



Mapping Emergency Responders' Current Procedures in the Event of a CBRNe Incident

Graham Hancox^{1,*}, Sue Hignett¹, Spyros Kintzios², Hilary Pillin³, Marco Plaß⁴, Jyri Silmäri⁵

¹Loughborough University

²Hellenic Navy

³HRP Professional Services Ltd

⁴University of Paderbor

⁵Etelä-Savon Pelastuslaitos

*e-mail: g.hancox@lboro.ac.uk

1. Introduction and Context

When a Chemical, Biological, Radiological, Nuclear or explosive (CBRNe) event occurs a time and safety critical environment instantly exists. In order for emergency services to most efficiently complete their primary task of saving lives it is essential to have effective and well-rehearsed procedures in place. This environment requires many different services to interact with one another including: Fire, Police, Health and Military personnel. Therefore, it is important that each service understand not only their role but also that of the other emergency services (JESIP, 2013). In such a scenario every second can make a difference, with tasks such as triaging, treating and decontaminating casualties all heavily reliant on a swift response. However, this has to be balanced with offering maximal health and safety conditions for the emergency service personnel (NARU, 2015). Emergency personnel from other geographical locations may also be recruited to provide further support, so having a nationally recognised standard procedure for each emergency service is essential to allow smooth interaction between regional emergency crews (NATO, 2014).

By taking a Human Factors/ Ergonomics approach to the problem it is essential to first understand what is required of each actor in the system. There are many different methods that can be used to capture a system such as that described above. One example is an Accident Map (AcciMap) (Rasmussen, 1997) - this allows for the different layers in the system to be identified, the lines and methods of communication to be shown as well as any interactions within a system to be acknowledged.

With this in mind the aim of a work package within the European Commission (EC) funded TOXI-Triage project (Toxi-Triage, 2016) was to establish procedures in the event of a CBRNe incident for different emergency service providers across a number of EU countries.

2. Objectives and Method

The objectives are to identify, and then display in diagrammatic form, the current procedures for emergency responders' during a CBRNe incident. It should allow for comparison across both emergency service providers e.g. Ambulance compared to Police, and across countries e.g. The UK's procedures compared to Greece's.

Existing documentation for standards and guidelines on emergency service response in the event of a CBRNe incident were obtained, read and then interpreted in the form of an AcciMap- a 'Tactical' level excerpt is shown in Figure 1. The UK's 'National Ambulance Resilience Unit's National Ambulance Service Command Control Guidance' (NARU, 2015)

was used. Interviews with experts who are trained and employed to act as Strategic, Tactical, Operational and ground level responders were then conducted. These interviews involved showing the responders the AcciMap produced based on the documentation in order to validate the diagram from their perspective and give further insight into how actual behaviour might differ from those in guidelines.

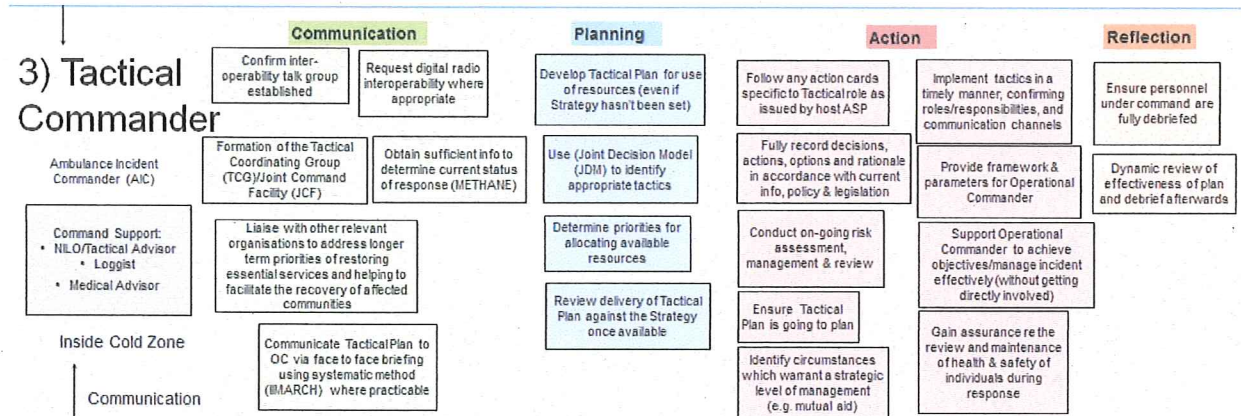


Figure 1. NARU Silver Command 'Tactical' level AcciMap extract

These procedures were then repeated for the 'NATO Guidelines for First Response to a CBRN Incident' (NATO, 2014) to create an AcciMap, followed by interviews with Strategic and Tactical commanders from the Greek Military. The same NATO AcciMap was also presented to a Finnish Fire Service (FFS) 'Strategic' level representative, followed by an interview to identify where the AcciMap needed modifying to accurately represent their procedures and system. This approach of creating uniform visual representations of the systems, in the form of AcciMaps, enabled high level comparisons across systems to be made.

3. Results and Discussion

The 3 AcciMaps have been compared and many similarities between the different nations' planned response to CBRNe incidents were found. All nations used the same structure of command ranging from top level Gold (also termed Strategic), Silver (Tactical) and Bronze (Operational). For NATO and NARU this was followed by two further levels of Bronze 1b (specialist responders) and Bronze 1a (initial responders). Similarities found between tasks carried out at each level are shown below:

- **Gold:** Outwards facing, dealing with 'the big picture', communicating messages to the general public and considering long terms plans for evacuation, infrastructure/economic recovery etc.
- **Silver:** Funnels information up and down the structure, so that both Gold and Bronze levels do not become inundated with unnecessary information. They also make tactical decisions based on the information they receive from above and below and pass these down to Bronze.
- **Bronze:** Formulating Operational plans deciding what people who are actually on scene should be doing as well as managing resources to ensure the tasks can be conducted safely and efficiently.
- **Bronze 1b:** The specialist 'on the ground' tasks including: triage; detecting, identifying and monitoring the agent; casualty decontamination etc.
- **Bronze 1a:** Recognise the scene they have arrived at may be a CBRNe event and pass as much information as possible on to control rooms so relevant specialists can be dispatched to the scene.

FFS differed slightly whereby Bronze 1b and 1a would be conducted by the same personnel, with additional backup teams called in if necessary.

4. Conclusions and Perspectives

The systems and procedures in place to deal with CBRNe events across 3 nations (UK, Greece and Finland) and 3 services (Paramedics, Military and Fire) were found to very similar when being viewed from a high level perspective. Furthermore, visually representing the systems in the form of AcciMaps proved an effective way to allow these complex systems to be captured and then compared.

Keywords: Chemical, Biological, Radiological, Nuclear, explosive (CBRNe) event, AcciMap, Human Factors/ Ergonomics, emergency response procedures, National Ambulance Resilience Unit (NARU)

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