

# Future rescue management: Design specifications for a 5G-enabled emergency response information system

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**Abstract.** Today, access to real-time information from emergency scenes is still limited for emergency medical services, fire departments, and their professionals, also called first responders. Emergency Response Information Systems (ERISs) have recently been discussed in the literature as a potential solution to this problem. Using the Design Science Research (DSR) paradigm, we present a novel 5G-enabled ERIS (5G-ERIS) design that leverages 5G mobile network technologies to offer diverse real-time information. We provide a user-centered examination of design specifications for a 5G-ERIS based on a smart city digital twin. Based on literature and qualitative expert interviews with several first responders in Germany, we derive how emergency medical services and fire departments can improve their decision-making with this 5G-ERIS. Based on existing 5G application architectures, we structure our identified design specifications into four system layers. Our findings provide an essential knowledge base for the successful development, deployment, and long-term use of 5G-ERISs. We stimulate a broader discussion on the design objectives and specifications of 5G-ERISs in theory and practice.

Keywords: 5G, design science research, ERIS, emergency, digital twin

## 1. Introduction

5th generation mobile network technologies – 5G for short – are attracting attention in research and public policy [1]. Jiang et al. [2, p. 5] envisioned 5G as an “all-dimensional, user-centered information ecosystem”. Innovations in the technical infrastructure make this possible. The cornerstones of the 5G infrastructure are high data rates, i.e., enhanced Mobile Broadband (eMBB), massive Machine Type Communication (mMTC) enabling Internet of Things (IoT) communication, and ultra-Reliable and Low Latency Communications (uRLLC) [2]. In addition, 5G networks shall be capable of Highly Precise Localization Everywhere (HPLE) [3,4].

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