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# 1. Introduction

This document describes the Disaster Response and Management System (DRMS) that is being developed for the State of Arstotzka. The goal of this system is to help emergency services react faster and work better together when a disaster happens, such as floods, earthquakes, fires, or other dangerous situations.

The system is made of three main parts: a web application for administrators, a mobile app for emergency responders in the field, and a network of IoT sensors placed in risky areas. These parts work together so that everyone involved can get real-time information, communicate easily, and make better decisions during emergencies.

## 2. Scope of the project

### 2.1 What is included

The DRMS will include:

- A web app for disaster management staff
- A mobile app for responders
- Sensors that measure things like earthquakes, water levels, and air quality
- A server that connects everything
- Alerts and notifications
- A system for managing rescue teams and equipment
- Maps and location tracking
- Offline mode
- Support for multiple languages
- Secure communication

### 2.2 What is not included

This project does not cover:

- Building or installing the sensors
- Running or managing phone networks
- Real rescue work in the field
- Buying phones, computers, or other hardware

### 3 Concepts

- **DRMS:** The whole disaster management system
- **Command Center:** The web app used by administrators
- **Responder:** A person using the mobile app in the field
- **Incident:** A disaster event like a flood or fire
- **Sensor:** A device that measures things like water level or air quality
- **Alert:** A warning sent when something dangerous is detected
- **Heatmap:** A map that shows where the disaster is strongest
- **Offline mode:** When the app works without internet

### 4 Role description

The **administrator** is the person who uses the web application in the command center. Their main job is to monitor disasters, view data from sensors and responders, and decide how to deploy teams, vehicles, and equipment. They also use the system to check maps, dashboards, and generate reports after a disaster.

The **emergency responder** is a person working in the field, such as a firefighter, medic, or rescue worker. They use the mobile app to receive alerts, see where they need to go, send their current status, and upload photos, videos, and notes from the disaster area.

The **IoT sensors** are devices placed in areas that are at risk. They measure things like earthquakes, water levels, and air quality and automatically send this information to the system so that dangerous situations can be detected early.

The **server** is the central part of the system that connects everything together. It receives data from sensors and mobile devices, stores it, processes it, and makes sure all applications stay in sync.

### 5 Assumptions and dependencies

- Phone companies provide special priority communication channels
- Responders have smartphones with GPS
- Sensors are already installed and working
- Internet may go down during disasters but will come back
- There is a central server running the system

## 6 List of requirements

### 6.1 Requirements related to functionality

#### FR-1 – Sensor data

The system should receive data from sensors that measure earthquakes, floods, and air quality.

#### FR-2 – Alerts

The system should create alerts when dangerous values are detected.

#### FR-3 – Sending alerts

Alerts should be sent to both the web application and the mobile application.

#### FR-4 – Responder status

Responders should be able to update their status, such as available, busy, or on mission.

#### FR-5 – Field reports

Responders should be able to upload photos, videos, and notes from the disaster area.

#### FR-6 – Navigation

The mobile app should show directions to the affected area using GPS.

#### FR-7 – Messaging

Responders and administrators should be able to send messages inside the app using priority channels.

#### FR-8 – Dashboards

The web app should display sensor data and responder reports on maps and charts.

#### FR-9 – Resource management

Administrators should be able to assign teams, vehicles, and equipment to incidents.

#### FR-10 – Tracking

The system should show the live location of deployed teams and vehicles.

#### FR-11 – Offline mode

Both the web and mobile apps should work without internet and sync later.

#### FR-12 – Language support

The mobile app should support English, Spanish, Arabic, and Hindi.

The web app should support English and Spanish.

#### FR-13 – Data synchronization

All data collected while offline should be uploaded when the connection returns.

## FR-14 – Reports

The system should be able to generate reports after a disaster.

## 7 Requirements related to characteristics

The system should be reliable even during extreme conditions.

- All communication between apps, sensors, and the server should be encrypted.
- The system should support many users and sensors at the same time.
- The apps should be easy to use, even in stressful situations.
- Alerts should be delivered as fast as possible.
- The system should be available at all times.