

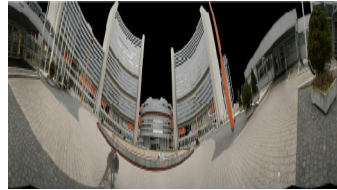


Illicit Trafficking and Nuclear Forensics

Prevention

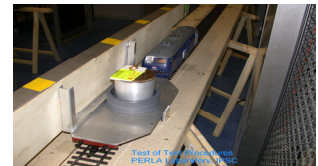
ITU contributes to traditional safeguards by operating two **on-site laboratories** (as a mandate of Euratom-DG TREN) in Sellafield, UK and La Hague, France

- around 800 samples/year
- no nuclear transport required
- timely analysis → quick response to discrepancies
- waste disposal to site waste streams
- economically more favourable



The **3D Outdoor Verification System** developed by the IPSC can effectively detect safeguards and security-relevant changes

The PERLA laboratory can perform **qualification and performance testing** of portable instrumentation for the detection of nuclear and radioactive material. A campaign done in 2003 called "test of test procedures" supported the IAEA in drafting the document "Technical / Functional Specifications for Border Radiation Monitoring Equipment"



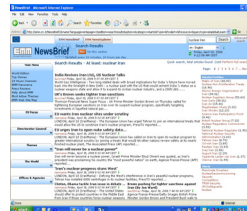
Detection

Radiation Portal Monitors (RPMs) are installed at border checkpoints (road, rail, airport, and seaport) to detect the presence of smuggled nuclear and other radioactive materials. The time-profiling method developed at IPSC shows that the space profile of the portal response can also be used for discrimination alarms that are triggered by **Naturally Occurring Radioactive Materials (NORM)**



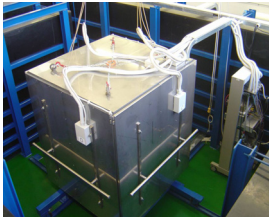
End 2005 a **Border Monitoring Working Group (BMWG)** was setup by the JRC-IPSC representing the European Commission, the IAEA, the US NNSA- Second Line of Defense (SLD) Program and the EU Council

Open Source Analysis for Nuclear Country Profiles



The information is collected from open sources such as the internet, high resolution satellite imagery, data bases (e.g. from the IAEA) and specialized technical literature

The **Pulsed Neutron Interrogation Test Assembly (PUNITA)** is a tool for experimental research in non-destructive methods for nuclear security and safeguards, such as mass assay of small quantities of fissile materials, and detection of explosives and hazardous materials



Response

International Technical Working Group on nuclear smuggling (ITWG)

ITWG was formed in 1995 to bring together experts from various areas (law enforcement, first responders, nuclear scientists) to combat illicit trafficking of nuclear materials by developing nuclear forensics



Nuclear Forensics Investigation - Example

In February 2007, 14 uranium pellets were found in a garden in Lauenförde, Germany. The material was sent to the ITU for analysis (geometry, impurities, isotopy...)

- intended use: a Western European PWR
- origin: Siemens (former RBU) nuclear fuel fabrication plant in Hanau, Germany



Uranium pellets found in Lauenförde



In a training session a car is monitored for radioactive substances.

Training

JRC provides training in following areas:

- Response to Illicit Trafficking
- Nuclear Forensics Awareness
- Nuclear Material Measurement Teams
- Nuclear Forensics Methods

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