Simulation of radiation in-field operations for training, exercises and capability testing

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eTTX	electronic Table Top Exercise
MORC	Material out of Regulatory Control
SIMO	Simulation of MORC – software (Python)

Radiation Sources and risk to man

	Type	Activity	Use
1	Small sources	1 kBq – 10 MBq	Calibration Training to use detection systems
2	Medium size sources	10 MBq -10 GBq	Field tests and exercises Sources must be handled by radiation experts in controlled environment
3	Dangerous sources Dirty Bomb Fallout	10 GBq – 100 TBq	Realistic training and exercises are difficult to implement, often impossible.

Exercises can be carried out in the the simulated world.

Table Top Exercise - TTX

- A table top exercise contains discussion-based sessions.
- Team members meet informally (class room).
- Participants discuss their roles and responsibilities during an emergency and plan the response.
- A facilitator guides participants through the scenario by providing more and more information as the event evolves.

Inject information → Break for discussion → Inject ..

Electronic Table Top Exercise - eTTX

Implemented as TTX

- A facilitator guides participants through the scenario.

However

The participants acquire themselves more information as the event evolves. Interactive field work is carried out:

- The participants plan and execute field missions virtually on digital maps: source detection, identification, localization and characterization, health hazard estimation
- Response operations can be implemented, such as area cordoning.

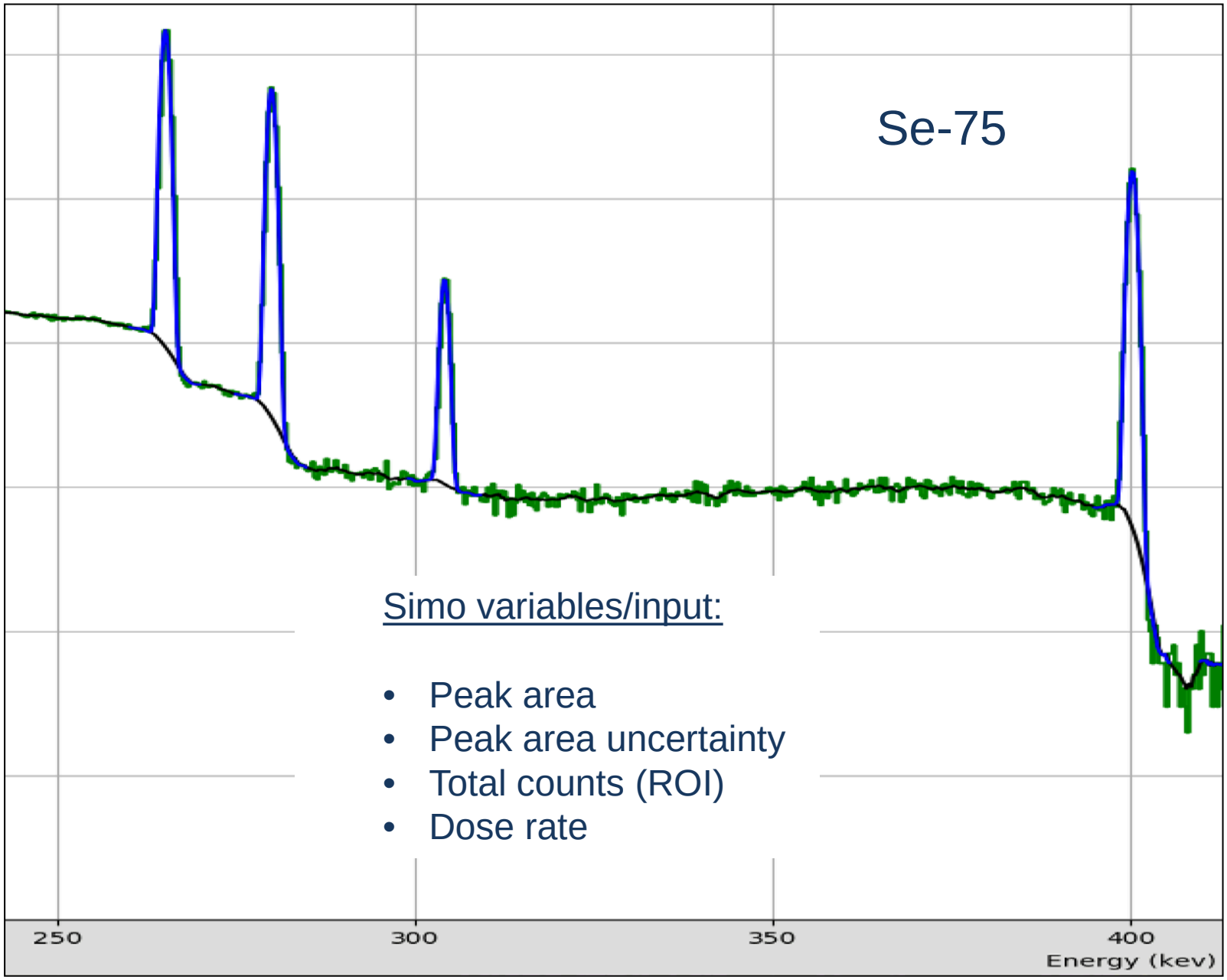
Simulations

eTTX organizer:

- Design scenario, including threat and risk
- Deploy source or sources in required geolocations
- Calculate radiation field: dose rate, spectral data

Participants:

1. Design field missions under coordinated leadership
2. Implement the missions on digital maps
3. Analyze the results
4. Communicate findings to other authorities
5. Recommend and implement counter actions



Simo variables/input:

- Peak area
- Peak area uncertainty
- Total counts (ROI)
- Dose rate

Simo
Interactive way of Working

Participants design field missions:

1. Plan your mission

2. Search for MORC on the area of interest (move mouse on screen or design flight pattern for a drone)
   - Measure and record the signal strength
   - Follow safety rules
   - Localize the source – search tactics!

3. Keep track of your findings

4. Communicate your findings to Command and Control

Search tactics

1. Random
2. Walk on straight line, find the signal maximum, turn 90 degrees
3. Source passing on a straight line (vehicle, drone)
4. Isocurve – fix the reading and move
5. Source localizer – special equipment
6. Systematic area scanning (drone)
7. Team work – supported by experts (reachback)

Simulations are intended for

- **Training and exercises of operational units**
  - **field teams (rescue, police, customs,..)**
  - **command and control**
  - **nuclear experts (expert support, reachback)**

- **Planning and testing detection capabilities**

A **video** to see the way of working with a drone:

https://www.dropbox.com/s/zthrbhd69m0gmxe/simo-RN-threat-simulation.mov?dl=0

THE END