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ORIGINAL ARTICLE

ON THE INVOLVEMENT OF CBRN AND MEDICAL SPECIALISTS IN THE EXPLOITATION OF FACILITIES SUSPECTED FOR THE PRESENCE OF BIOLOGICAL MATERIAL

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Summary

The existence of chemical, biological, radiological, and nuclear (CBRN) weapons poses a significant problem in terms of possible proliferation of technologies and materials, despite international agreements and regulations. The role of military forces in operations can be to support counter-proliferation initiatives to prevent their acquisition, deployment, or employment. The article analyzes the current situation in the field of site exploitation under CBRN environments, with a specific focus on biological threats. It describes a current state and a research question, which is addressed on the basis of scenario analysis methodology. The result is a scenario for the activities of troops in CBRN environments, which illustrates the possible operational reality during the localization of biological sites, their characterization and exploitation. The following application part presents proposals for the division of phases of the exploitation process and a proposal for the determination of CBRN and medical specialists of the Czech Armed Forces as the implementation elements.

Key words: Biological Weapon; CBRN Incident; Exploitation; Proliferation; Reconnaissance; Weapons of Mass Destruction

Introduction

The proliferation of WMD, related materials, and technology is considered one of the most serious security threats today. The development of offensive capabilities through military research and development, as well as the acquisition of capabilities and the acquisition of weapons, remains a problem after the end of the Cold War (1). Currently, industrialized and third world states with regional power ambitions are trying to increase their importance through

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WMD. However, the problem of proliferation does not only concerns nation states, but also isolated cells of terrorist groups (2, 3). The state-controlled larger technological process of biological weapons production is no longer considered dominant. On the contrary, semi-professional or improvised production methods, including the choice of novel means of delivery to the target seems more likely (4, 5). For this reason, military forces should be prepared to contribute to counterproliferation, which focuses on military action to prevent the acquisition of chemical, biological, radiological, or nuclear (CBRN) weapons. With the aid of robust intelligence support, forces should be able to identify relevant indicators and secure relevant information from infrastructure and facilities, i. e., CBRN sites, or specifically biological sites. This site exploitation must be done before the enemy can complete production or use the weapon. These steps, which can in principle be considered preventive and proactive, lead, among other measures, to effective protection of troops. This issue arises from the implementation of past allied deployments and the subsequent initiative to improve site exploitation capability in the conditions of CBRN Defence and global non- and counter-proliferation initiatives (6, 7). From a military point of view, the first real practical experience was already achieved in Operation Iraqi Freedom in 2002-2003, where an effort was made to "hunt" for enemy production of biological weapons (8, 9, 10).

Current Biological Threat

Biological weapons are one of the categories of weapons of mass destruction (WMD). Most of the requisite expertise and equipment for biological weapons are dual-use, and much dual-use equipment is commercially available for production, processing, and dissemination of biological agents. Commercial technologies, such as agricultural sprayers, dry agent production techniques, and more recently, microencapsulation, facilitate agent dissemination (11). Biologists point out that methods for manipulating, growing, recovering, concentrating, stabilizing, and testing biological weapons material employ many of the same processes, reagents, and equipment used to produce vaccines, pharmaceuticals, and a wide variety of food products (12). Associated technologies resemble each other, and this is why the production can be relatively easily disguised as non-military applications. Experts stress that advances in biotechnology will have a dominant influence on the future development of biological weapons. Understanding and manipulating genes, cells, and organisms are reinforced through parallel revolutions in information and nanotechnology, as well as neurosciences (13, 14). Due to the psychological effect of using a biological weapon, even technologies that are freely available on the international market are relatively dangerous. The fact that their methods of improvised use for terrorist or diverse purposes (15, 16) can be quite simple also contributes to this. While large-scale production can be carried out in dual-use facilities, small-scale laboratory production is quite sufficient for terrorist groups.

Biological incident response typically encompasses outbreak investigation, outbreak response, and recovery or redeployment of bio-response medical assets (17). Today, traditional medically relevant infectious disease surveillance practices (by physicians, veterinarians, laboratorians, and medical examiners), followed by epidemiological and laboratory investigation, constitute the mainstay of infectious disease surveillance (18). However, under conditions of military operations, several "nontraditional" strategies may prove well suited to settings of a highly dynamic military action, requiring less detailed but still rapid input of information. Medical prophylactic measures within Force Health Protection are an important part of the medical support of military operations. These include the vaccination of soldiers, but also, for example, the selection of the necessary antidotes that the units will carry with them. The mentioned disease surveillance is already underway at the place of deployment. The epidemiological reporting system used in practice is based on the retrospective collection of data on patients' illnesses during the last week. The data is subsequently analyzed and evaluations and recommendations are passed back to the attending physician in the field medical facility. This cycle takes 2 weeks. To support prevention, a system of near real-time data collection is currently being considered and discussed. Such a situation permits, probably even requires, the employment of new and less traditional military capabilities.

Site Exploitation and Technical Exploitation

Site exploitation, also called sensitive site exploitation (SSE), is originally a U. S. military term used to describe "collecting information, material, and persons from a designated location and analyzing them to answer information requirements, facilitate subsequent operations, or support criminal prosecution" (19). Within NATO, the term is semantically similar, but is referred to as technical exploitation (TE). The Allied Intelligence Publication AIntP-10 (20)

describes technical exploitation as a "process using scientific methods and tools to derive data and information of potential intelligence or operational value from collected data, information, materiel and materials". The term "exploitation" itself can be understood as "taking full advantage of any information that has come to hand for tactical, operational, or strategic purposes" (21, 22).

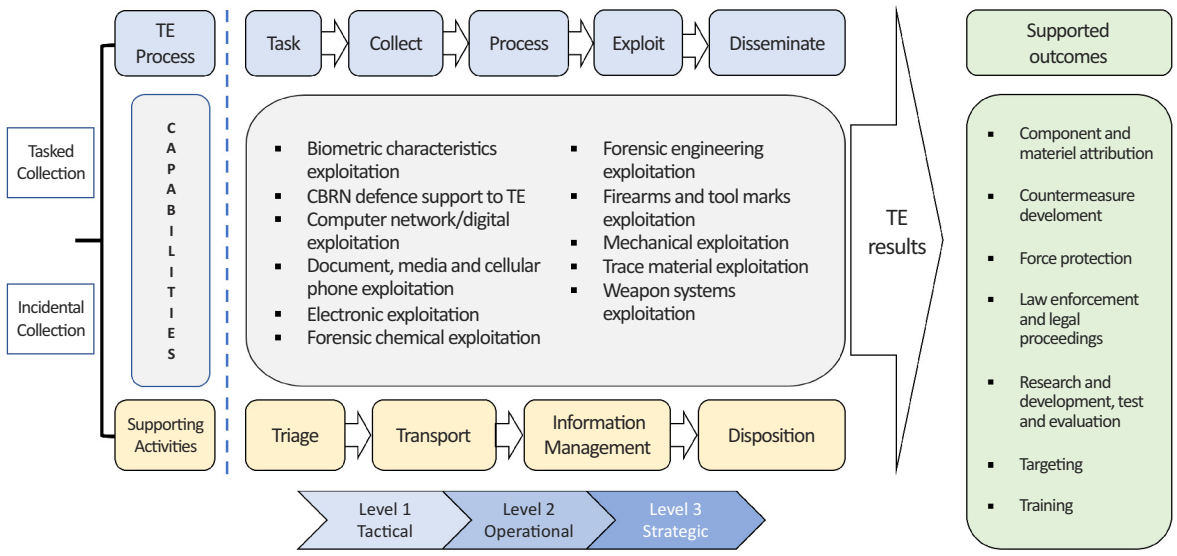

Figure 1. Exploitation process and its outcomes (20).

CBRN Aspects of the Exploitation Process

The exploitation framework utilizes multiple capabilities (see Figure 1) to include search techniques, biometrics, forensics, document and multimedia exploitation. For the purposes of CBRN Defence support to TE (see Figure 1), the definition of technical exploitation is applied to the conditions of operation under CBRN threat environment and at a location of a specific geographical position. It is necessary to add that the aim of site exploitation is gathering technical and scientific intelligence concerning the adversary's offensive CBRN capability in the area of operations and is part of the overall intelligence collection effort. When referring to "CBRN", site exploitation has to complement other detection, identification, and monitoring tasks of sampling, field analysis, and forensic analysis (23).

As a starting point for a deeper understanding of the central idea of the article in the context of CBRN issues, it is essential to define the term "CBRN incident". A correct understanding of the term opens up space for a subsequent discussion of capabilities and their possessors, designed to immediately reflect on the occurrence of the incident and to implement specialized tasks in the field of CBRN and health care. Contrary to the outdated understanding of the term CBRN incident, which is most often limited to the release of CBRN substances into the environment and the occurrence of contamination (gas, liquid or solid aerosols), the CBRN incident is currently understood as "an occurrence due to the suspected or confirmed presence of CBRN substances, either arising from the intention to use them by an aggressor or following their intentional or accidental release“ (24). The authors point to the terms "suspected" and "intention to use", i. e. situation where no CBRN leak has yet occurred. In this context, it is clear that CBRN incidents can be divided into "release incidents" and "nonrelease incidents". Similarly, in the case of biological incidents, it is necessary to emphasize a clear shift from the traditional reactive approach (25), towards proactive, i. e. preventive.

This creates a requirement for the ability of some form of search operation in a situation where we assume the existence of CBRN-related technologies, CBRN substances and know-how in a specific site, while contamination, illness or loss of lives does not necessarily occur. If a biological incident manifests itself as a release with risk of person-to-person spread, cordons may support control measures with restriction of movement (ROM), which may include sovereign boundaries (26). The collection of data and information can be tasked or incidental (see Figure 1),

while both options imply the requirement for additional information to be collected (usually stated among the commander‘s priority intelligence requirements). As part of the search, the finding will be assessed, described and documented, and a collection of samples and evidence from objects, equipment, technology, weapon systems, hideouts, etc. will be carried out at the same time. The Allied Joint Doctrine for Comprehensive CBRN Defense (24) describes sampling as "retrieval for analysis of materials that have arisen from a CBRN incident". When sampling is based on scientific methods and techniques and is compliant with the chain of custody, it is called forensic sampling. Depending on the urgency of the situation, even suspicions based on intelligence indicators may provide sufficient impetus to initiate a deeper investigation process and attribute the activity or origin of the material to a particular culprit or perpetrator. In this context, attribution is understood as an analytical process that uses all information sources for positive identification of the originator of an incident or a threat (27). The above is already indisputably a feature of the forensic investigation process, as a multidisciplinary approach in which the CBRN and medical specialists can be partial, yet essential sources of information. All scientific methods and techniques used to analyze materials and data in support of a CBRN incident or threat investigation is referred to as CBRN Forensics in accordance with the NATO Handbook for SIBCRA (28). Forensic missions provide information to support strategic or political decision-making processes (29) and contribute to host nation or international law enforcement. One of the basic skills supporting forensics is sampling and subsequent analysis, which takes place according to the principles of SIBCRA. This acronym expresses Sampling and Identification of Biological, Chemical and Radiological Agents, specifically “collection and transportation of materials suspected to contain chemical, biological and radioactive substances and the identification of such substances within the chain of custody in support of the investigation of a CBRN incident“. SIBCRA missions consist normally of a field part (i. e., field identification, sampling and exploitation) and a subsequent laboratory part (samples identification, forensic analysis). The results feed not only military and/or civilian decisionmaking, but also a medical lessons learned process, where inputs are represented by passive and also active data collection (30).

Competence of Czech Military Specialists

CBRN attacks are rare, so it can be difficult to weigh the benefits of spending time and resources training for them (31). Nevertheless, it is possible to monitor the growing competencies of specialists with capabilities for CBRN site exploitation and investigation of CBRN incidents among NATO countries, as well as adequate professional training (32). In the Czech Armed Forces, they are carried by units of several types, in accordance with NATO minimum requirements, belonging to a specific Capability Code (33). Primary assets possessing these capabilities are designated CBRN-LAB-SIBCRA, CBRN-MERT and MED-DOIT. In the Czech Armed Forces, these can be found among the Chemical Corps and the Military Medical Service.

Doctrinally, the Chemical Corps of the Czech Armed Forces in the conditions of biological contamination (biological incident) performs chemical support with focus on nonspecific (general) survey, sampling and prediction of areas of biological contamination. Even decontamination (i. e. disinfection) of persons and military material is a vital task necessary to be conducted by specialist CBRN assets (34). The goal of chemical support is to create necessary conditions for troops to fulfill their tasks in the CBRN environmnet, and to participate in their protection. In addition to protection and decontamination, chemical support also includes the detection of biological warfare agents (BWA) and toxic industrial biologicals (TIB), and monitoring the development of a biological situation during operations (35, 36). The Chemical Corps consists mainly of the following:

- CBRN reconnaissance units;
- decontamination units;
- units for colletion, transport, and analysis of samples (SIBCRA teams, CBRN-MERT, deployable radiological and chemical laboratories);
- CBRN collection and control centres for warning and reporting and hazard prediction of CBRN incidents.

From the point of view of the competence of Military Medical Service specialists, they form basic elements and capabilities of the biological protection system (37, 38):

- response teams, namely Mobile Biological Survey Teams and Special Mobile Biological Teams, which provide non-specific detection and primary specific identification of biological agents;

- laboratories, namely Mobile Field Microbiology Laboratory and the Field Hygiene and Epidemiology Laboratory, which provide confirmatory identification of biological agents;
- elements designed for the isolation, hospitalization and treatment of patients and the final verification of the identification of biological substances in stationary conditions.

Each battlefield maneuver formation, e.g., mechanized brigade, should have organic forces, providing enhanced and specialist CBRN Defence capabilities (chemical observers, CBRN reconnaissance units), which will ensure a limited but important role in providing initial inputs to the warning and reporting process, including feeding the intelligence cycle. Although the collection of CBRN samples can only be taken by trained and responsible persons who guarantee the uniform standard, correctness and safety of the procedure, non-medical units (ie non-biological specialists) could already have the initial information significance. The authors believe that the question of description and characteristics of a share of these units in the task, as well as their cooperation with maneuver units and Explosive Ordnance Disposal / Improvised Explosive Device Disposal (EOD / IEDD) teams (39), etc. forms a necessary prerequisite for defining the scope and mutual complementarity of all military occupational specialties that will participate in the site exploitation tasks.

Methodology

The authors' principled reasoning lies in the awareness of the operational reality, when unique specialties of Military Medical Service may not be immediately available, while the presence of other sources of primary CBRN-related information is more probable in operations. All units that potentially encounter CBRN objectives (facilities, laboratories, warehouses, hiding places) must not only be adequately prepared but must also be available with regard to their relative scarcity in the area of operations. The allocation of competencies to capability possessors is important, as the layered approach to site exploitation has not yet been proposed in the Czech Armed Forces.

Research question:

"What is the appropriate way to use CBRN and medical capabilities to participate in the exploitation of a biological incident?"

The study seeks to point out the importance and need for a broader examination and implementation of the site exploitation capability in the nomenclature and operating concepts of Czech Armed Forcess, specifically to Chemical Corps and Military Medical Sevice. To illustrate the relevance of the data found for the research, a scenario analysis method was chosen.

Scenario analysis is typically conducted in five steps: 1. Defining the problem, 2. Gathering data, 3. Separate certainties from uncertainties, 4. Develop scenarios, 5. Use the scenarios in your planning (40). A scenario is not a prediction about the future but is rather an experimental simulation of some possible future. It is used as both an explanatory method and a tool for decision making, highlighting the discontinuities of the present. The method helps to articulate the preferred visions of the future and to use what is learned during the scenario development process (41). The method is chosen because qualitative scenarios can have a richness that is not bound by quantitative methods. They can explore relationships and trends for which little or no numerical data are available and more easily incorporate motivations, values, and behavior.

The scenario and its analysis, performed by the authors, was developed and assessed in accordance with publications, manuals and available professional articles. Gained assumptions are indicative of comprehensive mental outlines and models of the future that reflect different perspectives on present and future developments. For development of a new theory, a backcasting process was selected. Backcasting method represents a scenario transfer technique, while methodologically it begins from a (desirable) future situation and develops various options for taking action in order to reach that target (42). The target situation in our example was constructed as an effective reaction to the presence of a CBRN threat, described in a scenario. The central question in doing so was: ‘What possibilities do we have in order to reach our military preparedness / capability?” or “What must be done now versus later in order to mitigate the threat?”

Based on this projection, a new concept was formulated, which is supplemented by a summary of recommendations for the development of CBRN Defence capabilities. The results and their applications do not conflict with existing NATO allied publications, which are for chosen problems more general.

Results

1. Defining the problem

The Czech national CBRN Defence-related publications do not fully embody and describe the CBRN site exploitation process and the collection of records that need to be obtained during tactical maneuver tasks, when biological materials are suspected to be present in various sites during combat.

2. Gathering data

To prepare a plausible description of the operational-tactical mission with implications pursuant to the implementation of biological site exploitation capabilities, a relatively broad view of the operational circumstances and its implications was considered. The data from which the scenario will draw is of the nature of military documents. Features of an operational/tactical reality on the battlefield will be based on doctrinal principles and statements outlined in relevant NATO allied publications and professional texts. All these sources of information are referenced in this study.

3. Separation of certainties from uncertainties

Main certainties relevant to the scenario development include:

- a condition, when Czech Armed Forces react to a danger of a country that has been developing WMD capabilities. The deployment there will take place for a proliferation concern due to the search for and acquisition of effective delivery methods. The adversary has relatively motivated military personnel (near-peer adversary). There is also a link to relatively independent religious extremist actors, who are considered the most likely perpetrators (43) expected to carry out sabotage or terrorist acts.
- The considered situation will include selected features associated with the Generic Planning Situation (GPS) used in the NATO Defence Planning Process (NDPP) named Counter Terrorism/ Anti Terrorism (CT/AT) mission.
- The biological threat level will be raised, which will have an immediate impact on CBRN Defence measures, including the employment of a robust CBRN-related intelligence support and adequate medical countermeasures.

However, the main uncertainties are assumed to be:

- type and nature of a CBRN incident. One method of attack might be a limited chemical or biological strike (rockets, shells). However, terrorist acts conducted by semi-military factions cannot be excluded. In addition, a non-release incident such as a planned or accidental discovery of biological-related infrastructure also appears as a variant.
- locations of CBRN-related infrastructure, as part of it may be in underground spaces or in so-called dual-use objects. These may be relatively small, hidden and inconspicuous. Although biological agents production methods are not expected to be improvised, character of production facilities will likely not have the nature of large industrial objects.

4. Development of a scenario

The authors developed and applied a scenario that focuses on proliferation of WMD and related technologies and may be characteristic to illustrate the need for development of biological-related military capabilities.

Part of allied troops deployed to the notional operation has been tasked to conduct missions to seek for and exploit possible chemical and/or biological sites. The main maneuvering military body to deal with this task is represented

by a multinational infantry division. Main tasks will be conducted by division´s organic CBRN specialists, which include CBRN reconnaissance elements with mobile biological survey teams (platoon-sized). In case of sensitive nature of a found target, CBRN-trained special operations forces (SOF) will also be available. This approach has to ensure that a campaign of a combined joint military force will be able to assess CBRN objects and CBRN-related infrastructure, and to prepare for their proper exploitation. The higher division headquarters expects to find incidental targets without prior warning. Each division brigade is assigned the mission to assess every suspected CBRN site located in the area of operations, secure and characterize the facilities. This step will set up conditions for further advanced exploitation activities by specialist CBRN, medical, and technical intelligence units. Multinational division headquarters provides a concise description of each known/suspected objective, which incorporates intelligence information and assessment from the CBRN Defence staff. The preferred approach of infantry brigades when reaching the target is tasking a combat reconnaissance battalion that will seize the objective and monitor required perimeter via its advanced unmanned aerial systems (UAS) capability and sensors (44, 45). The reconnaissance battalion is provided with appropriate enablers, consistent with prevalent threats (an EOD team is assigned to provide support for expected explosives, and a CBRN reconnaissance platoon is assigned to conduct initial assessment of the site and its technical infrastructure). If deemed necessary, infantry brigades may request a decontamination platoon to assist units operating on-site. While reaching the desired Named Area of Interest, the reconnaissance battalion establishes an outer cordon to isolate the object. Forward security elements already report identifying a suspected cache of technical appliances in a nearby warehouse. Provided that the objective is already clear of enemy combatants, CBRN reconnaissance platoon enters the secured location and recognizes an essential technology relevant to biological facility (e.g. bioreactor, sterilisation equipment, centrifuge, etc.). The CBRN reconnaissance platoon begins preparing a First Look Report (area sketch, pictures of appliances, list of hazards). In this report, the platoon confirms that the facility and a cache of storage apparatuses are of laboratory origin, highly likely intended for production of biological agents. The mechanized brigade continues to provide area security while headquarters requests deployable CBRN specialist support from operational level, for further exploitation. These supporting assets have to include capabilities to collect and handle suspected CBRN substances, providing CBRN assessment and technical expertise, possibly even in a semi-permissive environment. Based on their availability due to priorities in tasking, an appropriate asset may be selected. With respect to the nature of the finding and its significance, a relatively large, time-consuming and technically demanding operation is launched, whose results and reported outputs may have international political consequences. Established connection to reach-back laboratories and deployed laboratories provides real-time advice and scientific support during collection of samples and evidence. The exploitation team prepares a comprehensive assessment report with recommendations on further actions, which is sent to the operational level headquarters. All seized material is properly packaged, labeled, documented, and transported for further analysis. Intelligence community takes advantage of collected information and recognizes enemy modus operandi and probable future plans and perpetrators. All results are utilized for finding a target by attribution of material, support of legal steps, and increase in level of force protection.

5. Use of the scenario in your planning

Application of scenario´s main ideas enabled development of basic premises, leading to improvement in dealing with the presented situation. The essential conclusions that emerged from the scenario can be summarized as follows.

The mission of the multinational division is to identify CBRN-related enemy capabilities and possible perpetrators. Such a mission cannot be conducted exclusively by maneuver forces or by CBRN or medical forces alone. The involvement of a multidisciplinary team of various specialties will be indispensable. Different enablers include, but are not limited to, CBRN and medical units, EOD team, investigation team (military intelligence or military police exploitation specialists), engineers, etc.

- Premise for planning: the personnel involved must be aware of their specific ‘role’ on the scene, in order not to contaminate possible forensic evidence. This is especially true for the first units entering the scene.

In terms of time, the contributing forces across the warfighting functions will focus only on their specific task in the overall site exploitation mission. None of the teams involved will be fully competent and immediately available to perform the complete spectrum of tasks relevant to CBRN site exploitation.

- Premise for planning: notional differentiation into separate phases to complete the mission is suitable.

While on the scene, a gradual infusion of additional resources will be required to reach the goal. However, the availability of CBRN and medical specialists will be influenced by operational circumstances. Arrival of medical and technical specialists will take some time, however, many initial tasks can be completed by then.

- Premise for planning: flexibility in the form of layering of responsibilities to support individual exploitation phases is suitable.

Application of the findings in planning will be characterized by the proposals specified below. For the purpose of proposal of particular responsibilities of CBRN and/or medical enablers during biological site exploitation, phase separation can be designed as follows.

Table 1. Proposed phasing of a biological site exploitation mission.

Process of a biological site exploitation		
Proposed phasing	**Aim**	**Requirements**
1. Site recognition	Recognize biological weapons and related materials, delivery systems, and/or technologies, detect significant substances.	Less time (minutes to hours) and resources; however, an appropriate minimal training is required.
2. Site characterization	Characterize site purpose and scope, arrange an inventory of equipment, material, including its military specification and description and the personnel involved.	More time (hours) and level of technical capabilities. Requires specialized CBRN or medical enablers.
3. Field exploitation	Properly document and assess all findings; collect environmental samples, related materials/technologies and intelligence on-site.	More time (hours). Requires arrival of enablers that may not be organic to the parent unit.
4. Exploitation in a TE facility	Analyze collected material (substances), information and/or personnel.	Requires scientific enablers (subject matter experts) that are not organic to the unit. Tasks may be completed in or outside the theater of operations within days.

Implementation of above-outlined process requires understanding manoeuvre units activities during confirmation of the site, clearing, setting the cordon, and controlling the scene. While checking for acute threats limiting own procedures, focus should be maintained on presence of explosive ordnance (including IEDs), hazards with impact on individual protective equipment, presence of explosive atmospheres, fire, or collapsing infrastructure, and indicators of hostile activities.

Phase 1 is oriented solely on recognition of biological purpose, i. e. key equipment and methods, especially differentiation from chemical facilities, and in the case of improvised biological laboratories their differentiation from home-made explosives or narcotics laboratories.

Phase 2, named characterization, assumes acquisition of photo documentation, list of material, identification and prioritization of potential evidence, and designation of samples to be collected hereafter.

Phase 3 includes a field (tactical) exploitation and sampling mission - collection of evidence. Specialist enablers have to be chosen in accordance with evaluated risk level as not all participants are trained and equipped to work under increased risk of enemy activity. Under all operational circumstances (permissive, semi-permissive, or even hostile environment), forensic standards when detecting, collecting, processing, and analyzing material have to be followed.

Phase 4 brings technical results obtained from analysis of collected samples, material and other evidence. It may provide confirmed information to support not only an intelligence cycle, but also a legal process with possible strategic implications. Therefore, highlighted should be information on the objective and purpose of the facility, level of professionalism, scale and status of production, way of dispersal, and possible targets (if applicable). Substantial conclusions are results of samples analyses.

Due to the time and procedural complexity of the biological site exploitation process, it can be assumed that the operational reality may not allow immediate availability of specialized medical enablers to perform a high quality assessment, characterization and exploitation of the suspect biological site. With regard to operational tempo and time sensitivity of information collection, selected military personnel should have basic or advanced training in the field of site exploitation. Training must emphasize procedures that do not jeopardize subsequent exploitation and the forensic investigation in place. Based on previous results, Table 2 presents a possible inclusion of Czech Armed Forces specialists in the four proposed phases of the exploitation mission.

Table 2. Proposal of layered approach to involvement of Czech CBRN and medical specialists in a biological site exploitation during individual phases.

	Czech Armed Forces asset	Capability	Proposed exploitation phase involvement			
			1	2	3	4
↓ Increase in technical and scientific expertise ↓ Decrease in operational availability	CBRN Reconnaissance Squad/Platoon	Conducting reconnaissance, detection (point detection of biological warfare agents only), provisional identification, and monitoring of CBRN substances.	x			
	Mobile Biological Survey Team	Conducting static surveillance, detection, provisional identification, and monitoring of biological warfare agents.	x	x		
	CBRN Multirole Exploitation and Reconnaissance Team	Providing CBRN advice, reconnaissance and collection capability in a non-permissive environment, including in support of SOF.	x	x	x	
	SIBCRA Team	Operational and forensic sampling, transportation of CBRN substances.		x	x	
	Deployable Chemical Laboratory	Analyzing samples to detect the presence of some toxins (ricin, saxitoxin, botulinum toxins, staphylococcal enterotoxin B and T2 mycotoxin)			x	
	Special Mobile Biological Team	Rapid deployment in an area of operations to collect, analyse and assess evidence of suspected illnesses and/or infectious diseases and CBRN events.		x	x	x
	Deployable Biological Laboratory	Analyzing samples to confirm the presence of and to identify biological agents of up to confirmed level; Reach-back support.			x	x

Discussion

New, proposed findings point to the possibility of an effective solution to the crisis. Counter Terrorism/ Anti Terrorism mission scenario proved that it is appropriate for selected both CBRN and medical personnel to be oriented in the field of recognition of improvised or professional biological facilities, production or storage sites and laboratories. Their capability of biological sites assessment in terms of quality and scale of the processes involved would also be an advantage.

The first main result is the breakdown of the mission into phases. Each of the phases is characterized by a specific goal and requirements. Although general requirements are relatively known and doctrinally outlined, they cannot be implemented in one period of time and conducted by a single enabler. On the contrary, further increase in required technical expertise during phases will be a task for additional enablers (CBRN and medical specialists). These teams will not always be available, due to operational priorities. If the commander does not have the required specialists to provide the full range of tasks within all four phases of site exploitation, it is possible to partially replace them and supplement them through the suggested layered approach.

The second main result of the research is a layered approach to the involvement of Czech CBRN and medical specialists in a biological site exploitation during individual phases. This is an original, previously unpublished approach. Advantageously, it appears feasible in an environment that is lacking sufficient resources and alternatives are required. The successful conduct of Phase 1 by selected enablers may establish conditions for further advanced exploitation and record of relevant information (including sampling and laboratory identification), realized by follow-up expert teams. Highlighted is the fact that Phase 1 will normally be very fast, to a certain degree unexpected and usually lacking specialist medical support. Here, non-medical assets, typically belonging to the category of chemical troops, can be used with advantage. SIBCRA teams are primarily trained for operational use. With regard to operational SIBCRA it is obvious that speed of the mission will be the most important aspect and confidence will come second. These assets can however transform the information related to collected biological material and facilities into a format that is usable for the analytical process necessary for forensic confidence.

A generalized summary of recommendations for development of capabilities, resulting from the scenario analysis and its implementation (use):

- Conduct training of CBRN and medical units participation in suspected biological (or CBRN-related) facilities search, with aim to systematically locate, secure, characterize, eliminate, or dispose of WMD, CBRN weapons, CBRN devices, and CBRN materials and / or a potential adversary's capability to research, develop, test, produce, stockpile, deploy, or employ such weapons, devices, and materials.
- Enhance operational awareness of conditions in which specialists will perform their technical tasks, which can be effectively done through the development of future scenarios consistent with the involvement of CBRN, medical, EOD and even SOF teams.
- Clearly define the framework and differences of forensic and operational missions and subsequently define and train specific forensic procedures of teams responsible for sample collection.
- Prepare a study draft of conceptual documents or publications dealing with site exploitation, while differentiation between tasks of tactical site exploitation (activities performed at or near a specific location) and technical exploitation (conducted off-site in a laboratory environment) is appropriate.

Conclusion

The answer to the research question can be summarized as follows: An appropriate method of utilizing capabilities for the biological site exploitation task is using two basic principles, which reflect the reality of limited resources.

The first principle is the division of the mission into proposed phases, as these are a prerequisite for a time-consuming but correct and complete results. The second principle is the use of the proposed layered approach, which will ensure the availability of capabilities that partially support the achievement of goals of collecting information with evidentiary value. Both principles can be considered new and original, although they are based on a mosaic of partial experiences and NATO doctrinal principles.

In addition, the search for an answer to the research question led to the finding that the current operating environment implies a requirement to enhance biological- (and CBRN- in general) site exploitation capabilities in the Czech Armed Forces. The study confirmed a legitimate requirement to implement subject capabilities into conceptual documents that take into account the nature of current and future operations. The study also showed that training in the form of courses and joint exercises of CBRN and medical specialists will be beneficial for the development of outlined capabilities. The Czech Armed Forces has a relatively small amount of capacity for these tasks, so it will probably require cooperation not only between individual military services, but potentially also with the civilian sector.

A proactive approach by military personnel on this issue can bolster the reputation of the Czech Armed Forces CBRN and Medical Service, reflecting on the dynamics of changes in the security and operational environment.

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Conflict of interest

The authors declare that he has no conflicts of interest regarding the publication of this article.

Adherence to ethical standards

This article does not contain any studies involving animals performed by any of the authors. This article does not contain any studies involving human participants performed by any of the authors.

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