EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

Joint Research Centre

IPSC Presentation

Institute for the Protection and Security of the Citizen (IPSC)

European Commission Joint Research Centre, Ispra

June 2005

IPSC Focus

IPSC provides research-based, systems-oriented support to EU policies, in particular EU Security related policies (risk, anti-fraud). The application areas include:

- anti-fraud, compliance monitoring and cyber security
- risk management and mitigation such as in counter terrorism
- global stability and security
- border and transport security
- security of the energy supply (oil, gas, electricity)
- non-proliferation and nuclear safeguards

The Institute maintains and develops its expertise and networks in information, communication, space and engineering technologies in support of its mission.

IPSC core competences

- IPSC combines expertise in **data mining** & **satellite image processing and analysis** with competence in **nuclear safeguards**, **smart/embedded sensors** and **advanced seals** in order to support security and antifraud related capability needs.

- IPSC maintains and develops its expertise and networks in **information**, **communication and modeling technologies**, as well as **software engineering** in support of its focus areas.

- IPSC has developed specific horizontal competences, also in support to EU policies, in particular in the area of **econometrics.** With its significant experience in the area of **knowledge and composite indicators** IPSC will support the monitoring of the **Lisbon process** in a quantitative manner.

JRC Security Strategy - Policy Context

EU Security Policies

"A secure Europe in a better world - European Security Strategy", European Council 12 Dec 2003

EU Action Plan on combating Terrorism, European Council 25 March 2004

Four Commission communications on New Measures to Combat Terrorism - Oct 2004

Security Research Initiatives

Group of Personalities report, March 2004

Preparatory Action on Security Research (PASR), March 2004

FP7 Proposal “Security and Space” sub-programme

Anti-fraud applied to Agriculture

MARS: *Monitoring Agriculture with Remote Sensing*

Monitors compliance with the EU's CAP: Control with remote sensing in Mecklenburg – Vorpommern

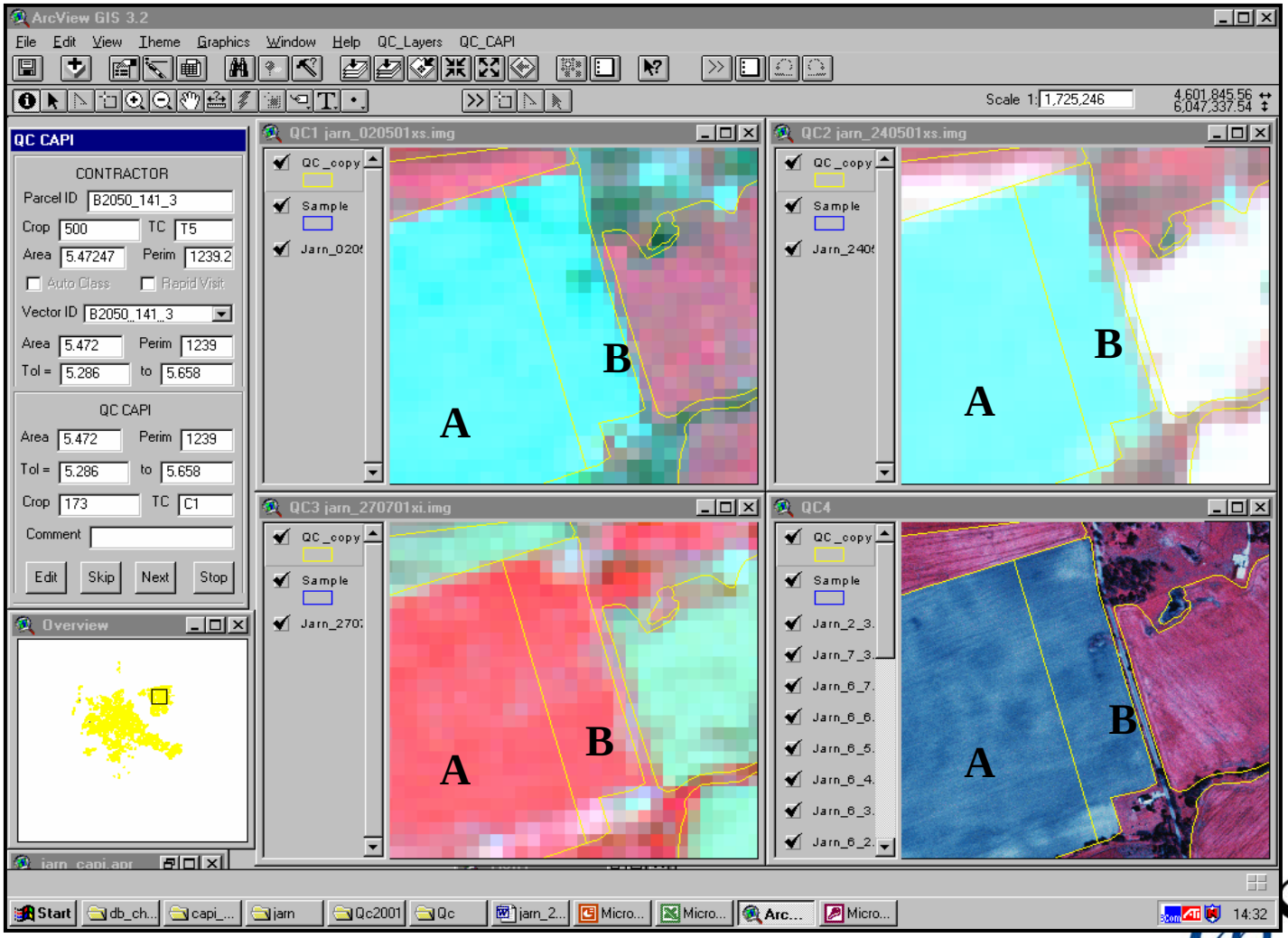
Parcel-id = B

Explanation
Parcel B was declared and accepted by the contractor as set-aside.

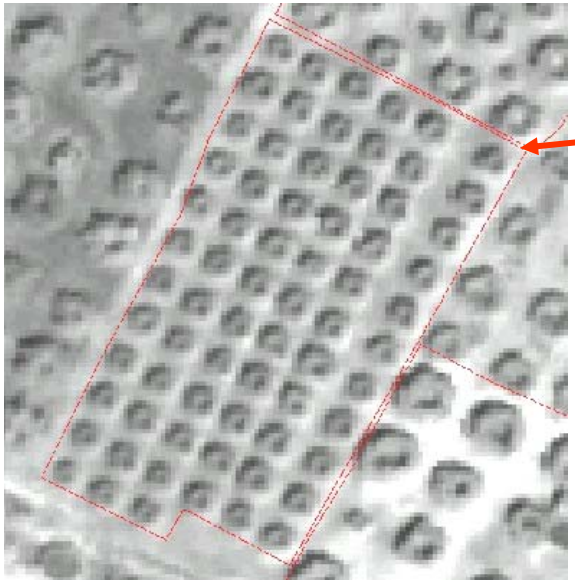
Parcel A was declared as maize.

The Quality Control by JRC has determined that also parcel B is maize. As a consequence, the declaration for this parcel was refused as wrong.

TBN:
Picture LT: satellite image 02 May '01
Picture RT: satellite image 24 May '01
Picture LB: satellite image 27 July '01
Picture RB: aerial photography



Identification and counting of trees



69 olive trees

almonds between olive tree rows

- 24 almond trees (orange)
- 74 olive trees (green)
- 4 pine trees (brown)

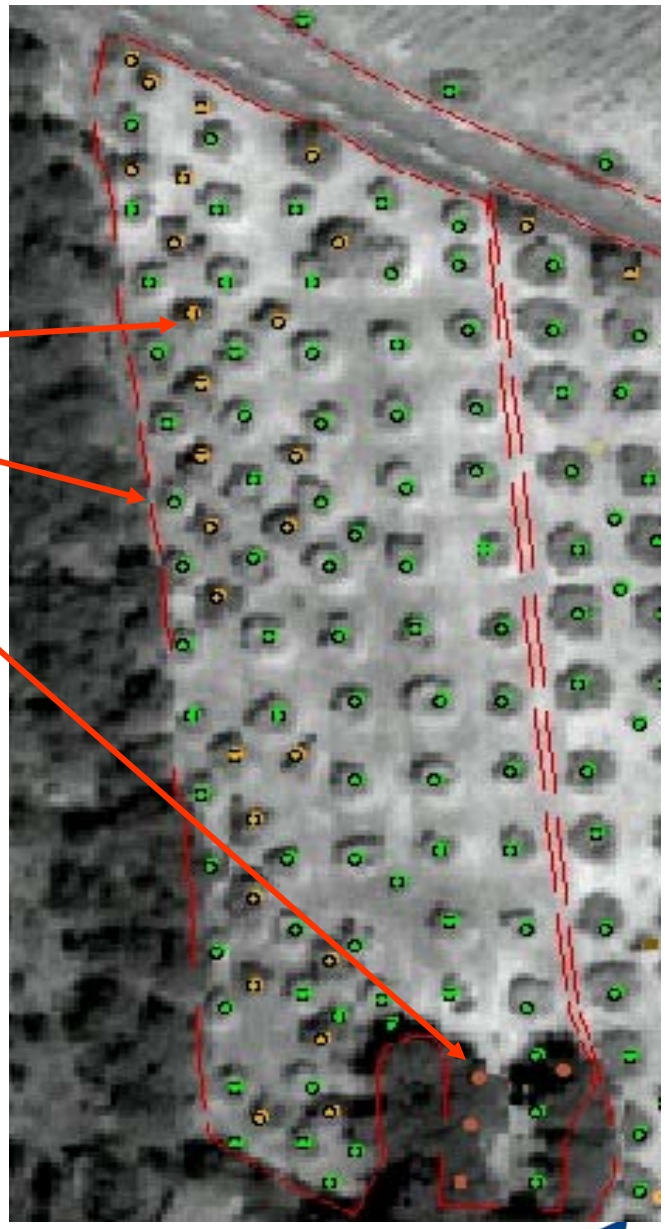


Image intelligence

Image intelligence: post-disaster damage assessment, humanitarian impact, refugee monitoring, illicit drug crop monitoring, global crisis atlas

a b c d

(a, b) Coca fields (ground image)

(c) Satellite image

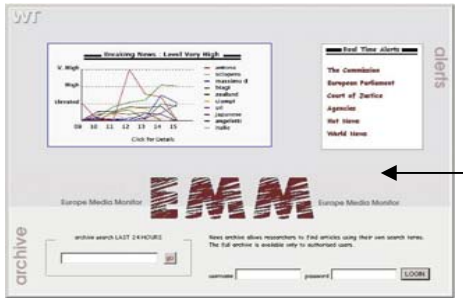
(d) Coca fields are detected by object-oriented image processing, (orange). Imagery collected over time provides insight in crop substitution programs

EMM – Europe Media Monitor

EMM is in active use by **all** Commission DGs

- 800 news sources updated every 10 minutes
- 32 languages (including Arabic)
- 55000 articles/day
- 4000 email alerts/day
- 100 SMS/day to VIPs
- 12,000,000 articles archive since 2002
- 10000 active web users
- 400 topic alerts real-time
- 10000 keywords real-time
- EMM is a truly live 24/7 news aggregator. Google News is delayed up to 1 hour & LexisNexis upto 1 day.
- Customised & secure intelligence to EU bodies (EC, Parliament, Council), independent of commercial or non-EU interests.

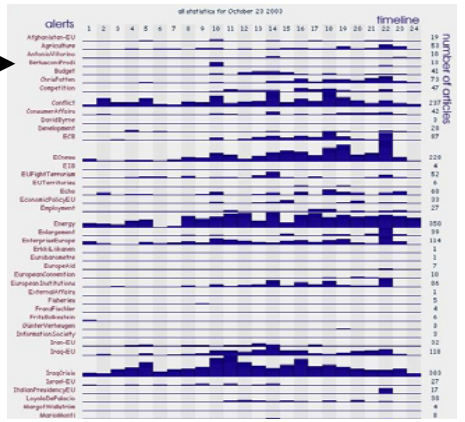
EMM Services



EMM
Europe Media Monitor

All Europe's news
Breaking News
12,000,000 articles
Archive since 2002

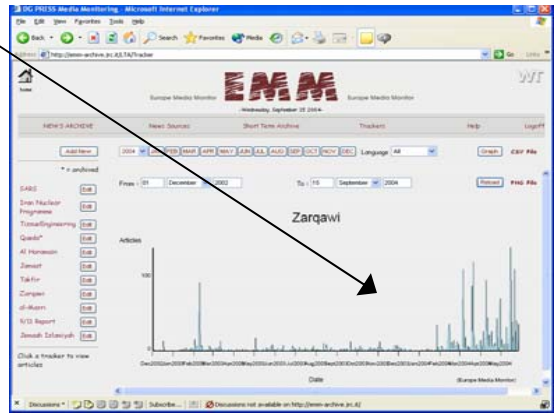
Live news
Push alerts
By SMS



RNS
Rapid news service

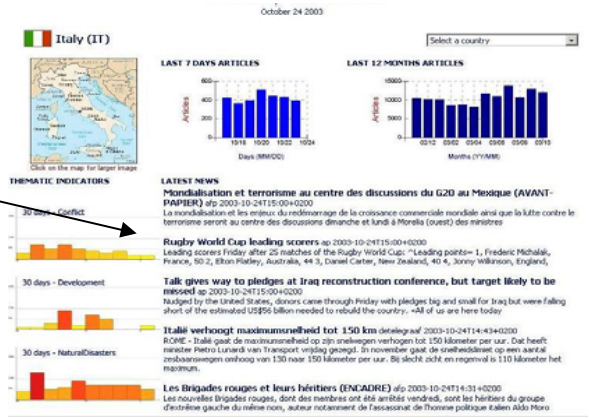
State of the World
Identify hotspots& forgotten crises

Zarqawi



EMM in active use by **all** DGs
- **800 sources updated every 10 minutes**
- 4000 email alerts/day
- 10000 active web users
- 100 SMS/day to **VIPs**
- 400 topic alerts **real-time**
- 10000 keywords **real-time**
- 55000 articles/day
- 32 languages including Arabic
- EMM is the EU fastest impartial news monitor: Google News is delayed up to 1 hour & LexisNexis up to 1 day

State of the World
Country watch



MediSyS

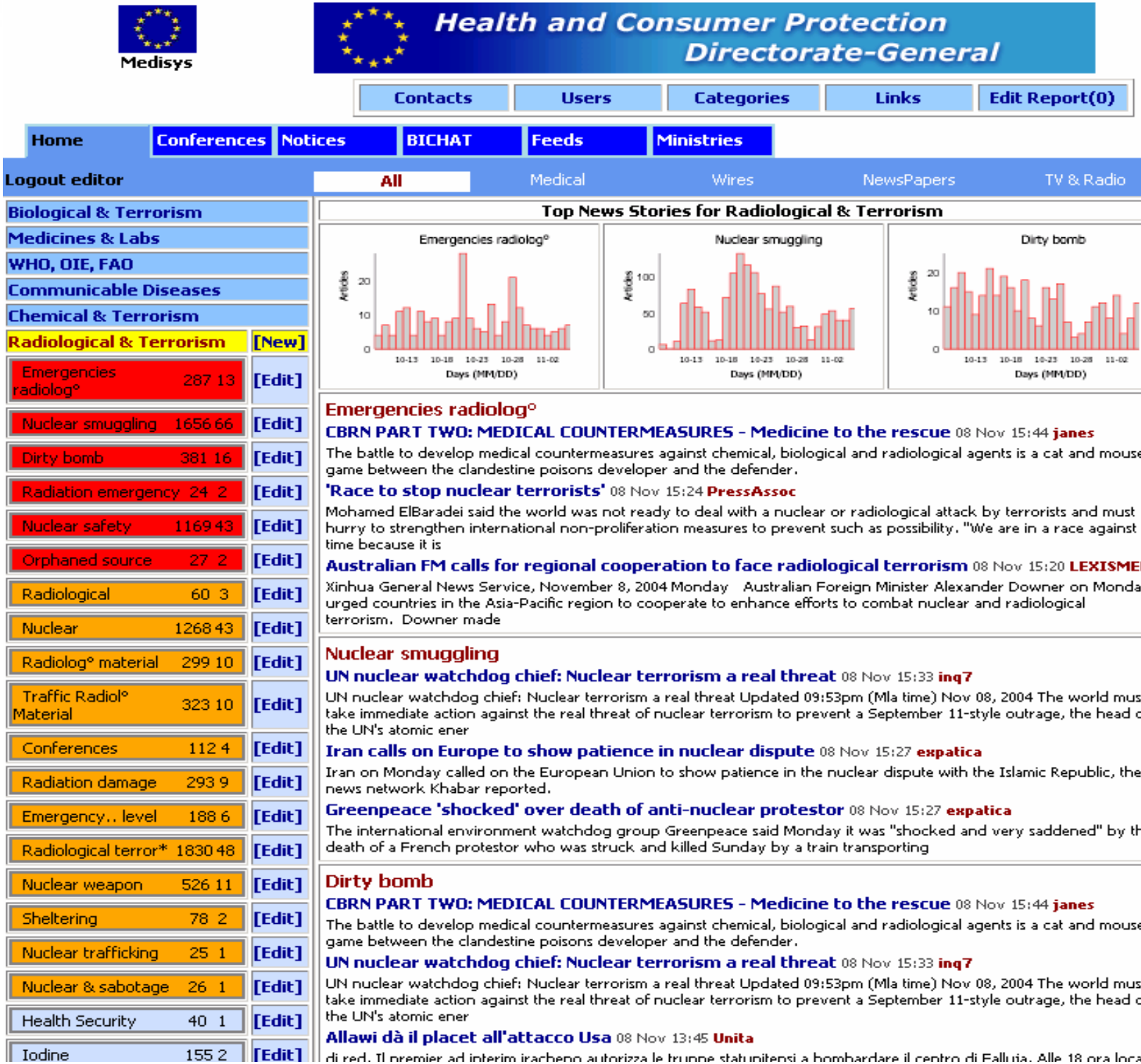
Network Monitors

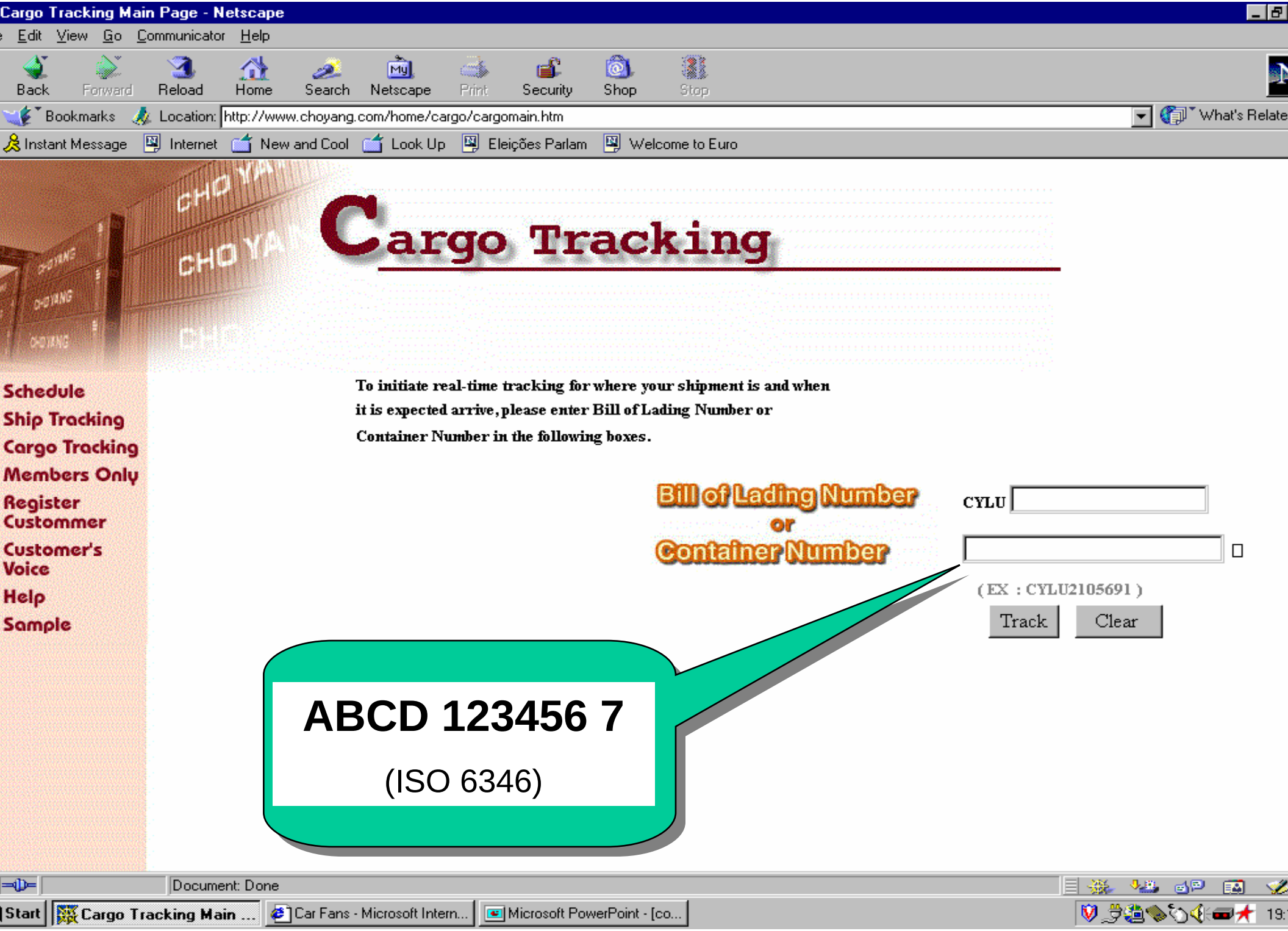
1. Disease Outbreaks

2. Biological agents

3. Chemical Agents

4. Nuclear threats




Cargo Tracking Main Page - Netscape
Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: http://www.choyang.com/home/cargo/cargomain.htm
What's Relate
Instant Message Internet New and Cool Look Up Eleições Parlam Welcome to Euro
Cargo Tracking
Schedule
Ship Tracking
Cargo Tracking
Members Only
Register Custommer
Customer's Voice
Help
Sample
To initiate real-time tracking for where your shipment is and when it is expected arrive, please enter Bill of Lading Number or Container Number in the following boxes.
Bill of Lading Number or Container Number
CYLU
(EX : CYLU2105691)
Track
Clear
ABCD 123456 7
(ISO 6346)
Document: Done
Start
Cargo Tracking Main ...
Car Fans - Microsoft Intern...
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Full record of maritime container movements

SELECTION OF CONTAINER: ABCD 123456 7 (Carrier X)

10-APR-00	ROTTERDAM (NL)	NA	OUT_GATE_AT_DISCHARGE_PORT
14-OCT-99	ROTTERDAM (NL)	VESSEL C	DISCHARGED_FROM_VESSEL
21-SEP-99	KAOHSIUNG(TW)	VESSEL C	LOADED_ON_VESSEL
15-SEP-99	KAOHSIUNG(TW)	VESSEL B	TRANSSHIPPED
14-SEP-99	HONG KONG(HK)	VESSEL B	TRANSSHIPPED
13-SEP-99	HONG KONG(HK)	VESSEL A	TRANSSHIPPED
10-SEP-99	SHANGHAI(CN)	VESSEL A	LOADED_ON_VESSEL
06-SEP-99	SHANGHAI(CN)	NA	PICK_UP

Source: ConTraffic Database

Suspicious container movements: "Loops"

TYPE OF FRAUD

Cases of "*false declaration of origin*" relative to the importation of a certain chemical product.

MODUS OPERANDI

Use of an intermediary transshipment port (Taiwan, Malaysia, Singapore, Thailand) to "switch" the bill of lading.

MOTIVATION

To avoid the payment of anti-dumping duties (24% → 48% of the value of the goods)

example: groups of containers traveling together

- **Pattern example**: 10 containers originating from China travel together and discharge their cargo in a USA port; a few months later the same 10 containers depart together with destination Europe
- **Motivation**: after containers are discharged and their cargo is delivered in some place, they normally then follow different routes; suspicion that their cargo was not discharged
- **Context**: analysts claimed that such a pattern was used for the smuggling of cigarettes from China

Overview of the results (anti fraud)

- **Suspicious containers identified by ConTraffic and then communicated to customs: about 200**
- **Number of containers actually investigated by customs: 60**
- **Number of fraudulent containers among these: 22**
- **Products concerned: chemicals, shoes, textiles, porcelain, etc.**
- **Irregularities: anti-dumping, quota-related infractions**

Overall hit rate 37% based on global routing information alone

Major Accident Hazards Bureau

Remit of MAHB:

- To provide research-based scientific support to the European Community on EU policies for the **control of major accident hazards** ("**Seveso**" **Directives)** in order to protect the citizen from major accident risks.

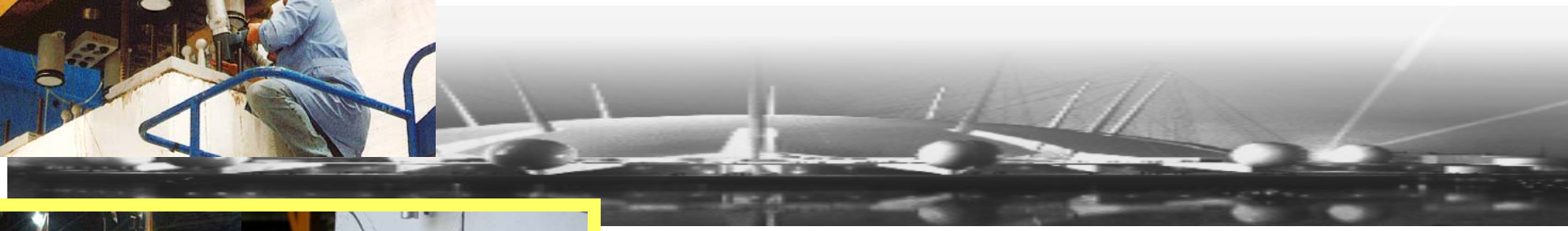
Main activities (examples):

- Accident analysis and **lessons learned** through the Major Accident Reporting System (MARS)
- Support to **harmonised implementation** of Seveso Directive in the MS through the development of Guidelines (in collaboration with the MS in Technical Working Groups)
  - Benchmarking of Risk assessment and Guidelines for Safety Reports
  - Land-Use Planning
  - Harmonised database of scenarios and frequencies for the underlying RA
  - Inspections
- Exchange of information and **good practices** amongst the MS (Mutual Joint Visits Programme)

European Laboratory for Structural Assessment

The mission of ELSA is to provide research and contribute to European Standards harmonization in construction, perform vulnerability assessment of buildings and civil infrastructures for risk mitigation and develop appropriate methodologies through integrated use of experimental testing and numerical modeling in Structural Mechanics

- Contributions to the EUROCODES
- Leading position in pseudo-dynamic testing of large structures



New challenges

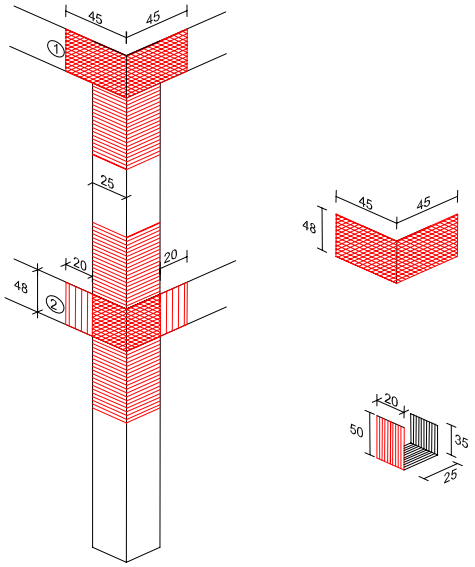
- Develop ERA dimension (testing and research training)
- Performance-based criteria for service and accidental loading (Earthquake, Explosion, Floods …)
- Creation of a 'virtual laboratory' to link structural engineering research sites across Europe

SAFECONSTRUCTION

- Support to Eurocodes:
  - Database and Harmonization of National Parameters
  - Coordination of WG on new Eurocode for Composite Materials.
  - Workshop Organization for New Member and Candidate States.
- Development of ELSA 'Virtual' Laboratory
  - Telepresence
  - Distributed testing
- Experimental activity
  - Testing of full/large scale models of structures (pseudo-dynamic, including sub-structuring, and dynamic)
  - Validation of new earthquake protection concepts and systems
  - New materials and techniques for post earthquake rehabilitation of structures

Large scale testing at the ELSA Laboratory

Model construction and testing

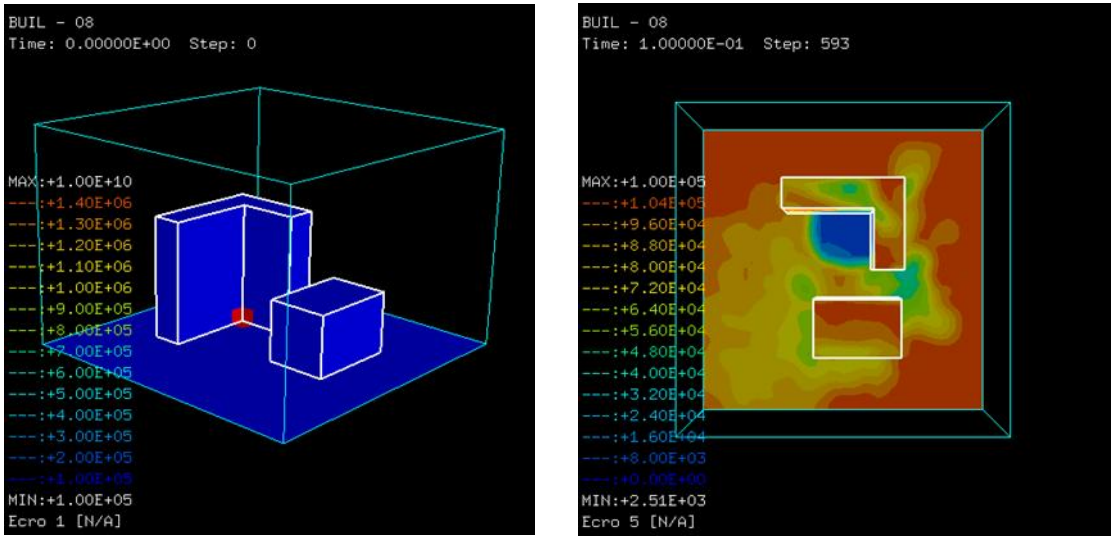


Rehabilitation of structures

Physical Vulnerability Assessment of Critical Structures

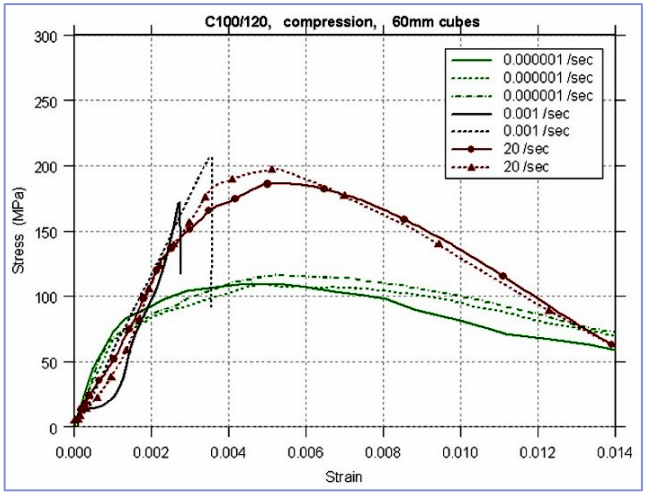
- Physical (structural) protection harmonization and enhancement of public buildings as well as critical infrastructures.
- Prevention measures for the structures under certain types of threats or accidents (explosions, blasts, impact, …)

Numerical simulations



Explosion in urban environment

Testing with the Hopkinson bar



Behaviour of Steel Fiber Reinforced Concrete under dynamic compression

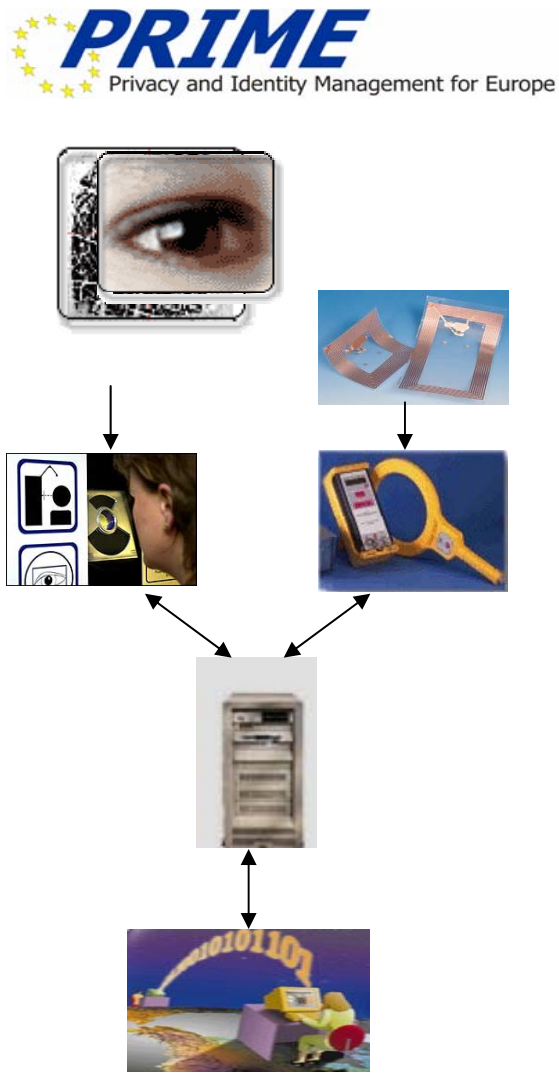
Physical Vulnerability Assessment of Critical Structures

Contribute to the enhancement of the Union interior security through the protection of critical infrastructures via

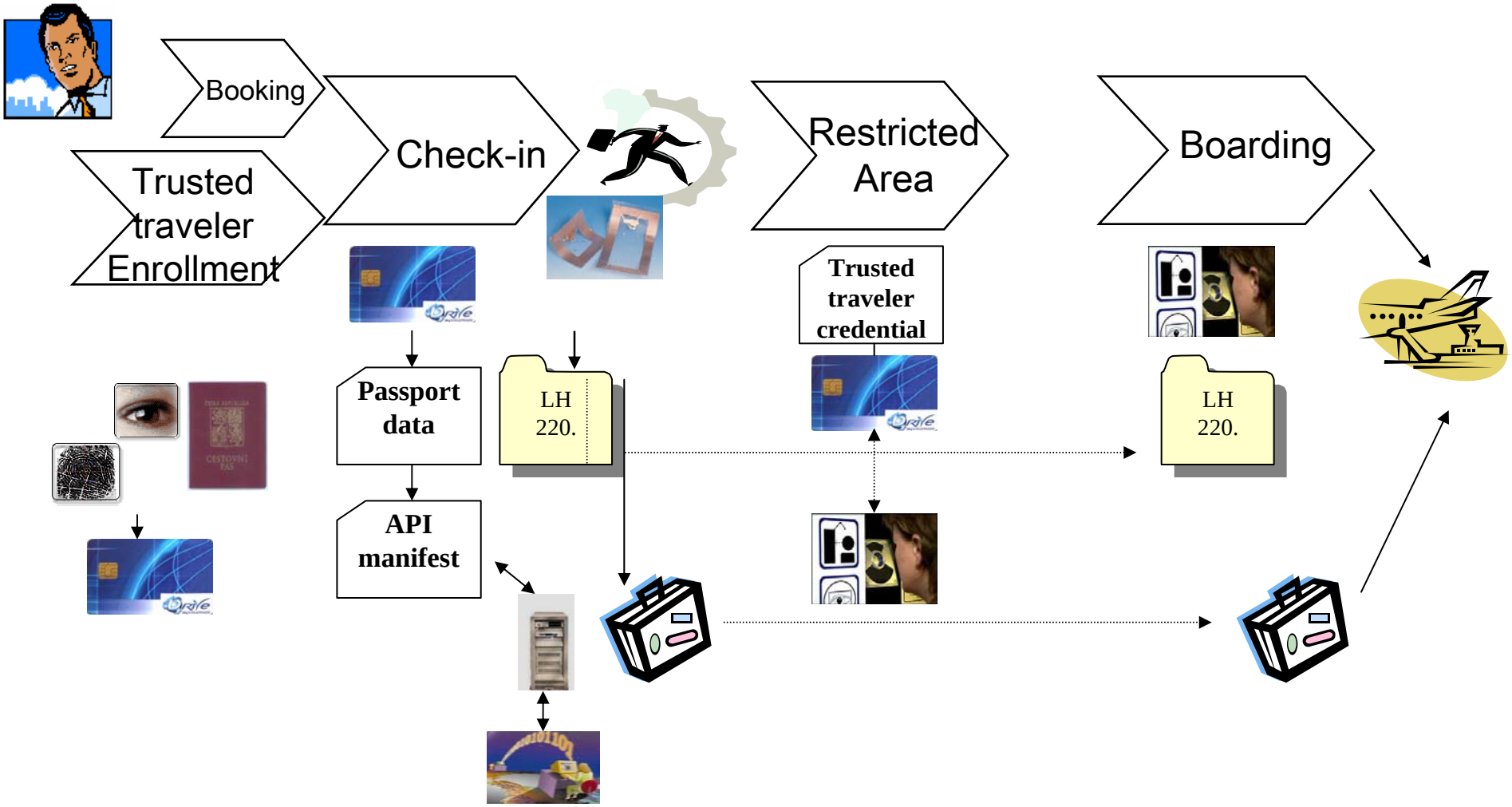
- Knowledge development relative to severity of threats of different types and intensities
- Provision of the competent authorities with reliable information concerning the vulnerability of critical structures to several threat scenarios
- Development of relevant techniques for assessing structural integrity under severe loads
- Their adaptation for incorporation into construction standards in collaboration with CEN (need already identified by TC250).

Airport security controls application

- Objectives:
  - Speed: faster departure control of a passenger ("Trusted Traveller" concept)
  - While maintaining high levels of security
  - And while maximising the privacy of passengers
- Integration of advanced technologies:
  - Biometrics: Secure verification of the identity of the trusted traveller;
  - Contact-less smart cards: Easy to use, cryptographic protection of data, tamper resistant.
  - Electronic tags (RFID's): Automate the boarding pass controls by remote reading of its number



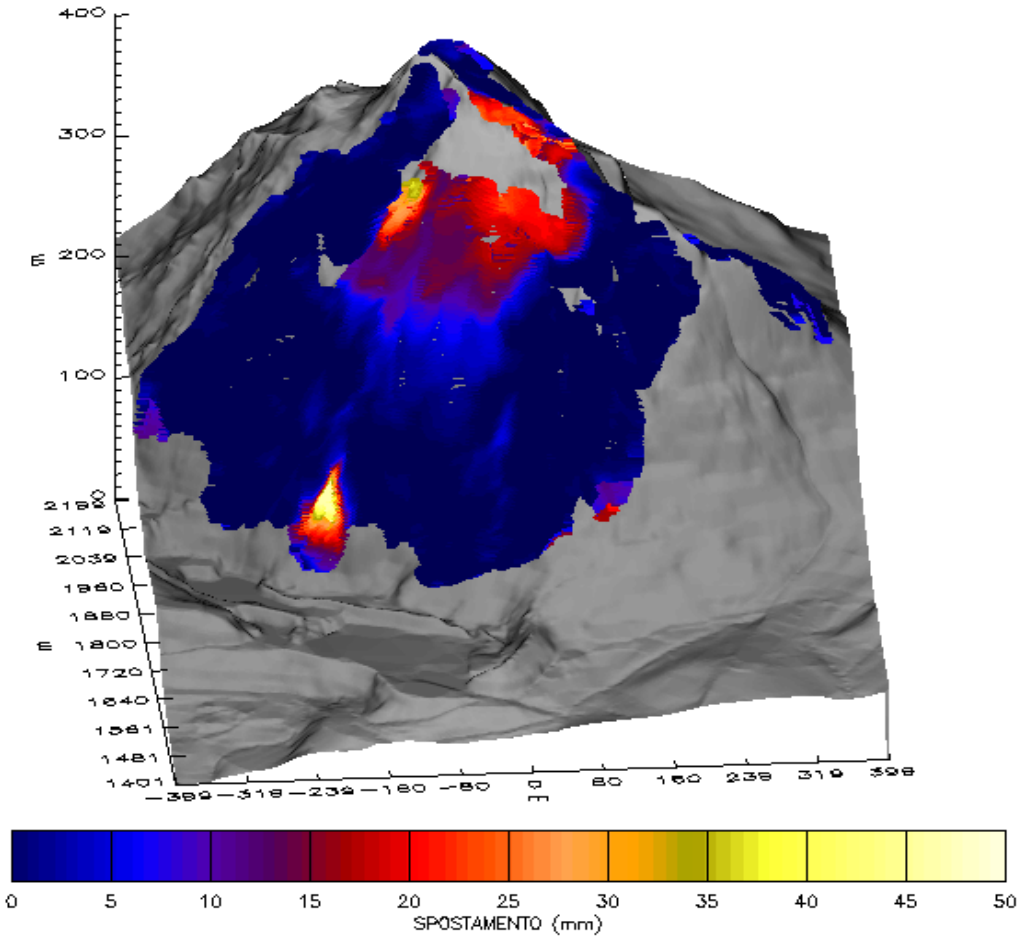
The *Trusted Traveller* Process



Landslides monitoring by radar interferometry

Monte Beni (FI)

Landslides monitoring by radar interferometry



time span: 124 h

time step: 40 min

maximum speed: 0.48 mm/h

average speed: 0.16 mm/h

Monte Beni (FI)

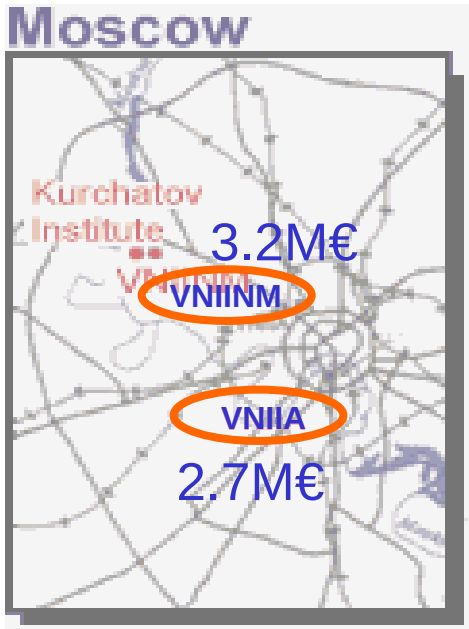
Nuclear Safeguards

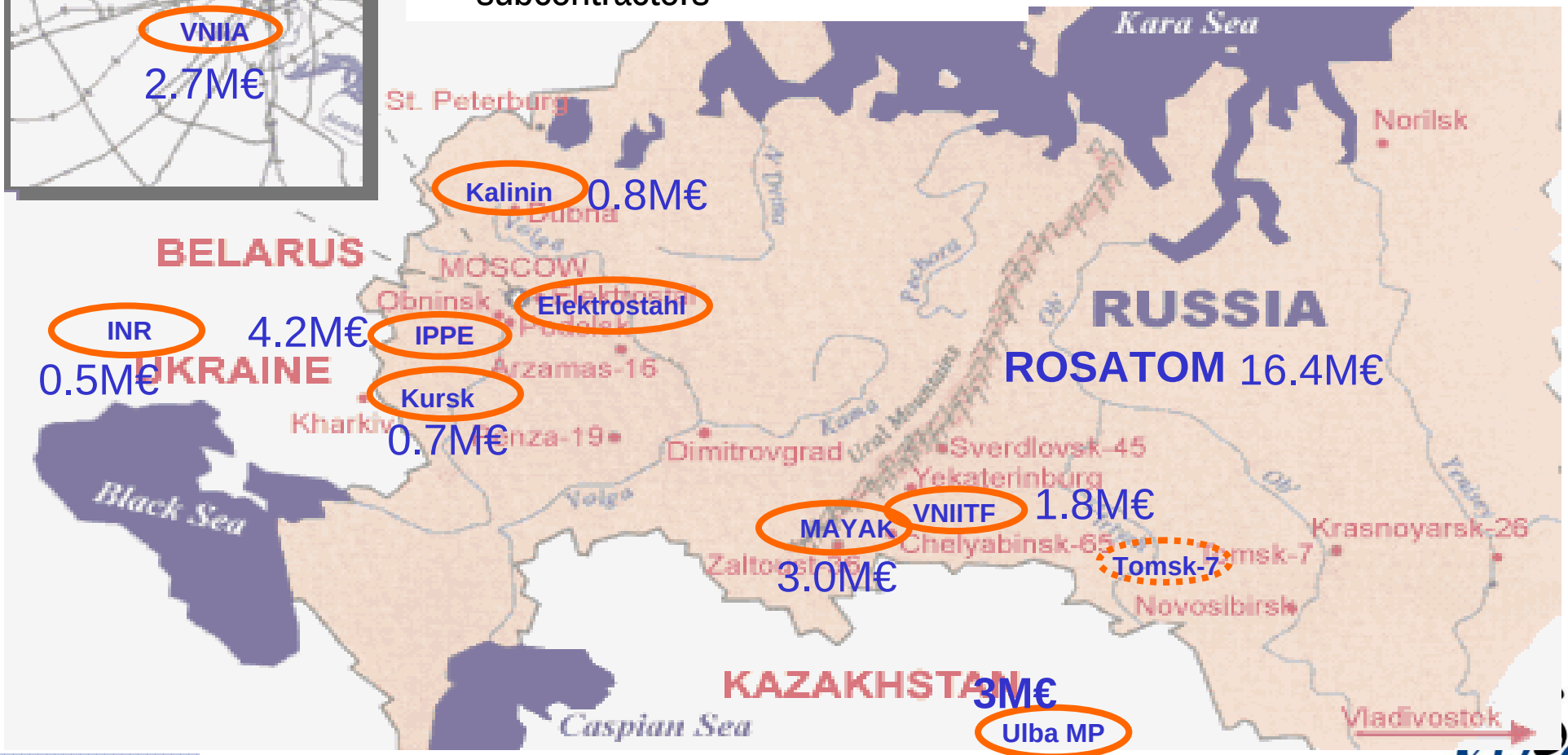
- Nuclear material accountancy
  - Non destructive methods (NDA)
  - Process Monitoring (incl. Mass and volume)
- Containment and surveillance
  - Surveillance and information retrieval techniques
  - Sealing and identification techniques
- Open Source and Information Analysis for the Additional Protocol
- Systems analysis and risk assessment
- Performance and conformance testing and reliability [ISO-17025]

Current Safeguards-related TACIS Projects

20M€ TACIS projects for the following beneficiaries:

- MINATOM (RF)
- KAEC (Kazakhstan)
- research institutes as subcontractors
- SNRCU (Ukraine)
- different nuclear facilities as end-users (of former Soviet fuel cycle)





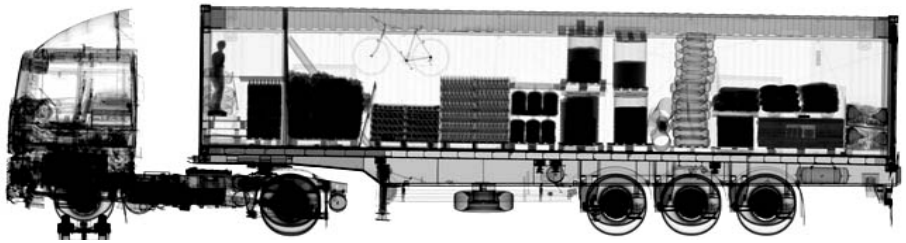
Illicit Trafficking

EURITRACK:

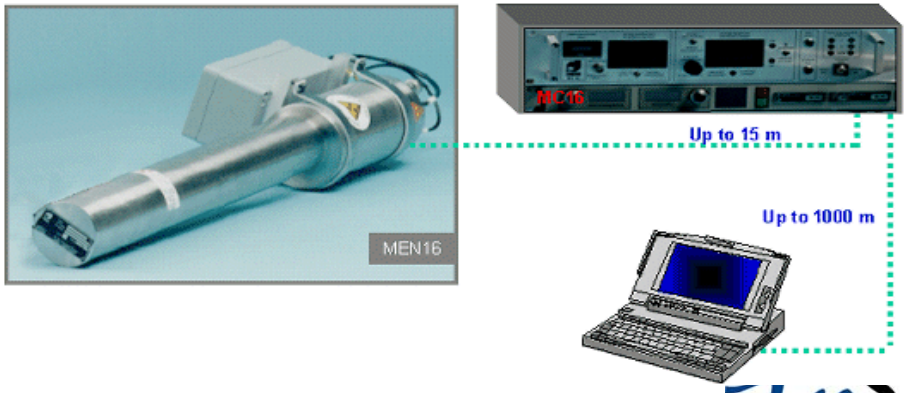
detection of explosives in containers

Partners:

- CEA (FR),
- INFN (IT),
- French customs,
- JRC,
- IRB (Croatia),
- IPJ (PL),
- KTH (SE),
- industry (FR, IT)



Combined Technology:
X-Ray Radiography
&
Neutron Interrogation



Nuclear country profile content and methodology

- Geopolitical situation
- Energy situation
- Officially declared information i.e. nuclear facilities IAEA
- Open source information
- Inconsistencies, i.e. presence of undeclared facilities

Nuclear country profiles - open source information

- Information Analysis Center - IAC: Advanced search on Internet and with EMM derived search engine to upload salient information into a data repository, with tools to reduce duplicate information. Currently contains about 4000 documents:
  - Treaties, regulations, agreements and related documents
  - Information from governmental and non governmental organisations
  - Information about verification regimes
  - Information about technology, materials
    - IAEA Physical Model

  Import export restriction related documents (e.g. trigger lists)
    - Trigger list INFCIRC/209
    - Dual use list INFCIRC/254 Parts 1 and 2
- Facility data bases, textbooks, journals on nuclear engineering, chemistry etc.
- Satellite images of different resolution
- Thematic Maps of different scale

IPSC Networking and Partnerships

- IPSC close to policy makers at EU level but also through networks with competence centers in EU MS & outside
  - Commission services
  - European Parliament
  - Council
  - National authorities + international organizations
  - National research centers
  - Industries
  - More than 200 partners

~ 15% of IPSC budget comes from competitive activities

Main customer DGs (non exhaustive)

UNITS	AGRI	FISH	RELEX	AIDCO	ECHO	DEV	JLS	TREN	TAXUD	OLAF	SANCO	INFSO	RTD	ENTR	ENV	ECFIN	MARKT
Support to External Security			•	•	•	•	•			•	•	•	•	•			
Agriculture and Fisheries	•	•	•							•					•		
Hazard Assessment								•	•		•		•				
European Laboratory for Structural Assessment			•					•	•				•	•			
Sensors, radartechnologies and cybersecurity	•		•				•		•			•		•			
Traceability and vulnerability assessment								•	•		•						
Nuclear Safeguards			•					•	•								
Econometrics and Statistical Support to Antifraud										•		•	•	•		•	•

Overview of IPSC customers & partners (outside the Commission / non exhaustive)

o National level
- Ministries of Agriculture and Forestry: MARS
- Ministero dell'Ambiente and Regional Agencies (Italy): SIMAGE
- Nuclear Centres : Areva (La Hague), BNFL (Sellafield)
- Research Laboratories (CEA, EDF, BNFL, ENEA, RISO,..)
- Qinetiq, DSTL
- Astrium
- Dutch National Aerospace Laboratory (NLR)
- German Aerospace Centre (DLR)
- Fraunhofer (D)
- Lufthansa
- Austrian Research Centers (ARC)
- US Department of Agriculture
- US Department of Energy
- US Environmental Protection Agency
- Japanese Nuclear Material Control Centre
- Japan Atomic Energy Research Institute
- Russian Ministries for Atomic Energy
- Kazakhstan, Ulba plant
- Ukraine, Transgas

o Industrial partners
- IBM, HP, Thales ……

o International level
- International Atomic Energy Agency (IAEA)
- Organisation for Economic Cooperation and development (OECD)
- United Nations Economic Commission for Europe UN/ECE
- United Nations International Strategy for Disaster Reduction (UN/ISDR)
- Office of the United Nations High Commissioner for Refugees (UNHCR)
- Committee Europeen de Normalisation (CEN)
- International Committee for Animal Recording (ICAR)
- European Union Satellite Centre (EUSC)
- European Investment Bank (EIB)
- International Civil Aviation Organisation (ICAO)
- European Space Agency (ESA)
- Joint Aviation Authorities (JAA)
- Eurocontrol
- Council of the European Chemical Industries Federation (CEFIC)
- European Process safety Centre (EPSC)
- Air Navigation Service providers
- Internal Market Advisory Board (IMAC)
- Economic Policy Committee (EPC) WG on output gap
- European e-Business Support Network (eBSN)
- EFTA Surveillance Authority