

The case for nuclear forensics to strengthen nuclear security internationally

By Maria Podkopaeva

Contaminated playing cards collected as evidence after being seized at a Bucharest airport.

(Photo: A. Apostol/IFIN-HH)



Romanian authorities have identified an organized crime group tied to two incidents at a Bucharest airport in 2018 involving playing cards contaminated with small amounts of radioactive material. Using their nuclear forensics skills and equipment, acquired in part through IAEA support, Romanian authorities determined that the cards were contaminated with iodine-125, which was being used to cheat at *Xoc Dia*, a popular game. This, along with information exchanged between experts facilitated by the IAEA and the Nuclear Forensics International Technical Working Group (ITWG), led to a full criminal investigation that was closed in 2019.

Initially, the two incidents were seen as isolated and considered to be misdemeanours with no legal grounds for a criminal investigation. However, information shared at an annual ITWG meeting helped link the two cases with other cases from different countries.

“Thanks to both the ITWG and the IAEA, we had ample opportunity to establish close contact with other experts who had investigated similar cases and to discuss their experiences,” said Andrei Apostol, Head of the GamaSpec Laboratory at Romania’s Horia Hulubei National Institute for Research and Development in Physics and Nuclear Engineering (IFIN-HH).

The initial clues and the exchanges of experience gave prosecutors key legal reasons for launching a full criminal

investigation. This investigation involved using nuclear and other methods to uncover details such as how the cards were produced and how they were used for financial gain, as well as their destination and origin. The results also helped authorities in Romania find new leads and expand the scope of their investigation, including collaboration with foreign authorities.

Nuclear forensics methods were an important component of the case, said Apostol. “The main purpose of nuclear forensics is to assist a nuclear security-related criminal investigation by analyzing and providing essential information on nuclear and other radioactive material that can then be used for prosecution and trial.” In this case, the results of the nuclear forensics examinations were compiled into reports used by prosecutors to prove the presence of iodine-125, an isotope mainly used for cancer treatment, which had been illicitly used to gain a financial advantage in the card game.

These reports also helped to tackle the big question of who was behind the contaminated cards. “From our experience, most of the smugglers of nuclear or other radioactive material can be considered opportunistic criminals. In the case of the contaminated cards, the people transporting them were not even aware of the presence of radioactive material on the cards,” said Apostol. Using the nuclear forensics reports and other investigative means, they successfully identified the criminal group responsible for the cards and proved the group’s criminal intent.

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Equipped and ready

Since 2015, officials in Romania have worked with the IAEA to build the country's nuclear forensics capacities, including the knowledge and skills used in the contaminated cards case. They have also established Practical Arrangements in Nuclear Forensic Science with the IAEA, which has facilitated Romanian experts' involvement in nuclear forensic science technical advisory missions, laboratory visits and training as well as regional coordinated research projects. These activities have also been complemented by cooperation with other nuclear forensics bodies internationally.

"When establishing the nuclear forensics programme in Romania, working with the IAEA, the ITWG and other international bodies was a natural choice," Apostol said, noting how an ITWG meeting held four years ago played a key role in strengthening Romanian officials' awareness of nuclear forensics, its importance and ways to use the country's existing capacities to build a nuclear forensics programme.

A unified approach

For the last 25 years, the ITWG has offered a forum for scientists, regulators, law enforcement personnel, prosecutors and policymakers from nearly 40 countries and international organizations, including the IAEA, to discuss best practices and recent developments in nuclear forensics. It also organizes training exercises and supports the development of guidelines on nuclear forensics. The aim of the ITWG is to create a unified nuclear forensics approach to assist law enforcement authorities.

To facilitate connections for mutual nuclear forensics assistance and information sharing between the countries, ITWG affiliates are frequently involved as experts in IAEA meetings, conferences and training courses. The IAEA also assists countries that are part of the ITWG community through, among others, sharing knowledge and providing analytical services related to illicit trafficking.

"Nuclear forensics as a scientific discipline has existed since the 1990s, and the ITWG, the IAEA and the Global Initiative to Combat Nuclear Terrorism have collaborated to help grow forensics as a nuclear security tool," said Michael Curry, a senior coordinator for nuclear forensics cooperation at the US Department of State's Bureau of International Security and

Nonproliferation and a co-chair of the ITWG. "As technical experts increasingly connected to policymakers, we saw tremendous growth and development of national programmes that utilize forensics as a nuclear security tool, and an important platform for those connections was the ITWG."

Since the field of nuclear forensics first emerged more than 25 years ago, the methods and technology have advanced, but so has the way criminals operate, said Klaus Mayer, Deputy Head of the Nuclear Safeguards and Forensics Unit of the European Commission's Joint Research Centre and an ITWG co-chair.

"Today, we are faced with perpetrators that act in a smarter way," Mayer said, explaining how activities can be veiled using online networks such as the 'darknet', which is anonymous and is not visible to standard search engines. "To stay ahead of the game, we not only need to continue increasing our scientific knowledge base, we also need to work in a much more information-driven manner and operate in a more integrated way with law enforcement and information services."

Countries worldwide work with the IAEA to increase their nuclear forensics capabilities. Such capabilities are a key aspect of a country's security infrastructure for the prevention, detection of and response to theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear and other radioactive material.

Nuclear forensics experts analyze contaminated playing cards seized at a Bucharest airport.

(Photo: A. Apostol/IFIN-HH)

