

**ICT systems and services
for
port operation and management:**

The contribution of recent and on-going R&D

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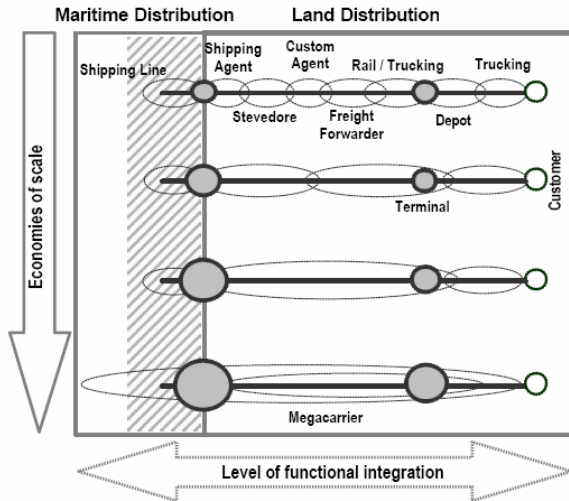
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MODERN PORT OPERATION CHARACTERISTICS

Economies of scale



Container Vessel Typology

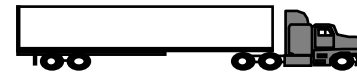
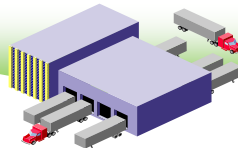
SEI GENERAZIONI DI NAVI CONTAINER



x 5

DESIRED PORT OPERATION ATTRIBUTES:

- Increasing throughput capacity
- Integration to efficient transport chains
- Increasing global logistics outreach
- Intensive use of integrated ICT solutions



Problems and Key Challenges

- Greater internal operational efficiency
- Difficulties of integration with the land networks
- Difficulties of integration with the global logistics networks and transport chains (different standards, lack of data exchange & interoperability, lack of “neutral” layers, business practices)
- Difficulties of integration between the port value system (stakeholders) due to:
 - Different levels of IT penetration
 - Low compatibility of IT systems used
 - Lack of systems integration.

Need to go beyond current state-of-the-art on three major fronts:

- **Improving the current “global Architectures”** for the collection, transmission, and utilisation of data and information for the operation of a port within global transportation and supply chain management.
- **Improving load unitization and “smart boxes”** for containers so that they become more power savvy, “intelligent”, and less costly, together with new innovative methods for data capture and transmission.
- **Improving the internal port operation** through IT efficiency coupled to new organisational models and processes, economies of scale and cost reduction
- **Improving the internal port operation** through legal and administrative simplification while meeting the security and customs requirements (one-stop-shop, secure container green lanes, simplification of customs procedures through international accords and conventions).

The contribution of Research & Development (R&D)

- 4 Billion Euro to surface Transport Research in the current EU 7 year research Framework Programme (7th FP)
- 3-4 Billion from National transport research programmes in 5 EU member countries (D,FR,N,DK,S) over same period
- R&D effort through joint “research” and “industrial” actors consortia
- Demos of research results essential
- Dissemination and exploitation plans required
- Financial contribution of “industrial” partners to all R&D effort funded by EU or National public funding, mandatory.

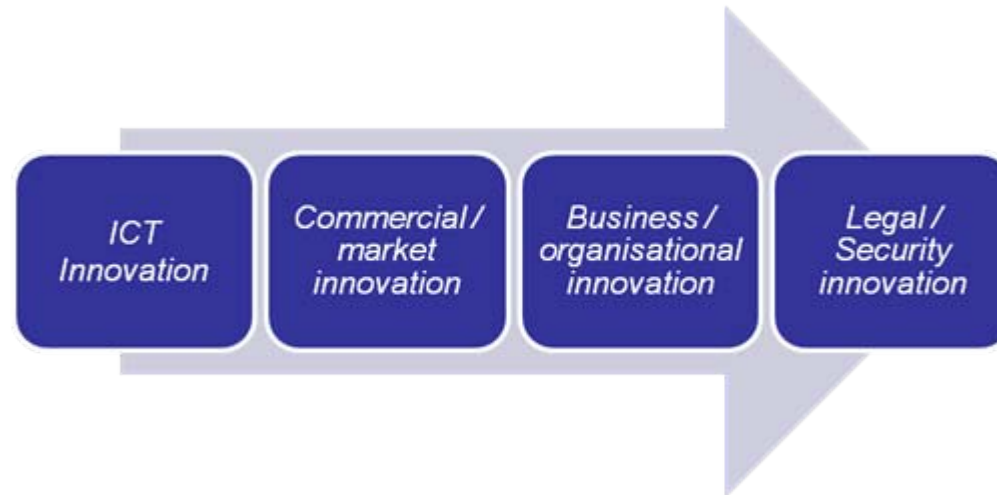
Some examples related to port operation

- At least 20 successful R&D projects of the 5th, 6th, and now 7th FP have produced results applied in practice.
- Key R&D projects with Greek applications: **EFFORTS**, **EURIDICE**, **FREIGHTWISE**, **MOSES**, **SMART-CM**, **ELOGMAR**, **REORIENT**, **CHINOS**, **GIFTS**, **TRANSLOGNET**, **MEDIGATE**, **CITYPORTS**, **IMONODE**
- Results have been produced in Greece with practical applications that resulted in commercial systems. Examples:
 - ✓ **FRETIS**: transport chain monitoring and planning package (application in PROODOS SA)
 - ✓ **FRETIS / IFT**: Container Terminal management (application in port of Thessaloniki)
 - ✓ **POD**: Proof of delivery for road transport distribution fleets (application in PROODOS SA)
 - ✓ **Train Management system**: Monitoring wagons in rail transport (application in OSE)

EXAMPLE 1: The SMART-CM project philosophy and expected results

Create a **GLOBAL CONTAINER DOOR-TO-DOOR ARCHITECTURE AND SERVICE PROVISION**

based on the notion of a
ONE STOP_SHOP SERVICE

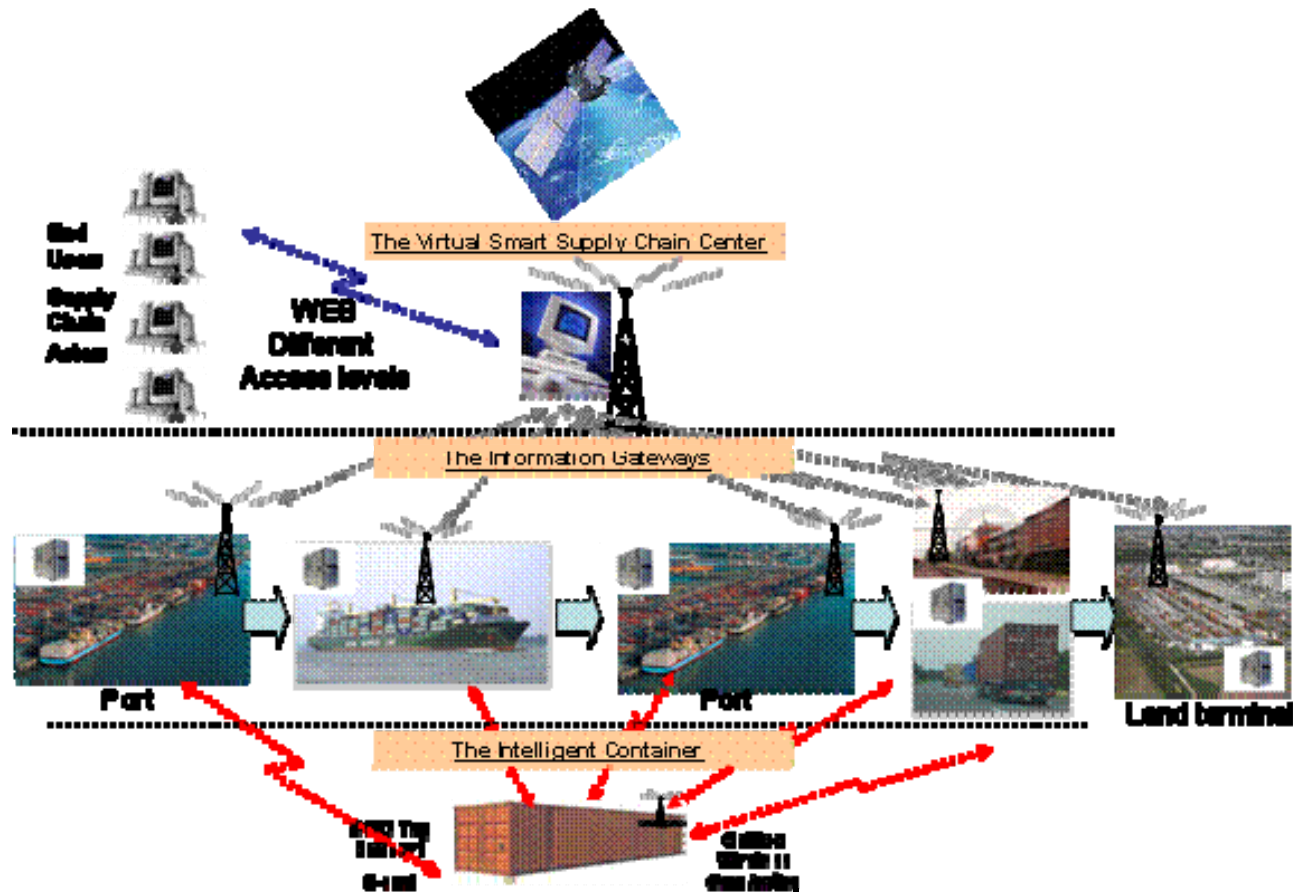


Aiming at :

- enhancing clearance and exchange of information / documentation between actors
- Creating cooperation at wider global level

THE SMART - CM CONCEPT!!

The three level communication approach within the SMART-CM system Architecture

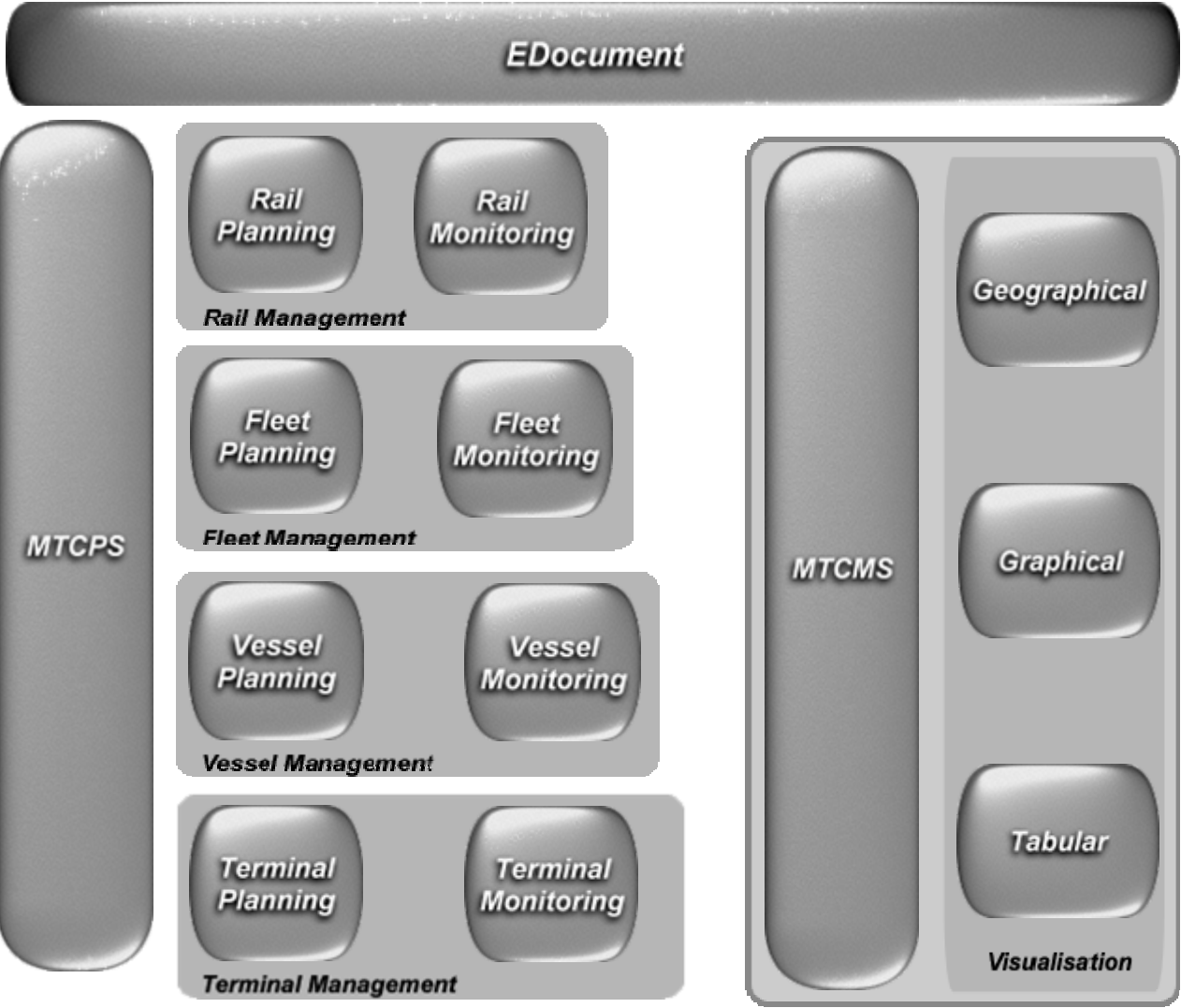


Enhanced “intelligent” containers



EXAMPLE 2:
The FRETIS system for Transportation chain
monitoring and management

- Integrated transport chain planning and monitoring system
- Modular, flexible, extensible, scalable architecture
- Modules include:
 - Fleet Management (trucks)
 - Vessel Management
 - Rail management
 - Terminal management (e.g. ports for productivity and performance)
 - Overall transport chain management



Technologies used

- Software
 - EDIFACT
 - XML
 - Web services
 - GIS/GIS over web
- Communications
 - GPRS/WLAN
 - Security (SSL/PKI)
- Hardware
 - (D)GPS
 - RFID
 - Barcode
 - Smart card readers
 - CCTV
 - Handheld devices
 - On-board units

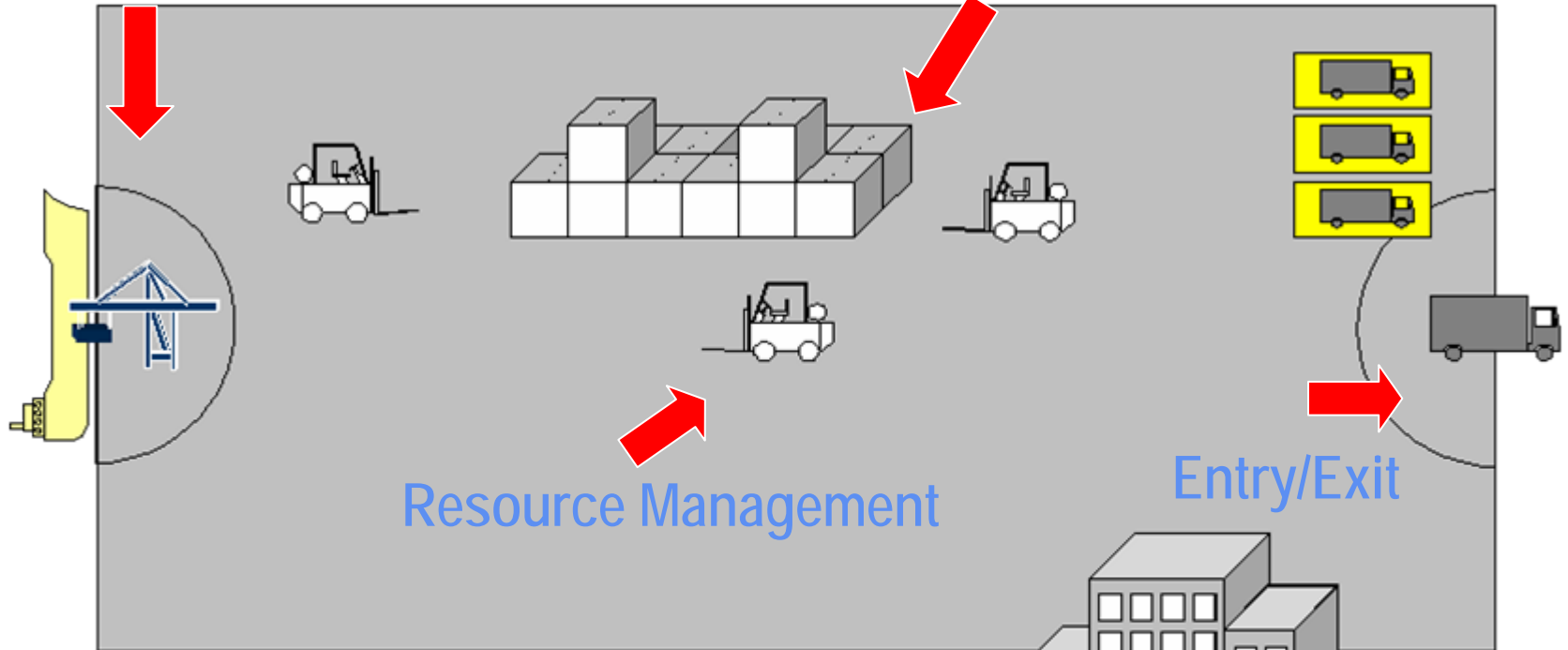
EXAMPLE 3:
The FRETIS/IFT system for
Container Terminal operation

- Integrated Terminal planning and monitoring system
- Modular architecture
- Combines state-of-the-art technologies for data gathering and transmission in order to enhance Terminal productivity and performance, and increase security and cost-effectiveness
- Currently in operation for more than 2 years at the port of Thessaloniki.

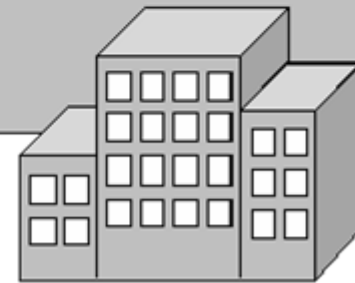
Terminal overview

Loading/Unloading

Yard



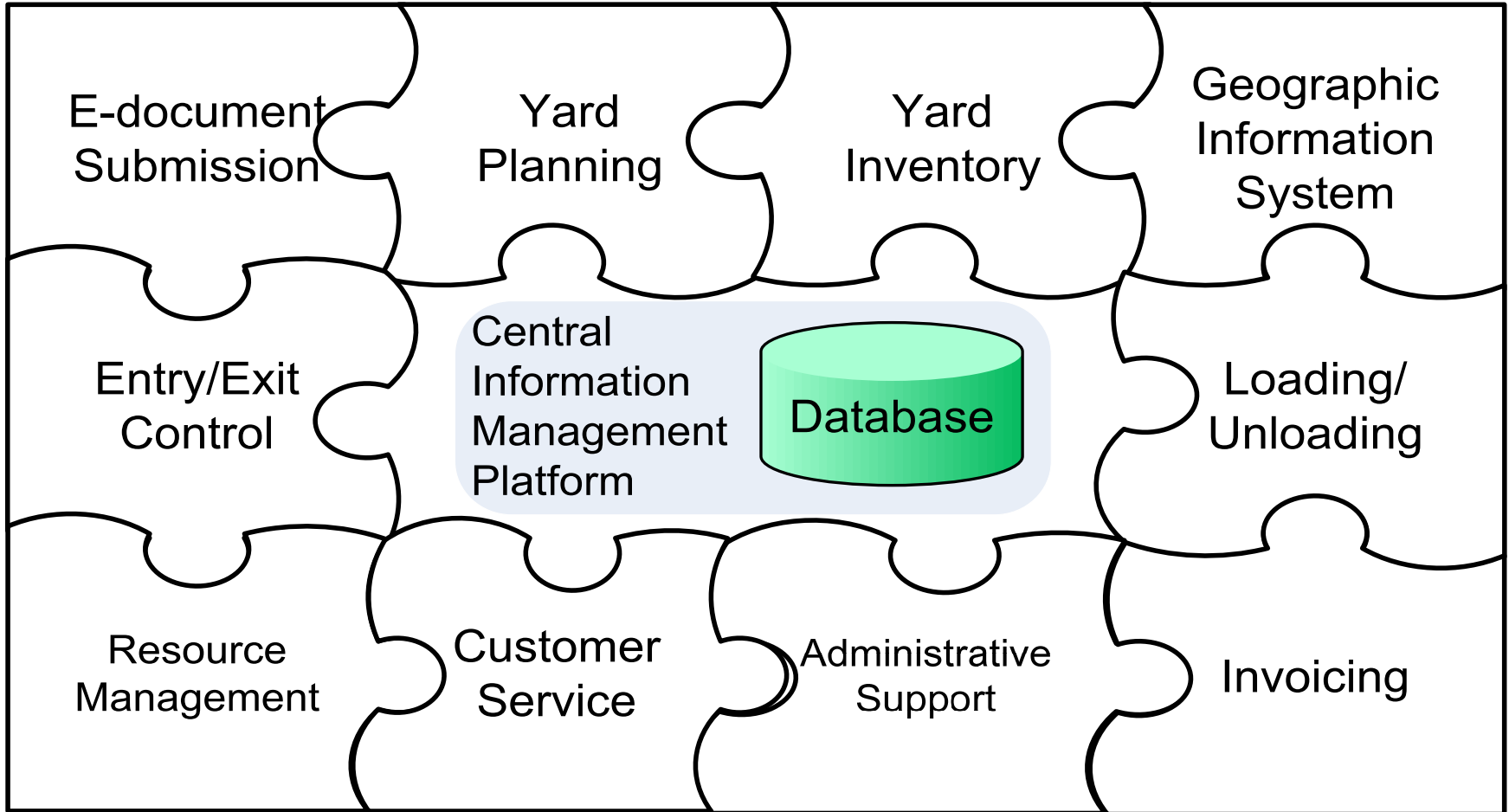
Customer



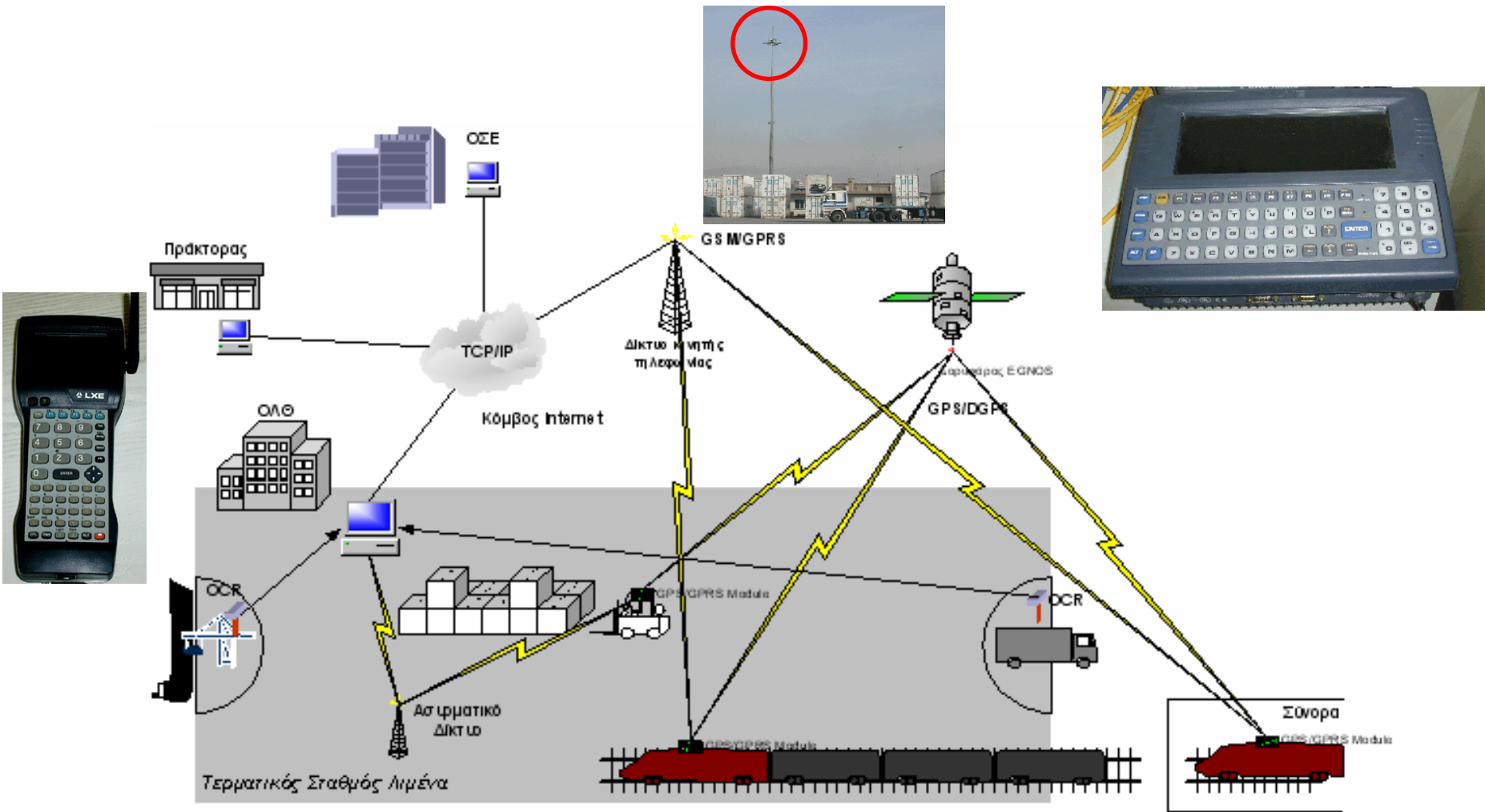
Port premises -
MIS



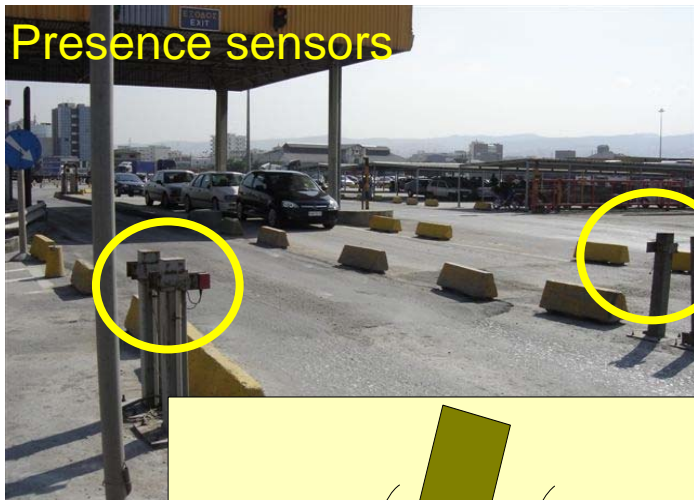
FRETIS IFT modules



Intermodal terminal communication infrastructure

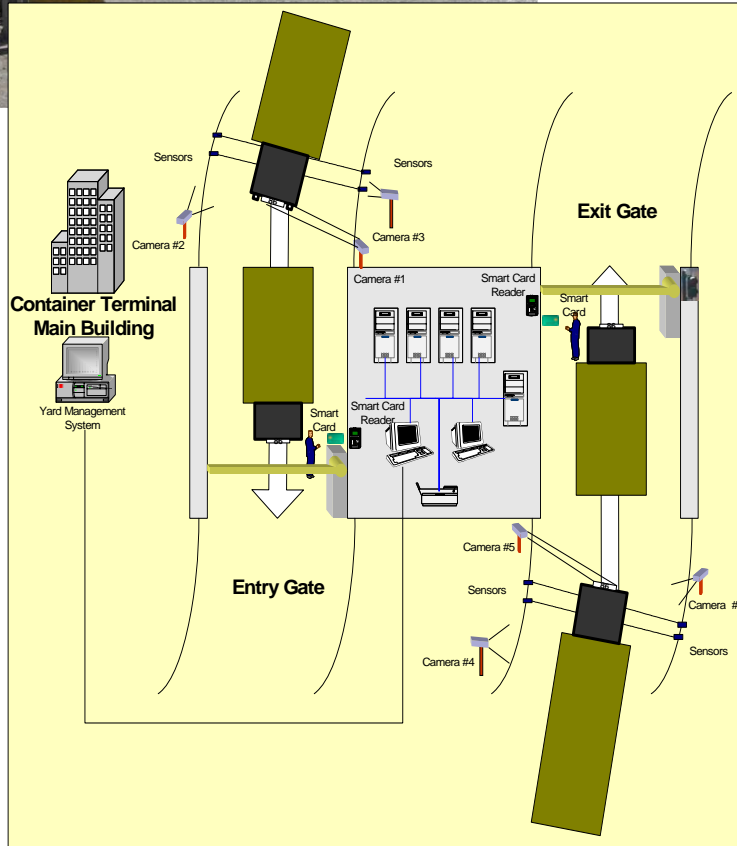


Presence sensors



Access control equipment

Traffic control devices



CCTV



Smart card readers



Innovation / Technology challenges

- Need to further pursue global standards so that data and systems are interoperable and open to all “actors” worldwide.
- Need to establish a global “framework architecture” (*Service Oriented Architecture – SOA*).
- Energy-efficiency and reliability issues for the equipment used (mainly in terms of the power supply for container monitoring devices and communication range).
- Intelligent use of available information and data.
- Need to further extend global uniform standards and rules for tracking the containers and the state of their contents all along the chain from door-to-door.
- Ability to *re-schedule* based on dynamic information and data.

Commercial & market problems

- Finding solutions which are not “industry” driven, but “market” driven.
- Integrating the intermodal (container) transport planning systems with the commercial environment of finding and concluding the business.
- Understanding better the various commercial characteristics of container line-haul and cargo handling operations.

Business / Organisational issues

- Further standardising the commercial or market related information in the container transport trade (*e-documentation*, and *e-business transactions*).
- The transport of containers is not sufficiently transparent
- Traditional business models do not correspond to the new ICT applications.

Legal / Security problems

- A large portion (approximately 50%-70%) of the containers that are inspected in both the United States as well as in Europe are inspected randomly - no risk profiling.
- The documentation that declares what is in a container is not always correct.
- Need to further standardise containers.
- Container seals should be applied in a standard way.
- Liability issues regarding the damage and/or interruption of the door-to-door supply chain.
- Alignment with the new security rules and regulations.

The E. Mediterranean, a rapidly developing region: Crete is its natural center for Transshipment services

