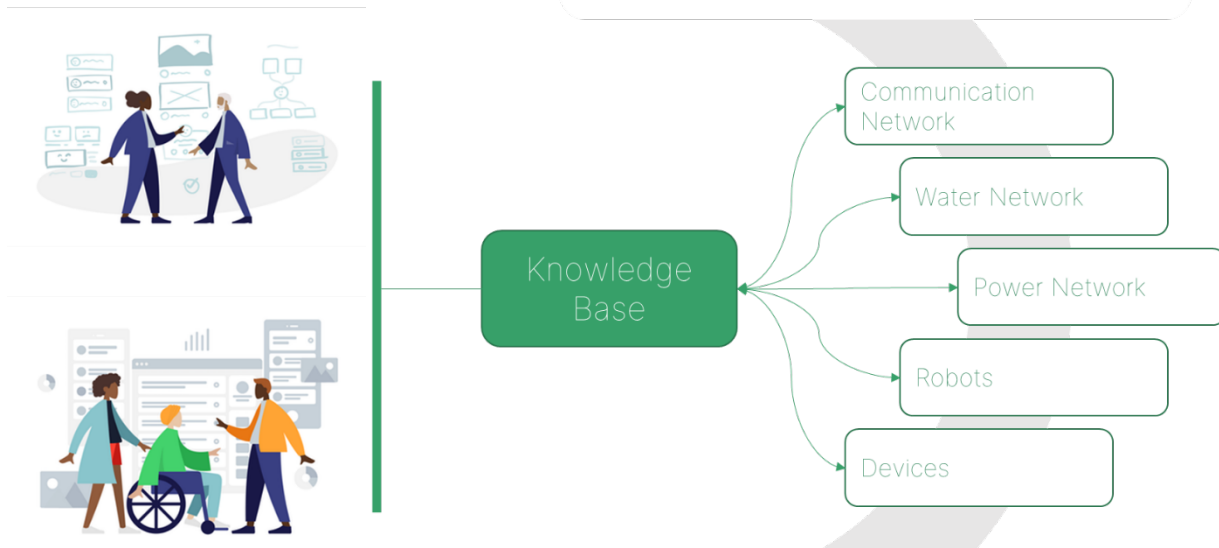


Mission Knowledge Base

1. Goal

It is our goal to create a Knowledge Base for storing, sharing, and accessing information from the resilient digital city. The Knowledge Base is an infrastructure that provides a common platform for hosting data provided by diverse sources from across the city. It is necessary for these data to be structured and linked in a framework. This framework is provided by common concepts agreed upon in an interdisciplinary understanding. The purpose of the Knowledge Base is to facilitate information exchange from different domains in the city. During a critical incident this can aid the coordination of responsive measures. Rather than building a reservoir of data, the gathered information is to be made semantically interpretable, allowing to draw conclusions regarding the state of the city. The Knowledge Base will support sense-making, especially during critical incidents and their appraisal, and facilitate identifying causes of crises. For ensuring the functionality of the infrastructure during critical incidents, we propose to design it using a decentralised, robust architecture.



2. Approach

How do we propose to reach our goal?

Considering our diverse and interdisciplinary perspective on the city, it is of vital importance to arrive at a common conceptualisation and a common understanding of objects and terms relevant to the city. Thus, we need to discern the most relevant concepts for describing the city. To avoid a purely technical conceptualisation, it is core to create awareness of (historical) path dependencies and socio-spatial differences in the city and incorporate this awareness in the conceptualisation of the city. Subsequently, the agreed-upon terms and concepts need to be implemented as a structure for organizing and sorting gathered data. This in turn requires implementing an architecture for storing, retrieving, and updating information. Since demands and requirements of citizens of a city vary not only during days, weeks, months, and years but also during critical incidents, the city needs to be understood as a dynamic system of systems. In consequence, we need to define efficient data structures, processes, and protocols for knowledge sharing among resource-constrained devices. We further

want to develop a tool for integrating information from ongoing and past situations, as that would help verify the gathered data and also bring lessons learned from past emergencies to mind. This will allow to develop new approaches and strategies for preventive measures.

What are our common research questions?

The primary common research question addressed by the mission is. Does a common language and data platform facilitate exchange of knowledge and does this improve the resilience of a digital city?

This leads to several follow-up research questions concerning two or more subprojects:

- How to design a Knowledge Base in the context of smart cities?
- How can the required information be gathered and processed in a way that is sensitive to privacy concerns of citizens and compliant with data protection laws?
- How can a knowledge base adequately reflect the diversity of a city’s population?
- What information is required when critical incidents occur?
- How does a Knowledge Base need to be designed to make it resilient?
- How can sharing and connecting the (consumption/demand, social, technical) data from our different domains improve our individual research?
- Identification of common data queries and analytical tasks in the context of emergency situations
- How can ICT, constrained during a critical incident, efficiently convey and prioritize information?

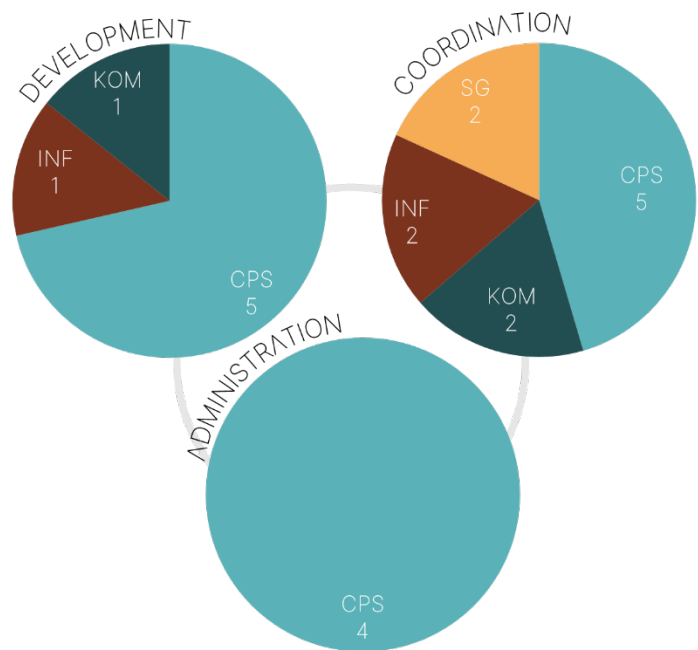
How do we collaborate?

Our mission is structured into three subgroups, the coordination group, the development group, and the administration group.

The coordination group is composed of members from all program areas of emergenCITY, providing perspectives from all involved disciplines. This group is a forum for discussing our understanding of the core concepts of the city, providing feedback on the architecture of the Knowledge Base from different contexts, and formulating requirements for the development of the Knowledge Base.

The development group is concerned with implementing the architecture conceived in the coordination group. It provides the infrastructure for different domains to add their own data and concepts to the Knowledge Base.

The administration group is responsible for communicating with the directorate of emergenCITY and meeting the formal requirements of the mission. Furthermore, the administration group ensures the collaboration with industry partners to communicate the mission’s research results and gather feedback to incorporate real-world issues in the work of the mission.



What demonstrators are we going to build by the end of it?

We want to build a working example of a Knowledge Base for a digital city using available technologies. This Knowledge Base needs to be decentralised and needs to run under constrained disaster conditions. We want to incorporate the Knowledge Base as an information model in our various domains to demonstrate in some use-cases the benefits of sharing knowledge efficiently during critical incidents.

3. Scope

The scope of the mission extends to building an example of an interdisciplinary Knowledge Base which can handle the data provided by the infrastructures and agents of a digital city and support response and recovery strategies for those infrastructures while ensuring awareness of diversity of the population as well as privacy concerns. The Knowledge Base itself will be designed in a resilient, decentralised manner.

Developing a complete sensor and data architecture of an entire digital city is however beyond the scope of the mission. We will not aim to build a full platform for the entire digital city with all facets and components. Rather than incorporating every domain and every aspect in each domain, we will focus on the areas relevant to the research of the participating researchers. The readiness of the technology will be limited to a core functionality. The mission will deliver a proof of concept that shows how the exchange of knowledge between domains can benefit the resilience of a city, which is considered as one system.