

# ITWG NUCLEAR FORENSICS UPDATE

No. 16 September 2020

## CHAIRPERSONS' ADDRESS

Welcome to the Nuclear Forensics International Technical Working Group Update. As the international community continues to adapt to the pandemic caused by coronavirus disease 2019 (COVID-19), the ITWG is also adjusting. We are working to complete our largest virtual exercise, the fourth Galaxy Serpent excercise (GSv4) on national nuclear forensics libraries, by September 2020 and preparing for our seventh Collaborative Materials Exercise (CMX-7), which is scheduled for September 2021. This issue contains two articles describing how the ITWG and the International Atomic Energy Agency (IAEA) are adapting to the pandemic and strengthening their virtual engagement with the nuclear forensics community. For example, the ITWG with strong support from our colleagues at the Alternative Energies and Atomic Energy Commission (CEA) in France is now offering virtual collaboration tools through its restricted website to enable the task groups to continue their work. We hope you find the resources and information useful for shaping your training and professional development efforts. This newsletter also covers multilateral efforts to build nuclear forensics capacity in Georgia, Ukraine, Azerbaijan and Moldova (GUAM). Building capacity is a common theme among our community, and this engagement is a valuable model for cooperation. Finally, in the calendar section, you will see that ITWG-25 has been moved to June 2021. We are excited that the Lawrence Livermore National Laboratory will continue to act as host of the meeting but disappointed that we will not be able to gather sooner in person as a community.

With best regards, Klaus Mayer and Michael Curry

# STRENGTHENING ITWG VIRTUAL ENGAGEMENT MICHAEL CURRY AND DAVID KENNETH SMITH

While the pandemic caused by coronavirus disease 2019 (COVID-19) has affected the way many of us live, it has not changed the priority that the international community places on nuclear security. In these unprecedented times when international travel is limited, the ITWG is working to strengthen its engagement with the nuclear forensics community by innovative and effective means such as webinars, podcasts and other forms of virtual outreach. Strengthening virtual engagement helps the ITWG to continue its mission to identify, develop and socialize best practices in the field of nuclear forensics. In addition, virtual engagement allows the ITWG to expand its reach to a broader audience than would be possible through traditional, in-person participation.

The ITWG has always prioritized outreach to the nuclear security community, and this objective will not change. Historically, efforts have focused on conducting exercises and sharing lessons learned through the publication of ITWG guidelines, conducting briefings at annual meetings and communicating findings in technical journals. The fourth Galaxy Serpent exercise (GSv4) to develop national nuclear forensics libraries and the sixth collaborative material exercise (CMX-6) involving analyses in the nuclear forensics laboratory both provide good opportunities for virtual engagement as well as incorporating lessons learned and best practices. The Galaxy Serpent exercises have proved to be one of the ITWG's most successful methods for virtually engaging with nuclear forensics practitioners. More than 200 experts from 25 states having participated in the exercises to date.

#### Strengthening virtual engagement

The ITWG is working in three areas to strengthen virtual engagement. First, the Outreach and Training Task Group has worked with the ITWG co-chairs to

## Strengthening ITWG Virtual Engagement... continued from page I

post a survey on the ITWG closed website in order to learn more about members' interests and desired formats for virtual engagement (e.g. podcasts and webinars). The survey was conducted in July and the task group is compiling the results for dissemination in the coming weeks as well as a summary that will be included in a future edition of the *ITWG Update*.

The ITWG is also working to expand virtual engagement by canvasing task group and ITWG Nuclear Forensics Laboratories (INFL) leaders for potential topics for virtual events. The Outreach and Training Task Group will combine this input with feedback from the survey and work with ITWG leaders to craft virtual content to be shared with our membership over the coming months.

A third way in which the ITWG is expanding virtual engagement involves video and audio

conferencing hosted on the restricted website. Colleagues from the Alternative Energies and Atomic Energy Commission in France have provided a versatile web-based platform that enables the ITWG and its task groups to connect using an online portal accessed through the restricted website. We hope to begin offering new virtual events on the website by mid-September.

These efforts complement existing mechanisms such as the ITWG public and restricted websites, the *ITWG Update* and the Galaxy Serpent series. As an informal association of nuclear forensic science practitioners, we are fortunate to have such strong support for the ITWG's work. Any further suggestions for strengthening either virtual or traditional engagement among the nuclear forensics community would be welcomed by the ITWG leadership. •

# REGIONAL NUCLEAR FORENSICS CAPACITY BUILDING EFFORTS WITH GUAM STATES LIZ DALLAS, KLAUS MAYER AND KAITLIN OUJO

The European Union (EU) and the United States have a long history of working with Georgia, Ukraine, Azerbaijan and Moldova (GUAM states) in the area of nuclear security. In recent years, the European Commission Joint Research Centre (EC-JRC) and the US Department of Energy, through its Nuclear Smuggling Detection and Deterrence (NSDD) Program, have worked with GUAM states to develop an integrated set of three nuclear forensics projects, which have been implemented within the framework of the Science and Technology Centre in Ukraine (STCU). Each project has involved all four GUAM states and focused on an area of work that is central to the sustainable practice of nuclear forensics in support of investigations: national nuclear forensics libraries (NNFLs), technical and institutional capacity building, and training to support the next generation of nuclear forensic scientists.

#### Mutual benefits and close communication

Embedded within the planning of the projects was an understanding that the conditions for successful joint working would depend on the creation of projects with mutual benefits and on close communication between the regional technical parties responsible for implementation. With this in mind, experts within GUAM states worked together, with strong technical leadership from Ukraine and US and EU support, to cooperatively convert the framework for project work into a detailed workplan. The STCU administered the project budgets, timelines and reporting.

#### Accomplishments so far

All three projects commenced as a set between May and September 2018, and each has resulted in significant accomplishments.

- Pilot versions of each domestic NNFL have been developed, as well as the framework for a Regional Nuclear Forensics Information System (RNFIS).
- The technical work and training developed by GUAM partners have sustained and bolstered existing domestic nuclear forensics analytical expertise. A series of tabletop exercises (TTXs) was planned by each GUAM state to promote and expand domestic and regional collaboration mechanisms. Figures 1 and 2 illustrate the TTX organized for GUAM states by Ukraine. Figure 3 illustrates a Georgian TTX on improving nuclear forensics interagency procedures, which included observers from the other GUAM states.
- Nuclear forensic science students at the masters and doctorate levels have had an opportunity to engage in extended research projects, and the first



**Figure 1.** A tabletop exercise held in Ukraine for GUAM states on the interpretation of nuclear forensics signatures using National Nuclear Forensic Libraries

![](_page_2_Picture_3.jpeg)

**Figure 2.** A tabletop exercise held in Ukraine for GUAM states on the interpretation of nuclear forensics signatures using National Nuclear Forensic Libraries

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![](_page_3_Picture_1.jpeg)

Figure 3. A tabletop exercise in Georgia on nuclear forensic interagency procedures, with participation by GUAM state observers

![](_page_3_Picture_3.jpeg)

Figure 4. Nuclear forensics Summer School for students from GUAM states

# Regional Nuclear Forensics Capacity Building Efforts... continued from page 2

annual Nuclear Forensics Summer School was run for undergraduates interested in the field (see *ITWG Update* no. 13 (December 2019) and figure 4).

The initial set of projects is scheduled for completion three years after their respective start dates. The global and local impacts of coronavirus disease 2019 (COVID-19) could have resulted in a decrease in or early cessation of project activity, but the dedication and exceptional creativity of GUAM partners allowed project work to continue with only minor modifications and delays, often utilizing online tools (see figure 5).

#### A unique project

The GUAM/STCU project is unique in three ways. First, project work has been conducted multilaterally. Rather than each GUAM state working bilaterally

with the USA or the EU, all four have worked together to accomplish mutually held goals in a domestically appropriate way. Second, all the project work has been conducted with the full observation and participation of the other project partners. This has allowed all the project partners to gain insights into the practices of their regional neighbours, which would not have been accessible in other working relationships. Third, multi-year integrated project planning has allowed project outputs to build sequentially to achieve longer term objectives. Regional collaborations of this type therefore provide an outstanding opportunity to increase trust, firmly establish scientific partnerships and build protocols that will be pivotal in the event of serious cases of nuclear material interdiction. Based on the accomplishments of the first set of projects, a new set has been developed and funded to run from mid-2021 to mid-2024.

![](_page_4_Picture_7.jpeg)

 $Figure \, 5.\, {\rm ITWG\,NL\,2} - {\rm ZOOM\,Project\,progress\,and\,planning\,participants}$ 

# INTERNATIONAL ATOMIC ENERGY AGENCY NUCLEAR SECURITY WEBINAR SERIES HENRIK HORNE

On 16 March, in line with the recommendations of the Austrian Government to reduce the risk of coronavirus disease 2019 (COVID-19) transmission, IAEA personnel were instructed to work from home. A controlled and gradual reopening of the Vienna International Centre leading to a full-time return to work began on 1 July.

## Lockdown

While in lockdown, the International Atomic Energy Agency (IAEA) Division of Nuclear Security under the Department of Nuclear Safety and Security has continued to deliver its core functions and obligations to member states, supported by the temporary adaptation of certain activities to virtual platforms. At a time of global travel restrictions and social distancing, to continue to enhance states' awareness and build capacity, the Division is launching an online webinar series in September 2020 on publications in the IAEA Nuclear Security Series (NSS) related to responding to nuclear security events involving radioactive materials out of regulatory control (MORC).

The webinar series will comprise four thematic sessions and each episode will highlight different aspects of nuclear security response in the context of nuclear security events involving MORC. The objective is to introduce the audience to relevant NSS publications on these topics and provide information about the IAEA's program of assistance in the respective areas.

## Webinar series

The first webinar will be on NSS guidance document no. 37-G, Implementing Guide on Developing a National Framework for Managing the Response to Nuclear Security Events. This will be followed by sessions on NSS guidance document 22-G, Implementing Guide on Radiological Crime Scene Management, and NSS guidance document 18, Implementing Guide on Nuclear Security Systems and Measures for Major Public Events. The fourth and final episode will be dedicated to nuclear forensics and NSS guidance document 2-G (Rev. 1), Implementing Guide on Nuclear Forensics in Support of Investigations. Each webinar will be presented by a different international expert in the field of nuclear security event response. The experts will provide an overview of each publication and discuss their own experiences of supporting states with implementing the guidance it contains. Each session will be interactive, with a number of activities and an opportunity for participants to ask questions. Participation in these

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**Figure 1.** A demonstration of an initial hazard survey of a simulated radiological crime scene conducted by Éva Kovacs-Széles with colleagues on the sidelines of the IAEA's International Conference on Nuclear Security (ICONS 2020), Vienna, Austria, February 2020

webinars is by nomination and in accordance with established IAEA procedures.

#### Nuclear forensics goes virtual

The IAEA webinar on the NSS guidance document 2-G (Rev. 1) is scheduled to take place at 14:00-15:00 (CEST) on 22 October 2020. It will be the IAEA's first virtual event focused specifically on nuclear forensics. It will be hosted by Éva Kovacs-Széles (Center for Energy Research, Hungarian Academy of Sciences) and Henrik Horne (IAEA Division of Nuclear Security). After introducing the audience to the IAEA guidance on nuclear forensics contained in NSS 2-G (Rev.1), and the scope and application of the publication, it will discuss the role of nuclear forensics in supporting investigation of a nuclear security event within the national nuclear security infrastructure. Based on her own experience, Kovacs-Széles will discuss the intertwined nature of nuclear forensics and radiological crime scene management, and some of the challenges in implementing nuclear forensics capabilities in member states. Figure 1 shows a demonstration of an initial hazard

survey at a simulated radiological crime scene, as demonstrated by the Hungarian team of nuclear forensics professionals led by Éva Kovacs-Széles at the IAEA's International Conference on Nuclear Security (ICONS 2020) in February 2020. Henrik Horne will outline the IAEA's programme of assistance on nuclear forensics and how the Agency works to raise awareness and build capacity in member states.

Information and a registration link to the webinar series can be found on the IAEA Nuclear Security Information Portal (NUSEC), under the Division of Nuclear Security and NuSecResponse Webinars, **click here** to access the link directly or go to <<u>https://</u> <u>nusec.iaea.org/portal/Division-of-Nuclear-Security/</u> <u>Nuclear-Security-Webinars/NucSecResponse-</u> Webinars>.

Based on the feedback received from the first four webinars, future sessions will be planned to discuss and explore in more detail the various technical aspects and elements covered in the NSS publications on responding to nuclear security events involving MORC. •

#### UPCOMING TRAININGS AND MEETINGS\*

- IAEA Webinar on the Nuclear Security Series (NSS) guidance document no. 2-G (Rev. 1): Implementing Guide on Nuclear Forensics in Support of Investigations, virtual event, 22 October 2020
- 12th International Conference on Methods and Applications of Radioanalytical Chemistry (MARC XII), Kailua-Kona, Hawaii, United States, 21–26 March 2021
- IAFS 22nd Triennial Meeting of the International Association of Forensic Sciences, Sydney, Australia, 17–21 May 2021
- IAEA Regional Training Course on Introduction to Nuclear Forensics for ASEAN Member States, Daejeon, Republic of Korea, 24–28 May 2021
- ITWG-25 Annual Meeting, San Francisco, CA, USA, 15–18 June 2021
- IAEA International Training Course on Introduction to Nuclear Forensics, Bangkok, Thailand, 27–30 September 2021
- AWE NuFor 2021 Nuclear Forensics Conference, London, United Kingdom, 13-14 October 2021
- IAEA Regional Training Course on Introduction to Nuclear Forensics for Latin America, Mexico City, Mexico, postponed until 2021
- IAEA Practical Introduction to Nuclear Forensics, Budapest, Hungary, postponed until 2021

\*Please check directly with the event organizer on the status and dates for implementation of the individual events listed above.

Dates and locations of IAEA training and meetings will be officially confirmed with host member states; participation in IAEA training and meetings is by nomination and in accordance with established IAEA procedures.

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#### NUCLEAR FORENSICS

Nuclear forensics is an essential component of national and international nuclear security response plans to events involving radioactive materials diverted outside of regulatory control. The ability to collect and preserve radiological and associated evidence as material is interdicted and to conduct nuclear forensics analysis provides insights to the history and origin of nuclear material, the point of diversion, and the identity of the perpetrators.

#### THE NUCLEAR FORENSICS INTERNATIONAL TECHNICAL WORKING GROUP

Since its inception in 1995, the Nuclear Forensics International Technical Working Group (ITWG) has been focused on nuclear forensic best practice through the development of techniques and methods for forensic analysis of nuclear, other radioactive, and radiologically contaminated materials. The objective of the ITWG is to advance the scientific discipline of nuclear forensics and to provide a common approach and effective technical solutions to competent national or international authorities that request assistance.

#### **ITWG PRIORITIES AND ACTIVITIES**

As a technical working group, the priorities for the ITWG include identifying requirements for nuclear forensic applications, evaluating present nuclear forensic capabilities, and recommending cooperative measures that ensure all states can respond to acts involving illicit trafficking and unauthorized possession of nuclear or other radioactive materials. An objective of the working group is to encourage technical peer-review of the nuclear forensic discipline. These goals are met through annual meetings, exercises, and informal and formal publications.

Outreach is a primary goal of the ITWG. The working group disseminates recent progress in nuclear forensic analysis and interpretation with the broader community of technical and security professionals who can benefit from these advancements. Affiliated international partner organizations include the International Atomic Energy Agency (IAEA), the European Commission, the European Police Office (EUROPOL), the International Criminal Police Organization (INTERPOL), the Global Initiative to Combat Nuclear Terrorism (GICNT) and the United Nations Interregional Crime and Justice Research Institute (UNICRI).

#### **ITWG MEMBERSHIP**

Nuclear forensics is both a technical capability as well as an investigatory process. For this reason the ITWG is a working group of experts including scientists, law enforcement officers, first responders, and nuclear regulators assigned by competent national authorities, affiliated contractors, and international organizations. The ITWG is open to all states interested in nuclear forensics.

ITWG participating states and organizations recognize that radiological crimes deserve thorough investigation and, when warranted, criminal prosecution. The ITWG encourages all states to possess the basic capability to categorize nuclear or other radioactive materials to assess their threat. As an international group, the ITWG shares its expertise through its membership to advance the science of nuclear forensics as well as its application to nuclear security objectives.

#### http://www.nf-itwg.org/

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