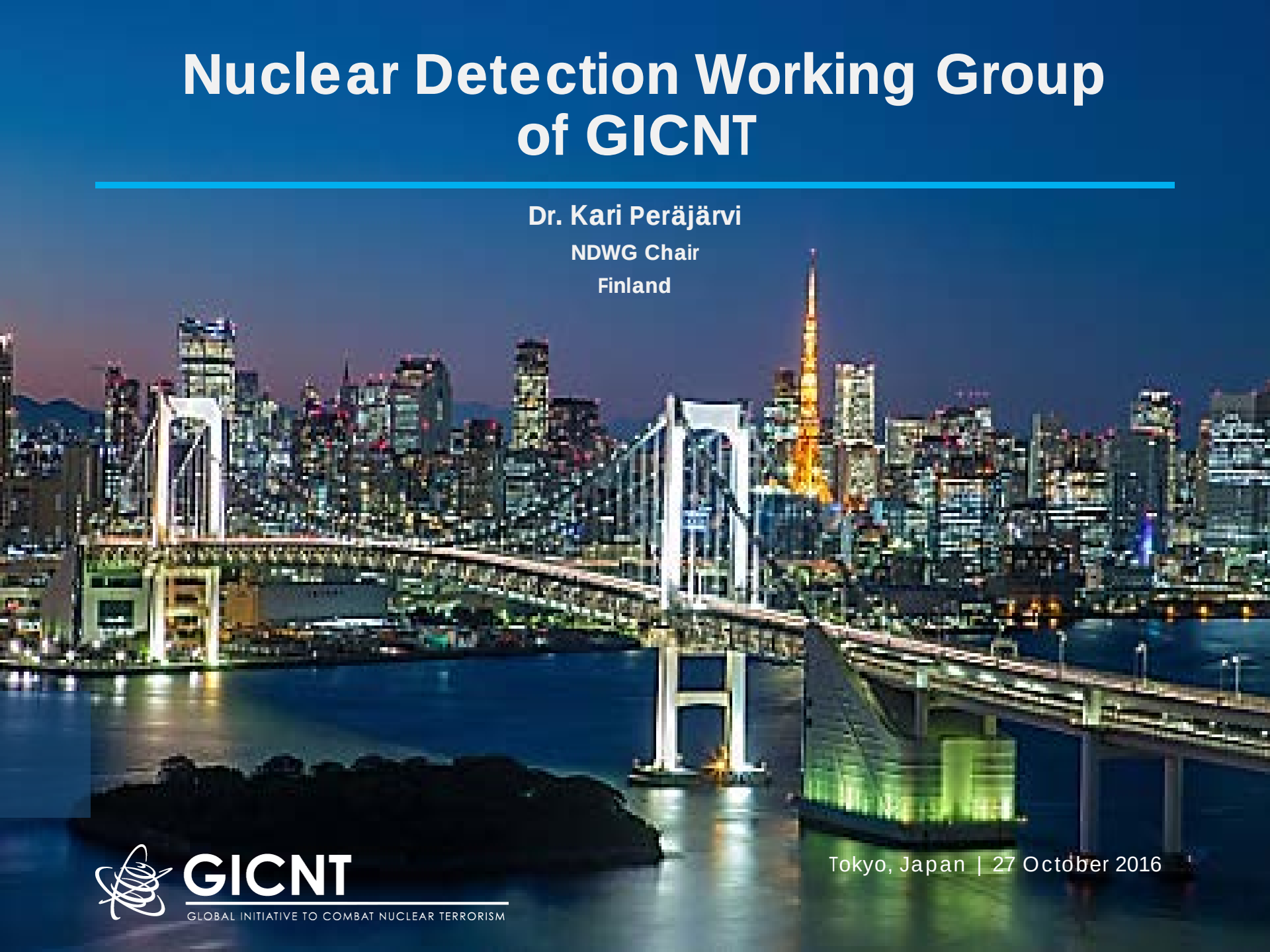
Nuclear Detection Working Group of GICNT

Dr. Kari Peräjärvi
NDWG Chair
Finland



GICNT
GLOBAL INITIATIVE TO COMBAT NUCLEAR TERRORISM

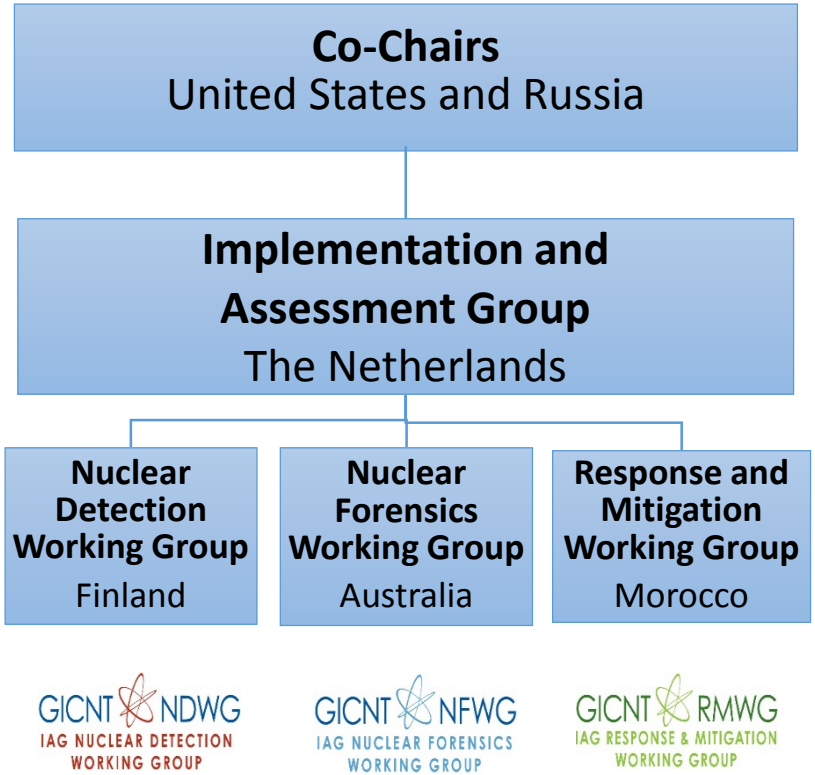
Tokyo, Japan | 27 October 2016

GICNT Overview

Origin: Established in 2006. Co-Chaired by the Russian Federation and the United States.

Mission: To strengthen global capacity to prevent, detect, and respond to nuclear terrorism by conducting multilateral activities that strengthen the plans, policies, procedures, and interoperability of partner nations.

- **Membership:**
  86 nations
  5 official observers
- **Working Groups:**
  Nuclear Detection
  Nuclear Forensics
  Response and Mitigation



Partner Nations and Observers

1. Afghanistan
2. Albania
3. Algeria
4. Argentina
5. Armenia
6. Australia
7. Austria
8. Azerbaijan
9. Bahrain
10. Belarus
11. Belgium
12. Bosnia
13. Bulgaria
14. Cambodia
15. Canada
16. Cape Verde
17. Chile
18. China
19. Cote d'Ivoire
20. Croatia
21. Cyprus
22. Czech Republic
23. Denmark
24. Estonia
25. Finland
26. France
27. Georgia
28. Germany
29. Greece
30. Hungary
31. Iceland
32. India
33. Iraq
34. Ireland
35. Israel
36. Italy
37. Japan
38. Jordan
39. Kazakhstan
40. Republic of Korea
41. Kyrgyz Republic
42. Latvia
43. Libya
44. Lithuania
45. Luxembourg
46. Republic of Macedonia
47. Madagascar
48. Malaysia
49. Malta
50. Mauritius
51. Mexico
52. Montenegro
53. Morocco
54. Nepal
55. Netherlands
56. New Zealand
57. Norway
58. Pakistan
59. Palau
60. Panama
61. The Philippines
62. Poland
63. Portugal
64. Romania
65. Russian Federation
66. Saudi Arabia
67. Serbia
68. Seychelles
69. Singapore
70. Slovakia
71. Slovenia
72. Spain
73. Sri Lanka
74. Sweden
75. Switzerland
76. Tajikistan
77. Thailand
78. Turkey
79. Turkmenistan
80. Ukraine
81. United Arab Emirates
82. United Kingdom
83. United States
84. Uzbekistan
85. Vietnam
86. Zambia

Official Observers

1. International Atomic Energy Agency (IAEA)
2. European Union (EU)
3. International Criminal Police Organization (INTERPOL)
4. United Nations Office on Drugs and Crime (UNODC)
5. United Nations Interregional Crime and Justice Research Institute (UNICRI)

Objectives

1. Integrate collective capabilities and resources to strengthen the overall global architecture to combat nuclear terrorism.
2. Bring together experience and expertise from the nonproliferation, counterproliferation, and counterterrorism disciplines, and promote the development of a global community of experts.
3. Provide the opportunity for nations to share information and expertise in a voluntary, non-binding framework.

Statement of Principles

1. Improving accounting, control, and protection of nuclear/radiological material
2. Enhance security of civilian nuclear facilities
3. Detect and suppress illicit trafficking of nuclear/radiological material
4. Improve ability to search for, confiscate, and establish safe control of nuclear/radiological material
5. Assure denial of safe haven and resources from terrorists seeking to acquire or use nuclear/radiological material
6. Ensure adequate legal frameworks to combat activity related to nuclear terrorism
7. Respond to and mitigate the consequence of nuclear terrorism
8. Promote information sharing to prevent and respond to acts of nuclear terrorism

Nuclear Detection Working Group

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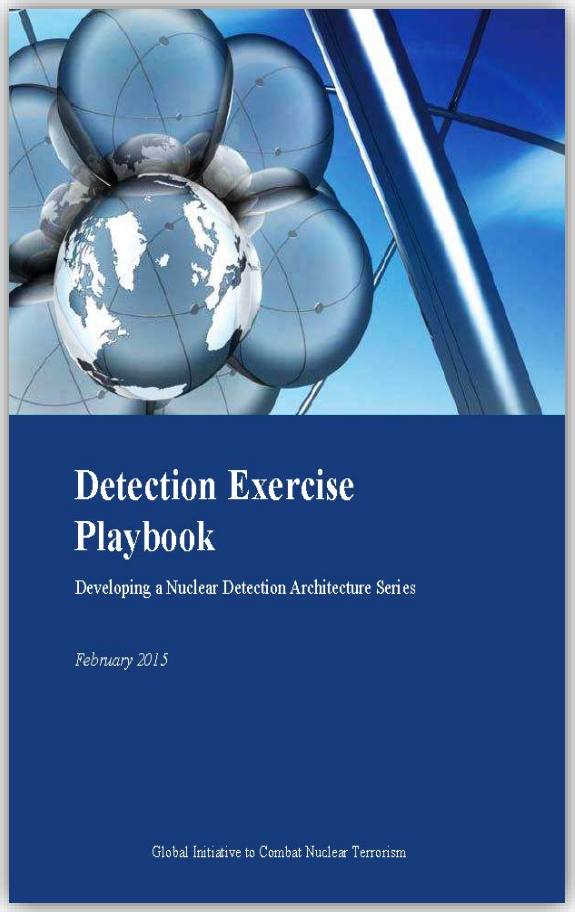
NDWG Background

- Formally established at the GICNT Implementation and Assessment Group Meeting in September 2010.
- The main objective of the NDWG is to enhance partners' national nuclear detection capabilities, in particular by:
  - developing practical guidance;
  - raising awareness of detection challenges and mitigating strategies;
  - promoting the transfer of knowledge and experience between detection experts and other key stakeholders;
  - holding activities that promote partners' practical implementation of nuclear detection best practices



NDWG Recent Highlights

NDWG Experts Meeting,
Jan 2016, Helsinki, Finland

This practical event focused on the on the sharing of experiences and perspectives in the development and implementation of national nuclear security detection architectures (NSDA) and the potential uses for Radio Frequency Identification (RFID) technology in enhancing NSDAs, especially detection within a state's interior.

House of the Estates, Helsinki, Finland

NDWG Recent Highlights

Exercise Falcon , Feb 2016, Abu Dhabi, UAE

This exercise was regionally-oriented and focused on key aspects of nuclear detection and initial response to realistic radiological and nuclear terrorism threats, with an emphasis on national planning, information-sharing, operational cooperation, and decision-making.

Key takeaways include:

- A National Nuclear Detection Strategy builds support for effective capabilities
- Nuclear Detection Operational Plans are best supported by technical and logistical expertise
- Legal and Regulatory Frameworks support a National Nuclear Detection Architecture
- Detection capabilities are strengthened through a unified and coordinated government approach

NDWG Recent Highlights

Exercise Olympus, Oct 2016, Bucharest, Romania

This 3-day regional tabletop exercise focused on the law enforcement and technical reachback challenges and strategies during a nuclear security incident. The 16 participating countries sent teams consisting of technical and policy experts as well as law enforcement officials to identify best practices in supporting collaboration between front line responders and technical reachback, information exchange, and legal frameworks.

Key takeaways include:

- *Technical reachback experts have a role to play in prevention; for example, experts may provide advice and guidance on technical information provided in information alerts; or may provide guidance on development of protocols and deployment of detection resources, etc.*
- *Technical reachback capabilities and protocols should be included in a comprehensive national system or architecture for nuclear detection*
- *Effective technical reachback requires development and sustainment of relationships between front line officers, law enforcement investigators, decision makers and technical experts (regular joint training, exercises and exchanges develop relationships)*
- *Technical reachback experts should be included in the procurement of detection equipment as part of holistic approach in developing detection capabilities*

Future NDWG Areas of Focus

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Development of Nuclear Security Detection Architectures

- Nuclear Security Detection Architecture (NSDA) needs to be kept up to date since infrastructures, technology, threats, and risks are continuously evolving
- Architecture needs to be flexible and extendable
- Potential themes for future NDWG Experts Meetings and Workshops that may bring added value to NSDAs include:
    - Novel Detection Solutions
    - Internet of Things (IoT)
    - Digitalization
    - Automatization
    - Big Data and Data Mining
- Development of laboratory instrumentation and techniques belongs more to the domain of NFWG

Sonni –Finnish mobile detection asset

Novel Detection Solutions, Internet of Things (IoT), and Digitalization

- Novel Detection Solutions (e.g. stand-off imaging and localization of radioactive material, novel relocatable portal monitors, versatile compact detectors, cheap detectors such as camera phones, active interrogation)
- Digitalization:
  - Adoption of integrated digital nuclear electronics
  - Use of Radio Frequency Identification (RFID) technology in connection of legal shipments of radioactive sources
  - Standardization and harmonization of formats and protocols
    - Promotion of machine readable formats to information sharing
    - Standardization of list-mode data format based on digital electronics is on-going
- IoT (communication layer of detectors and detector networks, enables Technical Reachback/Remote Scientific Support and Analysis):
  - Data transfer, including streaming, from instruments to a remote data server
  - Remote diagnosis and repair of instruments
  - In some applications use of smart phones for data transfer, positioning, and documentation
  - Integration of different CBRNE sensors to a common information system
    - Efficient handling of multiple simultaneous CBRNE threats
    - Different Technical Reachback centers for different threats, responders are often the same

Automatization, Big Data, and Data Mining

- Automated on-line monitoring and primary alarm adjudication on-site and/or at remote location
    - Continuous development of automatic analysis algorithms
    - Spectrometers are frequently used in Nuclear Security field operations
- Remote manual analysis of data (core capability of Technical Reachback center)
    - Software development and testing
- Data fusion (i.e. effective use of data from various sources, information alerts, sensor networks etc., during the analysis and decision making process)
    - Improves timeliness of countermeasures
- Employment of robots for contamination mapping and search of nuclear and other radioactive material out of regulatory control
    - Increase the safety of Front Line Officers and speeds up the response.

Exercise Northern Lights
Helsinki, Finland
2015

Mobile measurement demonstration based on data steaming

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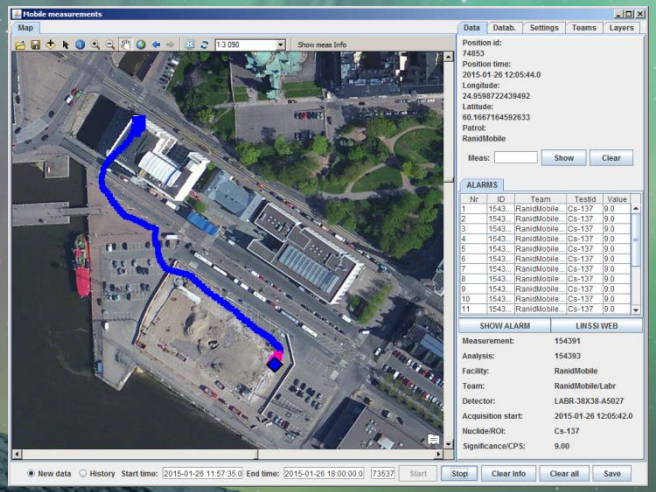
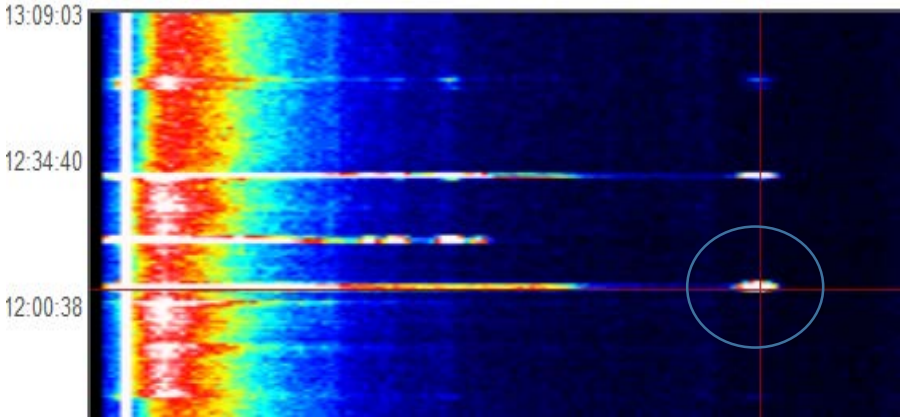
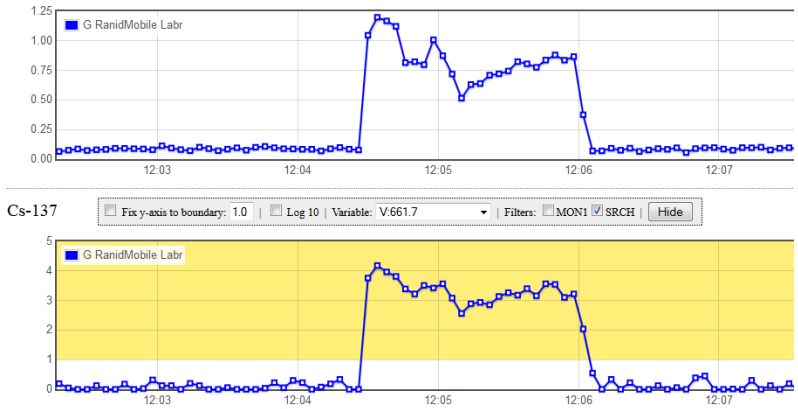
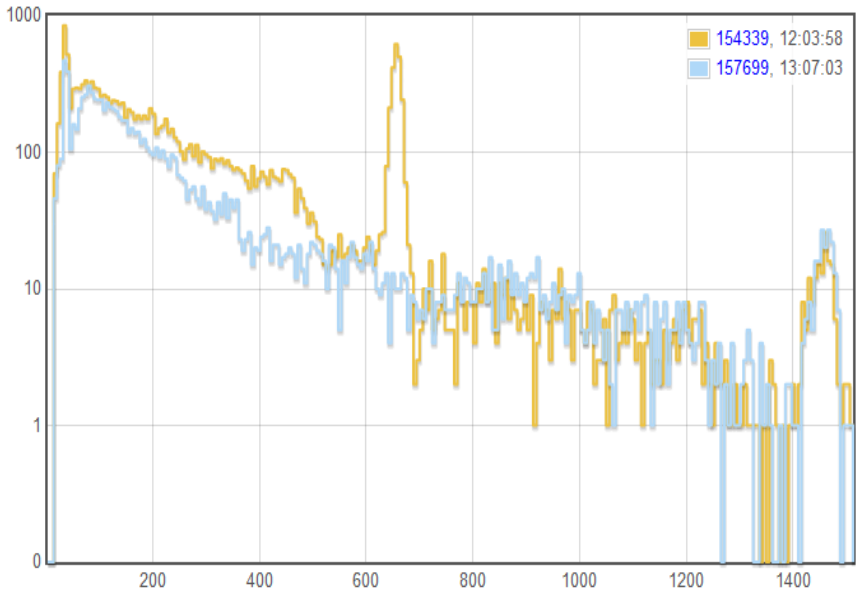
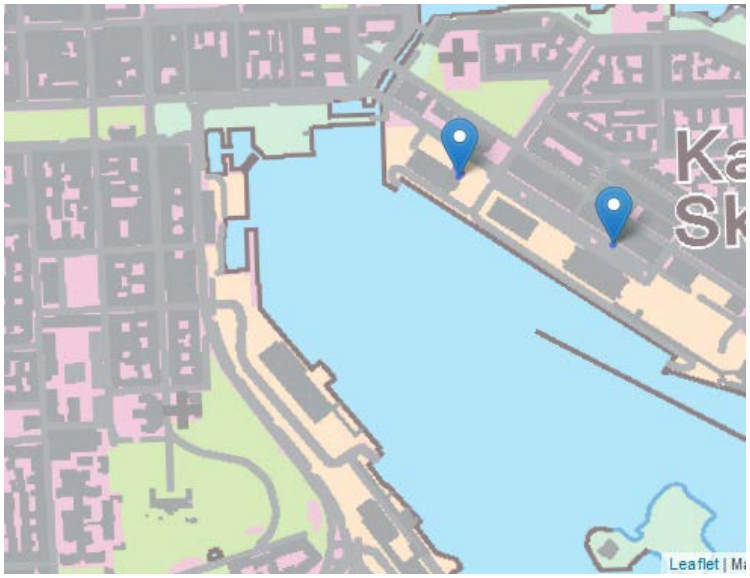


Real time analysis at the Reachback Centre (4 s)









Upcoming technical event

Event	*Date*	*Location*	*Summary*
Technical Reachback Workshop	Mar 2017	Ispra, Italy	• Workshop to discuss more broadly and thoroughly some of the technologies, issues and challenges shortly introduced in the previous slides. Special emphasize will be given for the Nuclear Security Detection Architectures and identification of roles and responsibilities of Technical Expert Support to adjudicate information alerts and instruments alarms related to nuclear and other radioactive material out of regulatory control (MORC).

Exercise Northern Lights
Helsinki, Finland
2015

Looking Forward to the 2017 Plenary

- The next GICNT Plenary meeting will be hosted in Tokyo, Japan in June 2017.
- The 2017 Plenary Meeting will be a key milestone, as it will take place one year after the GICNT's 10th anniversary and the Nuclear Security Summit.
- Participants at the Plenary will review the key outcomes of GICNT activities over the past two years, endorse products and documents produced by the IAG Working Groups, and provide strategic direction for activities in 2017-2019

Thank you

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