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www.chill-on.com

Improved competitiveness through optimization of cold chain communication

Guðrún Ólafsdóttir

Implementation Coach CHILL-ON

Pre-conference Workshop - EFFoST

Budapest November 10th 2009

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SCHOOL OF ENGINEERING AND NATURAL SCIENCES

FACULTY OF INDUSTRIAL ENGINEERING,
MECHANICAL ENGINEERING AND COMPUTER SCIENCE

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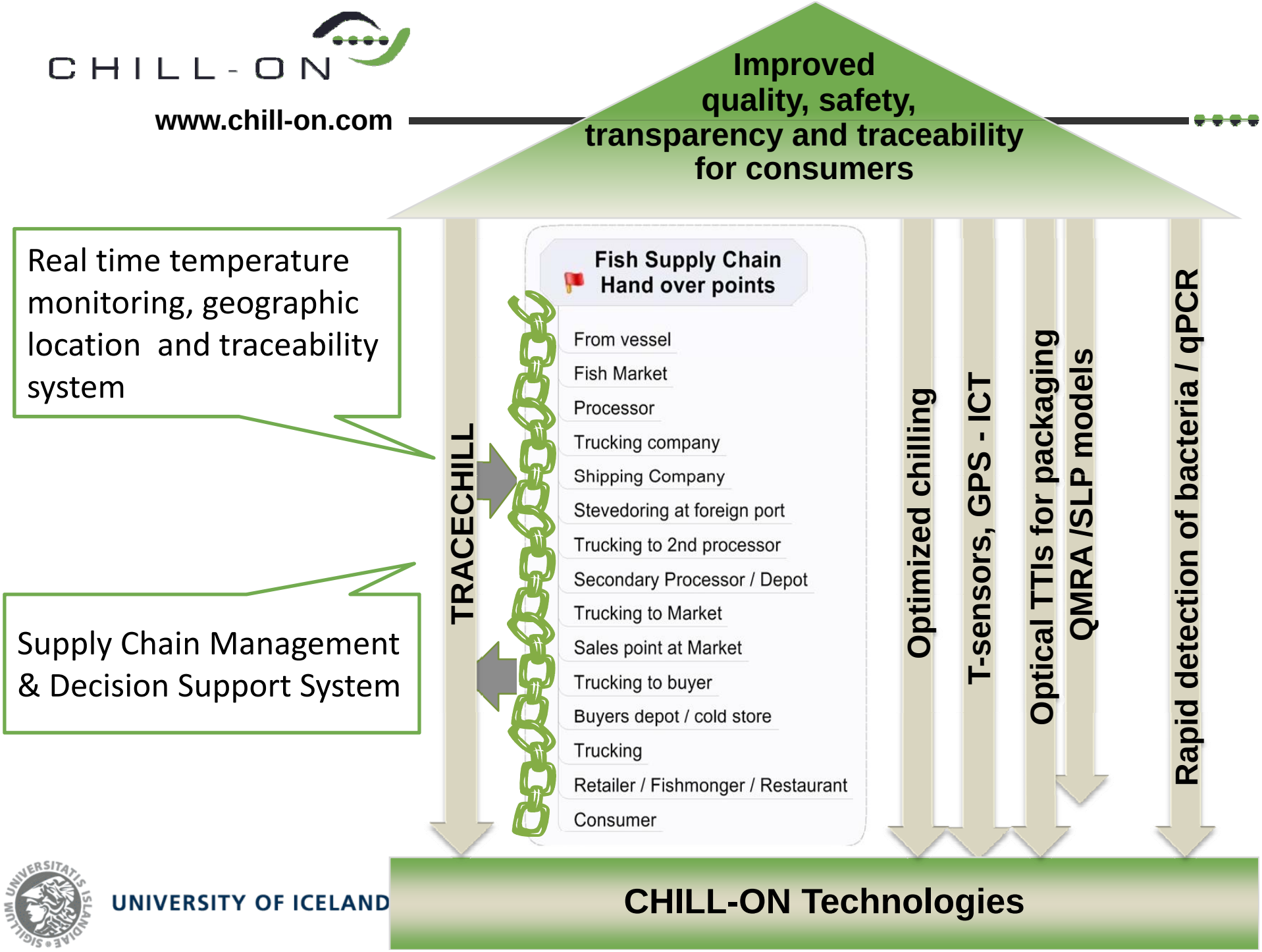

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Content

- CHILL-ON project
- CHILL-ON technologies
- Vision of CHILL-ON
- Implementation and validation in field trials
  - Monitoring of temperature - transparency
- Industrial requirements
    - Competitiveness
    - Compliance with regulations – industrial standards
    - Added value

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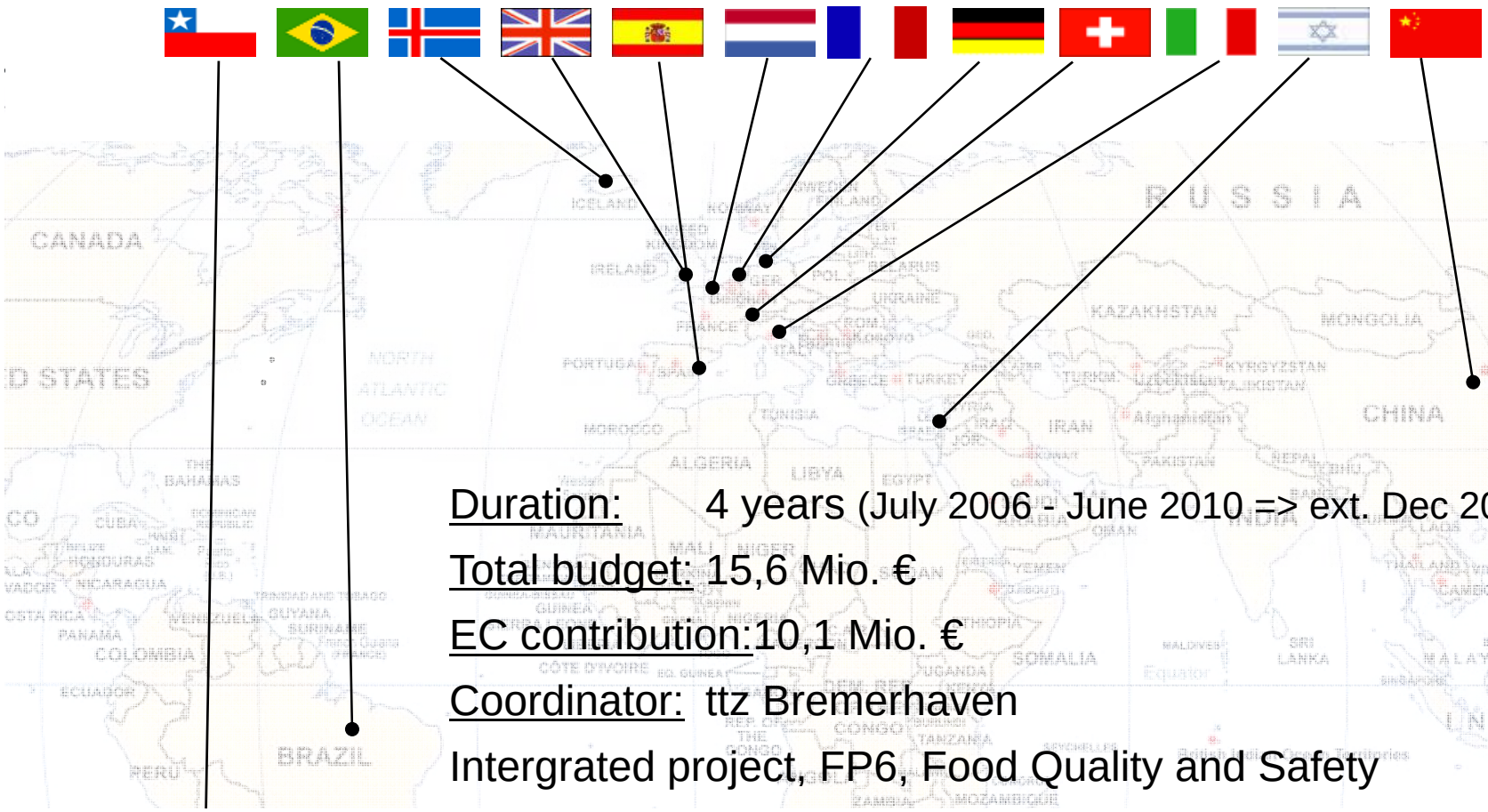
CHILL-ON Consortium
25 partners from 12 countries



Duration: 4 years (July 2006 - June 2010 => ext. Dec 2010)

Total budget: 15,6 Mio. €

EC contribution: 10,1 Mio. €

Coordinator: ttz Bremerhaven

Intergrated project, FP6, Food Quality and Safety

RTD

ttz Bremerhaven

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KENT UNIVERSITY OF KENT

ITENE PACKAGING, TRANSPORT & LOGISTICS RESEARCH INSTITUTE

OSM-DAN

matis

FUNDACION CHILE

SME & Industry

freshpoint

Bioanalytic

MOTOROLA

OpaleSeafood

CHAINFOOD chain quality intelligence

traceall

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Cargill

SEARA

Minuano

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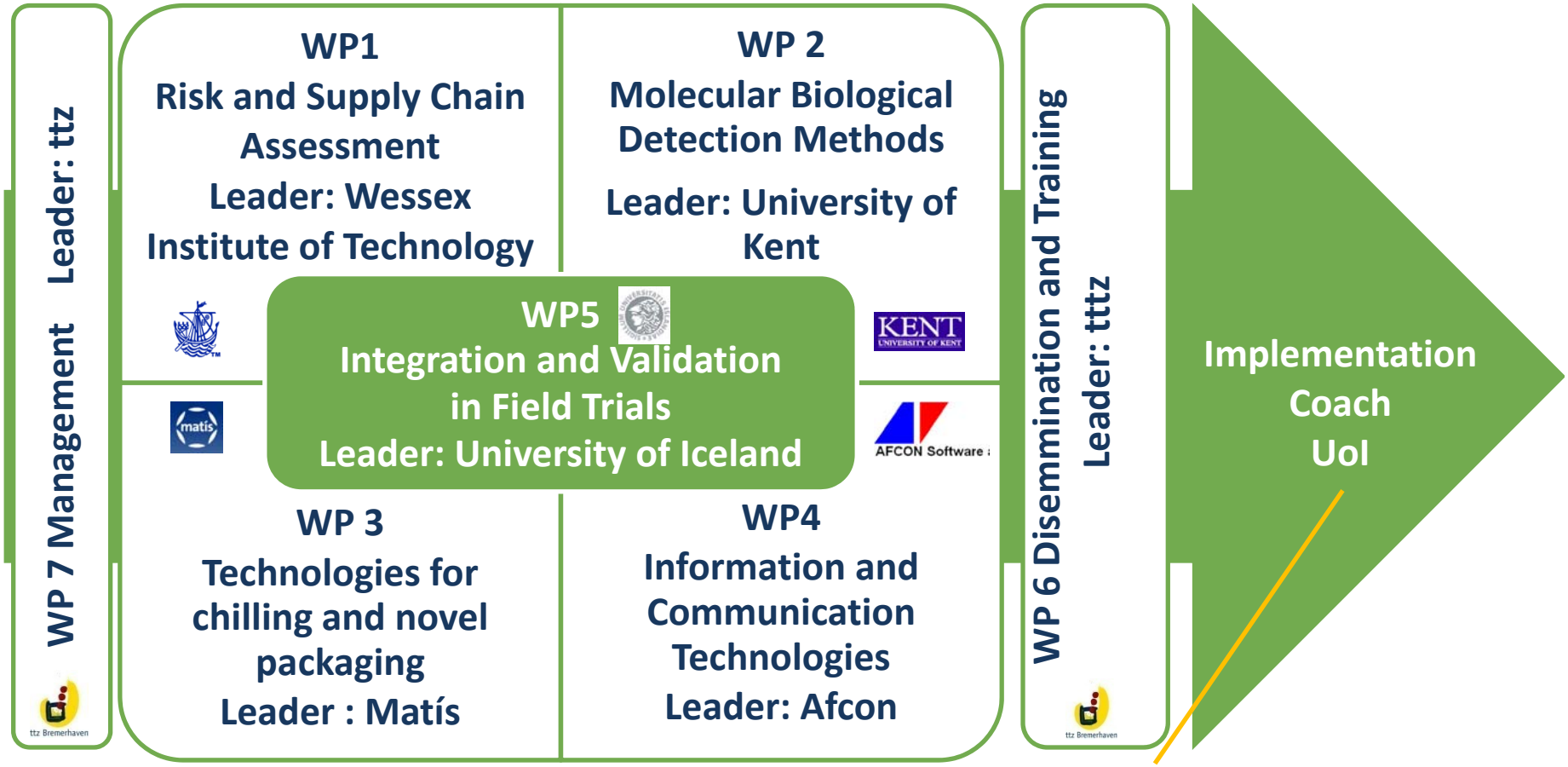
Novel technologies to improve the safety, transparency and quality assurance of the cold chain



intermediary between the anticipated and already achieved results of Chill-On and the practical needs of industry.

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Implementation -Communication

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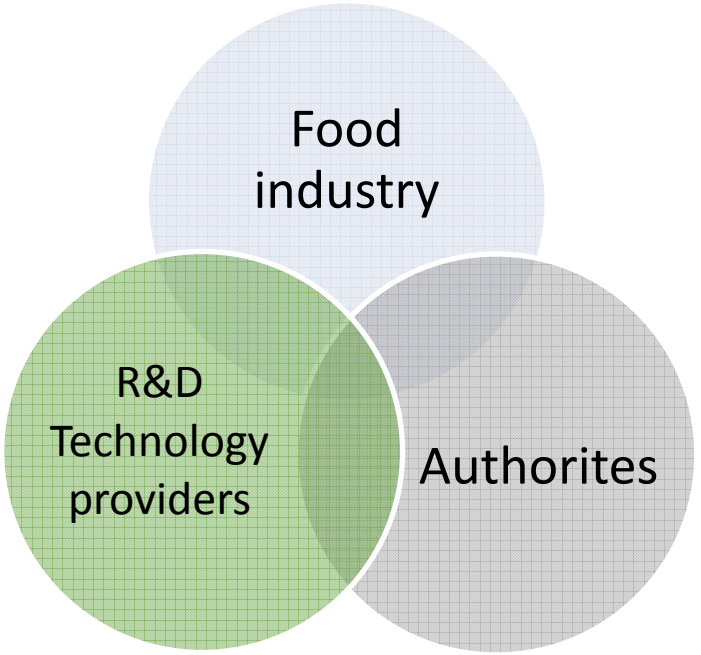
Challenges	
Different countries	• Cultural barriers • Language barriers
Different scientific disciplines	• Lack of understanding • isolation
Industrial partners	• Competition - IPR • motivation • committment



- Preparation for field trials
- implementation and validation of technologies
- integration, communication,
- complementary motives and mutual benefits of partners

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Validation of CHILL-ON technologies in field trials

CHILL-ON technologies

- a holistic concept
- stand alone technologies

Status

- Prototypes - still in the testing phase
- Ready for implementation
- Commercial products

Supply chains:

- *Poultry*
  - *Germany*
  - *Italy*
  - *Brazil*
- *Fish*
  - *Cod IS-> FR*
  - *salmon, CSS NO-> FR*
  - *Hake - Chile*
  - *Tilapia - China*

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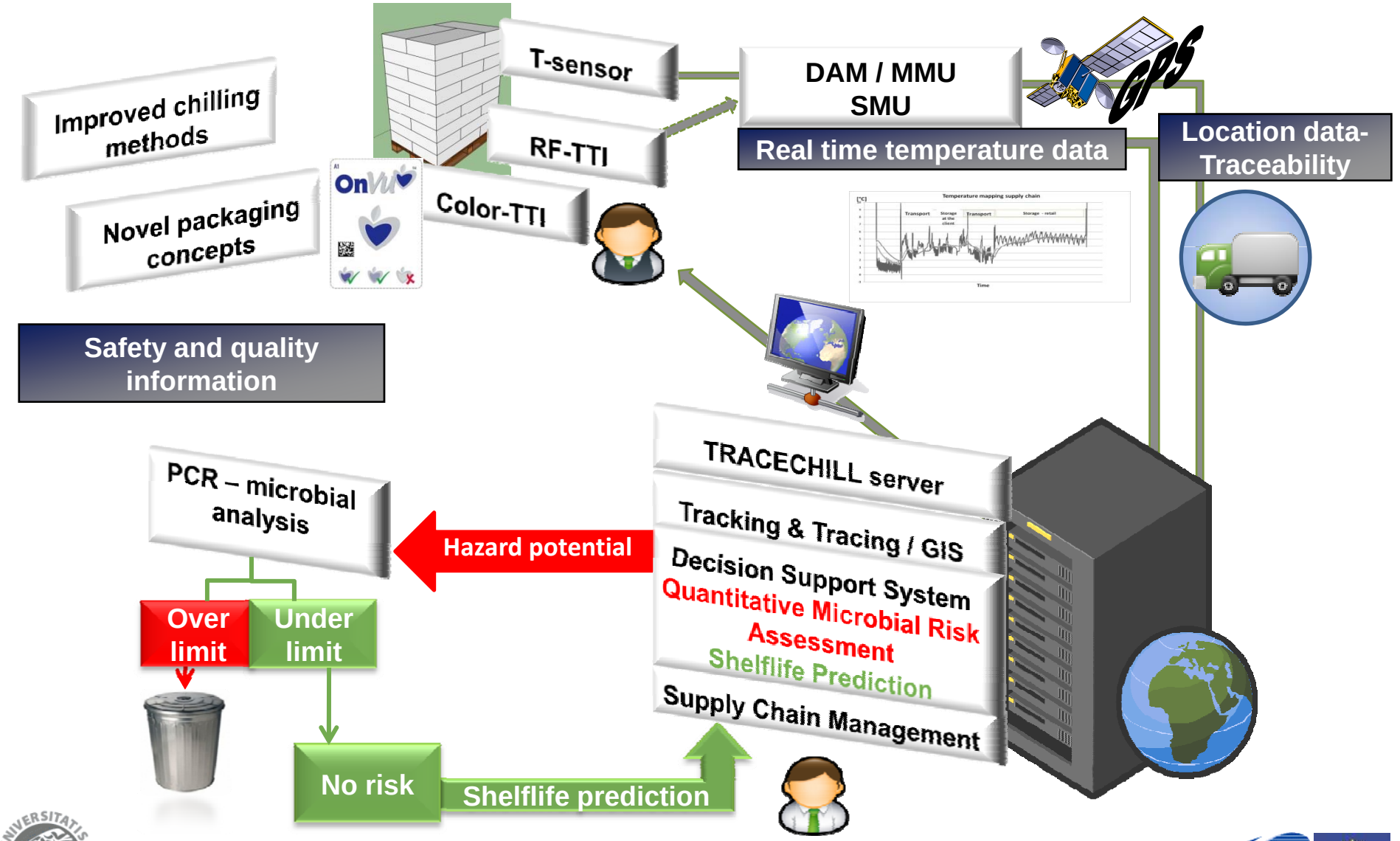
CHILL-ON technologies conceptual holistic approach



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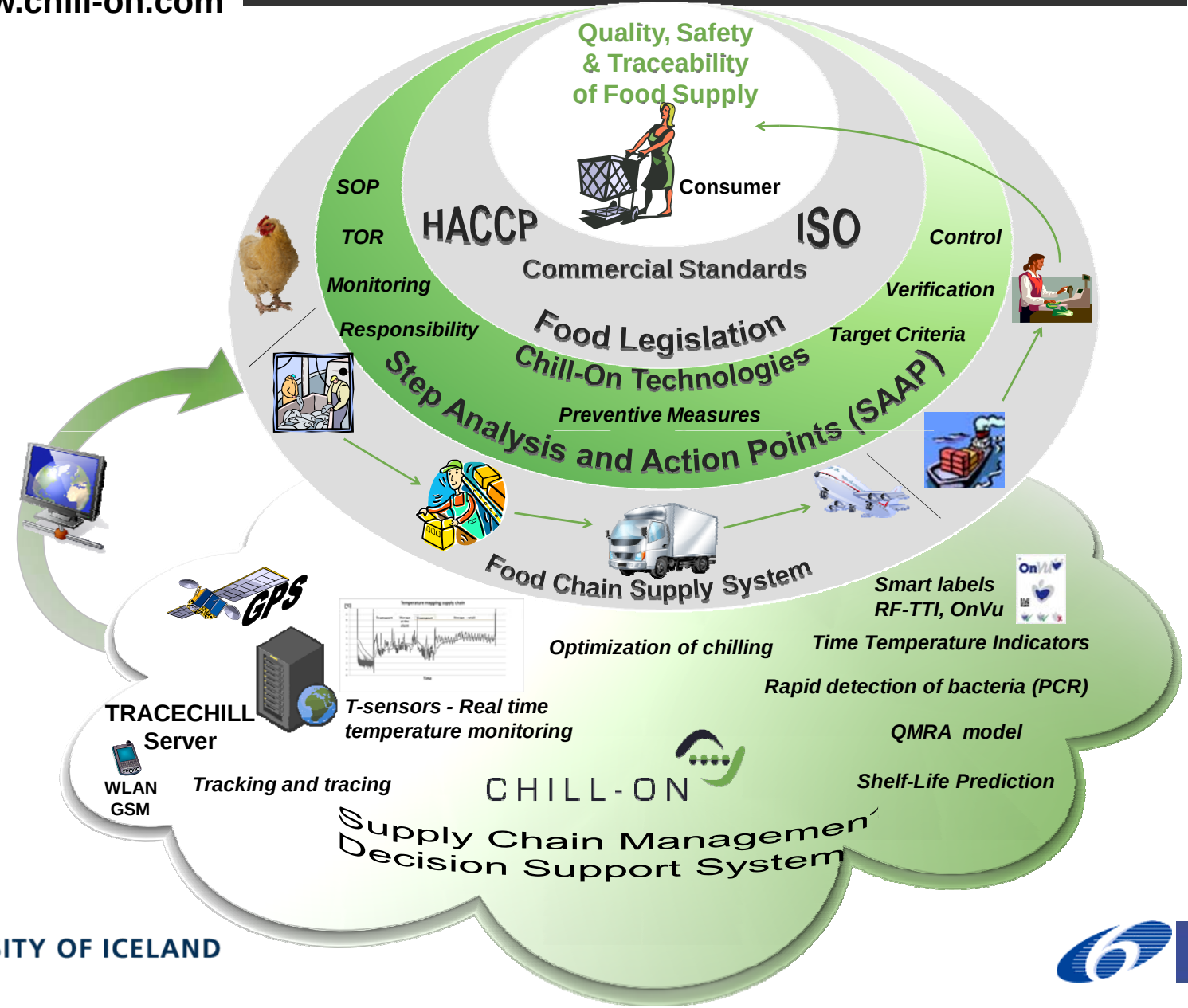
Vision of CHILL-ON



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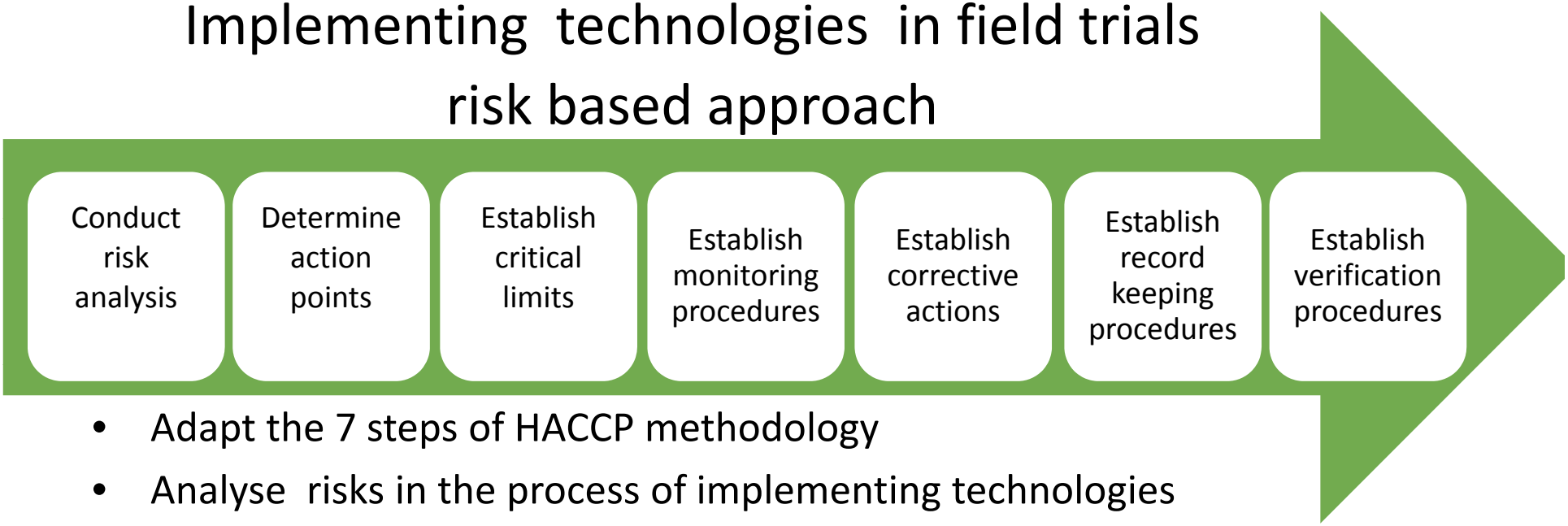
Step Analysis and Action Points - SAAP

Implementing technologies in field trials
risk based approach



- Adapt the 7 steps of HACCP methodology
- Analyse risks in the process of implementing technologies
- Evalute all obstacles / Risk Assessment /Action points

➢ SAAP – based on preventive measures

Step Analysis and Action points							
Action point AP	Preventive Measures	Control measures	Target critera min / max Alerts	Corrective action / Contingency plans	Records	Responsible operator	Internal reference documents

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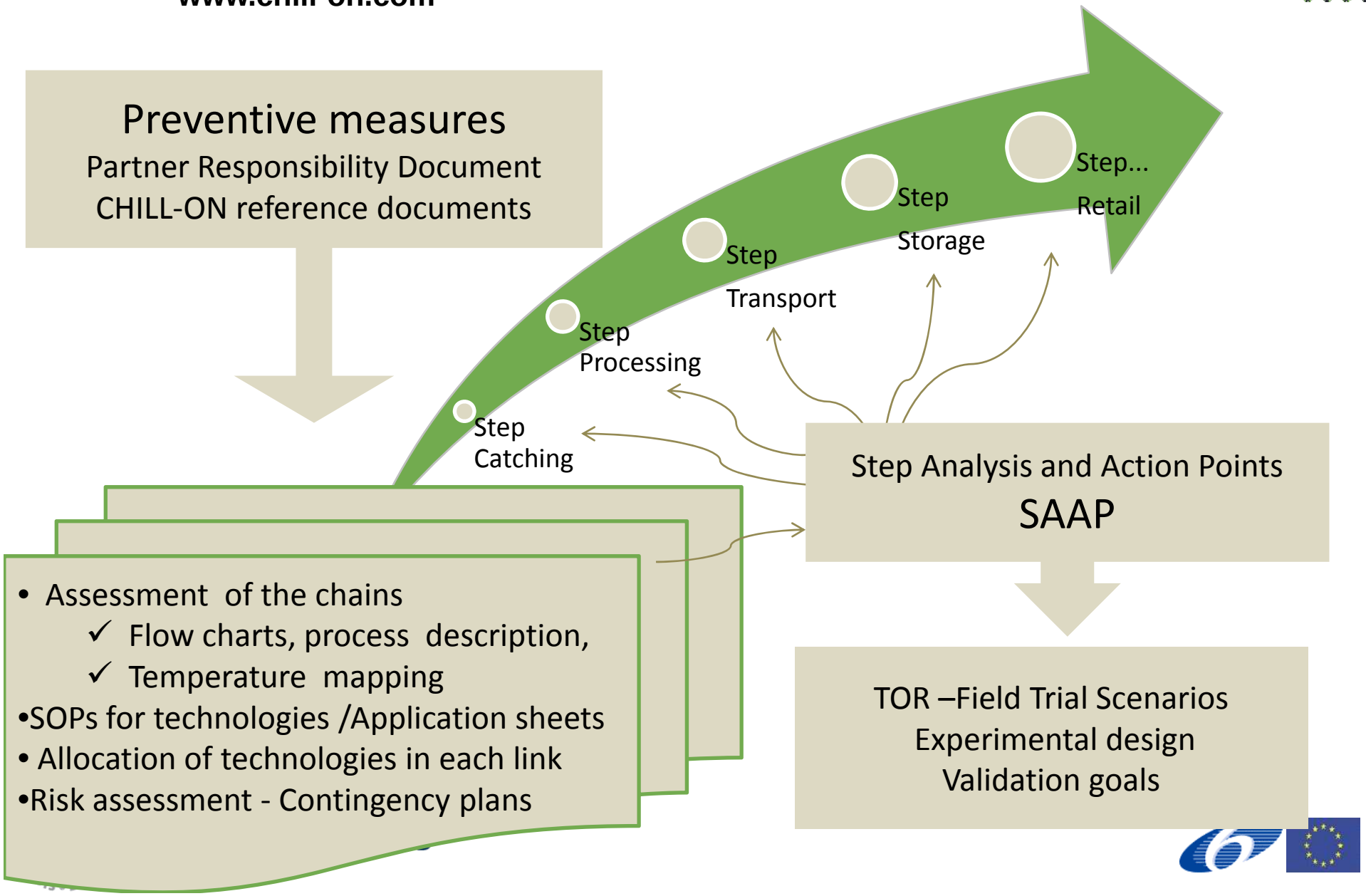
Establishment of Standard Operation Procedures (SOP) and TOR - Field trials scenarios



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Assessment of supply chains

- processes
  - Air transport v.s ship
  - Packaging
    - MAP/air / cooling mats
  - Optimized chilling
    - slurry ice v.s. CBC (Contact Blast and Cooling)

- requirements of the industry / authorities
  - Temperature critera
  - Type of bacteria and limits

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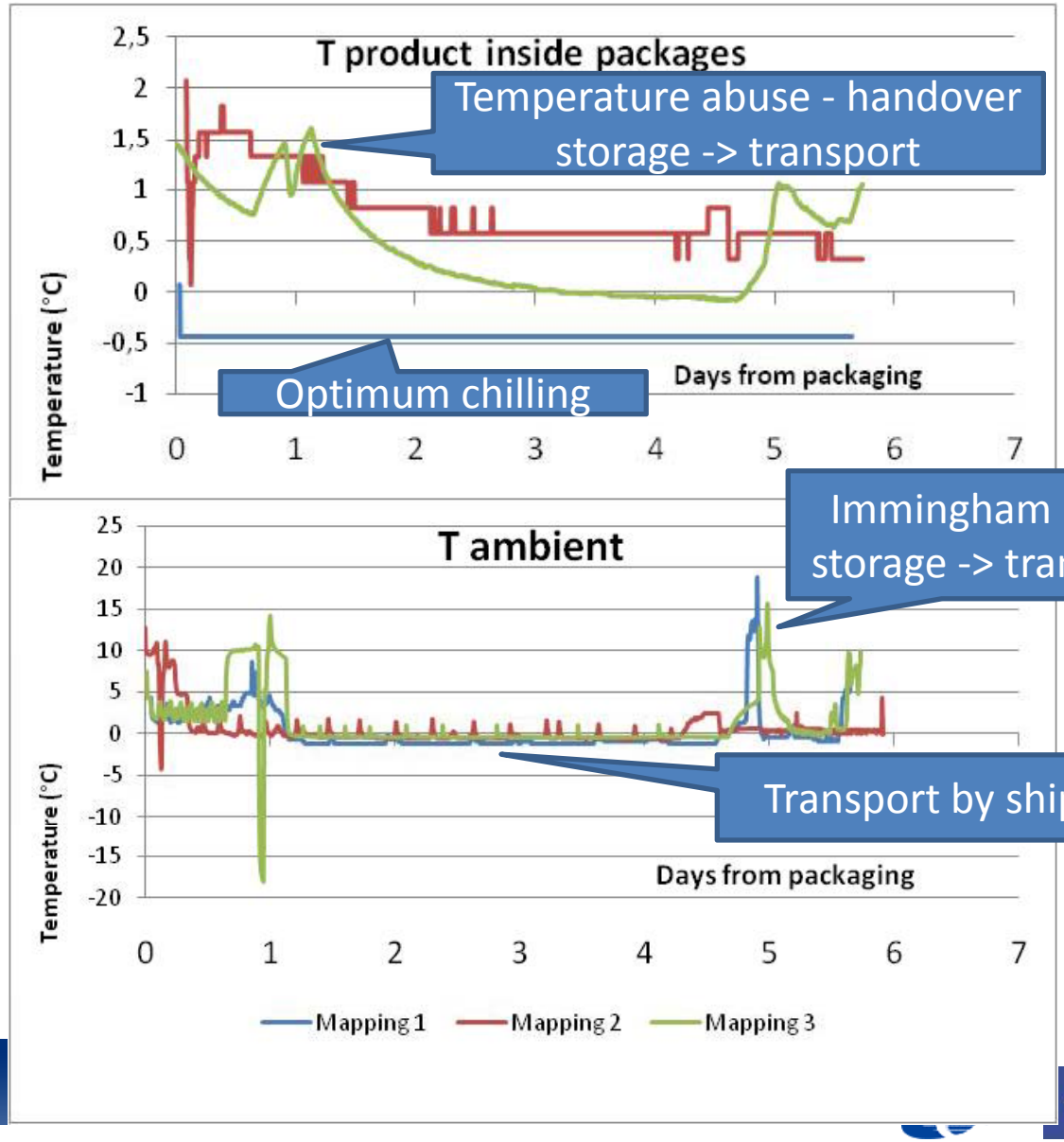
Mapping trials: cod fillets / loins transported by ship/truck IS-UK-FR

- Landing / weighing / market IS
- Transport to factory
- Storage in factory
- Processing and packaging
- Storage before shipment
- Transport to shipper IS
- Storage at shipper IS
- Shipping to Immingham UK
- Storage in Immingham UK
- Shipping to BsM FR
- Arrival at BsM FR



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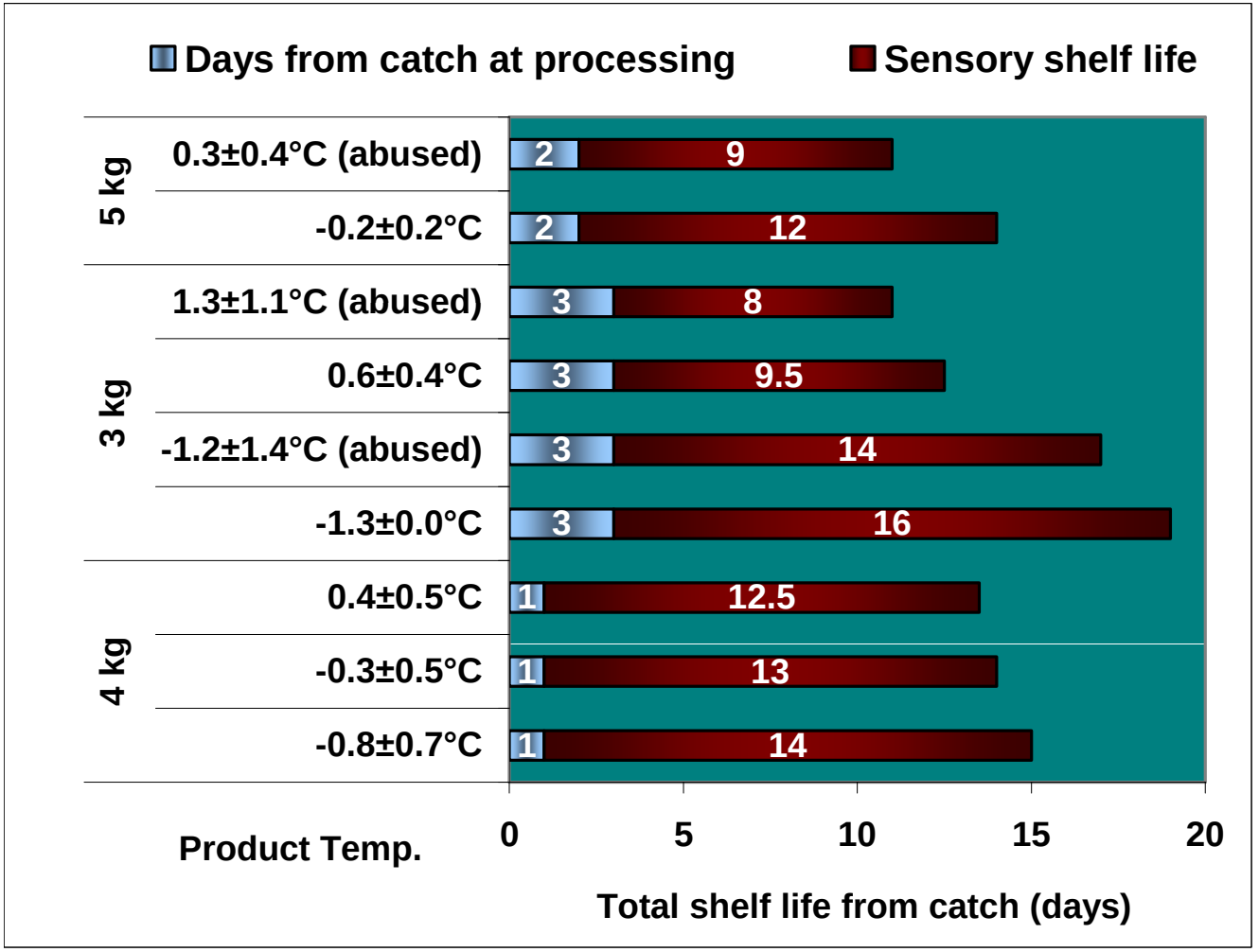
Effect of temperature abuse on shelf life of cod loins



Shelflife of products under various conditions verified by sensory analysis

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QMRA / SLP models and DSS

– Decision Support System based on output from:

AFCON Software and Electronics Ltd.

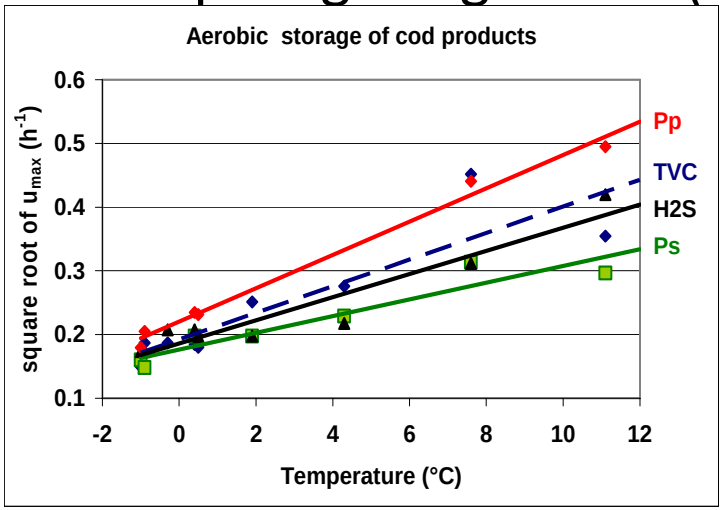
- Quantitative Microbial Risk Assessment Specific Foodborne Pathogens (SFP)
- Shelf life prediction - Specific Spoilage Organisms (SSO)

i.e. in cod

– *P. phosphoreum*

– *Pseudomonas spp*

– *H_2S-producers*



– *QMRA/SLP models take into account growth rate of bacteria at different temperatures*

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Molecular diagnostic tools

PCR test kits (Polymerase Chain Reaction) for

✓food pathogens (i.e *Salmonella, Listeria monocytogenes, Campylobacter, E. coli, S. aureus*)

✓spoilage organisms (*P. phosphoreum, Pseudomonas ssp, H_2S-producers*)

✓hygienic markers (*Enterobacteriaceae*)

Status:

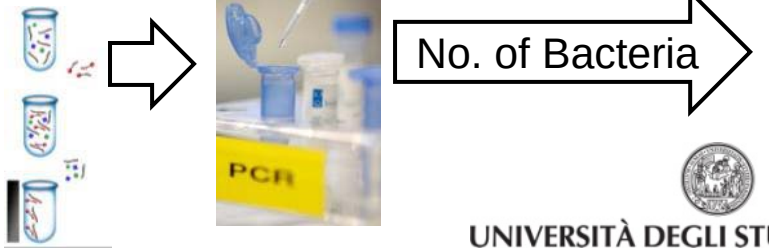
✓Validation of methods in ring trials between laboratories/ external laboratories

✓Shelf life studies to verify their correlation to conventional methodsl

✓link traceability with analytical procedures based on DNA analysis

Advantage:

- Analysis time ~ 3 -4 hours - conventional methods 3-5 days
- Quantification possible



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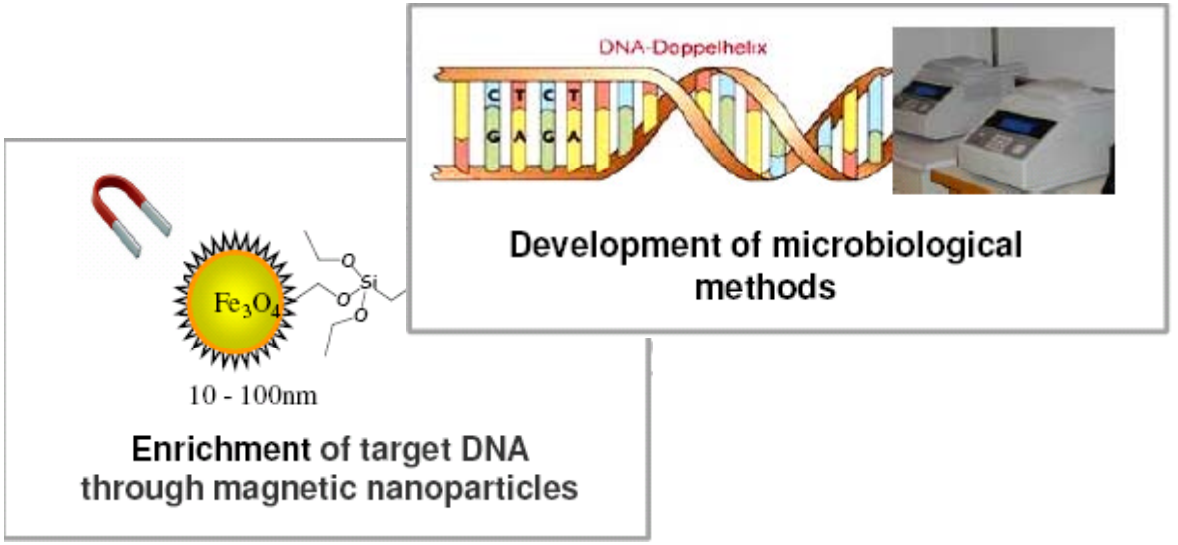
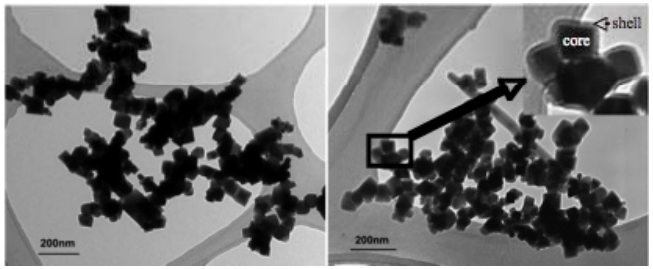
Molecular diagnostic tools - stand alone technologies



- PCR test kits
  - Spoilage bacteria
  - Pathogenic bacteria

- Magnetite and silica-magnetite nanoparticles, which can be added during DNA extraction to purify nucleic acids from food material (Univ. Kent)

KENT UNIVERSITY OF KENT



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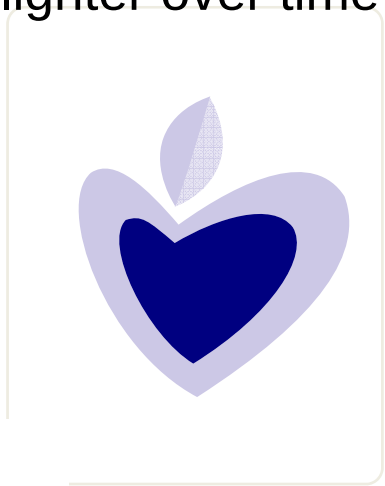
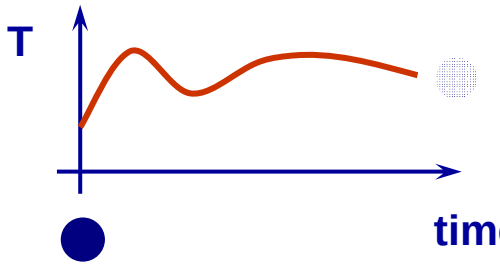
OnVu™ TTI Technology

- Freshpoint technology relies on the properties of organic materials that change color according accumulated temperature history of the product
- These materials form the basis of a pigment which is used to formulate their intelligent ink
- The TTI becomes dark when activated (by UV light) and then progressively lighter over time and depending on the temperature history.





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freshpoint™
Point Out Your Freshness

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OnVu™ – for poultry products in retail

Added value of CHILL-ON technologies

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CHILL-ON provides tools to:

- monitor HACCP - safety
  - » temperature (**T-sensors (active)/ color TTIs, rf-TTIs**)
  - » microbial contamination /spoilage (**PCR-test kits / QMRA models**)
- promote food supply of better quality (optimised **chilling & SLP models**)
- improve traceability (**ICT-solutions**),

- enhance consumer trust
- supply chain efficiency
- lower the cost of recalls,
- minimize perishable waste,
- enhance sustainability of products,

Temperature influences shelflife

- **Real - Time Alerts**

Quality v.s. logistics

- **FEFO - First Expired First Out**
- **FIFO First in First out**
- **Cost – benefit**

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Food industry - requirements

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- Food producers
  - Tools to ensure food safety and traceability
  - Quality / Competitiveness
- Public safety
  - traceability can protect public health and enhance consumer trust.

Poultry and Fish supply chains

- Audits / Compliance with regulations & industrial standards
  - BRC (British Retail Consortium)
  - IFS (International Food Standard)
  - ISO 9001 / ISO 22000
  - GMP Good Manufacturing Practices / Codex
  - HACCP – Hazard analysis critical control points system
  - Harmonized auditing and evaluation system
- European directives and regulations
- National legislations

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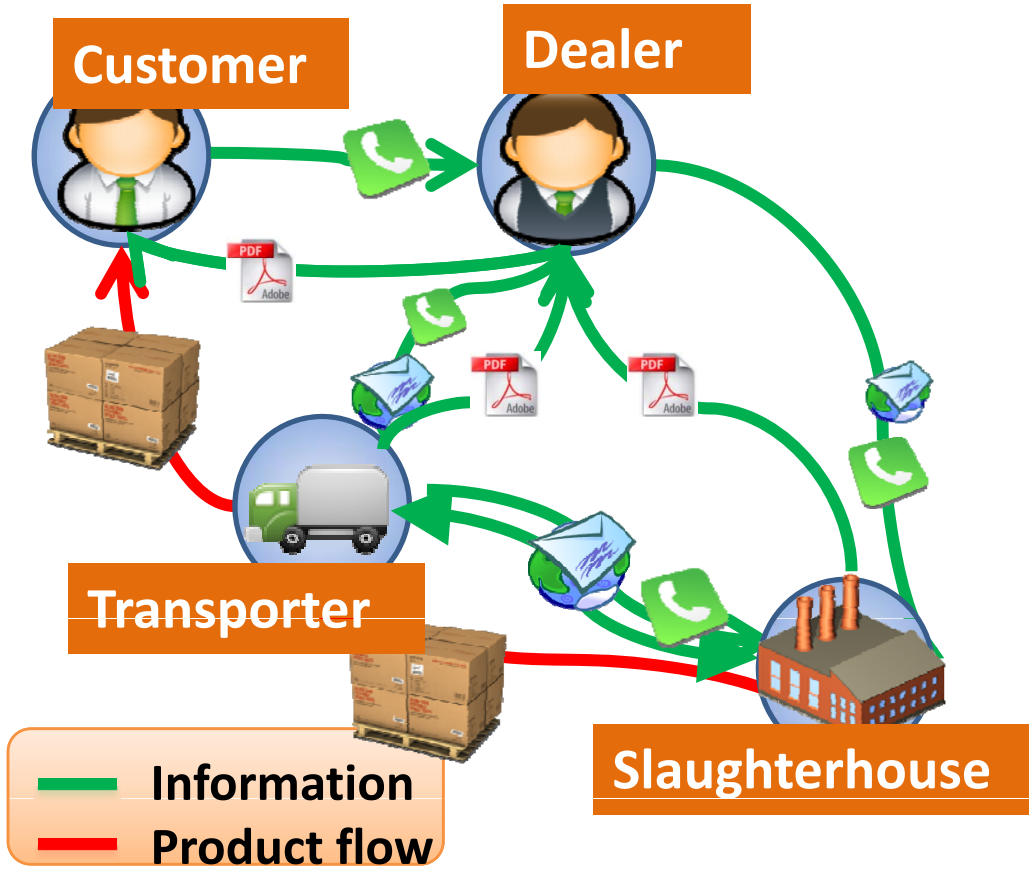
Current situation

– information flow - logistics

- Traceable units /barcodes
- Data / lab results /
- Dispatch papers- invoices etc.

- Paper based system in small companies
- Electronic systems in large enterprises



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ICT - TRACECHILL System

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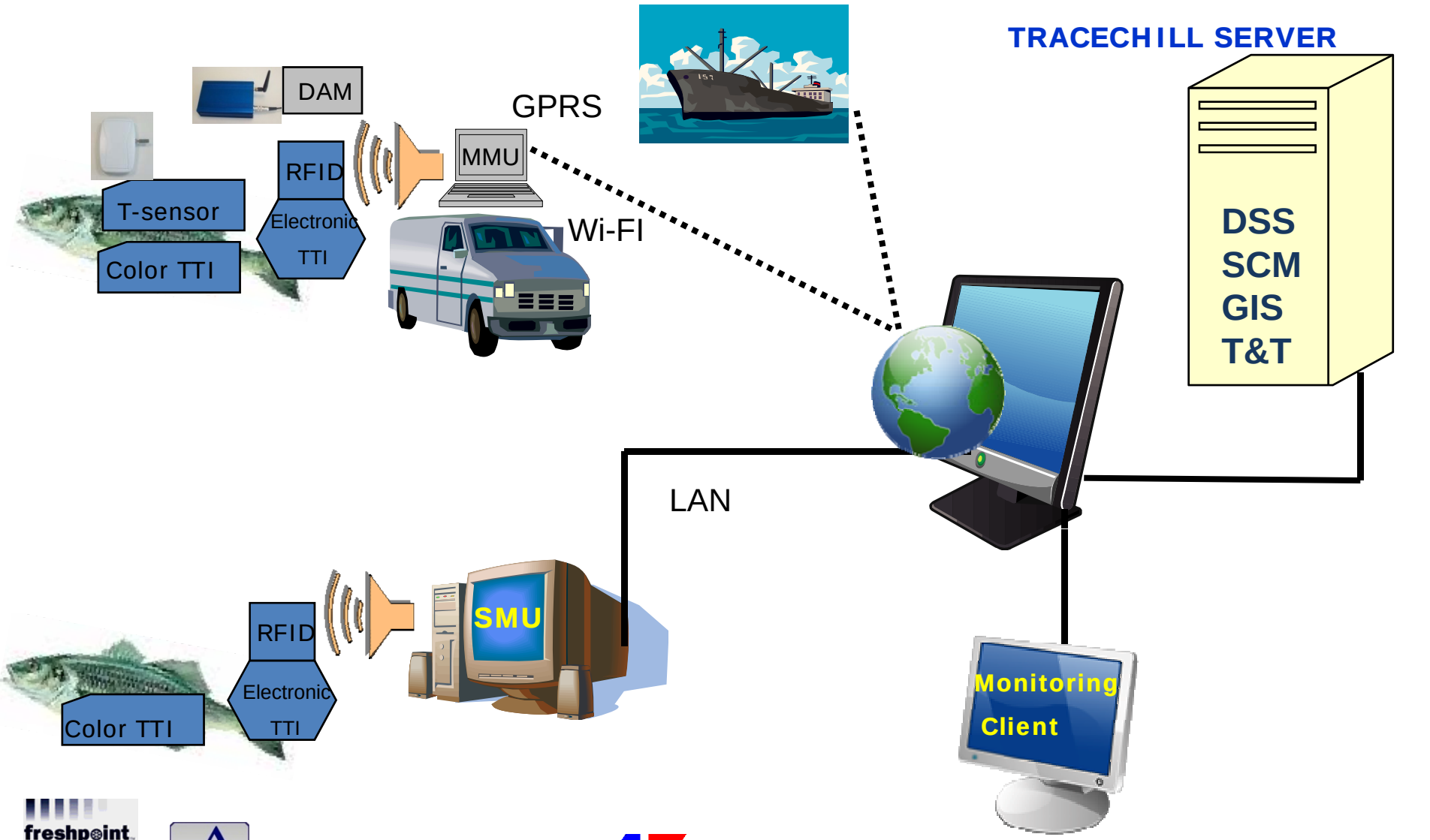

freshpoint
Point Out Your Freshness

traceall

ActValue

CHAINFOOD
chain quality intelligence

AFCON Software and Electronics Ltd.

MOTOROLA

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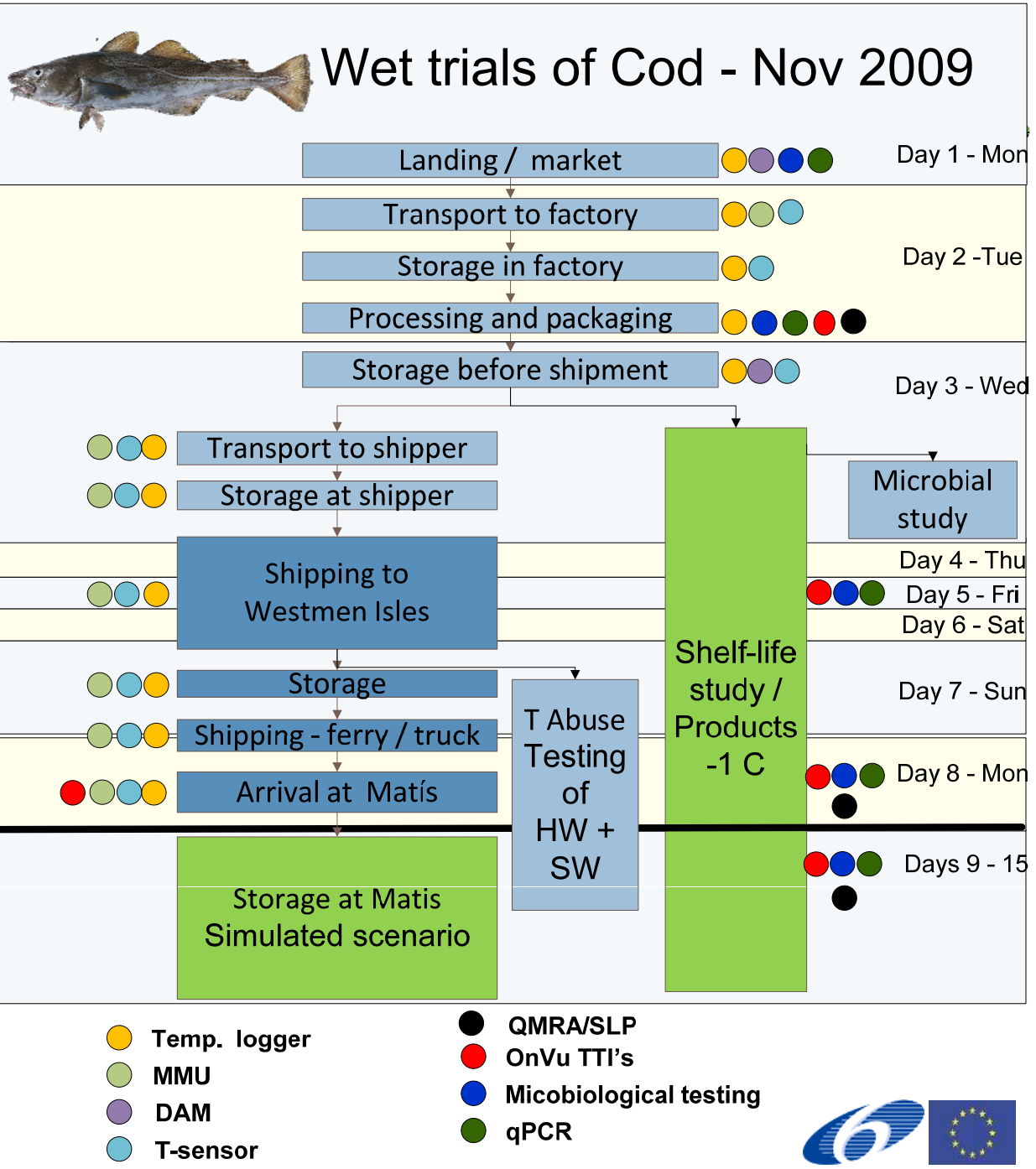
- Functionality testing of HW & SW
- Application sheets for training
- Target critera
  - Compatability
  - Signal strength
  - Temperture recording
  - Data transfer

=> Alerts

- Validation
  - Microbial testing
  - T emp & Data loggers



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Temperature is interoperable in the chain

if access is given to the temperature profile,
the whole chain becomes transparent !

Consumers 😐

Food industry / SME´s/Retail - Alliances

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Surveys:Implementation of traceability & temperature monitoring systems

Studies done in China and EEA,Vietnam and Chile

Barriers

- Cost of implementation too high
- Lack of unified standards
- lack of technical staff
- Lack of governmental support (China)

Benefits

- Improve supply chain management
- Differentiate from others

WFL Publisher
Science and Technology

Journal of Food, Agriculture & Environment Vol.7 (2) : 64-69. 2009 www.world-food.net

Adoption of traceability system in Chinese fishery process enterprises: Difficulties, incentives and performance

Feng Wang [1], Zetian Fu [1], Weisong Mu [1], Liliana M. Moga [2] and Xiaoshuan Zhang [1]*
[1]China Agricultural University Beijing 100083, P.R China. [2]Dunarea de Jos University of Galati, 47 Domneasca Street, 800008 - Galati, Romania. *e-mail: zhxshuan@cau.edu.cn

Thank you

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