# Disaster Decision Support System

## The disaster decision support system is a technology that provides predictive information on various disaster simulations occurring in the city based on 3D spatial data and supports decision-making necessary for responding to disaster situations.

In the event of a disaster, it provides policymakers with real-time simulation results and essential disaster response information, such as road closures and evacuation route guidance, to support a rapid response to natural disasters occurring in the city.


▲ Local government officials are analyzing areas expected to be flooded due to river overflow and simulating evacuation routes.

### Issues to Tackle

- In the event of a disaster such as flooding or an earthquake in a city, it is essential to predict the affected areas and damages in advance.
- In the event of a disaster, real-time disaster situation guidance and information about safe evacuation locations and routes need to be provided.

### Expected Benefits

- By using spatial information-based simulations, the system predicts damage areas based on the scale of a disaster in the city, providing the basis for decision-making in the event of a disaster.
- In the event of a disaster, a quick response is possible based on the latest response manual and contact information for each relevant agency.

### Key Services

· Providing information on disaster-specific scenarios and simulation results to support decision-making by disaster response personnel.

· Analysis and response to predictive scenarios based on numerical models and AI models for disasters such as earthquakes, floods, landslides, etc.

· Mobile application service that allows disaster response personnel to report disaster situations while on the move or on the spot.

### Use Cases

· Busan Metropolitan City, in July 2023, provided online information to help citizens quickly evacuate and respond to flood disasters, including flood forecast maps, river water level, flood depth in flood monitoring area, CCTV footage, evacuation routes, etc.

· Daejeon Metropolitan City used the route guidance for safety facilities such as automated external defibrillators, safety guard houses, emergency shelters (for disaster victims, earthquakes, civil defense, etc.), and safe restrooms in response to potential disasters during the festival period in August 2024.

· Ulju-gun, Ulsan Metropolitan City, introduced a smart disaster preparation system in 2021 to simulate emergency issuance criteria and requirements in case of natural disasters such as typhoons or flooding, and to establish a village-level disaster information-sharing and response system.

## Key Components

### Configuration

**Disaster Decision Support System**

| 1. 3D Visualization (Disaster Info.) | 2. Simulation | 3. On-site Report(Smartphone App) | 4. Evacuation RouteMobile Web |
|---|---|---|---|
| GIS Management | Flooding Model | User Management | Location Info. |
| Real-time Information | Earthquakes Model | Real-time Messaging | Route Info. |
| Building Damage Analysis | Atmospheric Model | Emergency Management | Alternative Route Info. (Real-time) |
| Ground Motion Analysis | AI Machine Learning | Reporter's safety Management | Emergency Disaster Info. |

### Technologies

**1. 3D GIS Urban Disaster Visualization System for Policy Making and Control**
· Flood solutions, simulation solutions, and earthquake solutions for control response.

**2. Disaster Simulation Module**
· Inputting data such as sewer network, land elevation map, and infiltration capacity to compare with data like flood trace map and flood prediction map. The simulation operates with distributed rainfall-runoff, displaying flood areas, flood volumes, and the number of manholes (IN/OUT) by time step.

**3. Real-time communication and situation reporting application**
· Real-time photo/video transmission based on the field personnel's location, location-based situation reporting, map radius search and report content, and data management.

**4. Citizen Safety Evacuation Route Solution**
· In the event of a disaster, the solution provides real-time information on dangerous areas and optimal evacuation routes to citizens, GPS-based directions to the nearest safety shelters, shelter information (capacity, contact details, etc.), and generates the best route by integrating road data.


### Technology Companies

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