eNOTICE
European Network Of CBRN TraIning Centres

D4.12 eNOTICE Recommendations for CBRN R&D and CBRN policies. Version 5

Authors and contributors:
Olga Vybornova (UCL) – Leading author
Jean-Luc Gala (UCL) – Contributor
Wolfgang Karl-Heinz Reich (JCBRND COE) – Contributor
Luc Calluy, Maaike van de Vorst (VESTA) – Contributors
Daniele Di Giovanni (UNITOV) – Contributor
Maximilian Kiehl (SIC) – Contributor
Adam Wieczorek (CNBOP-PIB) – Contributor
Liz Benson (WMP) – Contributor
Mariusz Młynarczyk, Adam Bagniewski (WSU – Contributors
Michael Domingues (SDIS77) – Contributor
Sylvia Pratzler-Wanczura (FDDO) – Contributor
Elif Surer (METU) – Contributor
Gilles Dusserre (ARMINES) – Contributor

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1	**Université catholique de Louvain (UCL)**	**X**
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10	West Midlands Police, National CBRN centre (WMP)	X
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Executive Summary

This document is Deliverable 4.12 (eNOTICE Recommendations for CBRN R&D and CBRN policies. Version 5) of eNOTICE, a European Horizon 2020 EC funded project, under the Grant Agreement n° 740521.

This document presents the final report on the eNOTICE recommendations for CBRN R&D and CBRN policies, where the findings result from five policy meetings organised by the project, five annual workshops, multiple meetings with the network stakeholders – representatives of authorities and decisions makers, industry, research and training professionals. The results, major key points, conclusions and a possible way forward considerations are summarised at the end of the document.

It is clear that eNOTICE network should promote and further develop collaboration with research and industry that are interested in testing and validating existing technologies and innovative solutions with practitioners at training centres. For training centres it gives awareness of available relevant innovations (tools, procedures and technologies) on the market and faster access to them. This collaboration will be the primary basis of the network after the end of the project.

eNOTICE is establishing contacts with the national industrial associations – in Germany, Belgium and the Netherlands so far, and with more EU Member States associations to come. National industrial trade associations can be involved in the network, they are being approached as they can be interested to aggregate technology development actors and fund technology testing with practitioners in the field.

One more promising direction of the network activity is collaboration with large international organisations, such as OPCW (Organisation for the prevention of Chemical Warfare) for chemical training, IAEA (International Atomic Energy Agency) for radiological training, GOARN (Global Outbreak Alert and Response Network)/WHO (World Health Organisation), ECDC European Centre for Disease Prevention Control) for biological training. Training centres would be interested in the C, R, B (certified) training coordinated with and by the international organizations, exchange of approved instructors and trainees.

The added value of the eNOTICE Network for TC is, amongst others that:

- Improve inter-agency, inter-institutional and inter-disciplinary procedures and coordination, by facilitating their cross-border networking / interactive interface with first responders and TCs (e.g., assessment of new emerging threats, assessment and implementations new related guidelines / SOPs, and new threat-driven innovations).
- Enhance civil-military cooperation in the field of CBRN
- Give TC visibility at EU level – to be known by EC, chosen and contacted in case needed for specific capability or cross-border training
- Promote and enhance training capability
- Exchange training practices, trainers, trainees – from inside and outside EU (Including exchanges with TC outside EU – via the CBRN CoE centres)

- Facilitate interactions between CBRN TC members in the network
- Support TCs in access to new markets, through participation in and hosting activities of research projects => thus creating new clients and beneficiaries
- Faster and efficient access to relevant innovations (procedures, technologies), testing and validation of developed innovations in cooperation with industry
- Possibility to influence (end-user oriented) capability development by interacting with industry
- Promote training involving citizens (incl. vulnerable groups)
- Facilitate information exchanges between (other) security stakeholders
- To be the cradle of training procedures adapted to a rapidly changing world (smooth adaptations to new types of threats; delivery of just-in-time training) and to foster a multinational and multidisciplinary exchanges on the most efficient and fastest way to address these emerging threats, both in terms of preparedness and response (i.e., exchanging on new threats driven-innovations, and new threats-driven SOPs).
- To have at disposal reference materials for testing the technologies of detection and identification, and to assess them in adequate conditions of safety and security.

Since the mutual interest of training centres and industry for collaboration is confirmed, it prompts the possible development of eNOTICE network of CBRN Training Centres to become a public-private partnership, pursuing both the possible institutional support (via calls for projects) and the service-oriented approach (involving active participation of private organisations, mainly private TCs and industrial network members). The network will set up a secretariat and an executive board consisting of training centres and industrial companies, to pursue the specific demand side needs – of the training professionals and practitioners, and match with the needs and offers of the supply side - industry and research.

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1 OBJECTIVES AND SCOPE

This deliverable presents the final findings and results of the work under the Task 4.3 Identification of opportunities to strengthen policies and recommendations for R&D – M3-M70: UCL (lead); VESTA, ARMINES, SIC, JCBRND COE, UNITOV. UCL leads, based on its experience in R&D and policy initiatives. VESTA, ARMINES, SIC, JCBRND COE and UNITOV contribute with their respective knowledge on civil and military CBRN defence policies and on needs for CBRN R&D.

Having identified in D4.8, D4.9, D4.10 and D4.11 (produced by eNOTICE consortium in 2018, 2019, 2020 and 2021 respectively) civil-military and international cooperation is one of the most important trends in CBRN defence policy. The recent findings at security stakeholders' meetings further proved this topic as a priority that needs to be further explored and developed. Policy Meeting 1 in 2018 provided general vision of the network with representatives of DG HOME, DG ECHO, DG DEVCO. Policy meeting 2 in 2019 confirmed the necessity of further development and deepening of civil-military cooperation. Policy Meeting 3 that took place virtually on October 22, 2020 opened the discussion and paved the way to the network sustainability - maintenance and successful functioning for many years after the end of the H2020 eNOTICE project funding in August 2023. The concept and activities of the network of CBRN training centres, testing and demonstration sites are in line with the EU CBRN Action Plan objectives, are strategic for Member States CBRN preparedness and development, and are interfacing CBRN themes of EC DGs – HOME, ECHO, INTPA (DEVCO at that time), JRC, FPI. The discussion at Policy Meeting 3 covered sustainability from all angles – from the point of view of training professionals from eNOTICE network training centres, EC DG HOME, ECHO, DEVCO representatives, industry, academia and current R&D projects and advisers – who provided their expectations, vision on possibilities and future network maintenance. Policy Meeting 4 took place also virtually in the form of a webinar on December 9, 2021, the speakers were representatives of industrial companies who shared their experience and concerns when displaying and testing their technologies with practitioners in the field. Since the previous policy meetings confirmed that participation of industry in the network and its possible financial contribution to the network maintenance is necessary, the requirements and expectations of industry were carefully analysed, and the problems and concerns are being taken into account when forming the mechanism of the network functioning. Policy Meeting 5 was held side-by-side with the multi-disciplinary field exercise in Campus Vesta training centre in Belgium, on May 20, 2022. As it was the final policy meeting in the series, the invited training centres representatives were asked to express their willingness to further contribute to the network, their opinions on the future network activities and the ways the network should function after the end of the project. The functionality of the network directly depends on the current CBRN policy, needs and requirements of the practitioners and training professionals that are part of the network.

2 NETWORK SUSTAINABILITY INSIGHT

2.1 PREREQUISITES AND CURRENT STATUS

Sustainability of the network has been considered during the whole project. As the project has entered its final phase the network is implementing concrete actions to materialise the sustainability of the network of CBRN training centres beyond the official end of the project in August 2023. The 52 training centres that are current members of the network are interested in maintaining it, to have the possibilities of joint activities and exchange of training practices between the network members. All network stakeholders benefit from its functioning, so the need for sustainability, maintenance of the network activities and expanding thereof is already proven.

During the lifetime of the project, eNOTICE developed several concrete resources that are offered to training centres as the basis for cooperation in the network. The primary resources are:

- The methodology and templates for preparation, organization and reporting on Joint Activities (JAs) – field exercises, table tops, simulations and serious games hosted by training centres and inviting other current national and European R&D projects, representatives of industry and research, policy makers – D4.1 and D4.6.

- All the collected reports from multiple JAs organized in the project are the source of a library of possible scenarios for JAs, the national approaches to CBRN threats handling. A library of national CBRN regulations can be added here as a reference for stakeholders from other countries willing to participate in the JA in a particular location.

- The capacity label that helps to comprehend, make visible and transparent all the training capabilities of a training centre – the available infrastructure, theoretical courses and practical training, the disciplines that can be trained, etc. – D2.2

- The eNOTICE Community Centre (D3.9) as the main communication and dissemination portal containing all the published resources, the Catalogue of member training centres, the implemented search function that allows external stakeholders to find the training capability and location of interest.

The surveys and workshops conducted so far showed that training centres are interested and willing to continue to host Joint Activities in the network. The member training centres will be asked to announce what exercises they can open up as Joint Activities to welcome external participants/observers, so that the policy makers and industrial actors can see what exercises and where will be available, and what CBRN technologies will be possible to test there, depending on the priorities and needs of the practitioners in that location.

The network will promote use of cutting-edge technology and advanced methods in CBRN training, such as integrating real CBRN sensors and equipment with virtual reality, thus obtaining full immersion with close to real-life perception and all sensing modalities of the environment with touch, smell, sound, realization of the objects and space, etc. The combination

of "traditional" field exercises employing progressive learning techniques and advanced technology is of high demand both for civilian and military training.

2.2 REPORT FROM THE FIFTH POLICY MEETING ON MAY 20, 2022

Context and objectives of the fourth Policy Meeting

The main ultimate goal of the eNOTICE project is to make the network of CBRN training centres sustainable and functional after the end of the project. For this purpose, the project partners collect and carefully analyse opinions of all network stakeholders, trying to understand their expectations, requirements, needs and possibilities in building the network. The previous policy meetings were dedicated to the discussion with policy makers, with TC - both civilian and military, and with practitioners. The results have been reassuring, the interest and motivation of all actors regarding participation in the network is inspiring, so the project partners know that the chosen direction is correct. The network will be sustainable only if all actors get what they need, and nobody's interests are compromised. The partners striving for the long life of the network, do not try to pretend that the process is simple and has no challenges. The challenges are numerous, and step-by-step in every study, in every discussion, we are revealing the issues, the concerns and the ways to resolve them. We have to be very precise in the analysis of requirements, conclusions and corresponding actions, in order to develop a solid operational mechanism of sustainability.

The fifth Policy Meeting on May 20, 2022 was dedicated to the discussion with the training centres of the network of CBRN training centres, testing and demonstration sites on the current status of the network, and the future plans.

Speakers, topics and agenda

On Friday, May 20, 2022 the 5th eNOTICE Policy Meeting was held in the Belgian training centre Campus Vesta, the day before the large CBRN multidisciplinary field exercise. This Policy Meeting was the last one planned during the project lifetime, and it was aimed at the discussion with the invited training centres and training professionals representatives on the future of the network, based on the needs of the CBRN practitioners, R&D and policy makers community.
After the UCL coordinator presentation of the current status of the network, the vision and plans for the future after the end of the project, there started an open discussion with all the participants. It is fair to say that the previous conclusions were supported. The discussion also revealed new issues that have to be taken into account when developing the sustainability mechanism.

During the discussion the participants were handed a printed questionnaire that they were invited to fill stating their preferences and expectations from membership in the network. The questionnaire can be found in the Annex.

The results of the survey

Eleven questionnaires were received that the Policy meeting participants filled during the meeting. Representatives of 9 civilian and 3 military organisations provided replies.

All respondents intend to contribute to the network after August 2023 (end of eNOTICE project: 8 as active member/decision maker, 6 as a participant/observer (a few participants indicated both options), and 1 participant still needed internal discussion within the organisation to decide about the form of contribution.

A few respondents are open to offer theoretical courses and practical trainings within and outside the network - providing augmented reality/mixed reality/virtual reality technology and serious games, courses approved by or linked to NATO, provide training upon request to external organisations. The Dutch police participants referred to the National CBRN Defense centre that would be responsible for offering training, as well as response in case of CBRN incident.
JCBRND COE would be willing to host an annual TC conference including industry, research and EU CBRN-related projects funded by Horizon Europe programme, EDA, EDF, with participation of DG HOME, DG INTPA, FPI, EEAS.

At the moment of the question, the majority of the respondents do not currently participate in any other EU project besides eNOTICE, only 3 participants are involved in other R&D projects. All the participating TC and their trainers are involved in EU (European Explosive Ordnance Disposal Network (EEODN) network), international (NATO, OPCW, IAEA, Interpol) and/or national expert groups (sometimes multiple groups), the majority (7 participants) at the national level.

Contact with industries?		**Comments**
Existing collaboration	7	Active collaboration for 4 and more limited for 3; the latter 3 expect that this network will help them to developed this collaboration,
No contact (yet)	4	All 4 wish to develop such contacts– e.g. as an opportunity to have access to the technologies on the market, to get new tactical equipment, PPE for fire officers, etc.

1 respondent pointed out the necessity to check the priorities with the TC customers.

The broad interest for emerging CBRN innovations has been expressed, the following shall be tested and implemented during training are: all technologies that protect first responders and bring them close to reality to be aware that CBRN presents a threat for health, virtual reality technologies, detection and analysis equipment, bio technologies, PPE and protective clothing, respirators that can cover beards. In general, new training methods and procedures are in high demand too.

All (but one who needs confirmation internally with the organisation) the respondents stated that they are willing to host Joint Activities when the network continues after the end of the eNOTICE project, both with ongoing European consortia working on CBRN issues and with other training centres. The stated opportunities were: annual C or R training, with testing robots and drones, field exercises, functional exercises, table tops trainees and trainers teaching and exchange, simulations and serious games.

Membership fee for the eNOTICE network ?		**Comments**
Agree to the annual membership fee	4	
Disagree with the fee	2	Payments are not possible for their organisation
Cannot yet take position	5	Further internal consultations needed within the organisation and with the authorities

2.3 KEY FINDINGS OF THE CERIS CBRN SESSION ON MAY 4, 2022

eNOTICE and the Community for European Research and Innovation for Security (CERIS) organised a CBRN session on May 4, 2022 at the CBRNe Research & Innovation conference in Lille, France, the session was led by eNOTICE. The session opened with state-of-the-art presentations by representatives of DG HOME, DG ECHO and FPI, and continued with two panel discussions of thirteen current EU-funded CBRN projects - eNOTICE, INCLUDING, NO-FEAR, FIRE-IN, PROACTIVE, HoloZcan, ECCOFEX, RESIST, VERTIgO, JA TERROR, Bullseye, EU-RADION and PANDEM-2.

The range of questions addressed at the panel discussions:

- stakeholders engagement in CBRN preparedness (including general public)
- gaps in preparedness
- multidisciplinary, multi-agency and civil-military cooperation, joint CBRN exercises
- innovative CBRN technological solutions for CBRN agents detection, PPE, decontamination, testing and validation
- acceptable risk or zero risk - what is the goal of standardisation?
- better use of European research outcomes,
- dissemination of results of EU projects.

Key points, take-away messages and recommendations on CBRN R&D&I

1. Further **synergies and true collaboration** between complementary projects are needed to amplify the results and ensure uptake. All groups of CBRN stakeholders - policy makers, researchers, civilian and military practitioners, industry representatives, citizens and civil society organisations have to be actively involved and share the knowledge and experience. But proper mechanisms for this exchange have to be explored and put in place.

The main gap is that neither all first responders, nor Critical Infrastructure Operators are trained for CBRN response (as often this training is provided only to "specialized teams", and not even for recognition of a CBRN threat. In the current situation and all well-known war events in Europe, the CBRN risks become even more real than before. Before, CBRN was perceived as a “low probability-high impact” event. In the context of the recent events and new challenges, the probability might be getting higher, and preparedness and training for first responders, but also awareness for population becomes significant, just as well as the point of “business continuity” for the industry. It is high time to strengthen the R&D&I efforts, common interagency SOPs development, training and preparedness for first responders, crisis managers and population to adequately respond to CBRN threats. It is strongly recommended to reinforce the funding opportunities in all relevant programs, such as Horizon Europe, ISF, EDF, DG SANTE to encourage further works in CBRN field, and not to decrease the budget in order to avoid creation of capability gaps. Professional networks, networks of practitioners are a good instrument building the communities where members can turn to each other when there is a problem at hand that needs urgent solution, or at least professional advice.

The past events, such as terror attacks and emerging challenges prove that immediate (e.g. critical infrastructure operators, citizens), first, second and third-line responders need to be trained or at least aware about how to recognise or to identify CBRN threats, as well as properly mitigate/respond to them and deal with the consequences. There is still a problem that stakeholders are not tightly linked, different disciplines do not work much together even within the same country, whereas preparedness at the EU level remains an even wider gap. This requires an increase in cooperation between organizations, cross-border and international cooperation, including the creation of SOPs.

Some projects such as ISF project MELODY are taking steps in the direction of defining harmonised procedures in preparedness and response. More multidisciplinary and multiagency contingency planning, trainings and exercises, like the ones undertaken by the RESIST project, are necessary to train interoperability between different institutions, including learning to communicate between each other, aligning terminology, concepts used by different (public and private) actors to describe the crisis situation.

The necessity of comprehensive approach to preparedness and training has been underlined by several projects (eNOTICE, NO-FEAR, FIRE-IN, PROACTIVE, RESIST, JA TERROR, INCLUDING, Bullseye, ECCOFEX..), in particular from the following aspects:

- **Versatile scenarios**, including combined C, B, R threats of accidental or deliberate nature, hybrid threats and emerging threats; with testing and validating innovative technologies at different stages of development. Moreover, there is a need for reference scenarios with regard to “what are we preparing for”, with formulation of clear objectives of the preparedness (e.g. are EMT 2 with C-RN capacities expected? Prediction of industry chemical substances for terrorist attack? etc.) eNOTICE is creating a library of resources, including CBRN scenarios, those played at the eNOTICE Joint Activities, and beyond, available with the project and network partners. Since the CBRN scenarios cannot be publicly available, the library will be organised at the eNOTICE Community Centre with protected access for the network members.

- The necessity to train CBRN stakeholders that might facilitate the management of the first moment of a CBRN incident against **critical infrastructures**. E.g. RESIST project is looking into training of Critical Infrastructures operators, considered as "immediate" responders, for their ability to react properly, safely respond to a threat, be aware of a threat, recognize how the threat is linked to CBRN, and forward precise and useful information to specialised first responders who will be responsible for managing the CBRN scene. The critical infrastructures covered in RESIST so far, and those beyond are mainly related to transportation ways and critical hubs - roads, railways, airports, seaports, space stations, water supplies, power plants, nuclear research centres, governmental and EC buildings, NATO premises.
- Collaboration of various actors, including the "traditional" ones – like first, second, third-line CBRN responders and crisis managers, industrial actors, but also stakeholders from cross-sectorial fields such as health care, justice, civil protection - to ensure a truly **multidisciplinary approach** covering all possible actors that might be involved in a crisis response. This can be achieved via networks of networks emerging from current RIAs and CSAs.

Engagement of citizens in CBRN response and communication to public during CBRN crises are considered a top challenge and are currently studied by project PROACTIVE. The problem is addressed from both angles – on one hand, it is necessary to familiarize the citizens with the response procedures, to involve them in trainings and exercises, to explain what to expect and what to be prepared for in case of a crisis, so that they can protect themselves and others. On the other hand, first responders and crisis management experts need to learn to deal with the population (including vulnerable groups) in the most efficient and ethical way, doing all the necessary procedures and at the same time providing the clear information and instructions, reassuring, encouraging and helping the people in the crisis situation. Effective and inclusive communication with the public and patients remains a critical gap. H2020 projects PROACTIVE and eNOTICE are pioneers in the field of engaging real volunteers and vulnerable citizens from the general population in the exercises with first responders in CBRN training centres.

Note: the latest eNOTICE JA in the military training centre of NBC School in Rieti, conducted with PROACTIVE project, and the workshop after the exercise, showed that there is still lots of important issues in the field of participation of non-trained unprepared representatives of population in the CBRN exercises, and communication between the first responders with the citizens, including vulnerable groups of population. eNOTICE network is going to promote the exercises involving different groups of citizen volunteers, in different Member States, to improve the interaction and make first responders used to this interaction.

FIRE-IN project also looks into improvement of population resilience, and puts forward the development of public self-protection and awareness, education of people, necessity to negotiate the values with communities before the emergency, cultural change towards risk tolerance and resilience, standards for communication with citizens, unified system of warning citizens in the EU, common understanding of such communication, guidelines for citizens.

Civil-military cooperation in CBRN defence field is indispensable to share the knowledge, experience and train civilian and military actors together (the approach followed by eNOTICE and Bullseye projects that have civilian and military partners in the consortia), with better structured interaction between civilian and military actors with clearly defined and equally distributed roles and responsibilities. A unique system of data collection and verification shall be used. Also, common terminology and interoperability of capabilities is crucial. The fact that CBRN technology is often considered "dual use technology" is a challenge both in research but also in real cross-border cooperation.

The nature and objectives of civil-military cooperation is extensively discussed in D4.9. According to the NATO Allied Joint Publication (AJP)-3.19 Allied Joint Doctrine for Civil-Military Cooperation, civil-military cooperation is defined as *"[…] a joint function comprising a set of capabilities integral to supporting the achievement of mission objectives and enabling NATO commands to participate effectively in a broad spectrum of civil-military interaction with diverse non-military actors."*

Cross-border exercises are very important with the focus on a harmonised approach in cross-border training to comply and align with procedures of neighbouring countries to enable efficient joint response, on legal, administrative and organisational aspects including language and communication barriers, that would lead to identification, harmonisation and proper addressing the capability gaps in the EU. A few CBRN-related projects implemented cross-border exercises, e.g. ISF TRANSTUN – with the objective to improve the preparedness and response of operators, emergency responders and Member States in addressing CBRN threats in cross-border land tunnels.

It is necessary to define SOPs in case of interagency cooperation, cooperation between individual emergency services, cross-border and international assistance.

2. CERIS is considered an excellent environment to exchange information, to raise awareness and share results in the R&D&I projects. Face-to-face meetings, as well as online meetings when necessary, help to know who is doing what, build on each-other's results, build synergies with collaborative project events or joint demonstrations and create new consortia. But besides that, this exchange of information should not happen only within CERIS. Projects and their results need to be known and taken up by Member States, at least by the countries whose partners participate in these projects, the importance of it was underlined by technology development projects, such as EU-RADION, PANDEM-2, VERTIgO, HoloZcan. So far, it has been discovered that Member States seldom know the results of EU projects. Dissemination efforts have to be directed to spreading the knowledge not only to the EU actors, but also locally, at the national levels, that would increase the chance of the generated results to be further developed and reach the market. Ideally, an official "open forum" should be created, where EC, MS representatives and EU projects agree on the best, most simple and straightforward mechanism of information sharing regarding the EU-funded projects outcomes to benefit all CERIS-related projects. Ensuring vertical dissemination, between R&D&I authorities, and response authorities is essential.

3. The **technology developed by R&D&I projects must reach the EU market**. The majority of projects finish the EU funding at the TRL levels 6 or 7, only large demonstration projects show integrated solutions of up to TRL 8-9. Since the Commission does not have a possibility to support projects after their end, it is desirable that corresponding Member States uptake the results and create the appropriate environment for the technology further development and finalisation to be ready for commercialisation. An example can be taken exactly from the CBRNe conference in Lille, where French Ministry of Defence, [Agence Innovation Défense - www.defense.gouv.fr/aid] and [DGA - GINCO NRNC – dga-mnrbc.ginco.fct@intradefgouv.fr] were represented while both are offering technological incubation. Such initiatives and programs are promising solutions for French entrepreneurs. Ideally, **a similar listing of all EU Member States initiatives could be identified**.
   The EU network of practitioners project eNOTICE - network of CBRN Training Centres - works a lot with practitioners of all disciplines and collaborates with industry as the industry is seen as one of the main contributors and beneficiaries of the network. Participation of industry starts from practical operational aspects, such as testing their tools/technologies/equipment with practitioners at training centres, in order to be sure that their development meets the needs of users. It is clear that development of new tools, e.g. CBRN detection tools or early warning tools and all other tools and technologies developed by researchers, need validation. In the case of low TRL (4-6) detection and identification methods the statistical study design behind the testing and validation procedures is a challenge, so the relevant IEC/ISO standards cannot always be applied. Therefore, **specific testing and validation protocols must be developed** according to the specific use cases and scenarios. This enables the finalization of development towards a cost-effective manufacturing technology. The developed detection technologies must be usable even in the specific conditions at the place of intervention. They must offer clear detection outputs that will allow the intervention commander on scene to make correct informed decisions.

   Training centres often test new equipment. The most suitable tools are used for trainings. So new technology is a crucial part of trainings. Sometimes first responders who train in a certain TC bring their own equipment because they want to be trained for their everyday work. The eNOTICE network shall deal with and be instrumental for resolving many questions – e.g. **How are we able to integrate innovation and make it attractive for end-users, for TCs?**

   The eNOTICE network should underline how innovation and research can also help training centres. It should therefore be aware of the needs of the training centres on the one hand, and of the benefits and limitations of the proposed innovation on the other. Thus, a sort of matching should take place between industry and training centre. If an innovation is proposed, the eNOTICE network could for example check if it increases the efficiency or effectiveness of the training centre, since these are often goals of public innovation[1]. On top of that, innovations that increase the legitimacy of a training centre could be considered as well.

   At the same time, the available resources of that training centre should be taken into account. If a new innovation requires three software engineers to keep it running at all time, it might not be the best fit for training centres that do not have that number of staff available.

[1] De Vries, H., Bekkers, V., & Tummers, L. (2016). Innovation in the public sector: A systematic review and future research agenda. Public administration, 94(1), 146-166.

An example of how the eNOTICE network can assist a training centre in reaching the goal of legitimacy can be found in the JA of November 2022 in Vyškov (see D5.16 for more information). At the end of that JA attendants obtained a certificate from NATO that they had participated in the course. If trainers of other training centres could participate in such a course, they could receive the certificate (if they complete the course), which would give them legitimacy as a trainer, and thus as a training centre could employ that trainer.

Another example could be innovations with regards to virtual training. If the virtual training could help training centres to train more people using less facilities and/ or (human) resources, it would increase their efficiency. On top of that, it could save costs (of course depending on the cost of the innovation, and the employees necessary to run it, in comparison to what is necessary without the virtual training). Depending on the learning curve of the trainees, it may also increase effectiveness of the training.

In this way, the eNOTICE network can also benefit and work towards one of the goals of the Horizon Europe programme, namely industrial competitiveness. The eNOTICE network can give industry access to experts in the field, and let them get acquainted with the needs of those experts. With this expertise industry can create products for the market that are co-developed with experts, thus being more likely to be appealing for experts. If a deal can be made between a training centre and the specific industry, it is a win-win situation for both sides.

The list of questions hereafter underline the potential input of the eNOTICE network on the selection and use of new technologies to increase the safety and the security of the responders, and on eNOTICE direct interactions with partners-TC in leveraging the advantages of being part of this network:

- **How can we show benefits of new technology to the people "on the ground", how they are going to use it?**
- **What are the limits of the technologies, and if they impose any risks?**
- **Will it be possible for TCs to choose what technologies they want to test?**
- **How shall we balance the technology push and the needs of practitioners to have certain types of technologies?**
- **What they would like to have, but do not have yet (e.g., PPE, early warning systems, (Smart) sensors, portable systems, robots, software, ICT tools to collect data and support decision making process), and what kind of technologies could be interesting for practitioners right now, at this moment?**
- **How can new technology, tools, and equipment be more inclusive and more adapted to the needs of the vulnerable groups?**

CBRN practitioners often do not know what technology and what innovations are available, and how they can benefit from it.

eNOTICE is the perfect vehicle to address the current and future place of rapidly developing AI technologies in responders teaching and workflow, for example by answering the following questions:

- **What capabilities can it give to first responders, to crisis management actors?**
- **What users can do with it in their everyday activities, how can it help them?**
- **What new materials are used and what is improved innovative design of PPE?**
- **How will the technology be perceived by the public?** The eNOTICE Network could possibly be instrumental in this (PROACTIVE research results can support this point).

These are all questions that need to be taken up and that need to be dealt with.

Users often lack such information, while technology developers also lack information about the users' needs and very often don't know how to approach users for technology testing in the field. **It is necessary to ensure regular communication and efficient collaboration between practitioners and technology developers**, and the eNOTICE network of training centres is seen exactly as the cradle facilitating the dialogue in such a crucial domain as CBRN where design of technology exactly corresponding to the user's requirements and expectations is particularly significant and even life-saving. For this reason, the growth of new training and testing centres like the Calvarina base, managed by SAFE, is a fundamental asset to sustain the eNOTICE approach and its sustainability in the long term ensuring an increasing impact for the benefit of the overall community of EU stakeholders.

The eNOTICE network promotes collaboration with industry and research offering grounds for testing and validation of technologies. However, companies face a number of challenges when testing technologies in the field. These challenges are broken down in the following groups, some of them generic, others more specific:

<u>Laws and Norms</u>

- National and international laws/agreements often prescribe export restriction rules to cross-countries movements of materials and technical information related (mostly military but also some civilian, plus dual use can be tricky and in case of doubts normally the stricter rule applies)
- Norms are not globally standardised (differences between EU, UK, North America, etc.) which makes it difficult to reach global validation of products. Developers try to use as reference civil and/or military standardised norms and test protocols if possible (ISO, EN, BS, NFPA, ASTM, STANAG, etc.)

<u>Logistics</u>

- The complete value chain of the process to test CBRN equipment or tools is almost never in a single site location, this means material and information need to travel between different places, often cross-countries (test labs, field test facilities, industries, etc.)
- International export control regulations and customs procedures make it sometimes difficult and costly to transport equipment and materials from/into countries, which is especially challenging when the exercise/training takes place outside the EU, or when a technology provider from outside the EU is bringing technologies in the EU. CBRN equipment, being "dual use" by nature is often under specific import/export regulations, which could pose issues in cross border cooperation (in training and / or operation).

Time

- It usually takes time for companies to obtain authorisation for export/import of materials and information
- Product/tool/process design and re-design according to the feedback of end-users after the exercise
- Manufacture of the end products
- Testing of developed technologies is not limited to one exercise, the complete full set of testing and validation is a long process

Costs

- Production for testing is expensive and is a pure investment (because no sales take place), it's especially difficult for small SMEs that do not have lots of resources.
- Legal and technical expertise
- Transports (material needs to travel across the world)
- Tests can be very expensive esp. full system testing. Sometimes, for full systems testing starting from scratch, for all tests, the costs can be up to 100.000 euros or more, just for the testing. For specific tests, e.g. in simulant chambers, several specific tests can be performed, that might be around 10 – 20k per test depending on where the test takes place, how many garments are tested). Validation of full systems can take up to 2 years
- Accidental damage of equipment in the field, that requires extra expenses for insurance
- The use of Virtual Reality can reduce the costs for training implementation, which are very high especially when considering CBRN practical courses. With this regard, the experience gained from the EDIDP-funded project VERTIgO will be essential for other (also non-defence oriented) initiatives as well

Expertise availability

- CBRN is a "small world" but experts are not around the corner, it's difficult to find appropriate profiles to work with
- Cooperation amongst full process stakeholders (Industry, Users, Govt. Institutions, Experts, Research Institutions). There are not many networks existing, eNOTICE is a good example, but then again there is a lack of "full-cycle" networks that would involve all relevant stakeholders
- Different stakeholders' cooperation is possible but inside national laws
- Not many places where cooperation is promoted globally
- Lack of harmonisation in the method of work
- The companies must fully comply with practitioners' procedures and standards, e.g. the procedures of CBRN samples delivery are very strict
- More cooperation between civil and military actors can facilitate the identification of suitable expertise and the exchange of relevant good practices and lessons learned.

Sharing results

- Sometimes not possible because restricted (mostly MIL)
- Not only norms are not harmonised but also performance levels accepted as valid by different countries/institutions/experts thus difficult to share and agree on results
- IPR issues - non-disclosure agreements have to be concluded with the participating practitioners to protect the company's IPR
- Interoperable data management plan between projects with similar TRL could promote the sharing of results and raw data as well

Technical challenges

- As seemingly simple a problem as lack of power supply in the field can be and obstacle when the equipment cannot be plugged to a socket. This is usually easy solve, it just needs preparation in advance.
- Internet / Wi-Fi connection – same thing, it has to be negotiated and provided in advance, otherwise CBRN sensors, software, etc. cannot function without reliable connection in the field. Cybersecurity issues must be also taken into account.
- Cross-border communication and language might be a problem if the hosting TC training professionals or practitioners do not speak English. But usually it is possible to find at least 1-2 persons who can assist through the exercise/tests to brief about the objectives, goals, procedures, and translate when needed.
- The definition of calibration process related to several sub-components of the complex, integrated measurement devices is also a challenge. To overcome this problem, we must design and execute strictly separated calibration protocols to test the performance of the sensor system and the integrated sub-components which support real time operation and have crucial impact on the detection
- The biggest challenge is calibration of equipment in the field, because every time depending on the location it will be different. One other challenge besides the issue of spatial properties is the temporal variability of samples in bio-detection systems. Developers must pay attention to seasonal data collection to build the appropriate databases as reference for the final calibration and software support.
- The conditions in the field are of course different from the "sterile" lab conditions, so companies must apply rigid quality assurance and quality control procedures to comply with the standards and ensure the data quality, in field conditions where background noise is usually very high. The combination of appropriate QA/QC procedures together with skilled personnel results in valid and more useful field data.
- Some specific technical challenges related to particular technologies testing can occur, such as using a robot or a drone in unknown environment; weather conditions in the field might be difficult to use drones or sensors; necessity of spare parts for electronics that might break down; problems of hardware interfacing, etc.

- The use of VR can facilitate the delivery of multi-agencies and multi-countries joint training sessions, allowing multiple users practicing together on the same scenario at the same time. With this regard, results from VERTIgO project aims at supporting the creation of the first European Exercises Simulation Platform (EESP).

Favourable environment for exchanges and regular communication between technology suppliers and users are key to understand each-others' needs and limitations, and to achieve best results beneficial for all. Many projects are working on new detection technologies. New technologies require mutual understanding between the industry, developers, trainers, implementers and users. Creating "mutual understanding" requires efforts and identification of the respective partner who has the interest / capacity.

It is essential to define the R&D priorities, so that the users clearly express what technology/tools/equipment they need most, and that technology suppliers know what to work on. For example, NO FEAR project reminded that the first responders in a CBRN release in a public site are not protected, and in many cases they are not "blue lights" but rather operators of critical infrastructure or private contractors. There is need to develop tools for those first responders (as the 5 R – Recognize, Remember, Report (using M/ETHANE), Respond, Remove).

4. The issues of **standardisation** in CBRN require further effort and clear policy in:
   - aligning the terminology - same terms can mean different contents for different stakeholders, depending on the field of use or on the country;
   - definition of zero risk or acceptable risk in CBRN incidents response and aftermath - as long as toxicity thresholds for CBRN agents are not defined and not commonly agreed (for long term exposure of "regular citizens" – post decontamination), it creates a problem to determine detection thresholds and decontamination requirements. In the same line – military units and public safety organisations have different standards for PPE protection of responders (e.g. Fully encapsulated suits with a self-contained breathing apparatus, or a mask with a canister and a light garment), to a civilian incident. This gap comes from different perception of risk – zero risk or acceptable risk to responders in a CBRN incident, and causes issues of trust among those involved in the response as well as with the public;
   - harmonisation of procedures can be a long intermediate step towards standardisation and is currently considered by projects MELODY, PROACTIVE, Bullseye, FIRE-IN, JA TERROR.

2.4 CONCLUSIONS AND WAY AHEAD FOR THE NETWORK SUSTAINABILITY MECHANISM

The discussion at the CERIS CBRN session confirmed some previous findings (cf D4.8, D4.9, D4.10 and D4.11), opened new questions and proposed new solutions to the challenges of building, further developing and maintaining a successful network of CBRN TC. It is clear that eNOTICE network should promote and further develop collaboration with research and

industry that is very interested in testing and validating existing technologies and innovative solutions with practitioners at training centres. This collaboration will be the primary basis of the network after the end of the project. With industry and private training centres seen as the main sources of the network funding, the network governance body will consist of the secretariat, three public training centres (changing every three years) and two or three industrial companies – SMEs or large industry, to be chosen from the wide range of contacts made possible by the members of this network.

The eNOTICE network is seen as facilitator and the core of CBRN training in Europe. Training centres naturally occupy the central place in the dialogue between practitioners and technology developers. It has to be remembered that Member States' practitioners - end-users of the technology - are mostly public organisations. If the end-users appreciate some particular technology, it does not mean that it will be necessarily procured by the Member State. Every Member State must adhere to the EU procurement rules. The gap expressed and discussed with many CBRN stakeholders is that these EU procurement regulations are not always well adapted to practitioners in particular Member States, which creates lots of problems and does not lead to the desired result where end-users have at their disposal the technology they need.

Still, technology suppliers (which are largely private organisations) must find ways to make their Member State authorities aware of what innovations they develop, what technology is available, what they can offer.

eNOTICE network is seen as the mediator and the facilitator of this dialogue (i.e., an "exchange platform") where technology suppliers know whom to approach to display, test, validate the technologies, and practitioners know what is available for them.

Civilian training centres are proven to be open to this kind of collaboration. Military training centres are interested as well, however a number of limitations (see D4.11 for details) that allow industrial actors to be considered in military organisations at the pre- pre-procurement phase, but prevent them from being considered afterwards.

Since eNOTICE network of practitioners inherited and keeps developing the Dynamic Catalogue of Technologies created by CBRN Cluster part a) ENCIRCLE project (coordinated by UCL), eNOTICE network has access to the 141 registered organisations in the Technological and Industrial community and 94 Practitioner organisations, with 279 tools described in the Catalogue, plus all the current contacts of the training centres of the network.

eNOTICE plans to make an industrial fair, an Industry 'Open Day' at the final exercise that will take place in Campus Vesta, Belgium on May 13, 2023. The idea is to invite companies to present their technology/product/service with a possibility of discussion and establish partnerships. The most interested and promising companies will be chosen to follow up with them for pursuing the collaboration with the network.

Besides that, eNOTICE is establishing contacts with the national industrial associations – in Germany, Belgium and the Netherlands so far, and with more MS associations to come. National industrial trade associations can be involved in the network, they are being approached as they can be interested to aggregate technology development actors and fund technology testing with practitioners in the field. The industrial associations are seen as the source of valuable knowledge on the profiles of companies that are part of the associations, and

possibility to make direct contact with these companies who are currently developing CBRN-related technologies, and are interested to collaborate with the network.

One more promising direction of the network activity is collaboration with large international organisations, such as OPCW for chemical training, IAEA for radiological training, GOARN/WHO, ECDC for biological training. The direct contact with OPCW has prompted the following plan:

- OPCW is interested in collaboration with eNOTICE network in the field of chemical training, already because eNOTICE is doing in the EU something what OPCW is doing worldwide. eNOTICE would be seen as the platform for communication, source of information and network contacts for OPCW. eNOTICE is interested in coordination of C trainings with OPCW, exchange of trainers and trainees – this is agreed as feasible, where the trainers and trainees are selected by OPCW, so such training courses are endorsed and/or hosted by OPCW.
- OPCW is already working with many training centres in different countries, based on bilateral agreements, including some training centres that are part of eNOTICE network (e.g. Population Protection Institute in Brno, CZ), so it is possible to extend the collaboration to those eNOTICE training centres offering C training who do not yet work with OPCW.

Further discussion with OPCW Office of Strategy and Policy, aiming at formalisation of the collaboration, is currently ongoing and has to be completed before the end of the project.

Since the mutual interest of training centres and industry for collaboration is confirmed, it prompts the possible development of eNOTICE network of CBRN Training Centres to become a public-private partnership, pursuing both the possible institutional support (via calls for projects) and the service-oriented approach (via fees paid by private organisations, mainly private TCs and industrial network members). The network will set up a secretariat and an executive board consisting of training centres and R&D companies/organisations, to pursue the specific demand side needs – of the training professionals and practitioners, and match with the needs and offers of the supply side - industry and research.

The description of the sustainability mechanism is part of the work in Task 4.4 and will be completed in D4.13.

ANNEX - 5TH POLICY MEETING QUESTIONNAIRE

May 20, 2022

European Network Of CBRN TraIning CEnters
eNOTICE

Objectives of eNOTICE 2.0 network

The ambition of eNOTICE 2.0 is to continue and develop the work based on the outcomes of the eNOTICE H2020 project https://www.h2020-enotice.eu/ through:

- Sharing procedures and CBRN capabilities through teaching and training at various levels (basic, experienced, expert) of response to CBRN incidents with respect for Member States governing rules and regulations;
- Opening the network of training facilities to other projects/ industries for testing and training (e.g. evaluation of CBRN equipment, tools and technologies).
- Organisation of Joint Activities and workshops both within and outside the network.

Quick survey for Training Centres:

1. Name of the organisation:

   Civilian ___

   Military ___

2. Do you intend to contribute to the network after August 2023 (end of eNOTICE project? Y / N

   As an active member/decision maker? ___

   As a participant/observer? ___

3. Are you offering theoretical courses and/or practical trainings that you would like to share within the network and with participants outside the network? Y / N
   - Within the network
   - Outside the network

4. Can you afford to pay a membership fee for supporting a part time network secretariat and specific training network activities (NB/ specific fees will be required for external participants or beneficiaries of the network-specific activities?

5. Do you have contacts and collaboration with industry in or outside of your home country? Do you want to make new connections of this type through the network activities?

6. What emerging CBRN innovations do you want to test or implement in your training facility?

7. Are you willing to host a Joint Activity when the network continues after the end of the eNOTICE project? What kind of activity?
   - With ongoing European consortium working on CBRN issues (e.g. technological, societal) With other training centre
   - With other training centre
   - Both

8. Are in involved in any EU or national CBRN projects? Which?

9. Do our training centre's experts participate in CBRN expert groups/focal points/… at the EU or national level?