SSMART

System for Safety in Multimodal Assisted Remotely Transports

SSMART: improving safety for dangerous goods transport

Harwell, April 19th, 2012

- Needs
- Background & actors
- Project overview: requirements, design, market
- Feasibility assessment: drivers, trade-off, limitations
- Roadmap

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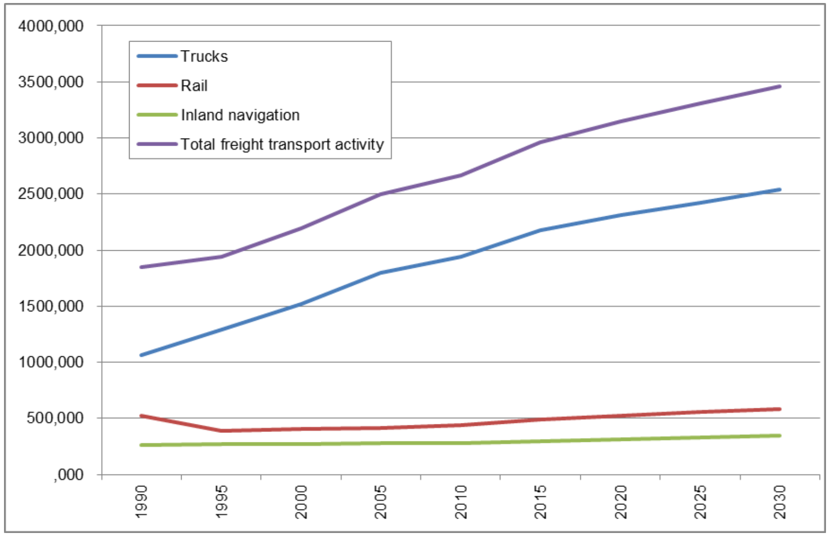
- Context
  - Freight transport increases in Europe
  - Dangerous goods share is around 8%
  - Low probability but high severity

- Needs
  - For industrials: to monitor the payload of a Dangerous Good Transport (DGT)
  - For Publics Bodies (PB): to get timely and correct information about DGT crossing the area of competence
  - For Both: to share a common tool for safety enhancement



Trend

New French regulation 18/08/2010 – Article 17 - Protection and control of nuclear materials during transport

Real-time monitoring

Automatic queries by Public Bodies

- 2009-2010
  - Maturation of the needs by entities such as AREVA, APS, the Belgium Public Bodies, Infrabel and Ziegler
  - Creation of a consortium involving:
    - *An end-user community represented by AREVA and APS*
    - *An industrial community composed by Vitrociset Belgium, VITO and Création*
  - Start of a feasibility study under ESA IAP framework
- 2011
  - Completion of the feasibility study project (400K€): requirements & specifications, design concept, viability analysis, guidelines for a demonstration project

- Transport
  - Worldwide payload monitoring (geo-localisation, sensors data, CANBUS data)
  - Intermodality (railway, road, sea) & interoperability (area of competence)
  - Continuity in data communication between transport, Control Centre, PB
  - Secured transmission and treatment of data
- Operations
  - Workflow management at preparation, monitoring and emergency stages
  - Schedule, resources, navigation management
  - Service database (ADR tunnel, weather forecast, dispersion model…)
- Business: running cost equivalent to current systems

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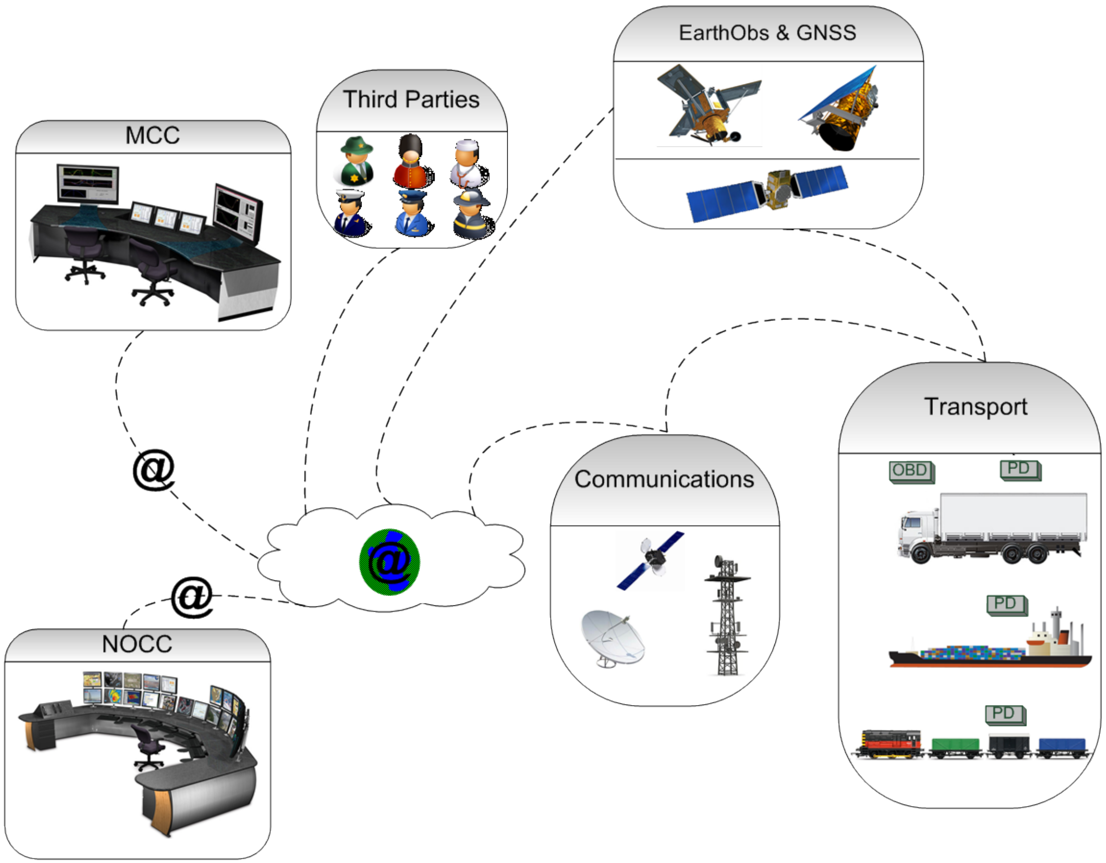

NOCC: gather, process and monitor all services

MCC: allow users to remotely access services

PD: gather sensors telemetry, estimate positioning information, primary processor

OBD: offer a set of services for road transport

Space segment: satellite communication & navigation, added-value services

Terrestrial segment: GSM/GPRS services, internet link

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Segment 1: Nuclear fuel cycle; Hazardous transports by railway

Segment 2: Nuclear non-fuel cycle; Hazardous transport by road

Sub-segment	Customer characteristics	Customer needs
Segment 1	Few market players (<200) Big and international/European companies Railway Suffer a strong competition with road DGT prepared and followed Major DGT highly visible Use of dedicated transport equipment	Prevention Safety enhancement Overview of DGT (Public bodies) Public relation concerns
Segment 2	Large amount of companies Small and local Strong competition Sector very sensitive to global economic sustainability DGT is a transport among other Random breaking events during the transport	Competition added-value Logistics enhancement Overview of DGT (Public bodies)

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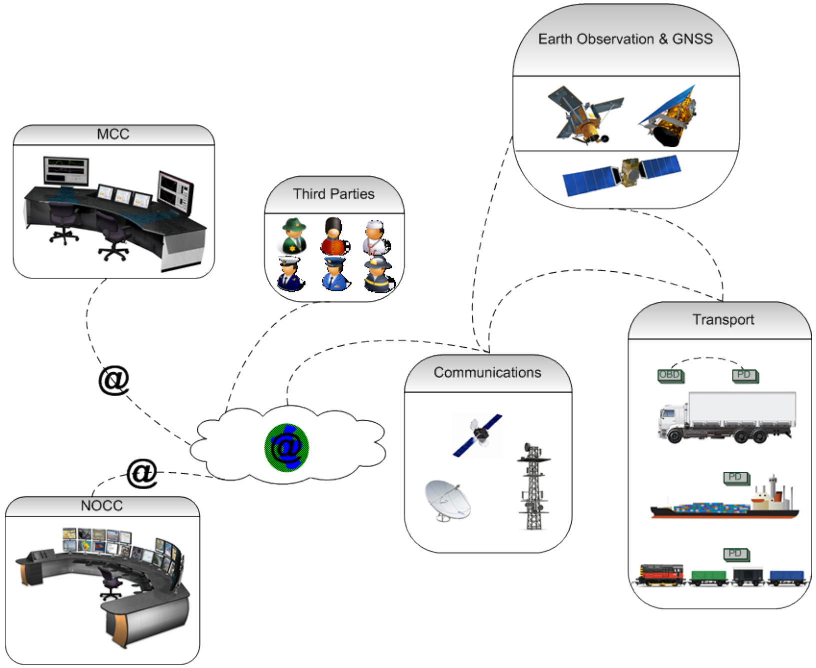
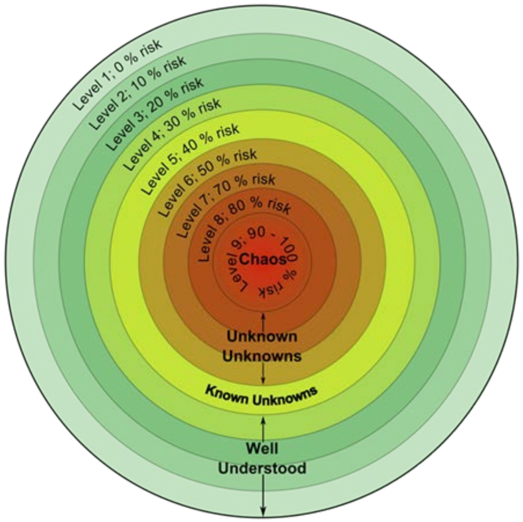
- Technical drivers
  - Capabilities
  - Level of maturity *(Advancement Degree of Difficulty; credit to University of Strathclyde)*
  - Obsolescence risk
  - Implementation process



- Market drivers
  - Prevention and safety enhancement
  - Secured data
  - Running cost equivalent to current systems



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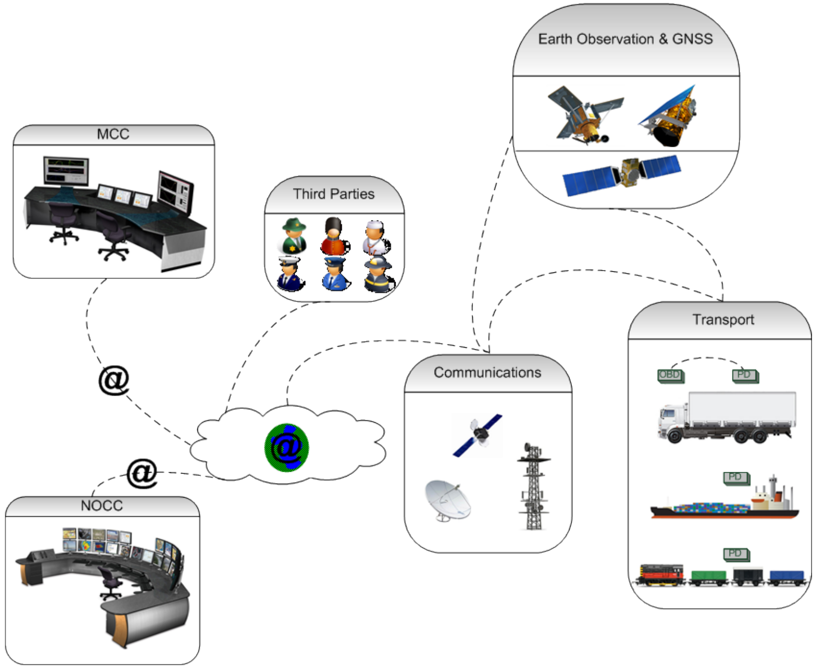
- Communication architecture at transport level
  - 4 possible architectures
  - Rational: capabilities (amount of data exchanged, short wireless network performance), implementation process

- Satellite communication
  - 2 possible satellite providers
  - Rational: capabilities (amount of data exchanged, latency), running cost, provider & currency dependency
  - Main driver for the PD technology selection



- OBD technology selection
  - 3 possible solutions
  - Rational: capabilities (batteries, processor), running cost

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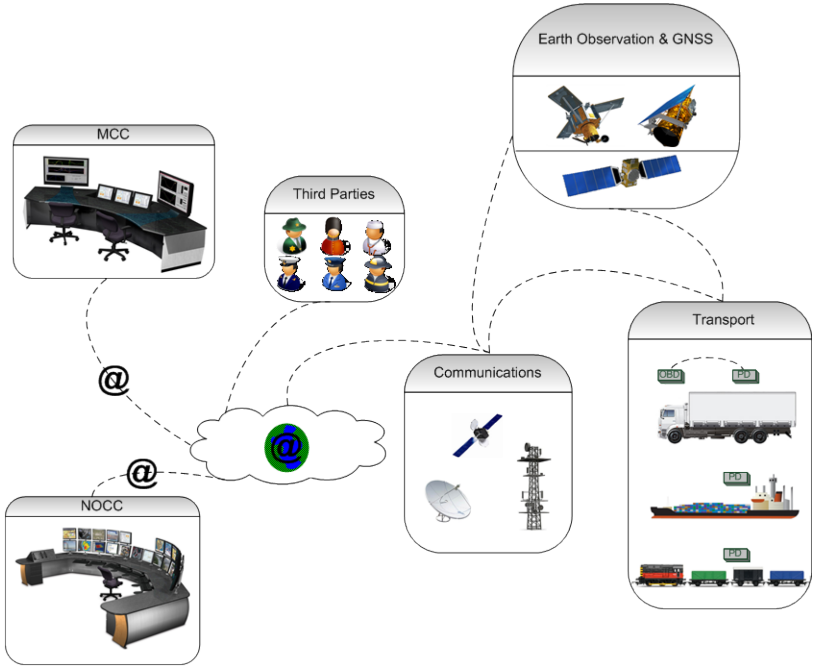
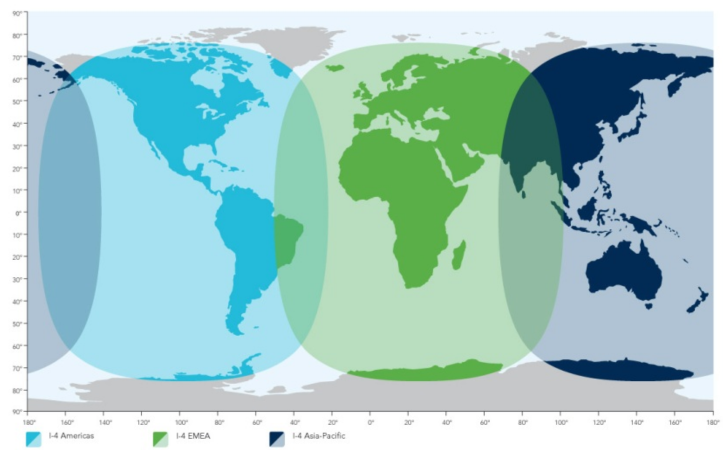
- Technical limitations
  - Permanent tracking for maritime transport only if the satellite modem is in the line of sight
  - No coverage in extreme high latitude locations

- Economical limitations
  - Near real-time payload status:
    - *For critical data: 1 minute*
    - *For non critical data: 5 to 10 minutes*
  - No monitoring capabilities if a tracked maritime payload falls overboard (beacon system considered too expensive)





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70% of non-compliances are related to “nice to have” requirements

Way forward

Demonstration stage to be started mid-2012 (2.1M€; 4 prototypes)

New company to be created to run the service

Challenges

Demonstrate interoperability & intermodality

NOCC software development

PD & OBD implementation process

Partnerships with key providers

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Thanks for your attention

Question/Answer

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