After-action Analysis of the Magic Maggiore Workshop on Expert Support and Reachback

ERNCIP Thematic Group Radiological and Nuclear Threats to Critical Infrastructure

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Abstract

The European Commission's Joint Research Centre (JRC) in collaboration with the Global Initiative to Combat Nuclear Terrorism (GICNT) organised a two and a half-day workshop on expert support and reachback entitled Magic Maggiore at the JRC Ispra, Italy in 28-30 March 2017.

Through a series of presentations, case studies, panel discussions, and a demonstration exercise, Magic Maggiore helped raise awareness and build commitment towards technical reachback. Furthermore, the workshop presented best practices to address key challenges, and identified areas for future work in this field. The workshop included a real-time detection and reachback exercise of a hypothetical nuclear security incident, put on between the JRC (Ispra) and France (Paris). The demonstration focused on core components of alarm adjudication and information exchange between front-line officers, a national reachback centre, and an advanced centralised reachback centre located in Paris.

A list of concrete post-workshop activities has been generated. The purpose of the list is to pave the way for the identification of the next steps towards development of European capabilities for nuclear security and in more general, for CBRNE security.

Reachback is necessary for alarm adjudication to provide timely information for a balanced response. Information sharing between competent authorities is of vital importance for nuclear security. Due to the variety of responsibilities, Technical, Scientific and Operational support needs to be defined. The Member States should consider developing joint protocols on data structures and data handling to ease the information flow and so the response time.

1 Scope and structure of the workshop

The European Commission's Joint Research Centre (JRC) in collaboration with the Global Initiative to Combat Nuclear Terrorism (GICNT) organised a two and a half-day workshop on expert support and reachback entitled Magic Maggiore at the JRC Ispra, Italy from 28-30 March 2017. The workshop brought together more than 60 experts from 25 countries, and representatives from the European Commission (EC) and the International Atomic Energy Agency (IAEA). Most of the participants were technical, scientific, or operational experts on detection of and response to a nuclear security event, including information sharing, data processing, alarm adjudication and technical responsibilities, such as running and sustaining large detection networks for nuclear security.

The workshop included a series of presentations and panel discussions to introduce the key themes for the discussion with a particular focus on the roles and responsibilities of expert support. A deep dive was made into three common reachback challenges: information sharing, alarm adjudication, and detection technology. Also, the impact of the new technology on nuclear security detection architectures was analysed.

National-level presentations were included to identify the core components of different reachback systems. Supporting panel discussions were focused on scaling and sustaining reachback capabilities.

A real-time detection demonstration was organised between the JRC and France to show how the front-line officers (FLO) and the reachback centre could work together to resolve a complex nuclear security event.

2 Main findings

During the workshop, it transpired that the participants use words or concepts that have very different meanings in different countries or even in different authorities within a country. It was acknowledged that the lexicon issue needs further clarification. Otherwise, the development of guidelines and recommendations is made difficult. For example, in some contexts **'expert support'** is a synonym to reachback. However, many experts view these two as separate concepts:

- **Reachback** is a (virtual) network of subject matter experts to provide advisory, technical, and coordination assistance.

- **Expert support** is an operational or technical capability that can be deployed to the field to resolve a potential or actual nuclear security event.

Additionally, the concept **'triage'** can refer to the analysis services of a reachback centre to find out the unusual observations (alarms) from a massive amount of data.

Due to a variety of roles and responsibilities of technical experts, participants proposed that there are three levels of expert support:

1. Technical support, which includes detection systems, deployment and maintenance of equipment and training of operational forces.

2. Scientific support, which assesses, offers in-depth analysis, and adjudicates alarms **on request** from the FLO.

3. Operational support, which integrates with operative units, such as CBRNE teams, law enforcement investigators, and crime scene management.

Challenges facing expert support include distribution and processing of information, understanding the operating environment (remotely), as well as information security and accuracy. Reachback support during an incident requires timely response and exchange of information between FLO, technical and scientific experts, Command and Control (CC) and decision-makers. Therefore, the experts need to understand what information is relevant to FLO and CC in order to appropriately and effectively respond to a situation. And vice versa, FLO and CC need to understand the role of the experts in the operational cooperation.

The participants identified the following 'best practices':

- Include expert support in the national-level information sharing protocols, as well as in the emergency response coordination mechanisms.

- Conduct joint exercises (including table top exercises and drills) that test and evaluate the interactions between technical experts, law enforcement, and decision-makers.

- Conduct peer-to-peer exchange, joint training, and exercises with regional partners and international organisations to enhance the information sharing procedures and advance relationships between partner-nations.

- Identify and make use of advanced regional or international partners for reachback services to support national efforts in developing analysis capabilities for alarm adjudication.

In border control, the main operational challenge is to reach the right balance between addressing threats and clearance efficiency. This balance depends on the speed and accuracy of adjudicating innocent and false alarms in order to effectively respond to threats while maintaining the necessary flow of people and commerce. FLOs must know when and how to request technical or scientific expert support and there has to be established procedures to facilitate a quick transmission of threat and/or alarm information.

Decision-makers, CC, FLOs and experts can share technical data in a variety of ways, including formally established communication tools (methods such as the use of encryption, secure cloud services or dedicated mobile networks) or informal methods. Regardless, protocols for both on-scene operators and remote technical experts should clearly define the procedures for sharing the technical data. Additionally, information exchange applies to many other aspects of expert support, such as deploying instruments and improving cooperation over borders as well as national, regional, bilateral, or international exchange of information on prevailing threats.

Detection technology faces a multitude of challenges: efficiency of detection depends on type of detector, speed, distance, time, and background levels; the frequency of false alarms and innocent alarms; and masking or shielding tactics. No single detector technology addresses all detection needs. Thus, when developing, implementing, and improving plans, processes, and capabilities, nations should consider the characteristics of different instrumentations and technical expertise to better understand the advantages and constraints of the detection technology. Nations can then consider relevant trade-offs to develop and modify protocols and guidance, in order to properly deploy the detection resources.

A major public event may be at higher risk of being the target of a nuclear security incident. Technical support teams may therefore be on-site being capable of operating in a degraded environment with degraded communication capabilities. On the other hand, these forces may also utilise remote reachback support that requires enhanced coordination leading to additional challenges in the timeliness and reliability of communications.

3 Workshop conclusions — key takeaways

A nation's threat and risk assessment should include the development and deployment of technical, scientific, and operational reachback support.

Bilateral or regional protocols and memorandums of understanding (MOUs) for alarm adjudication and reachback support would improve the efficiency of nuclear security detection architectures of the states involved.

Use of detection instruments should be supported by technical and scientific experts.

A number of participants noted that there may be a need to define precisely the key concepts of information sharing and cooperation between the competent authorities. In particular, the concepts reachback, expert support, and triage are used with different meanings in different countries or even within the competent authorities of a country. A joint lexicon, acknowledged internationally, is warranted.

4 After-action analysis by the ERNCIP Thematic Group Radiological and Nuclear Threats to Critical Infrastructure — Reachback sub-group

A sub-group meeting of the ERNCIP Radiological and Nuclear Threats to Critical Infrastructure Thematic Group was held on 14-15 September 2017 in London. Among other things, this meeting continued the discussion on Magic Maggiore outcomes. As a result, a preliminary list of concrete activities was generated for further consideration and discussion at the ERNCIP RN Thematic Group's reachback meeting in Brussels on 11 October 2017. The purpose of the list is to pave the way for the identification of the next steps towards development of European capabilities for nuclear security and in more general, for CBRNE security. Some of these activities are for adoption by the ERNCIP RN Thematic Group, while some actions are recommended for other relevant bodies.

4.1 Awareness raising

1. *Awareness raising on expert support*
   Organise awareness events for decision-makers on the role of expert support. Promote enhanced collaboration between FLOs, technical and scientific experts, and international partners. Influence the agenda of upcoming workshops by suggesting workshop topics.

2. *Cross-border demonstrations and exercises*
   Organise cross-border demonstrations and exercises with reachback involvement nationally and bilaterally. Invite EC/JRC observers and document the exercises in collaboration with the organisers and disseminate the results to a broader audience.

3. *Dissemination of activities*
   Co-organise joint JRC/GICNT events inviting international organisations such as the IAEA and Interpol in a role suiting the development of their nuclear security efforts.

4. *Different detection systems*
   Arrange awareness-raising campaigns targeted for decision-makers on the use of different sets of detection instruments combined with strong expert support. Different technologic choices go from low cost, low-performance technologies to high-cost, high-performance technologies. The philosophy of a nuclear security detection architecture is based on the different sets of detection instruments

combined with expert support services which in turn depend on the type of data to be analysed.

4.2 Scientific, technical and operational expert support

5. *Novel detection technology*
   Analyse the impact of the integration of novel technologies, such as the use of list-mode data format, on detection, identification, localisation, source characterisation and radiological threat and risk assessment. What does this mean for reachback services, including common centralised database structures? What kind of access experts and different competent authorities should have to the data and results? What kind of software should be developed for data management?

6. *Core capabilities of expert support*
   Explore and identify the core capabilities of expert support. Define notional models for expert support containing different levels of technology and expertise. Utilise technical and scientific experts to improve the detection technology for usability, interoperability, efficiency, sustainability, accuracy and reliability. Notice that there are different detection architectures that require different kinds of expert support.

7. *Cost–benefit analysis*
   Perform cost–benefit analysis on expert support considering different sets of technologies for primary and secondary inspection.

4.3 Alarm adjudication

8. *Procedures for alarm adjudication*
   Identify the procedures for timely, correct and efficient alarm adjudication. Expert support helps prevent overreaction when there is no threat, while enabling appropriate response when the threat appears to be real. In border control, the main operational challenge is to reach the right balance between addressing threats and clearance efficiency. This balance depends on the speed and accuracy of adjudicating innocent and false alarms in order to effectively respond to threats while maintaining the necessary flow of people and commerce.

9. *Best practices for FLO*
   Identify and promote best practices to help FLOs to adjudicate alarms. FLOs must know when and how to request technical or scientific expert support and there has to be established procedures to facilitate a quick transmission of threat and/or alarm information.

4.4 CBRNE threat management — integrated prevention, detection and response

10. *Status of CBRNE strategies*
    Review the status of CBRNE strategies in EU Member States. Some EU Member States may have integrated CBRNE strategies instead of dedicated C, B, RN and E strategies. Furthermore, find out which EU Member States have developed nuclear security detection architectures. Reachback is usually a cross-cutting element of such an architecture.

11. *Action plan on CBRNE security risks*
    Support the implementation of the new EC action plan on CBRNE security risks (October 18, 2017 — COM(2017) 610 final).
    Especially the following objects support the development of nuclear security architectures:
    - Strengthen risk-based customs controls to intercept dangerous CBRN materials at the border (1.2);
    - Conduct a gap analysis on the detection of CBRN materials (2.3);
    - Reinforce nuclear security capacities and networks (2.9);
    - Develop cooperation with specialised international organisations (3.3).

12. *Active interrogation to detect CBRNE threat*
    Adopt active interrogation techniques for non-destructive detection of shielded nuclear materials, chemical weapons, explosives, etc. The produced data can be analysed automatically but expert review and interpretation as well as timely information sharing may still be needed. Reachback capability allows the separation of the analyst and the instruments. Both fixed and relocatable active interrogation systems are commercially available. Passive radiation measurements produce rather similar data compared to active interrogation. Reachback related to passive measurements is already operationally used in some EU Member States. Investigate the role of reachback in case of active interrogation.

13. *Role of subject matter experts*
    Determine pros and cons related to independent and integrated CBRNE reachback solutions. Independent of the characteristics of the threat, the same FLOs are the responding officers. For different threats, there are often different supporting expert organisations. Analyse the need for remote expert support in the C, B and E fields, noting that part of the metadata is the same for all: time, geolocation (GPS), communication tools, event information, etc. Note that in real life there can also be multi-threat situations. Protection of CBRNE detection and response teams is of utmost importance (safety as first principle). Consider here also the development of joint CBRNE data structures.

14. *Role of ERNCIP*
    Assess the role of ERNCIP in promoting nuclear security. ERNCIP is a good forum to initiate non-binding cross disciplinary discussions related to CBRNE reachback since it has thematic groups for most of the threats. Cross-thematic group meetings could be useful to get together relevant expertise. ERNCIP could also review outcomes of relevant FP7 and Horizon 2020 projects such as GIFT and C-BORD. These projects produce technology for more than one of the CBRNE threats. Efficient detection and handling of CBRNE situations is also in the interest of special military units. Therefore, civilian CBRNE reachback solutions might also interest them.

4.5 International issues

15. International agreements

Analyse whether reachback and/or cross-border nuclear security cooperation and information sharing are adequately addressed in international agreements and/or in binding EU documentation such as the BSS (basic safety standard) directive. Review also the IAEA documentation in this respect. Document the findings and potential gaps.

16. International assistance

Identify areas where international assistance can support national capabilities regarding expert support and reachback. Identify where and how advanced regional or international reachback support could complement national capabilities.

17. Bilateral or regional protocols

Promote bilateral or regional protocols and memorandums of understanding (MOU) for alarm adjudication and reachback support. These instruments should be established prior to an incident.

18. *Lexicon*

Promote harmonised understanding of Expert Support, Reachback and Triage through lexicons at EC and other international level.

19. Nuclear Security Detection Architecture

Draft an EU guideline on Nuclear Security Detection Architecture and related expert support. Extract and use elements from the recommendations of the IAEA Nuclear Security Series (NSS). The objective is to develop minimum specifications for the design and implementation of a Nuclear Security Detection Architecture in an EU Member State.

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