



**FROM CBRN-E R&D TO OPERATIONAL CONOPS: THE FRENCH EXPERIENCE IN CONNECTION WITH NATIONAL, EUROPEAN AND INTERNATIONAL GUIDANCE**

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## 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



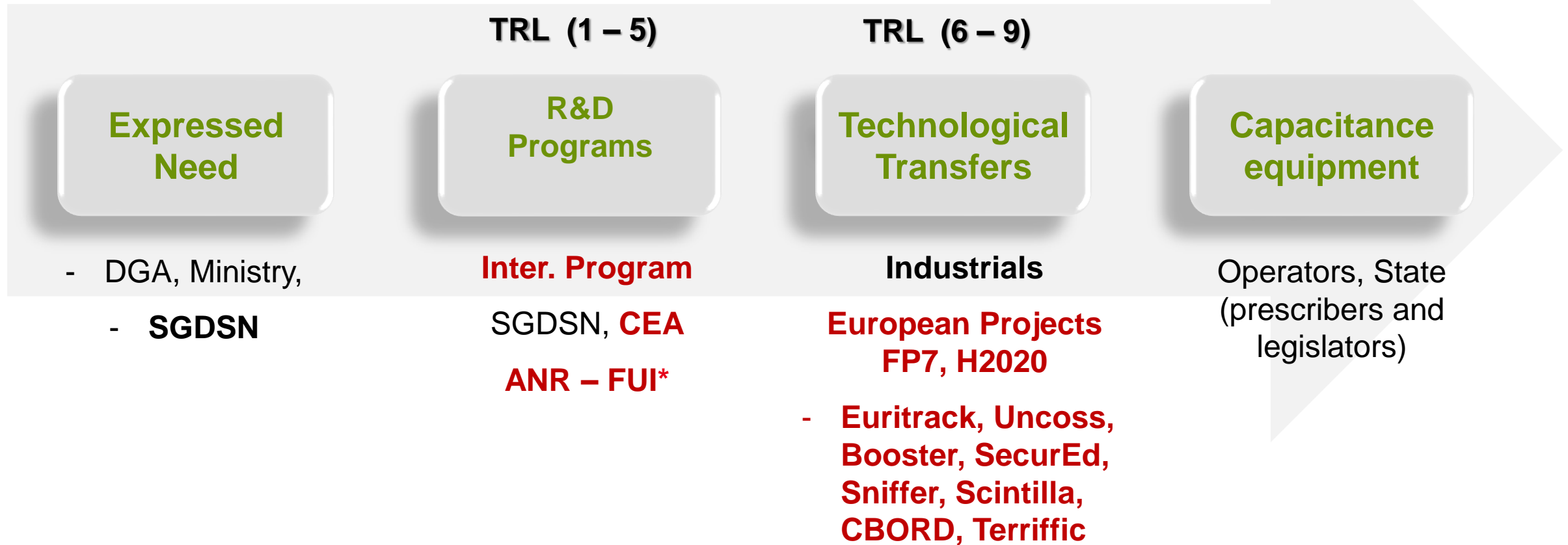
# CEA TECHNICAL ANSWER TO THE CHALLENGES RN DETECTION

- Operationally:
  - **Characterization and training platform : CEA DAM**
  - Capacity of expertise in rear base (**CEA DAM**): « Reachback », « **Triage** »



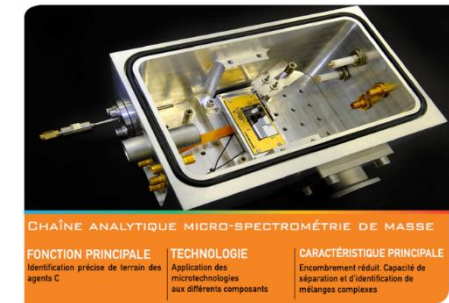
## CEA TECHNICAL ANSWER TO THE CHALLENGES RN DETECTION

- R&D



## Scientific and technical results: facts & figures

- 40 projects / year
- More than 300 published papers and 100 patents since 2005
- Products included in portfolio of companies (15 technological transfers, including 3 in 2016)
- 7 joint laboratories CEA - industry
- Technological demonstrators
- Industrial prototypes (~10)



# R/N TECHNOLOGIES DEVELOPED BY CEA FROM THE INTERMINISTERIAL CBRN-E R&D PROGRAM



DIRAD



RPM



Photo Fission



Muons detection



Gamma imager

# LESSONS LEARNED FROM REDAR NUCLEAR DETECTION ARCHITECTURE

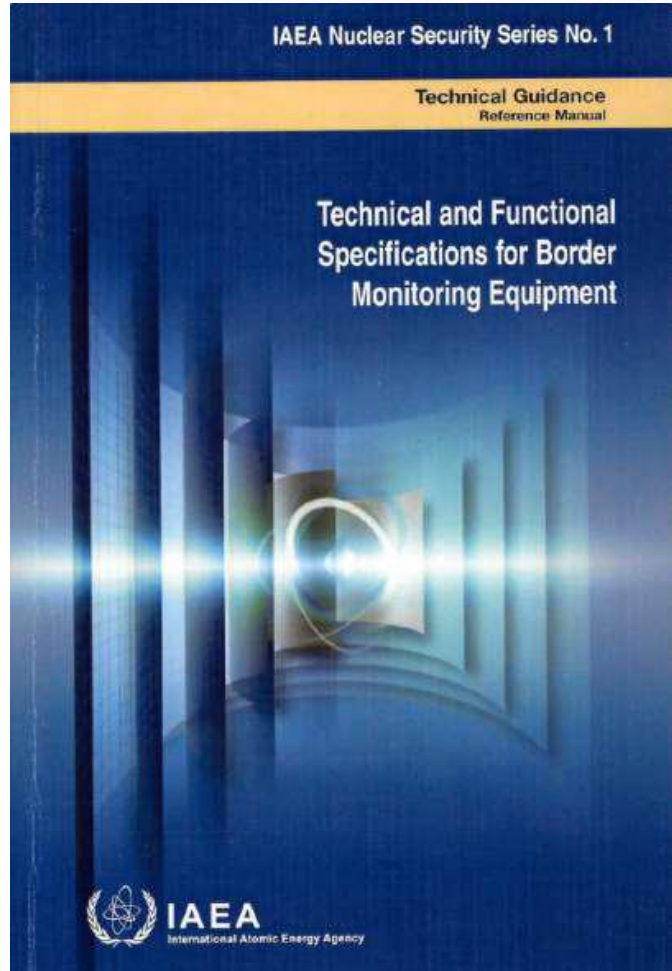


- 20 000 vehicles per week (900,000 over 10 months) :
  - ~ 15 events/day identified as natural → No alarm
  - ± 1 to 2 events identified as in vivo medical per month → No alarm
  - **± 1 or 2 alarms per month requiring confirmation**

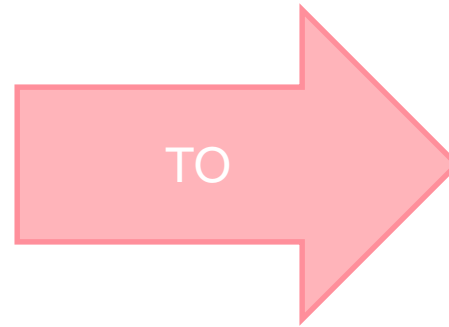
**Fully automated**  
**No human decision**  
**Automated rejection**

# IAEA NUCLEAR SECURITY GUIDANCE ON RADIATION DETECTION INSTRUMENTS FOR NUCLEAR SECURITY

From NSS1 (2004)



NST 059 (2017-2018)



Provide guidance to competent authorities on **functional specifications for radiation detection equipment** used in their **national nuclear security detection architecture**.

The guidance is written to be as **agnostic to technology** as possible to minimize the need for future revisions as technology advances.



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

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