

# Chapter 17

## Designing Information Systems to Facilitate Civil–Military Cooperation in Disaster Management

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### ABSTRACT

*The efficient management of natural and man-made disasters typically represents a major information exchange and coordination challenge, as in most countries a number of organizations are involved in all phases of the disaster management cycle. In this article, the authors introduce the approach of the Austrian national project INKA, which aims at improving civil-military interoperability between the Austrian Armed Forces and the corresponding federal state level institutions through the introduction of IT-supported information exchange without media discontinuities. Apart from providing a comprehensive overview of their interdisciplinary research methodology, the authors present a number of important results which are based on a detailed qualitative assessment of stakeholder requirements. Furthermore, they provide first insights into designing a valuable IT-platform for civil-military interoperability in Austria.*

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## INTRODUCTION

In order to optimally address both natural and man-made disasters, in most countries typically a multitude of governmental and non-governmental disaster relief organizations are jointly active in all phases of the disaster management cycle, i.e., mitigation, preparedness, response and recovery (cf. (Neal, 1997)). In the mitigation phase the collaboration of the different organizations only needs to be synchronized at the time scale of days or weeks – typically for the exchange of information and the coordination of mitigation actions in specific geographic areas. The remaining three phases of the cycle require a much more closely aligned operation of all parties involved. Ideally, in the phases of disaster response and recovery, the available resources in terms of personnel and equipment should be used in an optimized manner across organizations. Thus translating to a fast allocation of the same which matches the developing situation at hand to the best extent possible (Meissner et al., 2002). In order to achieve such efficiency, it is of utmost importance to assure timely, accurate as well as syntactically and semantically aligned information sharing among all the organizations involved. This is true also for the preceding preparedness phase in which intra-organizational communication needs to be practiced regularly.

During our interviews with the relevant public stakeholders from civil and military organizations we found out that currently this enormous communication challenge is addressed by bilateral e-mail and phone communications and via the setup of joint inter-organizational disaster management teams which are in charge of information exchange. There is no IT-supported information exchange free of media discontinuities, as the organizations often rely on different software suites for their internal information management, which are not mutually compatible and therefore cannot seamlessly interoperate, or they even do not rely at all on IT-solutions for this purpose. Interestingly, the systems in use often not only differ with respect to the type of organization at hand (e.g., civil vs. military) but rather also vary within the same type/group of institutions across different federal states. The same is also true for IT-security aspects, which on the civil side are addressed varyingly at the level of federal states, thereby increasing the complexity of mutual information exchange and management processes. As far as the military side is concerned, the existing classification levels from the internal IT- and communications systems landscape are also used in crisis and disaster management.

In the framework of the research project INKA<sup>1</sup>, we currently pursue the objective of designing and prototypically implementing an interoperability platform which enables real-time or near real-time information exchange between the different organizations involved in crisis and disaster management. The focus is thereby set on enabling seamless interworking between the information management system of the Austrian Armed Forces (AAF) called PHÖNIX (Pöckl, 2013) and its various civil counterparts at the individual Provincial Warning Centers (PWCs), e.g., the system Planning & Response by Intergraph used in Styria (Intergraph, 2015). The information management system PHÖNIX of the AAF is based on international standards, e.g., JC3IEDM - STANAG 5525 (North Atlantic Treaty Organization, 2015), which defines the information exchange between different armed forces, thereby paying special attention to the requirements of classified information. The INKA design philosophy is based on a thorough scientific analysis of the present organizational and inter-organizational crisis and disaster management processes in Austria. Extensive scientific studies have demonstrated that only those IT-design decisions which are firmly aligned with the organizations' actual needs and which optimally adhere to real-world requirements and processes have good chances of successful deployment.

In Lichtenegger et al. (2015), we have presented first results from the analysis and synthesis phase of INKA. Being an extended version of the aforementioned paper the present article shows detailed results

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