

Complexity Management in Digital Civil(-Military) Population Protection & Disaster Control

Doctoral candidate Martin Azzouni, M.Sc. M.E., M.Sc. M.E. & Mgmt Institute of Flight System Dynamics, Prof. Dr.-Ing. F. Holzapfel, Technical University of Munich

This scientific poster shall give an approach to holistically solve complexity and difficulties for coping with disasters on site in the best possible time due to organisational and communications related matters. Therefore Multiple-Domain Matrices (MDM)¹ were used to sort and link terms^{2,3} neatly as well as to develop the proper product-service-system^{4,5,6,7,8} in the shape of a so-called "Incident Command Vehicle (ICV)"9 with an Internet of Things (IoT)- and radio architecture in the backend. Moreover, further autonomous product-service-systems have been interacting successfully in the fields of aerial search and rescue (SAR)¹⁰ and active environmental protection¹¹, which is equivalently called environmental rescue. The ICV is already operating in scenario exercises successfully together with German emergency services.

Methodological background:

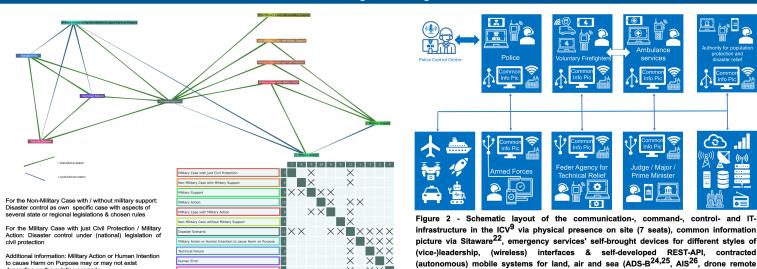


Figure 1 - Thematic interrelationships of disaster causes versus population protection, disaster control, protection of assets and environment with or without military participation 1,2,3,12

Using MDMs to determine neat terms and respective subsystems for population protection and disaster control as well as for protection of assets and environment^{2,3}. Then, displaying the varities of different emergency services, authorities and voluntary organisations with their linked utilised communication equipment with LOOMEO¹². Deducing a holistic product-service-system, which overcomes nondigital and digital boundaries for seamless and legally compliant communication, cooperation and command. Moreover, mathematical methods of operations science, systems engineering, optimisation and (advanced) statistics have been used^{13,14,15}.

Results and Discussion:

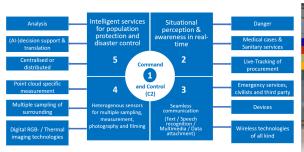


Figure 3 - The Command & Control (C2)-System of the Incident Command Vehicle1,4,6,12,13,14,15,21,30,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47



Figure 4 - Incident Command Vehicle - Exterior view⁹



control^{27,28}), via various communication technologies (all frequency bands, emergency

services radio²⁹, ethernet, wlan³⁰, LTE, satellite³¹).

Figure 5 - Incident Command Vehicle - Interior view⁹

The disaster mostly doesn't come to the command and control (C2)-centre, therefore the C2-centre must move to the disaster sector as close as possible. Therefore, a special-purpose vehicle is necessary, which has been developed, designed and produced 16,17,48. Emergency services, authorities and voluntary organisations need a common space to communicate, coordinate and command. This is a nondigital factor which must be taken into account first. Second, all participants are in need of having the same shared common information picture. Moreover, the C2-centre must fulfill requirements for (German) civil 18,19 and/or (NATO) military 20,21 procedures to gain the maximum ability and capability in population protection, disaster control as well as protection of assets and environment in every phase of the disaster, starting with prevention and (possible) preparation, followed by the disaster as an event itself, which can exist as a chaos phase, through the management of this to its follow-up. There are three compatibility types of participating groups: 1. Full integration with identical EMIS, 2. Partially integration without or different EMIS but connected devices to the ICV, 3. No integration at all but using the common information picture is realised by the software SITAWARE²² which has been adapted and converted from a BMS to an EMIS²³. The software is compatible to all armed forces of EU, NATO, Switzerland, Australia, New Zealand and many more and can overcome the shattered civil EMIS structure within and between mentioned states and countries as off-the-shelf-solution. Moreover, civil disasters such as robbery or the request of special pioneer tanks can be handled as well. All of this can only be legally compliant for a specific timespan for a defined disaster sector for responsible participating groups in official disaster matters.

Keywords & Acronyms

Population protection, search and rescue, disaster control, disaster prevention, disaster management, disaster realisation, curses of crisis, catastrophe, environmental protection, environmental rescue, natural disaster, protected good, protected asset, protected good, protected asset, protected on disaster protection of protection, territorial defence, military action, military support, hostile human error, technical failure, normal asset, protected good, protected asset, protected protection of protection and lifestocks, homeland security, civil protection, territorial defence, military action, military support, hostile human error, technical failure, normal asset, protected protection algositation, actional legislation, actions algositation, actions before immangement, internet of Things (10T), emergency action, emergency protected protections, displaination, protections, displaination, protections, displaination, protections, displaination, protection, protection, protection, protection, military support, hostile human error, technical failure, normal asset (10T), protection and internet protection, protection, military support, hostile human error, technical failure, normal asset (10T), protection and internet protection, military support, hostile human error, technical failure, normal asset (10T), protection and internet protection, military support, hostile fundamental rescue, and internet protection, military support, and internet protection, military suppo

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[1] Lindemann/Maurer – Structural Complexity Management, P.67ff., 1-Edition, Berlin, Springer Verlag (2006). ISBN: 978-34-640-878894-7 [2] https://www.bbk.bund.de/Elrinforbak/Glossarigiosase_node.html/ [9] Cwil Configeracies Act 2004 of the UK: Civil protection, and employers of protein and expensive proteins of the UK: Civil protection, and employers of the UK: Civi

