

## 2021 ROMANIA TRANSPORT SECURITY TABLE-TOP EXERCISE (TTX) – LESSONS LEARNED AND GOOD PRACTICES

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### Abstract

During the period of 15-18 March 2021, the IAEA conducted a national workshop addressing the security of radioactive material in transport. The workshop was jointly hosted by the Romanian regulatory authority and the General Inspectorate of Romanian Gendarmerie. The workshop assisted Romania in improving its capability to evaluate the ability of response forces to counter a malicious act against radioactive material in transport. The event consisted of briefings, exercises, a demonstration of transport security equipment, and a transport security table-top exercise (TTX). The workshop was conducted in a virtual-hybrid format in such a way as to meet the COVID-19 related requirements in compliance with Romania's guidelines. This paper provides an overview of the workshop's activities, lessons-learned, and good practices related to the transport security TTX exercises.

## 1. INTRODUCTION

An effective response to nuclear security events is an important element of the nuclear security regime and, according to the IAEA nuclear security guidance, the States should ensure that contingency plans and procedures exist to counter malicious acts directed at transport of nuclear and other radioactive material ([1], [2], [3]). The States should conduct tests and exercises to evaluate the effectiveness of their transport security measures.

Table-top exercises (TTX) is one such testing and evaluation tool and are discussed in the IAEA document TDL-007 “Preparation, Conduct and Evaluation of Exercises for Security of Nuclear and Other Radioactive Material in Transport” [4]. TTX exercises can be used to develop and validate contingency plans for a shipment as a whole. They also can be used to assess procedures for response force actions in the event of an attack against the shipment at a specific point of the selected transport route. TTX exercises are highly cost-effective and are also an excellent training tool for response force personnel.

Preparation, conduct, and evaluation of transport security TTX exercises require specialized skills that the States need to develop and maintain relevant staff. It is important to establish a cadre of experts knowledgeable of a wide range of specialized technical topics including transport operations, risk-significance of nuclear and radioactive material, physical protection measures for transport, response force procedures and capabilities, and design basis threat (DBT) and adversary attributes. Additionally, these experts must be able to develop technically-accurate exercise scenarios, to facilitate the conduct of the exercises, and to collect and evaluate the results in order to enhance the security of radioactive material shipments.

Romania, in the spirit of continuous improvement in nuclear security, has requested IAEA to provide the training on the preparation, conduct and evaluation of transport security TTX exercises to evaluate the ability of the transport response forces to counter malicious acts, including attempted radiological sabotage and theft, against radioactive material in transport.

### SIDE BAR: ROMANIA’S FRAMEWORK FOR NUCLEAR SECURITY IN TRANSPORT

Romania conducts a large number of radioactive material shipments both within and across its national borders. These transport activities support Romania’s nuclear industry, including the production of uranium, fabrication of reactor fuel, operation of nuclear research and nuclear power reactors, and management of irradiated reactor fuel; its nuclear research and development activities; and the wide use of radioactive material in research, medical and industrial applications.

Romania has established regulatory and implementation infrastructure to ensure the security of nuclear and other radioactive material in transport. The responsibility of the Operator (shipper/carrier) are assigned to the operating organizations in the nuclear and radioactive material sectors. The General Inspectorate of Romanian Gendarmerie (IGJR) has a key role in ensuring an effective response to malicious acts directed nuclear and other radioactive material transports. Consistent with the Romanian law, specially-trained and equipped IGJR personnel serve as security escorts for high-significance nuclear and radioactive material shipments. Local governments, police agencies, and emergency response organizations also have a role in the planning and execution of radioactive material transports. Romanian National Commission for Nuclear Activities Control (CNCAN) serves as the regulatory authority, responsible for the development of the national regulatory requirements and the associated regulatory oversight activities, including reviews of transport security plans, inspections, and enforcement.

Romania actively promotes nuclear security both at the national and at the regional and international levels. In 2018, Romania and Norway, with support from the IAEA, launched a project on “Enhancement of Nuclear Safety, Security and Emergency Preparedness in Romania” (NORROM project) to further enhance Romania’s capacity to respond to nuclear security events and other emergencies involving nuclear and radioactive material both at fixed facilities and in transport.

## 2. PREPARATORY CONSULTANCY MEETING

IAEA began the preparation of the national transport security TTX workshop by conducting a virtual consultancy meeting in February 2021. The meeting was attended by IAEA staff, external experts and representatives from Romania's CNCAN and IGJR. The participants developed the workshop's training agenda, including technical briefings, exercises, and demonstrations, and identified the necessary equipment and logistical requirements. The participants agreed that the workshop's exercise activities would focus on the methodologies for planning, conducting and evaluating convoy-level TTX exercises involving actions by a mock-up adversary force and transport response forces. They also provided the technical input required for the preparation of the workshop's transport security TTX exercise, including the context and nature of transported materials, the postulated point of origin and destination, and the postulated threat. Noting the need to protect confidential nuclear security information, the IAEA suggested to use hypothetical information to develop the workshop's TTX scenarios. The consultancy meetings served as a starting point for the preparation of the workshop's training materials and, eventually, for conducting a successful training event.

## 3. TRANSPORT SECURITY TTX WORKSHOP

The transport security TTX workshop was conducted from 15-18 March 2021. The workshop, hosted jointly by CNCAN and IGJR, was attended by approximately 20 participants representing Gendarmerie's nuclear security response forces, the regulator, and nuclear facility operators and carriers, as well as IAEA and its external experts from Member States. The workshop was conducted in a virtual-hybrid format with the participants, the Romanian expert, and IAEA staff participating at a physical location in Sinaia, Romania and the international instructors participating remotely.

The participants received briefings and participated in instructor-led group discussions on the topics of nuclear security risks, transport security planning, and physical protection measures. They also made presentations on the national approaches to and regulatory environment for nuclear security transportation in Romania, as well as on the existing emergency response arrangements, coordination of emergency response and contingency response, and planned exercises involving the transport of radioactive material.

The class-room activities were complemented by a demonstration of transport security equipment that was conducted at the IGJR training center. To address the nuclear safety-security interfaces, representatives from the Romanian Horia Hulubei National Institute of Physics and Nuclear Engineering presented a radioactive material transport vehicle and discussed its security features, emergency response procedures and equipment, and the associated regulatory requirements. IGJR familiarized the participants with vehicles and equipment used by the IGJR's transport response forces. The demonstration served to facilitate a discussion of practical considerations for the selection and employment of transport security measures (Fig. 1 and 2).

The workshop then focused on the conduct of a practical convoy-level TTX exercise, which provided examples of adversary and transport response force actions and the associated consideration for physical protection system evaluation and improvements. The participants worked to develop skills required to plan a TTX scenario, to conduct an exercise, and to evaluate the results of transport security TTX exercises.



Fig. 1: Demonstration of emergency response and safety features of the transport vehicle (Photo credit: CNCAN)



Fig. 2: Demonstration of transport response force's vehicles and equipment (Photo credit: CNCAN)

#### 4. TRANSPORT SECURITY TTX EXERCISE

The workshop TTX was conducted as a moderator-led exercise involving transport response force (TRF) and Mock-up Adversary Force (MAF) players. The exercise used a MAF-developed exercise scenario, which included a simulated armed attack against a radioactive material transport with the objective of the theft of radioactive material. According to the turn-based approach used during the exercise, the overall event is divided into 30-second intervals. For each interval, both MAF and TRF are given the opportunity to formulate their actions in response to the actions taken by the other side and in accordance with their plans and procedures. Considering the evolving situation and using a probabilistic-based method, the moderator was making calls to determine the outcomes of TRF-MAF engagements. The battle continues until either the MAF completes its mission and succeeds in stealing the radioactive material or it is no longer capable of meeting its objective due to attrition or loss of essential capability.

The TTX exercise utilized a novel remote delivery platform, developed by the U.S. Oak Ridge National Laboratory (ORNL). This specialized TTX tool portrays the mock-up adversaries and nuclear security response forces overlaid on a high-resolution satellite imagery of the location of the hypothetical security event. The tool helps the trainees to evaluate the situation and to develop an appropriate course of action in an interactive, dynamic, and effective manner (Fig. 3)



Fig. 3: ORNL transport TTX tool (Photo credit: O.Bukharin)

## 5. CONDUCTING A TTX WORKSHOP DURING PANDEMIC

The workshop was conducted in March 2021, at the time of restrictions due to the Covid-19 pandemic situation. The organizers therefore made a significant effort to ensure the safety of participants and instructors. The training activities at the Sinaia location were conducted in such a way as to meet the Covid-19 related requirements and guidance established by the Government of Romania and by the World Health Organization. These measures included temperature reading for all personnel entering the training area, the use of face masks, social distancing, and remote participation of international experts (Fig. 4). The safety measures were effective in preventing the spread of the infection.



Fig. 4: Training facility arrangement (Photo credit: CNCAN)

## 6. IN CONCLUSION

The National Workshop on Planning, Conducting and Evaluating an Exercise on Security of Radioactive Material in Transport, which was conducted by IAEA in cooperation with Romania's CNCAN and IGJR from 15-18 March 2021 in Sinaia, Romania, was highly successful and assisted Romania in the implementation of its transport security regime for nuclear and other radioactive material. The primary objective of the event was to enhance the participants' ability to plan and conduct transport security TTX exercises, a versatile and cost-effective training and evaluation tool that can be used to develop and support transport security measures. The participants noted the importance of the training because, although the TTX methodology is relatively simple, an effective use of TTX exercises requires staff with specialist skills and knowledge.

The participants noted that the in-person participation by trainees in the workshop was highly beneficial. At the same time, remote learning technologies, including the U.S. ORNL remote TTX delivery platform, were highly effective and further enhanced the delivery of the training.

The IAEA has an important role to play by facilitating the exchange of best practices in conducting transport security exercises and by coordinating the preparation and conduct of nuclear security training events. The IAEA's technical guidance document TDL-007 is in use by Member States to prepare, conduct and evaluate their own TTX exercises. IAEA also directly assists Member States by designing and delivering the transport security TTX exercise training.

## REFERENCES

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- [4] INTERNATIONAL ATOMIC ENERGY AGENCY, Preparation, Conduct and Evaluation of Exercises for Security of Nuclear and Other Radioactive Material in Transport, IAEA-TDL-007, IAEA, Vienna (2018).