eNOTICE
European Network Of CBRN TraIning Centres

D4.11 eNOTICE Recommendations for CBRN R&D and CBRN policies. Version 4

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Executive Summary

This document is Deliverable 4.11 (eNOTICE Recommendations for CBRN R&D and CBRN policies. Version 4) of eNOTICE, a European Horizon 2020 EC funded project, under the Grant Agreement n° 740521.

This document presents the detailed report on the policy meeting with representatives of industrial R&D&I companies, that took place as online webinar on December 9, 2021. The results, major key points, conclusions and a possible way forward considerations are summarised at the end of the document.

eNOTICE needs a solid roadmap for sustainability of the network. The 4th Policy meeting was a continuation of the discussion with network stakeholders, started at previous meetings. The 4th meeting was dedicated to the discussion of participation of industrial and R&D companies in the network of CBRN training centres, testing and demonstration sites. The discussion covered practical operational aspects, such as experience of industry and challenges that companies face(d) when displaying and testing their tools/technologies/equipment with practitioners at (eNOTICE) training centres.

The outcomes and conclusions of the meeting are described in detail and are the basis for the next issue of policy recommendations and the next step in development of mechanism of the network sustainability.

The main conclusions and future works include the following points:

- The eNOTICE network of CBRN Training Centres (TC) has been developing a clear understanding of the interests and roles of all the stakeholders, and is now working on the development the mechanism of sustainability after the end of the project.
- The network will ask TC members to list their trainings, exercises and technologies they are looking for
- The network will set up clear terms of reference, guidelines and generic checklist for TC and industry to precisely know the pre-requisites and conditions of participation in exercises for technology testing/validation
- The network will facilitate the contacts between the industrial companies and TC via the eNOTICE network
- The network will provide an updated and in-depth economic analysis to determine the network functioning costs, models of cost sharing between different stakeholders and members and cost-benefit analysis
- **The goal is for the network to become a public-private partnership, where the non-profit TCs funded by national or regional authorities work together with private organisations (mainly private TC and industrial companies) as one of the sources of funding, to maximize the dialogue between technology suppliers and technology end users and pave the way of practitioner-validated technologies to the market. This is mainly true for civilian TCs, and the mechanism should be further explored for the military TCs**.

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1 OBJECTIVES AND SCOPE

This deliverable presents further findings and results of the work under the Task 4.3 Identification of opportunities to strengthen policies and recommendations for R&D – M3-M60: 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 and D4.10 (produced by eNOTICE consortium in 2018, 2019 and 2020 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 are carefully analysed, and the problems and concerns will be taken into account when forming the mechanism of the network functioning.

2 NETWORK SUSTAINABILITY INSIGHT

2.1 PREREQUISITES AND CURRENT STATUS

Sustainability of the network has been considered during the whole project. As the project is entering 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 49 training centres that are current members of the network are all 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 efficient functioning, so the need for sustainability, maintenance of the network activities and expanding thereof is already proven.

The previous Policy Meeting (see D4.10) concluded that the attitude of many TCs, especially military TCs to industrial participation is rather careful. The main concern is allowing external parties access to the SOPs that shall not go out in the public domain. Another reason for not using military TC as opportunity for private industry to test their equipment could be strict procurement procedures which might negatively influence transparent competition of industry during procurement by tender. At the same time, the added value of industrial participation is recognized for the possibility to test and validate the tools and equipment developed by industry to make sure that these technologies exactly meet the needs of the practitioners, and for the network funding opportunities. Thus, it is a must for eNOTICE to set up the clear concept of such public-private partnership, define the terms of reference and the conditions of industrial participation, so that there is only mutual benefit and never trouble for any side. The conditions might be different from one training centre to another, and these conditions must be respected. SOPs and training procedures, as well as comfortable exchanges between training professionals without worrying about sensitive information leaks or intellectual property rights (IPR), are in the centre of priority. One of the possible solutions is defining by a TC what exercises they can open to industrial participation, and what they prefer to keep closed, so that industrial suppliers cannot participate in any exercise or training course in a TC, but only in those which are formally agreed in advance and prepared for the external private partners involvement. That would avoid exposing tactics, SOPs and skills, because TCs will decide themselves what to show and what not, and to what extent they want to be open to allow sufficient information to the industries to develop the technologies correctly, which will facilitate launching of the new products to the market by the technology providers.
Since the topic of collaboration between training centres and industry is very important for the eNOTICE network sustainability, the consortium decided to have a dedicated discussion with representatives of industry to draw conclusions about the possibilities and limitations of such collaboration from the industry point of view, which can be taken into account by the TC in the further planning of the network sustainability.

2.2 REPORT FROM THE FOURTH POLICY MEETING ON DECEMBER 9, 2021

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 fourth Policy Meeting on December 9, 2021 was dedicated to the discussion of participation of industrial and R&D&I companies in the network of CBRN training centres, testing and demonstration sites. The discussion covered practical operational aspects, such as experience of industry and challenges that companies face(d) when displaying and testing their tools/technologies/equipment with practitioners at training centres. We invited several speakers who are interested in the network, who already had or plan to have collaboration with training centres. They all already said previously why they want to be in the network – they want to test their technologies, tools, equipment with practitioners in training centres, in order to be sure that their development meets the needs of users.
Besides, we envisage one more type of collaboration, when large industry and training centres work together, for example, to develop training grounds for joint use. This is also a very promising direction of collaboration that we will definitely promote in the network.
We have asked all the speakers to be very critical, honest and straightforward - we deliberately concentrate on actual and potential problems, because we want to know the practical challenges that companies face when displaying and testing their tools/technologies/equipment with practitioners at training centres and we need to know what requirements and limitations of industry we must take into account in the network.

Speakers and topics on the agenda

On Thursday, December 9, 2021 the 4th eNOTICE Policy Meeting was held online from 10.00 to 12.30 using the Microsoft Teams communication tool. With the ultimate goal of creation of a sustainable network in mind, this time the discussion was devoted to a very particular aspect that was revealed during previous discussions, and is necessary to take into account when formalising the requirements and expectations of the network stakeholders – we invited representatives of industrial companies to share their experience and concerns when displaying and testing their technologies/equipment/tools in the field with practitioners, and all the challenges related to industrial participation in the exercises from their own point of view. The meeting started with a short introduction explaining the background, objectives and purpose of the discussion. A consortium training centre Campus Vesta presented its views and its own experience in collaboration with industry, especially with large industry. And then representatives of 5 European industrial companies spoke briefly on the kind of technologies that their companies are developing, and shared experience of participation in exercises, as requested, with particular focus on challenges and problems that they faced or are likely to face before, during and after the field tests with practitioners. The scheduled two and a half hours for the meeting was nearly enough to have a very intense exchange of opinions, though the interested motivated participants were ready to discuss further. The objective of the meeting

was fully met – the eNOTICE consortium has got valuable inputs for understanding the challenges of the industry, so that this information can be used as food for thought when defining the conditions of participation in the network exercises, terms of reference for the training centres and for the industry.

4th Policy Meeting agenda:

10.00	**Welcome and introduction** - Olga Vybornova, *Université catholique de Louvain, BE*
10.10	**Collaboration with industrial companies: a short introduction** - Maaike Van de Vorst, *Campus Vesta training centre, BE*
10.25	**Creating an Evaluation user Community** - Noel Mitchell, *CSNR Technologies Ltd, UK*
10.50	**Addressing Quality Assurance/Quality Control challenges of field-deployable chemical detectors in exercises** - George Psarras, *T4i engineering, UK*
11.05	**Sharing experience from exercises testing technologies with practitioners** - Sergey Babichenko, *LDI Innovations, EE*
11.20	**Complexity of individual CBRN protective clothing testing vs. best possible outcome** - Giovanni Longo, *GORE, IT*
11.40	**European projects assessment and associated possible technical issues** - Laurent Walle, *TL&Associés, FR*
12.00	**Discussion**
12.30	***End of meeting***

2.3 KEY DISCUSSION POINTS AND TAKE HOME MESSAGES

1. Training centres, can be involved in different types of collaboration with industry. The example of Campus Vesta (Belgium) shows the following 3 types of collaboration: in terms of infrastructure, training, testing and research.

- For infrastructure – Campus Vesta is working on new chemical plant infrastructure, and this opportunity resulted from the need of the community. The city of Antwerpen, near which Campus Vesta is situated, is the 2nd largest chemical hub in the world, there are many SEVESO companies. There is a need to train industrial firefighters, which is not possible in Belgium. The companies that want to train industrial firefighters need to go abroad to other countries for that. So, Campus Vesta training centre and SEVESO[1] companies decided to work together to build a new chemical plant training infrastructure where it is possible to train response to large and medium size industrial fires. Having exchanged the training needs and possibilities, a cube with 3 floors was

[1] A Seveso establishment is an establishment which has an activity linked to handling, manufacturing, using or storing dangerous substances (i.e. refineries, petrochemical sites, oil depots or explosives depots).

designed to practice different types of fires inside, the design and setting was made in complete agreement with the chemical companies.

- For training – Campus Vesta training professionals went to a company in the Netherlands to receive train-the-trainer course on how to teach industrial firefighting. This know-how and exchange of experience is a normal collaboration, many Campus Vesta trainers come from companies. Campus Vesta also regularly provides trainings to companies. These are the same courses that public firefighters and public first responders are following. This helps to create common know-how and exchanges of experience with companies, and enables beneficial collaboration as well as improved quality of interventions.

- Testing and research is another important aspect of collaboration – e.g. a university that also works together with multiple companies, comes to Campus Vesta to test how different metals from bridges react to fire, test batteries in fire, this kind of tests and research takes place very often.

Other training centres also have examples of successful collaboration with industry, in a similar or a different way. Such examples will be collected and analysed in order to find similar and different points, and elaborate a common approach.

2. The training centre follows some considerations for collaboration with industry and research organisations (again, on the example of Campus Vesta (Belgium), but shall be considered for other training centres as well):

- The main task of the training centre is training public responders, it always goes first, it is a priority. This task must be fulfilled first before looking into commercial training, trainings with companies and industry. So the question is always - where is the balance? How much knowledge, effort, time, resources can the TC give without compromising the main task?

- When talking about building an infrastructure, the question is competition with private TCs. There is a number of private TCs that companies can use to train, and Campus Vesta has to be careful about not to compete with them in unfair terms, also keeping in mind the main task – priority for training of public first responders – the task that private TCs often do not have.

- Building an infrastructure shall be always focused on the community needs, such as what those needs would mean for occupation of infrastructure. It is never a good idea to just build infrastructure if only one person needs it, or people need it once a year. The training centre needs to make sure that if something is built, if the training centre invests in something, it is going to be regularly actively used by public responders (as the priority) and by private responders.

- The environmental aspects play an important role in the activities of the training centre. Campus Vesta has ISO 14001 certification, and must comply with the norms. There is always a question - What tests or research can be performed and what not? For example,

the research on batteries in fire mentioned above had to be unfortunately stopped, because of too much pollution. It's a pity, such research is needed, but the training centre must comply with environmental standards. ***The question remains – where shall the research organisation or the company perform such research and tests if training centres cannot make it? Or how to create favourable environmental conditions to make such tests possible?***

- Building infrastructure for training and tests must comply with environmental requirements, and these considerations need to be taken into account before the infrastructure is built. Campus Vesta makes many tests with fire, but fire means air pollution. So, when building infrastructure, it is necessary to think how to reduce pollution. For instance, at the chemical plant, liquid petroleum gas was used to reduce pollution. One more question is – how to purify or recycle the water or foam that have been used to extinguish the fire? In this issue collaboration with industry is absolutely crucial. Together with one company Campus Vesta created a bio-degradable training foam, that can be used for training. This is a big benefit both for the training centre and for the company, because this foam can be used without concerns about the environment.

In general, it is important that both the TC and the company know exactly each other's needs, concerns and capabilities, then the collaboration is mutually beneficial, enriching, because both sides learn from each other a lot.

The question of preference for companies to work with public or private training centres has been discussed. Seemingly, it should be easier for companies to collaborate with private TCs than with public ones, like Campus Vesta, and many other TCs in eNOTICE network representing their authorities and prioritizing training for public first responders. However, it depends – public TC can offer services for public firefighters, and public TCs can allow companies to participate in those trainings as well, so the companies are offered a possibility to follow the same training as public first responders, while private TC cannot do that. Besides, private TCs often have limitation in the services they can provide, e.g. in Italy there are no private TCs that work with "R" sources or with chemical warfare agents (CWA), the accreditation process to perform such kind of is very difficult, so some services cannot be offered by private TC. On the other hand, since the main task is always to train public responders, public TCs have fewer slots for training involving companies, so companies might sometimes have to wait longer for training, while in private TC they can get training quicker. This point of comparison of possibilities is especially significant for eNOTICE, because the network focuses on public TCs acting on behalf of national/regional/local authorities. Private TC can join the network, but not as core members.

A number of significant points were made by the invited speakers from the technology development side:

- Companies and researchers have two primary **reasons to approach end-users**:
    - Technology developers are not CBRN/HazMat Responders, but practitioners are. Without expert user input and advice the technologies would lose a lot in contents and quality. If the communication is done correctly, and the ice is broken, the technology developer can benefit from a diverse community of

users, their excellent feedback on particular products/processes/tools and help to prioritise the development work - depending on the needs what should go first, what to work on primarily - e.g. on explosives, or CBRN detectors, or ergonomics for equipment, etc. When the collaboration with certain practitioners works as efficient as it is hoped, it creates more appetite for further joint works which is a mutually beneficial situation.

  - The rules and eligibility criteria for R&D projects require that practitioners either participate as full members of the consortium, or have active roles to play in the project development

- Companies use various possible methods to reach out for end users and create Evaluation User Community engaged in the activities to familiarize with and possibly give feedback on the developed technologies, e.g. they progressively start discussions during feasibility studies and hold interviews with practitioners at different meetings, contact networks of practitioners (such as eNOTICE, FIRE-IN, NO-FEAR, EXERTER, etc.), contact practitioners from R&D projects (such as ENCIRCLE, MELODY, ECCofEX, etc.), send out newsletters, approach practitioners to fill questionnaires, display their products and discuss face-to-face with users at conferences and exhibitions (F2F is most efficient mode, of course), organise live demo online teleconference meetings (especially useful during covid restrictions).

- Sometimes communication with users is associated with challenges, e.g.:

  - for Data & Integration - need to use free data to avoid cost driver

  - user reluctance to either share information or data at all or in a timely manner

  - reticence of users to allow access to part of their data creates barriers to demonstrating integration

  - for Security: issues with GDPR, including difficulty to approach or share contacts

It is noted that the traditional mechanism of users' participation in H2020 projects is not optimal. Mixed consortia with very active technology developers and much less active (due to busy everyday schedule) users, user groups, users invited to occasional meetings – all this does not work as it should, does not bring much added value to the product under development. It is much better when possible to give the product to users for a "test drive" for some time, and then get feedback. Best is to give the product to many users, to create a community of interested users afterwards. That is why the idea of testing technologies in training centres is so attractive.

Further on, a working product can be given free for users for an extended period of time, to validate it from all aspects. Such collaboration requires long time, patience and trusted contacts. Besides, resources are needed to be able to properly support each of the users e.g. for translations in several languages, troubleshooting, bespoke materials, map data layers, provide different levels of access to data, etc.

Companies face a number of **challenges** when testing technologies in the field, that we break down in the following groups, some of them generic, others more specific:

Laws and Norms

- 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 standardized (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 standardized norms and test protocols if possible (ISO, EN, BS, NFPA, ASTM, STANAG, etc.)

Logistics

- 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.

Time

- Obtain authorization for export/import of materials and information,
- Access to documents, protocols
- Design and re-design end items
- Manufacture end items,
- Complete full set of testing

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

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 harmonization 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.

Sharing results

- Sometimes not possible because restricted (mostly MIL)
- Not only norms are not harmonized 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

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.

- 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 biggest challenge is calibration of equipment in the field, because every time depending on the location it will be different.

- 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 importance of **practitioners training to use innovative technologies** developed by companies was underlined as a driving mechanism on the way to the market:

- Training with mature technologies ready for the market can serve as a means of launch of the innovative products to the market – if the practitioners validate and accept the new technology, it will increase the chance for successful marketing.

- However, the launch time should coincide with the general trends and demands. If the innovation uptake and the product commercialization to become available to users takes too long, the precious time of highly demanded innovation might be lost. **Timely offer of the innovative technology is a crucial factor for success. Ideally, a fast-track mechanism can be foreseen to launch the desired innovation approved and validated by practitioners in the field conditions faster, as a priority**.

- At the same time, the technology offered for training must be mature enough by the time of training. If the technology is not yet ready, "the earlier, the better" concept is not always productive. Immature tools with lots of features to yet improve or update cause frustration of users and can negatively affect the acceptance. But at the same time the technology should not yet be commercialized, to leave space to implement the users' feedback. It is always a trade-off, a balance that has to be pursued

- To achieve best results of training, technology developers might want to choose/adapt/personalize the appropriate format of training delivery for particular users.

- The training should be reasonably short to save the time and costs, but at the same time long enough for users to understand and appreciate all the advantages and characteristics of the technology.

- Cost of the training, displayed equipment, associated costs of insurance, transportation, deployment can be very significant. **The appropriate model of cost sharing is required**. **Cost sharing model is one of the eNOTICE focus of attention – how much shall the training costs for training centres be? For the companies? Depending on what shall the costs be formed – on the size of the company? On the size of training? What other factors shall be considered?**

- The focus of training for innovative technologies is on hands-on training with equipment, not on passive or theoretic training

- Narrow (deep) training option launching new products to the market within customer/cooperative projects case training and direct feedback is possible

- Wide option exercises with equipment in training programs with practitioners requires **standardization of training.** Standardization of training means to comply with corresponding requirements, by having the trainers with experience in different conditions and different locations and context and the right credentials. It is easier to fulfil by large industry with lots of resources, but not easy for small companies.

  Harmonisation (and probably in some future perspective standardisation) of CBRN training across the EU is considered by many stakeholders one of the driving engines of the network sustainability. At the previous 3rd Policy Meeting this wish was expressed

by TC - the network should set minimum criteria for "acknowledged" (certified) CBRN training, to get training harmonized within Europe. Now the 4th Policy Meeting industrial participants put forward the same wish to meet the needs of industry enlarging their market potential – harmonisation/standardisation of training would facilitate testing and validation of CBRN technology in different countries and regions of Europe to make sure that the resulting technology is accepted by all EU practitioners, not only in a one particular location.

TC at the previous Policy Meeting pointed out that harmonisation has to be carefully handled, because on one hand **non-binding guidelines** how to conduct a certain course are important, but on the other hand training centres should have **their own freedom** to conduct a course according to their rules and their availability of having necessary equipment, expertise of trainers, profiles of trainees, etc. Professionals can attend training courses in many countries. Every training centre has its own procedures and equipment. Every training event is different, and it is usually very inspiring and fruitful to experience different styles of training – so that the best and most optimal practices can be chosen for a particular training centre in a particular Member State. Thus, speaking about harmonisation of training, it probably makes sense to have **guidelines on the trainings curriculum** that can be followed by training centres, but equipment, responding procedures in a particular region etc. might be different - depending on rules and legislation of each country. Such peculiarities can be kept as a source of useful differences as a good way how training courses should be driven to work. **A common curriculum** would be good and is welcomed by many TCs (though not for all, especially military TCs are in question here), even if it is not always an easy task to introduce new features or adapt existing established curricula practiced by the TC. A common curriculum would ensure that core skills and core equipment across MSs are at such a level that eventually would turn into interoperability. The network is encouraged to work in this direction with strong support from the members.

eNOTICE works on this topic in collaboration with ISF project MELODY that seeks to develop a common curriculum, at least to be a first step towards it from the side of EU research. The next eNOTICE Policy Meeting will be held with training centres during the Joint Activity in Campus Vesta TC (Ranst, Belgium) in May 2022, where MELODY will present its developed curriculum to training centres and look for the feedback.

- It is important to know what categories of users are interested in the innovation, and why they are interested – what exactly characteristics of the innovations are useful for them. Then the developers can figure out if this innovation will be a breakthrough, a game changer or incremental innovation, and how to develop this line of products further.

- Innovative products might raise the adoption barriers, as not all users are always willing to take up innovations, some users are quite reluctant, because they are happy with what are used to and what works satisfactory so far. There are adoption barriers, resistance to innovation.

- To make sure that the developed innovations meet expectations of the users, technology developers should work with the subject matter experts and other stakeholders for measurable results.

- **TC cannot provide certification of products to the developers, but they can provide good field testing and relevant facilities. So training, testing and technology validation activity in the field are crucial. The key idea is to ask TC's availability to provide information about their facilities, the laws that they respect, the EU and national directives that they follow, and make the merge of request from industry with what TCs can provide with no additional request or cost.**

- Trust for the particular developer plays a significant role in the technology acceptance, if the company offers a range of recognized technology solutions or just a single advanced customized technology which met the needs of users before, there is a higher chance for acceptance.

- Training sessions can be beneficial opportunities for companies to meet together at the same training session, learn about each other and see complementarity, e.g. software developers can be interested to see sensors developers, and discover how they can match to improve the products. That can be real opportunities – meeting together and getting to know more about each other.

A question of like-minded companies networking was raised and discussed. It was noted that in the field of CBRN many companies join EU security and defence associations, also each nation has industrial trade associations. In the UK a popular forum is CBRN UK where like-minded companies have a role and share expertise in protection, detection, information management and other aspects dealing with CBRN. Besides, technology developers certainly meet at exhibitions, fairs, conferences and workshops.
In general, people who work in industry tend to stay longer in the field than people in governmental organisations who might change field and stay no longer in CBRN in a couple of years. Industry might have more endurance than in the public sector.

2.4 CONCLUSIONS AND WAY AHEAD FOR THE NETWORK SUSTAINABILITY MECHANISM AND COLLABORATION WITH INDUSTRY

The discussion at the fourth Policy Meeting of eNOTICE confirmed some previous findings (cf D4.8, D4.9 and D4.10), opened new questions and proposed new solutions to the challenges of building, further developing and maintaining a successful network of CBRN TC:

- Together with all TC in the network it would be interesting to map what technologies in what region/location/TC can be relevant and urgent to test right now. Companies would access this map and see where they are most demanded with their product. And TCs will have exactly what they are looking for. eNOTICE plans to create this map and share information both with the TCs in the network and those who are not yet in the network and give them a clear message – they can pick up and choose what they want to test, but they need to keep eNOTICE informed. Of course, TCs can pick and choose the technology

developers and their products themselves, because national legislation plays an important role here, and also they can answer themselves 2 questions – why should I care? (we cannot judge it for them), and what is the need for me? (they can liaise with individual technology providers, talk to them bilaterally). **eNOTICE plays the role of a mediator** between TCs (training professionals, practitioners) and industry.

- The network activities related to survey of innovations, needs, gaps and research priorities must be fed from R&D and industry, in particular the information about CBRN technology developers and available tools can be directly taken from H2020 ENCIRCLE CBRN Cluster Dynamic Catalogue of technologies, which has been migrated to eNOTICE since September 2021 to be further explored by the network of practitioners. Such concrete information would encourage greater interest, facilitate contacts and collaboration with industry, and provide a regular workflow for eNOTICE in terms of active knowledge exchanges and stimulating innovations. Besides, eNOTICE is an active player and contributor to the activities of the Community of European Research and Innovation for Security (CERIS) of DG HOME that unites stakeholders from policy making organisations, practitioners, R&D projects, and industry, so it is an excellent platform for knowledge exchanges, building synergies and keeping the dialogue alive.
- 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. The eNOTICE network provides this type of validation that can be used by technology developers – industry, academia, research projects.
- One of the advantages for industrial companies of being in the network is to have easier and more predictable access to users. If technology developers contact TC in the network, they are more likely to receive feedback. Otherwise when users receive multiple requests from companies they do not know, never met, they tend to discard such requests from external companies, because their busy everyday activities leave no time to deal with unknown requests.
- An advantage for users, besides receiving the technology that meets their needs in its characteristics and functionality, should be that users engaged in the co-design and co-development of the technology with the industrial companies, in spending time and giving advice to companies, could expect to receive the product cheaper at the end.
- How are we able to integrate innovation and make it attractive for end-users, for TCs? How can we show benefits of new technology to the people on the ground, how they are going to use it? 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 - PPE? Sensors? Robots? Software? What kind of technologies could be interesting for practitioners right now, at this moment? CBRN practitioners often do not know what technology and what innovations are available, and how they can benefit from it. For example, rapidly developing AI technology – 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? 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.

- Training centres usually test new equipment often. 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. If the equipment is provided by technology suppliers, then it's important to keep in mind that during the international trainings with participants from different parts of the world (such as OPCW trainings, for instance), technologies for them have to be easy to use and to understand, not too complicated. Usual TC mono-national trainees can test technologies too, of course. If TCs have paying customers who fund the tests of their equipment with practitioners – it can be an interesting opportunity.
- The recent findings prove that training centres, especially civilian ones, are willing to accept external industrial partners for trainings, and are available for solid collaboration with industry. However, from both sides, such collaboration is possible only **under certain conditions**. The concern is that by involving industry TCs expose tactics, SOPs, and some of the skills that should not be out in the public domain. On the technology developers side the concerns are related to IPR protection issues, costs of tests and insurance for equipment that might be damaged during the tests, and all other technical and organisational challenges that are described in detail above.
- On one hand the network stakeholders and their needs are well defined – it is civil and military TC, training professionals in TC, practitioners who receive training, industry that is interested in testing their technologies with practitioners in TC, national and EU authorities and policy makers who frame the operation of this collaboration. On the other hand, this community is large enough and heterogeneous enough, so that makes it necessary to leave space and some freedom of operation to adapt to the numerous constantly changing officials with changing expectations, not-so-well defined requirements. Not everything can be predicted and described in advance, we have to deal reasonably well with uncertainty, which means recognizing the non-linear process of the network development – with possible mistakes, coming backs to correct the strategy, adaptations, further actions, etc.
- The link between industry and TC works very well when it is ***specific*** – when both sides know each other, they know who is doing what, what technology a particular company develops. But the problem of the network sustainability is to make the exchanges ***generic*** – so that exchanges are made and contacts established between TC and industries that did not work together before, but get to know each other through the network. To make it generic is more complicated, because companies do not know exactly which TC could fit their requirements and vice versa. So eNOTICE should focus on how to improve these generic exchanges between industries and TCs. Part of the work has been already done in eNOTICE to roster and characterise TCs (see D2.1), to classify them, and we should build on it further. eNOTICE is planning together with all the training centres of the network, to set up clear terms of reference (updating the previous initial draft), the checklist explaining

conditions of industry and research participation in the exercises and trainings. The checklist of the conditions for participation in exercises must cover all aspects, all points of view – procedural, legal, logistical, financial, clearance, standardised training (standard protocols for test equipment, tools), harmonised procedures for training, non-disclosure agreements (NDAs), how many people will participate in training, what technology and at what maturity level (at what TRL level) of the technology is acceptable for training, under what conditions, what information will be and what will be not disclosed, how many trainees, how long will the training and testing take, etc. Checklist should reflect the available resources and cover the answers to all the issues raised by industry.

- Each training centre of the network will be asked to announce the training/exercises that can be accessible for R&D players, as well as the types of technology that they would like to have. This transparent approach will make it easier for all interested parties to find the most appropriate – technology developers will know in advance the rules of the game, "TO DOs and NOT TO DOs", will see where their technology under development is most demanded, will be able to choose the type of training, dates and location where they can go for testing. The training centres will know what to expect, they will test the technology that they are looking for and will receive financial contribution from the technology developers. Of course, no spontaneous attendance of trainings is planned, the expression of interest and agreements on the participation will be shared between the parties in advance.
- Industry can participate in an exercise only when they know the scenario, and if the TC is ready to accept them. The industrial players have to understand that although end-users have access to all the operational information and procedures, they are by no means decision-makers, they do not decide what technologies to buy and what not, and feedback from tests would be purely to improve the technology, so that authorities decide if this or that tools can be purchased or not. However, this feedback can push the authorities to positively decide for suitable technology if it is validated by the practitioners and operators in the field.
- National industrial trade associations can be involved in the network, they will be approached as they can be interested to aggregate technology development actors and fund technology testing with practitioners in the field.
- In collaboration with industry we envisage not only testing and validation of technologies in TCs, but also partnerships of TC with large industry to build and use together training infrastructure (like in the example with Campus Vesta TC) or similar type of long-term significant collaboration. The new infrastructure for training of public and private first responders is a very promising direction of activity and a source of significant revenue for TC. All aspects of such collaboration will be analysed, such as support of the regional/national/local authorities when the need for the community is proven, and accreditation (no accreditation means no subsidies), but accreditation takes long time and effort, so it has to be a substantial long-term planning.
- Since the mutual interest of training centres and industry for collaboration is confirmed, it brings us forward with the idea that eNOTICE network of CBRN Training Centres can 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 is now concentrating the efforts on establishing the framework mechanism of the network functioning, including the terms of reference, the guidelines, probably the checklist setting up the clear transparent criteria according to which the amount of membership fees for commercial partners, the cost-benefit analysis and the cost sharing model. This is part of the work in Task 4.4 and will be completed in D4.13.

- Differences in the approach for civilian and military TC are still under discussion. Military TC have even more significant restrictions, e.g. in the sphere of information sharing, than civilian TCs, but CBRN area is huge and offers different possibilities. For example, the CBRN TC of the War Studies University in Poland leaves the door open to the collaboration with industry. A possible way can to be to focus on table top exercises and computer-assisted exercises where the TC can use software produced by companies. There is also a possibility for field exercises - there are large scale exercises organised in Poland every 2-3-5 years. It might be possible to put in place a platform for technology testing. Of course, it needs proper preparation for field exercises involving industry and specific technology
- Many TC would see their main, perhaps their only, purpose as being the practice, refinement, development and delivery of training and skills for either their own organisation's personnel or paying customer personnel, with little time or attention for any type of relationship development/involvement with industry unless that just happened to coincide with a training need (e.g. with their current equipment providers). However, it can be possible for each TC to curate their own industry forum, to announce details of the upcoming training activities or course programmes.
- Ideally, TCs can hold Industry 'Open Day' type events (e.g. annually). For instance, such events can be in the format of around 10 min slots for each company to present a new technology/product/service offering, with perhaps 5 mins only for questions. TCs can then choose the most promising candidates in this 'beauty parade' presentations, and follow up with them for more detailed discussion.
- Best would be to systematise the needs and knowledge from each training centre, and to make it all transparent to stakeholders - industry for tests, EU agencies for trainings, etc. So far, we succeeded to find out what in general each TC is doing, what kind of disciplines they train, what they specialize on - C, B, R, or all together, what theoretical and practical courses they provide, what training infrastructure they have. All what we found so far is shown per each TC in the Catalogue https://www.h2020-enotice.eu/static/catalogue.html . In the further activities of the network, it might make sense to enrich the existing Capacity Label with further information derived from the TC capabilities comprehensive survey made by eNOTICE yet at the first 2 years of the project. Besides making public only the general areas of training – if a TC makes trainings in C, B, RN, we can think of further detailing and specifying to what extent the TC is interested in such areas as Protection, Detection, Medical Countermeasures, Hazard & Information Management etc. This information might also fine-tune the contacts with relevant industry, so that companies can see what TC is interested in the type of technology it is developing. Mapping the needs of TC for certain technology would let the industry know what TC is interested in what, while making TCs also familiar with what industrial companies develop technology of their

interest. It is not an easy task, the current 49 TCs of the network are very heterogeneous, we need a lot of resources and energy to collect, systematise and publicize the information (for those TC who are willing to share it!).

There are lots of opportunities and engaging perspectives for the network development after the end of eNOTICE project, and it only proves the necessity to ensure the network financing and sustainable functioning for the benefit of the CBRN community.