DE LA RECHERCHE À L'INDUSTRIE

cea

The French experience on nuclear detection architectures and related reachback

www.cea.fr

GICNT meeting Ispra 28-30 March 2017

THE INTERACTION BETWEEN R&D SECURITY AND NUCLEAR INTERVENTION

Nuclear non proliferation

Support of the national et international authorities

Development of detection tools of proliferation activities

Nuclear test monitoring

Development, exploitation of CTBT stations

Fight against Nuclear and Radiological terrorism

Intervention in case of radiological accident or incident on a weapon or nuclear propellant

R&D for global security : Detection and identification of CBRN-E agents, Cybersecurity, infrastructure security , ...

OBJECTIVES AND PRIORITIES OF CEA RESEARCH IN SECURITY

Reducing the CBRN-E threat

- Bring a technical expertise to French public authorities (Defense, SGDSN,,…)

- State the needs expressed by authorities in technologically focused research programs

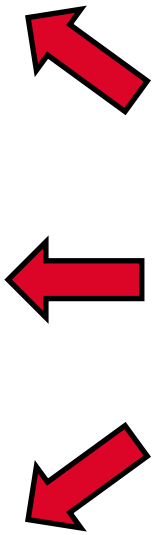
- Integration of new technologies in complex security systems

- Contribute to improve the national CBRN-E response capacities

Triage: Eurotunnel securization

Securization of great events

Nuclear detection architecture



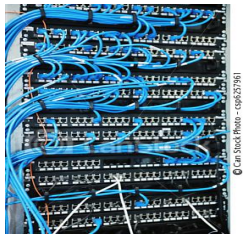
Reachback

Future orientations on reachback

1. TRIAGE : EUROTUNNEL/CYCLAMEN

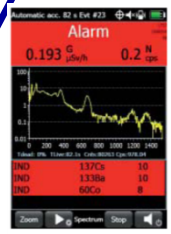
CEA network

Internet

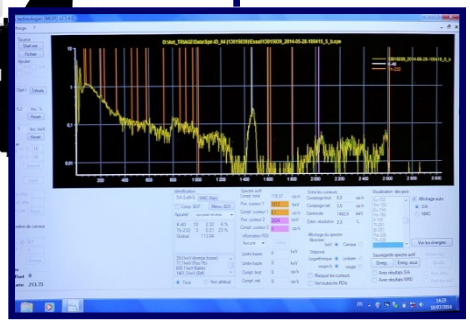


VPN

SDIS 62



MIRION TECHNOLOGIES



Expert analysis

2. N/R SECURITY OF THE 2015 WORLD CLIMATE SUMMIT

Mobile Detection and Expertise

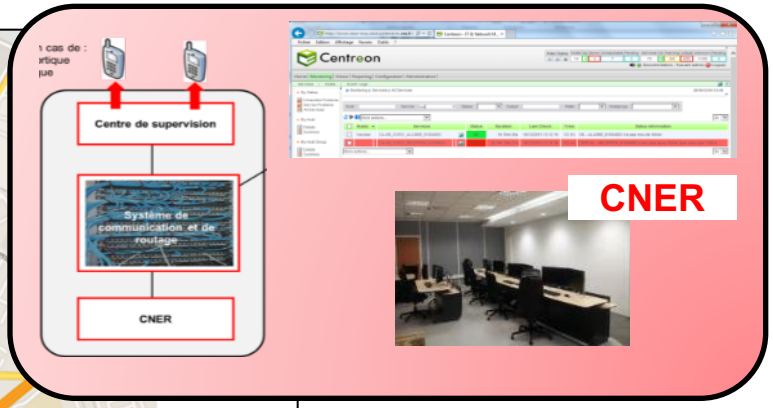
Porte Kbis

Vehicle Portals

Porte M1

Pedestrian Beacons

Supervision and Reachback expertise



Local Operational Command Post

Activated from 19 November to 12 December – 25 CEA personal concerned

2. EURO 2016 – 10th June to 10th July 2016

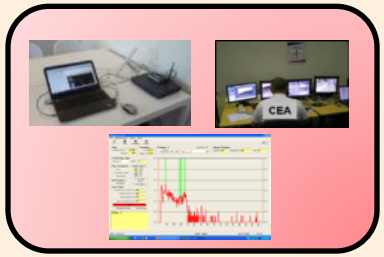
R/N Securization of a Major Public Event

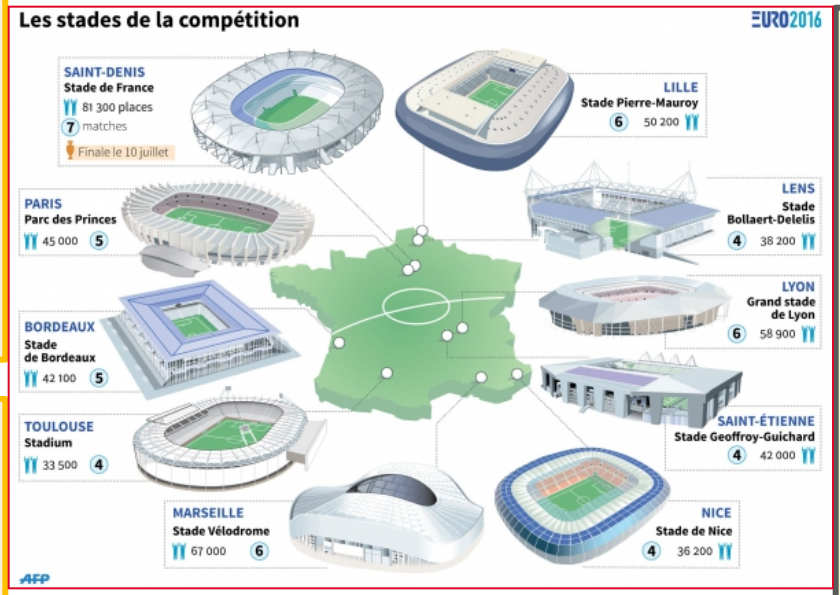
R/N Securization of:
10 Stadium
37 over 51 matches

4 to 12 CEA **experts in the field** each day

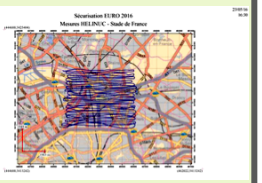
Joint effort by mixed teams with Police lead (DCI-IT)
Police
CEA
EOD (GCIN)
Civil Security

Local and remote Control Posts





7 Aerial Surveys (HELINUC)

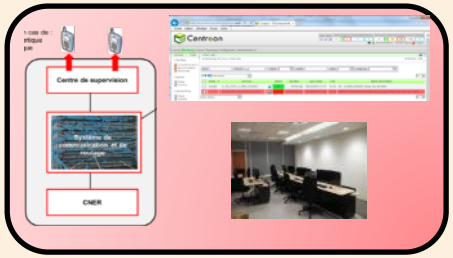


Carborne Surveys (VLG)
before each of 37 matches

Pedestrian search teams
before each of 37 matches

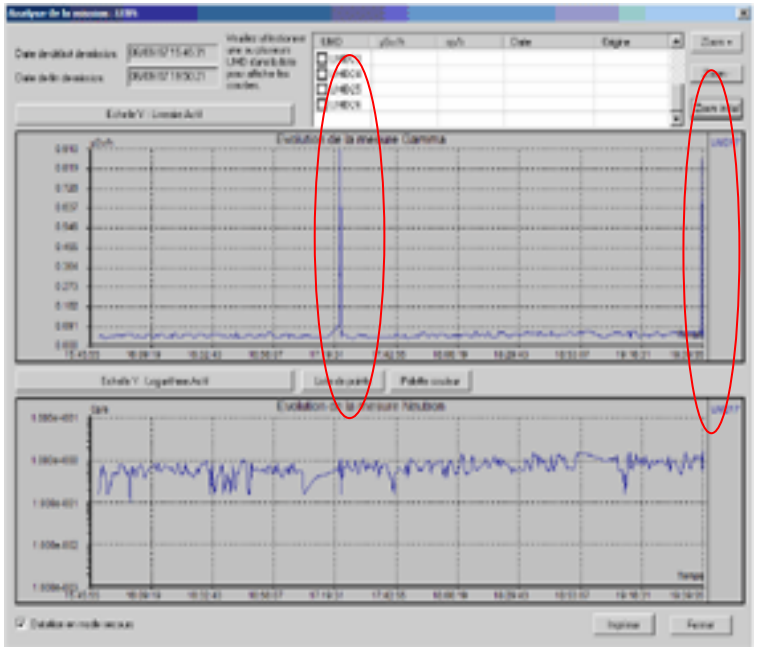
Pedestrian beacons (VIGIRAD)

Reachback capacity by home teams (TRIAGE)



BEACONS ON STADIUM POINT OF ENTRY

- Discrete
- Gamma identification
- Neutron detection
- GPS / data transmission
- Local and/or distant alarm
- Reachback expertise of spectrum



3. REDUCING THE CBRN-E THREAT IN CRITICAL INFRASTRUCTURES

Risk sizing

Sensor technologies

Reach back expertise

Integration - Supervision

REDAR: A R/N NATIONAL DETECTION ARCHITECTURE

2011

Infrastructures sensibles

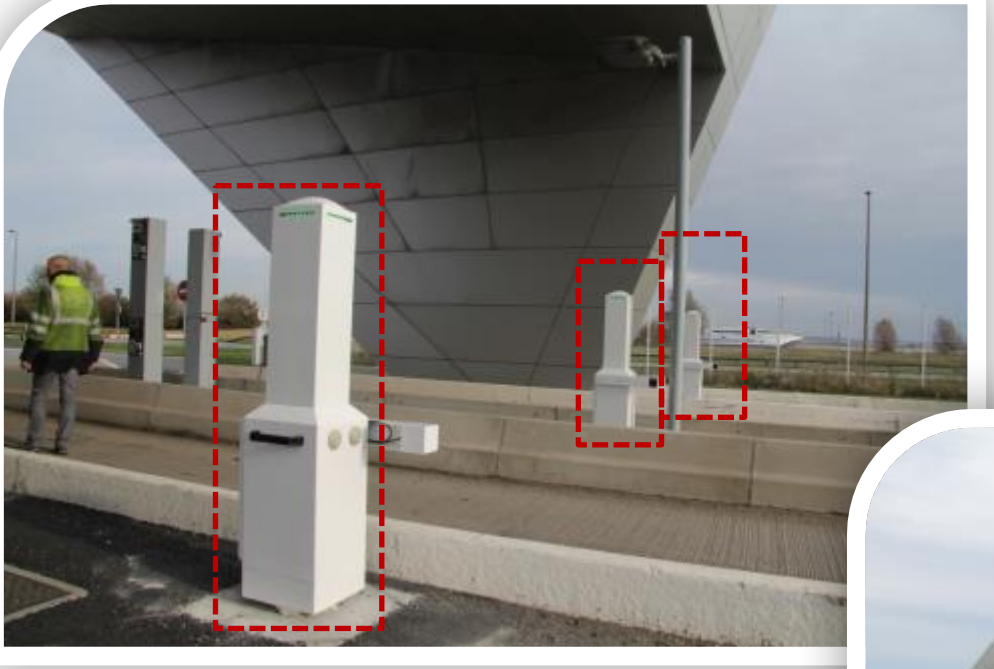
2010

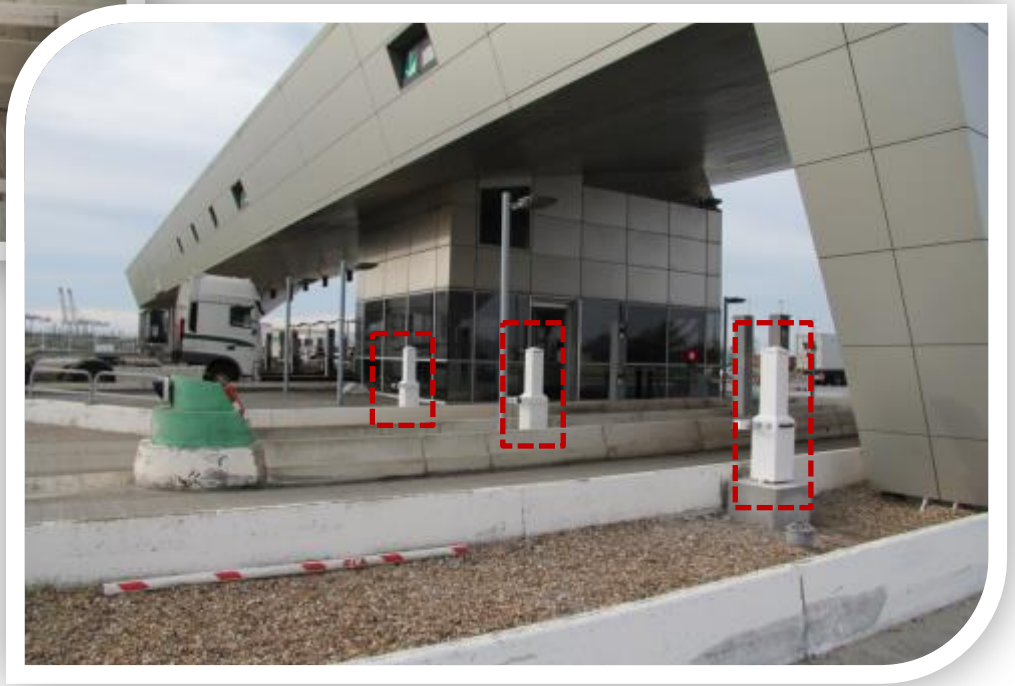
2012

2012

4 LANES TRUCKS EQUIPPED WITH IDENTIFICATION MODULES DETECTORS

2 LANES FOR LIGHT VEHICLES EQUIPPED WITH IDENTIFICATION BEACONS





LESSONS LEARNED

20 000 vehicles per week (900,000 over 10 months) :

- ~ 15 events/day identified as natural ➔ **No alarm**
- ± 1 to 2 events identified as in vivo medical per month➔ **No alarm**
- **± 1 or 2 alarms per month requiring confirmation**

Fully automated
No human decision
Automated rejection

WHAT IS THE COMMON POINT BETWEEN THE SECURIZATION OF A MAJOR PUBLIC EVENT AND A NUCLEAR DETECTION ARCHITECTURE?

Reachback: The French National Center for Radiological Expertise (CNER) located at CEA premises

AN ARCHITECTURE COHERENT WITH THE NETWORK DEVELOPED AT THE CEA

Network supervision

Mock-ups

Communication and routing system with star network

Metrology / training platform

PC Sécurité Port

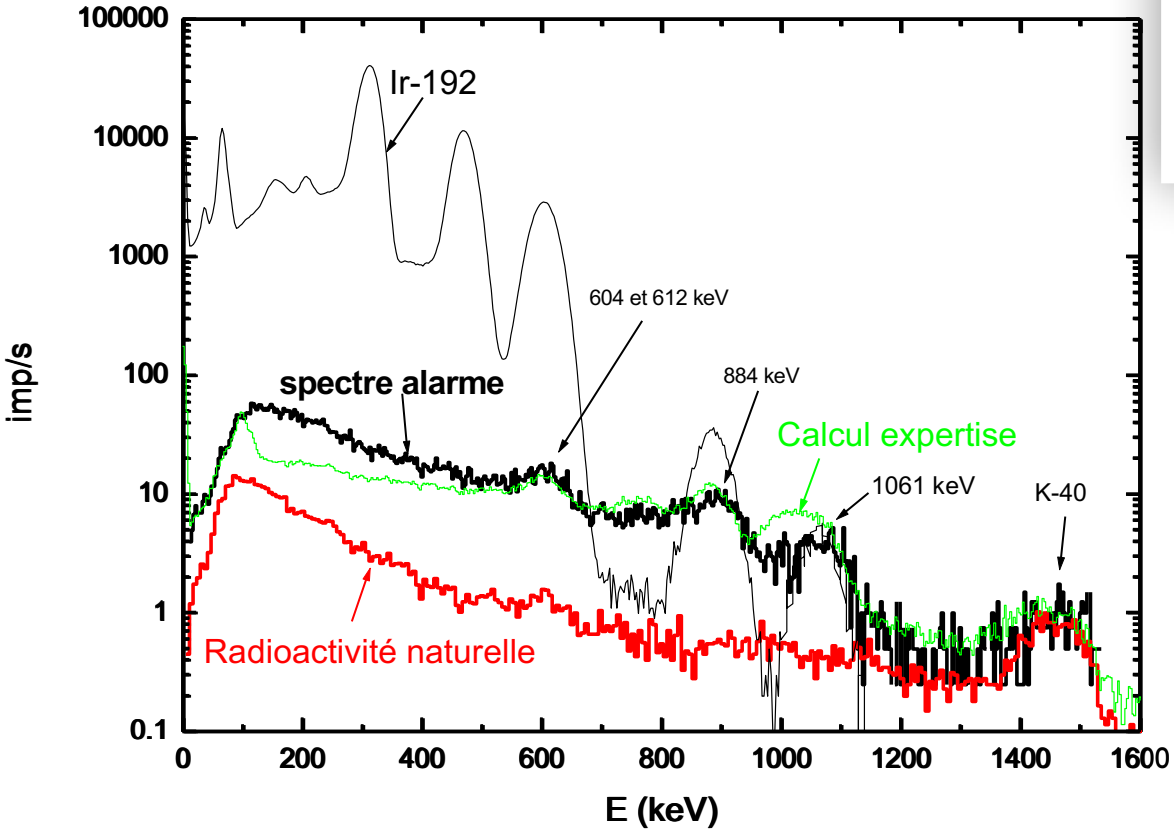
Port site

RETEX : EXPERTISE AND ASSISTANCE FOR 1st RESPONDERS

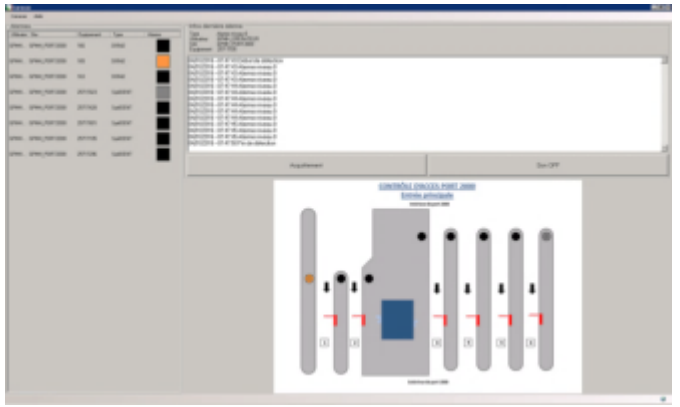
Detection (alarm) on passing heavy vehicle

- Day: dd/mm/2016 at 00.10
- No automatic identification
- Expertise advice: ^{192}Ir + biological protection (screening)

(Non-destructive test?)



Port Safety Service information



WHAT TO DO TO PROMOTE NATIONAL NUCLEAR DETECTION ARCHITECTURES?

Proposing minimal guidances

- Based on different combinations of equipment: different levels of response quality

SET OF EQUIPMENTS (NOT EXHAUSTIVE)

	Technology 0	Technology 1	Technology 2	Technology 3
Primary	Handheld pager			
Secondary	Handheld spectrometer			
Investment cost	Low			
Manpower	Low			
False alarm rate at 1st	Low			
Local qualification	Low			

SET OF EQUIPMENTS (NOT EXHAUSTIVE)

	Technology 0	Technology 1	Technology 2	Technology 3
Primary	Handheld pager	Plastic portal		
Secondary	Handheld spectrometer	Handheld spectrometer (low throughput)		
Investment cost	Low	Low		
Manpower	Low	Medium to high		
False alarm rate at 1st	Low	Medium to high		
Local qualification	Low	Low		

SET OF EQUIPMENTS (NOT EXHAUSTIVE)

	Technology 0	Technology 1	Technology 2	Technology 3
Primary	Handheld pager	Plastic portal	Plastic portal	
Secondary	Handheld spectrometer	Handheld spectrometer (low throughput)	NaI portal (throughput)	
Investment cost	Low	Low	Low to medium	
Manpower	Low	Medium to high	Medium to high	
False alarm rate at 1st	Low	Medium to high	Medium to high	
Local qualification	Low	Low	Low	

SET OF EQUIPMENTS (NOT EXHAUSTIVE)

	Technology 0	Technology 1	Technology 2	Technology 3
Primary	Handheld pager	Plastic portal	Plastic portal	NaI spectroscopic beacon
Secondary	Handheld spectrometer	Handheld spectrometer (low throughput)	NaI portal (throughput)	Handheld spectrometer
Investment cost	Low	Low	Low to medium	Medium
Manpower	Low	Medium to high	Medium to high	Low
False alarm rate at 1st	Low	Medium to high	Medium to high	Low
Local qualification	Low	Low	Low	Medium

WHAT TO DO TO PROMOTE NATIONAL NUCLEAR DETECTION ARCHITECTURES?

Proposing minimal guidances: points to be discussed

- Based on different combinations of equipment: different sets of balance
- Communication & monitoring network
  - Minimum (electronic communication to reachback for low throughput)
  - Definition of procedures
  - Beyond
    - ICT secured network (VPN,…)
    - Connexion to reachback
- Defining mission and tools for the security officers (not in charge of secondary inspection)
- Defining mission and tools for the secondary inspection team
- …

MINIMAL GUIDANCES FOR A REACHBACK CAPACITY

Reachback (if available in the MS)

- Transmission of field data (availability, integrity, trustworthyness,..)
- Dedicated tools of expertise (IAEA references)
- Minimum tools to engage legal action and prosecution

Beyond

- Experts qualification and availability
- Database of reference spectra

PREPARE THE FUTURE

A priority: disseminate the concept(s) towards EU member states

- Attract: Detect 90% threats is better than 0%
- Simplify: Determine minimal guidelines to operate an architecture and a reachback center
- Responsabilize: Work with JRC, IAEA and organizations (GICNT, BMWG,..) to promote this concept
- Write and exchange: NST 59 (NSS 1)and next workshops
- Be careful with standards: make appropriate use…