ICP-AGIR Best Practice for
Incheon (Republic of Korea)

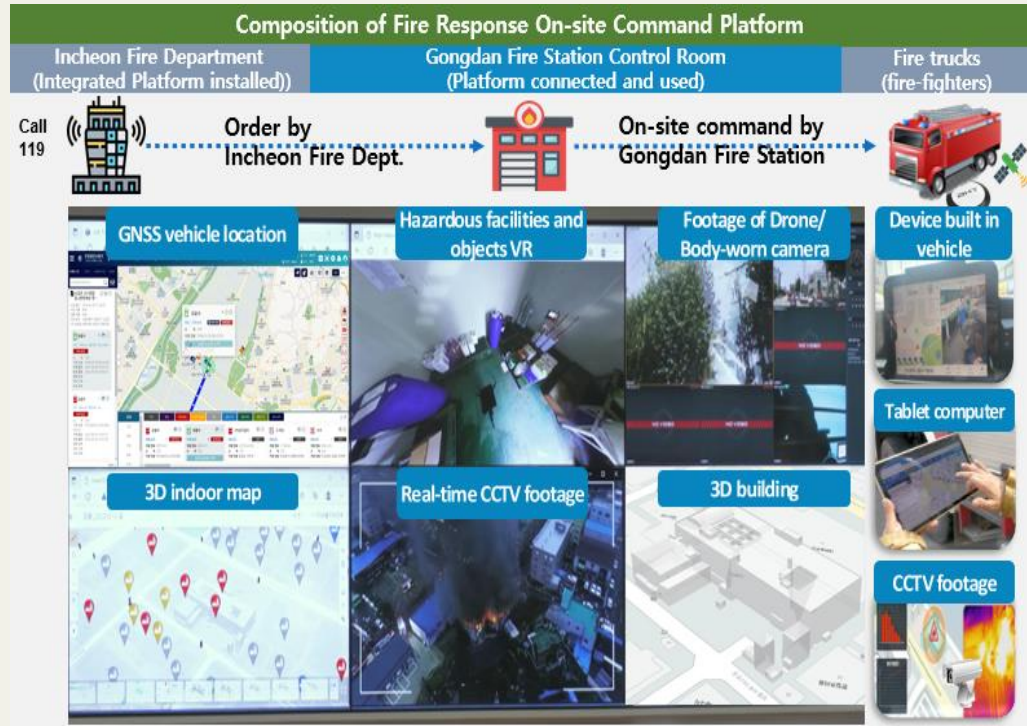| Digital Twin-based Fire Response On-site Command Platform	
	Incheon **Republic of Korea**
Departments/Institutions involved	**Foreign Affairs Department, Incheon Metropolitan City**
ICP AGIR City Coordinator and contact data	**Hansol Jeon** **Official** Hsjeon0119@korea.kr
ICP AGIR Pairing Manager	**Yookyung Oh** Yookyung.oh@icp-agir.eu
Description of the best practice	**'Digital twin-based Fire Response On-site Command Platform' allows for fire response in a more effective and prompt way by building a fire-fighting data based Digital Twin.**
Theme and sub-theme if appropriate	**Circular Economy**

Description of Best Practice	
Challenge Addressed	**'Digital twin-based Fire Respone On-site Command Platform' intuitively visualizes the information of fire accidents and disaster sites as well as the location of dispatched vehicles in real time and provides support for emergency personnel to effectively establish the response strategy and take actions, contributing to securing the golden time.**
Solution Implemented	- **Since 2021, Incheon City has worked with Gongdan Fire Station to collect the fire-fighting data (e.g. hazardous facilities, fire water, building entrance, etc.) and built a Digital Twin by incorporating such data. Fire-fighters can access 'Digital twin-based Fire Response On-site Command Platform' via computer or mobile device to gain necessary information prior to their arrival in accident scenes.**

	- The platform processes the signals from GNSS device attached to the dispatched vehicles and enables users to understand the location of vehicles (positional accuracy: within 3cm), travel routes, and speed in real time so that the commander can dispatch vehicles to the scene effectively. - Also, the platform makes it possible to identify CCTVs around the accident scene, drones flown over the scene, and body-worn cams, helping to understand the accident scene multi-dimensionally.
Partnerships	Incheon Gongdan Fire Station, Incheon Metropolitan Government's Smart City Division, Namdong Industrial Complex Control Center
Lessons Learned	- The data which used to be retained by individual entity is visualized via a Digital Twin and provided for the users to understand it at a glance, drastically reducing the time required to collect data. - Not only on-site command officer, general service personnel can also share the information and situations in real time, which reduces unnecessary communication. - In particular, the platform ensures more effective deployment of limited resources in case of large-scale fire accidents or disasters which require a large number of vehicles to be dispatched at once. - Notwithstanding, since the platform builder (Smart City Division, Incheon City) and the user (Gongdan Fire Station) are separate authorities so that continuous collaboration and communication between them are essential to generate more substantial and practical outcome.
Main Milestones	- Gongdan Fire Station currently uses this platform for disasters and accidents as well as fire drills. This has helped to develop a new digital twin-based model applicable to administrative works in various areas.

Materials for Promotion	
Quote **from city representative**	Digital Twin visualizes and simulates various urban issues, providing support for administrative works in a more predictable way. The city of Incheon continues to exert its effort to improve the work process by introducing Digital Twin in various administrative fields and plans to keep expanding it towards a goal of becoming a true 'Smart City of Incheon'.

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Materials for Promotion

Graphic Material	

Composition of Fire Response On-site Command Platform

Incheon Fire Department (Integrated Platform installed)) — Gongdan Fire Station Control Room (Platform connected and used) — Fire trucks (fire-fighters)

Call 119 → Order by Incheon Fire Dept. → On-site command by Gongdan Fire Station →

- GNSS vehicle location
- Hazardous facilities and objects VR
- Footage of Drone/Body-worn camera
- Device built in vehicle
- 3D indoor map
- Real-time CCTV footage
- 3D building
- Tablet computer
- CCTV footage

1. Construction of Digital Twin-based Data Dam for Fire Response (9 types)

Collect, analyze, and design database (GIS Open Data) → 2D/3D field check data editing/structure editing → Quality control (Test/Demonstration) → GIS Platform Services

- Search network (Vehicles / Pedestrians)
- 3D risky (hazardous) facilities
- 3D buildings and indoor maps
- 360° VR panorama
- Object address
- Entrance (building/building complex)
- Mapping buildings and building register
- Fire-fighting facilities (outdoor/indoor)

Materials for Promotion

2. Development of Administrative Service Model (5 types)

Collect functional needs from fire stations → Design UI/ Implement connectivity → Embed on-site command platform (Performance verification) → **Gongdan Fire Station provides services**

Fire engine route search

Monitor IOT water meter in real time

Link 2D map to 3D map

Link to sickbed information at general hospitals

Advance fire command and control system

Radius/table top exercise/review/distance measurement, etc.
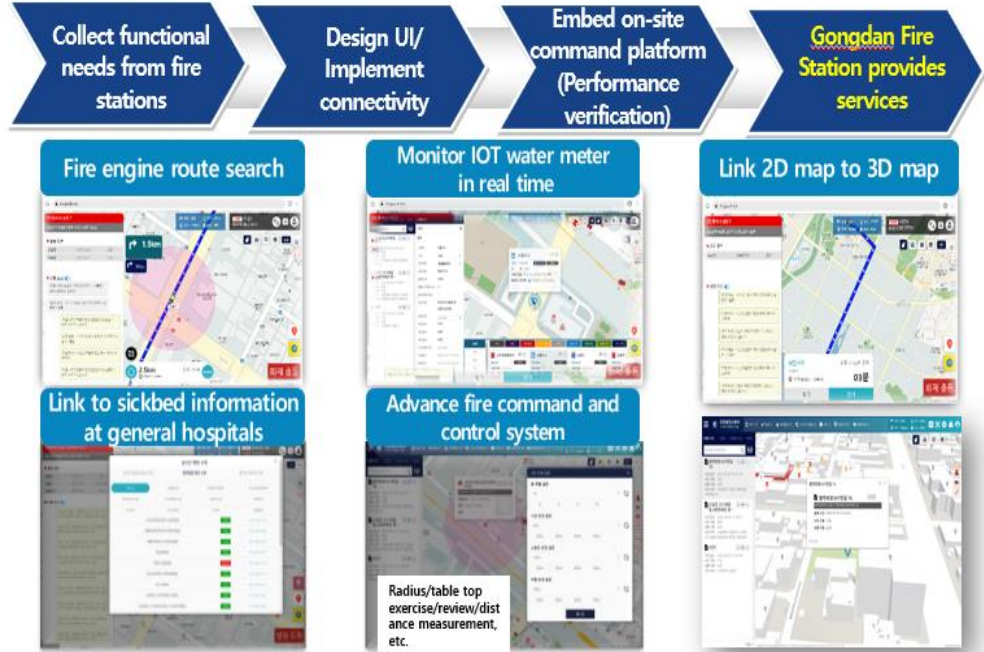
2. Development of Administrative Service Model (5 types)

Improve Control Room Services of Gongdan Fire Station
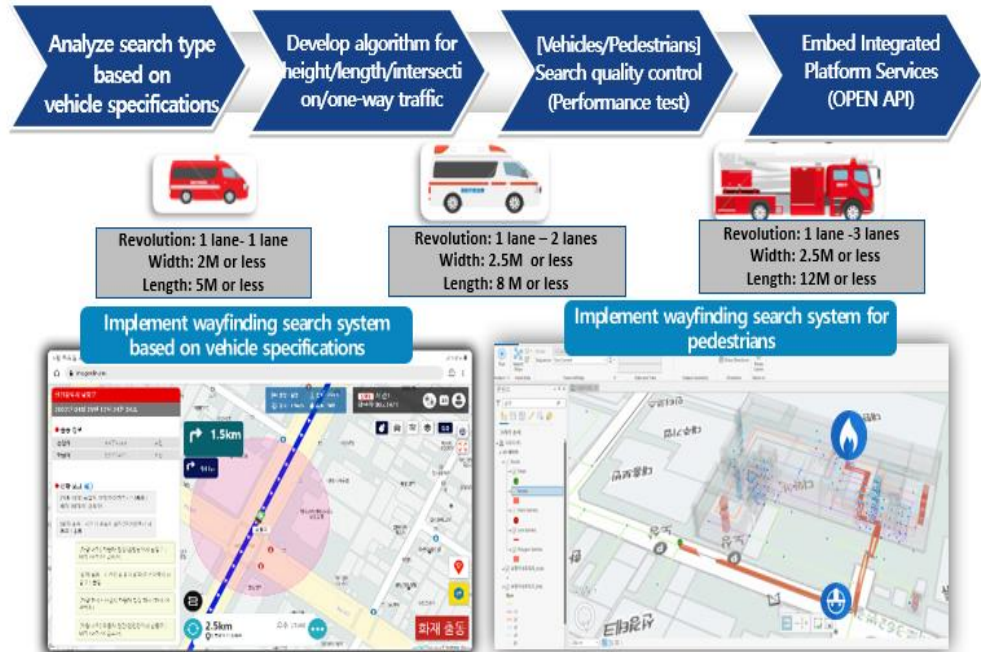
Before developing Integrated Platform (2020)

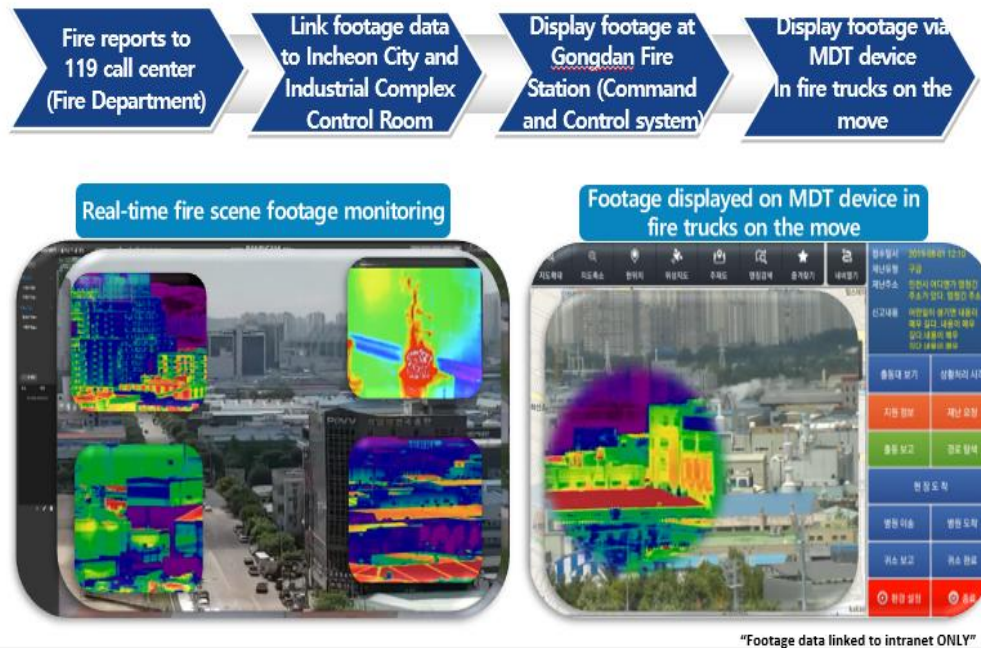After developing Integrated Platform (2022)

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Materials for Promotion

3. Implementation of Wayfinding Search Engine for Fire Trucks and Pedestrians (2 types)

Analyze search type based on vehicle specifications → Develop algorithm for height/length/intersection/one-way traffic → [Vehicles/Pedestrians] Search quality control (Performance test) → Embed Integrated Platform Services (OPEN API)

Revolution: 1 lane- 1 lane
Width: 2M or less
Length: 5M or less

Revolution: 1 lane – 2 lanes
Width: 2.5M or less
Length: 8 M or less

Revolution: 1 lane -3 lanes
Width: 2.5M or less
Length: 12M or less

Implement wayfinding search system based on vehicle specifications

Implement wayfinding search system for pedestrians

4. Implementation of Real-time CCTV Footage Monitoring (2 types)

Fire reports to 119 call center (Fire Department) → Link footage data to Incheon City and Industrial Complex Control Room → Display footage at Gongdan Fire Station (Command and Control system) → Display footage via MDT device In fire trucks on the move

Real-time fire scene footage monitoring

Footage displayed on MDT device in fire trucks on the move

"Footage data linked to intranet ONLY"

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Materials for Promotion
Online links   Not open to the public due to security reasons