

This thesis explains how semi-coordinated or separated utilization of information and communication technologies may affect collaborative work between different emergency management organizations, and their capabilities to perform joint tasks during emergency responses. Another aim is to explore the modeling of emergency management and data collection methods with respect to utilization of these technologies. The theoretical basis for the thesis consists of system science, cognitive system engineering, communication, informatics, simulation, emergency management, and command and control. Important notions are the joint cognitive systems concept and the communication infrastructure concept. The case study method and the real-time role-playing exercise approach are the main methodological approaches. On the basis of two main studies, geospatial data and related systems are studied as an example. Study I focuses on emergency management organizations' abilities to collaborate effectively by assessing their communication infrastructure. Study II, on the other hand, highlights the emerging effects in use of data in collaborative work when responding to a forest fire scenario. The results from the studies, and from the general work conducted and presented here, show that the semi-coordinated or separated utilization of the technologies affects (a) how well the organizations can collaborate, (b) the capabilities to carry out collaborative tasks during crises and disasters, and (c) to what extent the technology can be used in real-life situations. The results also show that the joint cognitive system notion and the real-time role-playing exercise approach provided new ways to conceptualize and study the emergency management and the command and control system.