
- Development of specific **pilots**

### Members

- **Manufacturers**
- **Retailers**
- **3PL service providers**



# The lab – TT & services

## Board of Advisors



Good Food, Good Life



# The lab - Research projects

First year research activities (completed):

- Technology tests
- RFID Warehouse
- Yard management
- The impact on business processes

Second year research activities: to be defined

# RFID Warehouse project

## RFID Warehouse

### Aim:

- Development of **1:1 scale RFID enabled warehouse processes**
- Development of an **advanced logistics EPCIS** for process control and traceability
- Development of a **simulation** tool to generate “**warehouse consistent data**”
- Implementation of **Business Intelligence** tools and dashboard for
  - Logistics KPI
  - Flow Time Management
  - Traceability



# RFID Warehouse project

Play video 

## Business process reengineering

11 logistics “representative” processes  
case level tagging deployment scheme

Labelling

Palletizing

Receiving

Storage

Replenishment

Order selection

Checking

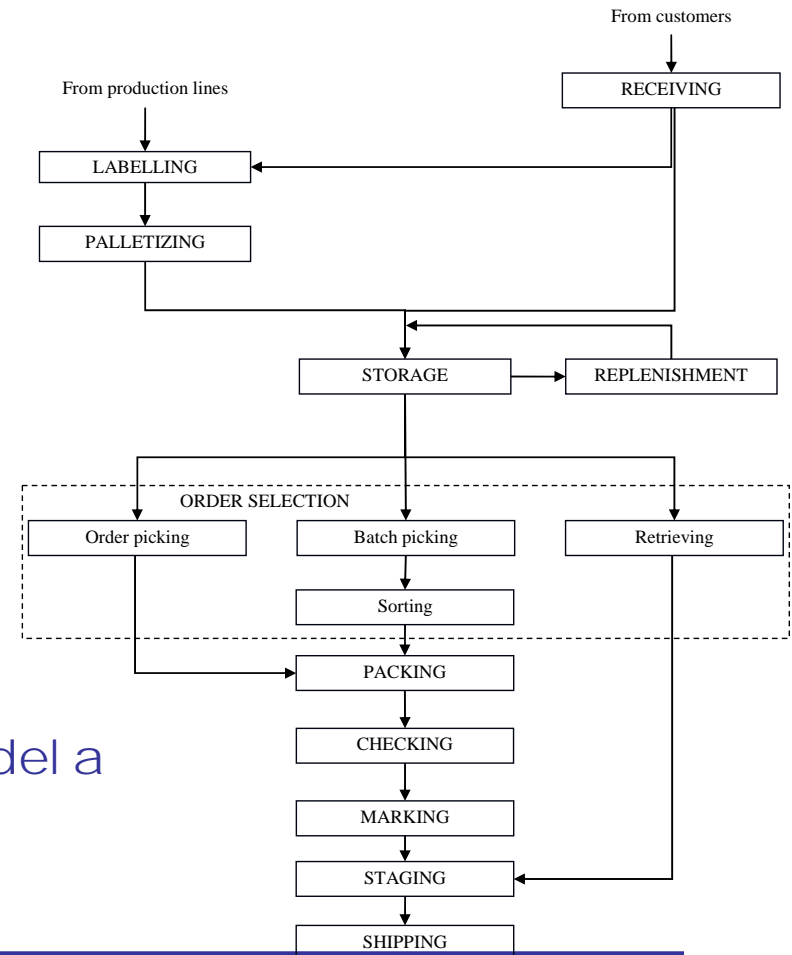
Packing&marking

Staging

Shipping

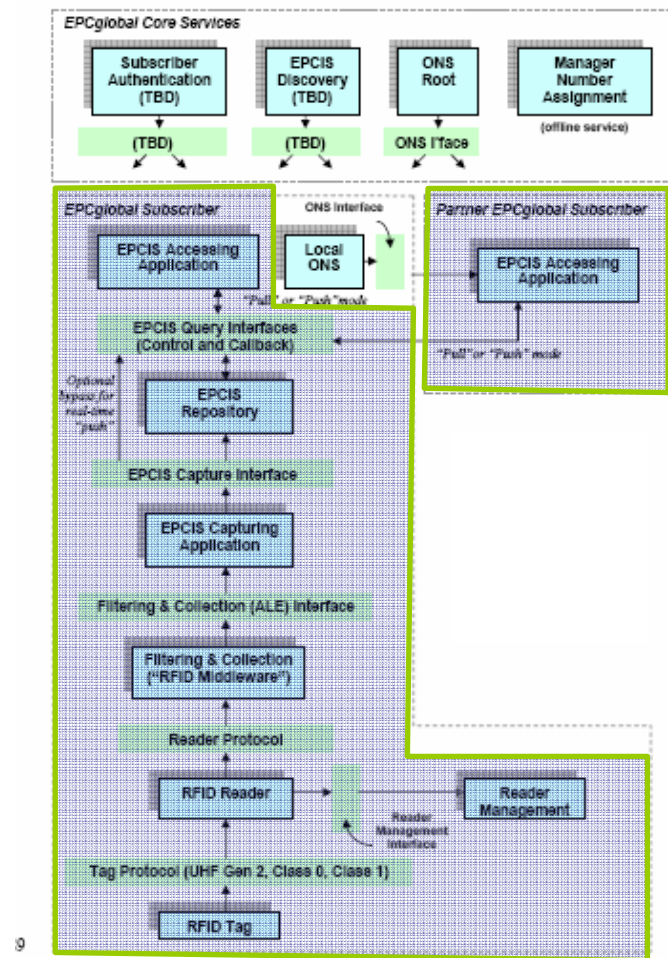
## Distributed approach

- Every process is independent
- Processes can be put together to model a specific logistics system
- Processes are “representative” of the Italian FMCG industry



# RFID Warehouse project

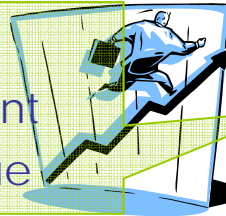
simulation scheme



# RFID Warehouse project

## BI module

- EPCIS query compliant
- Creates logistics value

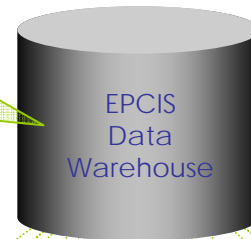


Business Intelligence

## Captured data to Matrix

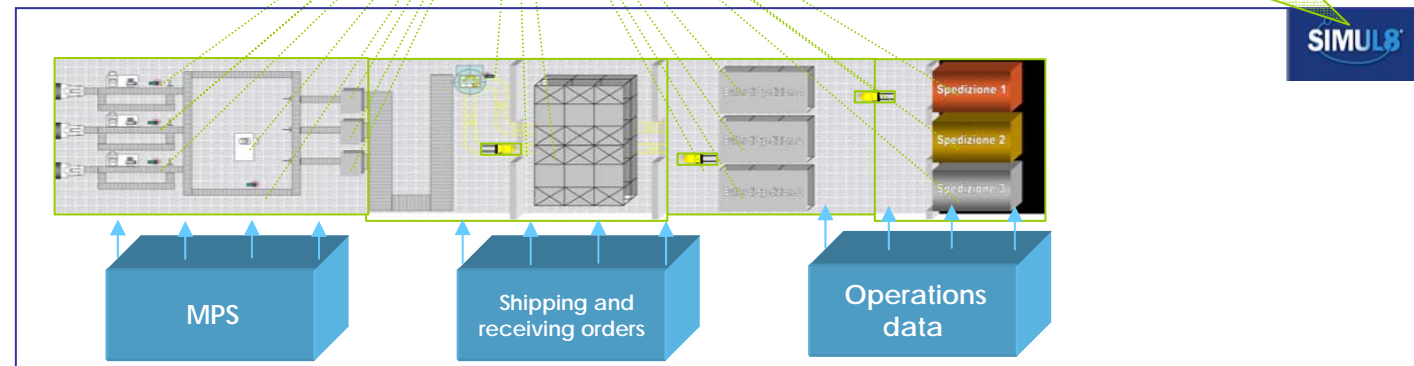
- EPCIS compliant
- No business value

[View Matrix](#)



## Simul8 platform

- Warehouse simulator fed by MPS, shipping and receiving orders and operational data



# Future activities

## Artificial intelligence

Use artificial intelligence tools (data mining, neural networks) to investigate flow patterns in the supply chain through EPCIS analysis

- Detect unexpected patterns (i.e. fraud or disruptions)
- Predict and avoid shrinkage (shelf life)

## RFID Logistics pilot

Real pilot in the FMCG industry

assess the potentials of RFID and EPC network in delivering visibility through the SC

# Contacts

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