FOSS4G KOREA 2021

Gaia3D The GeoSpatial Company

mago3D

State of mago3D, An Open Source Based Digital Twin Platform

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MAGO

Goddess of Earth
in Korean old myth

mago3D - History

2014
Project started.
NSIP Program

2016
Live 3D Geo-Platform
Alpha version released.

2017
GeoBIM Platform
Version1.0 released.

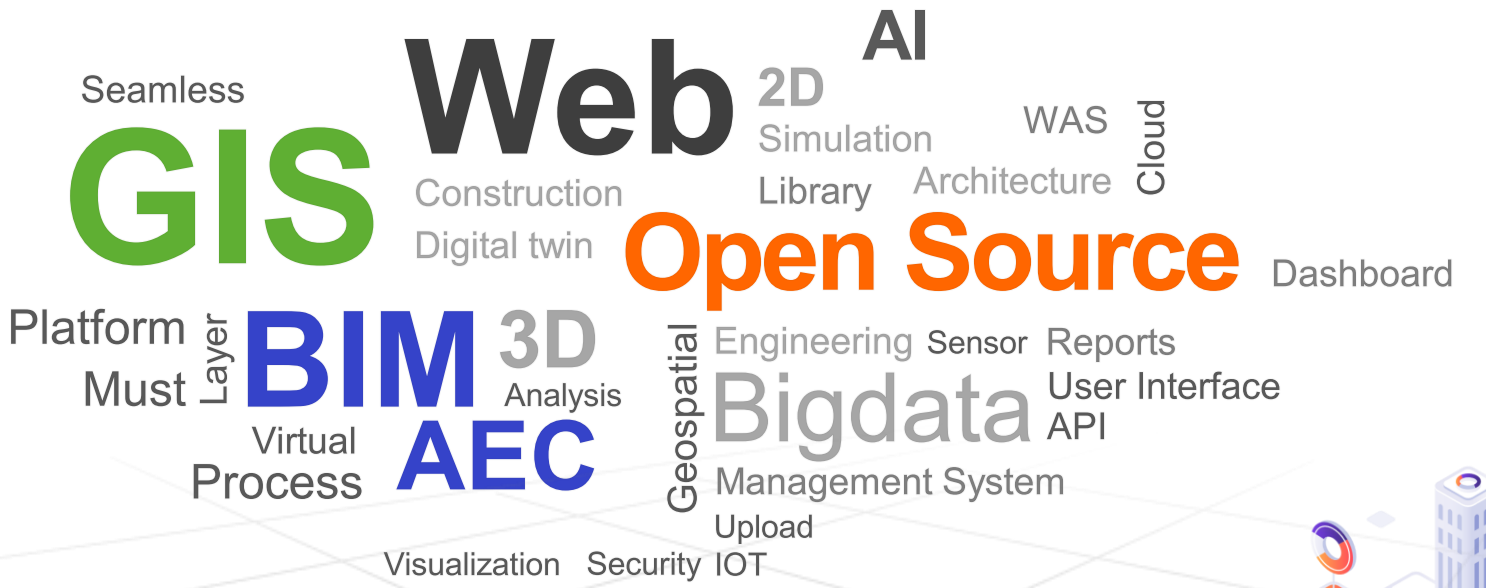
2018
OpenIndoorMap opened

2019
Digital Twin Platform
Version2.0 released.

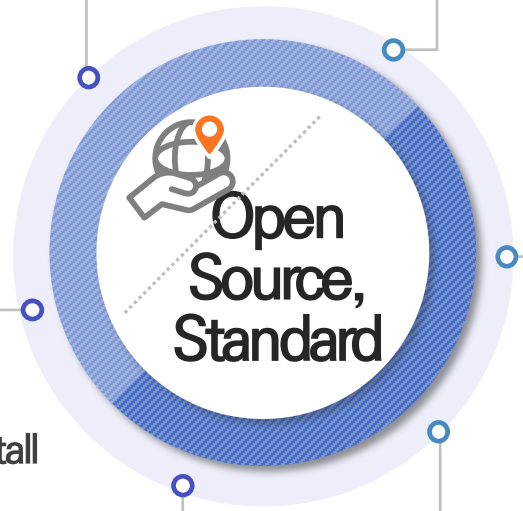
2021
Digital Twin Platform
Version2.5 released

mago3D - Overview

mago3D is an open source based **Digital Twin Platform** that can replicate and simulate the real world objects, processes, and phenomena on web environment. mago3D can integrate, manage, and visualize various kinds of data such as CityGML, IndoorGML, LAS, IFC, 3DS, IoT, and other popular GIS formats.



mago3D - Overview



1 BIM/AEC

Integration of BIM/AEC(Architecture, Engineering, Construction)and 3D GIS

2 Browser

HTML5 based. No need to install additional plug-in or programs

3 Seamless

Seamless integration of indoor and outdoor space

4 Automatic Data Conversion

Just drag-and-drop the data on your browser

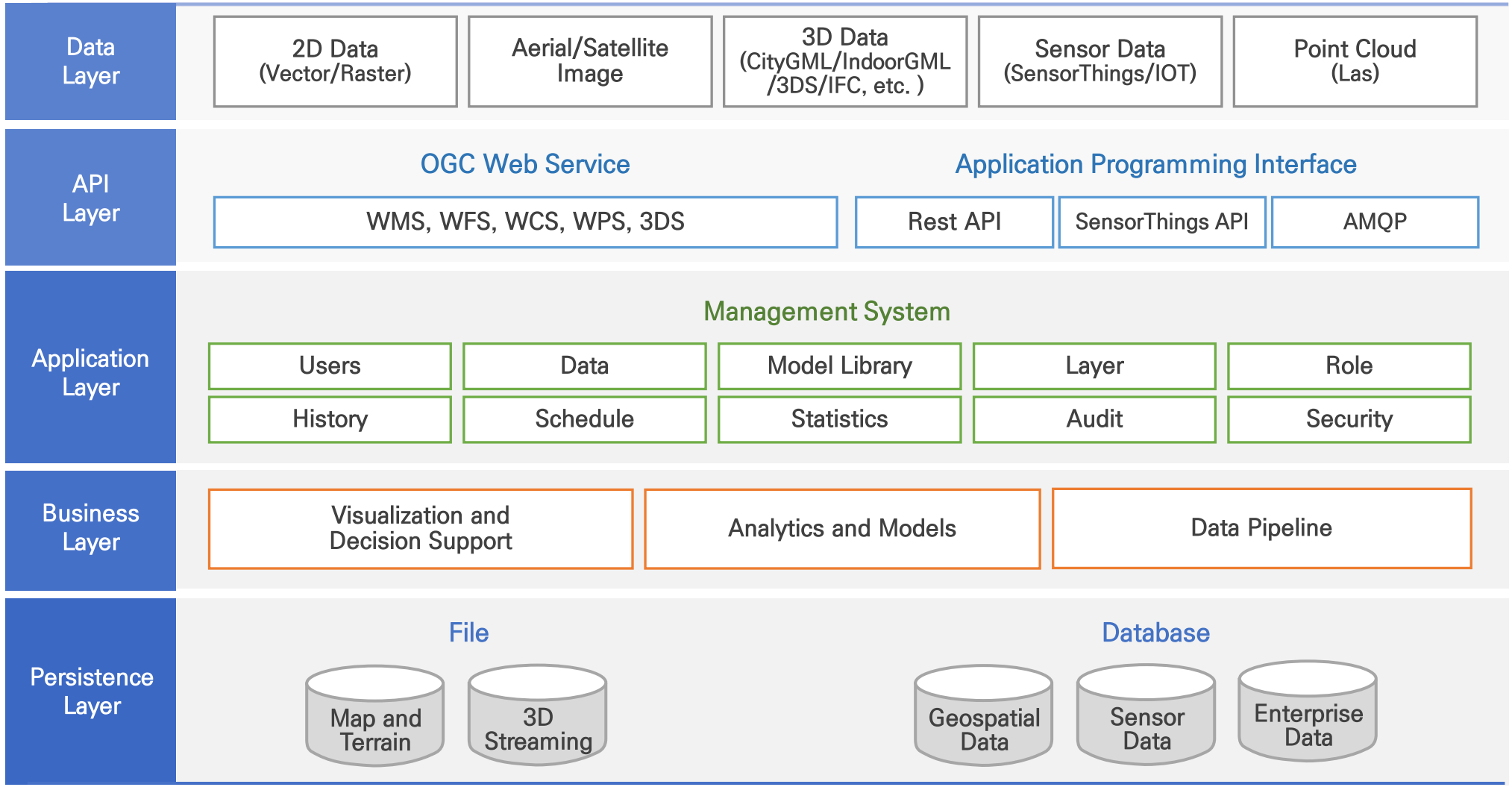
5 Simulation

Management and visualization of various simulations

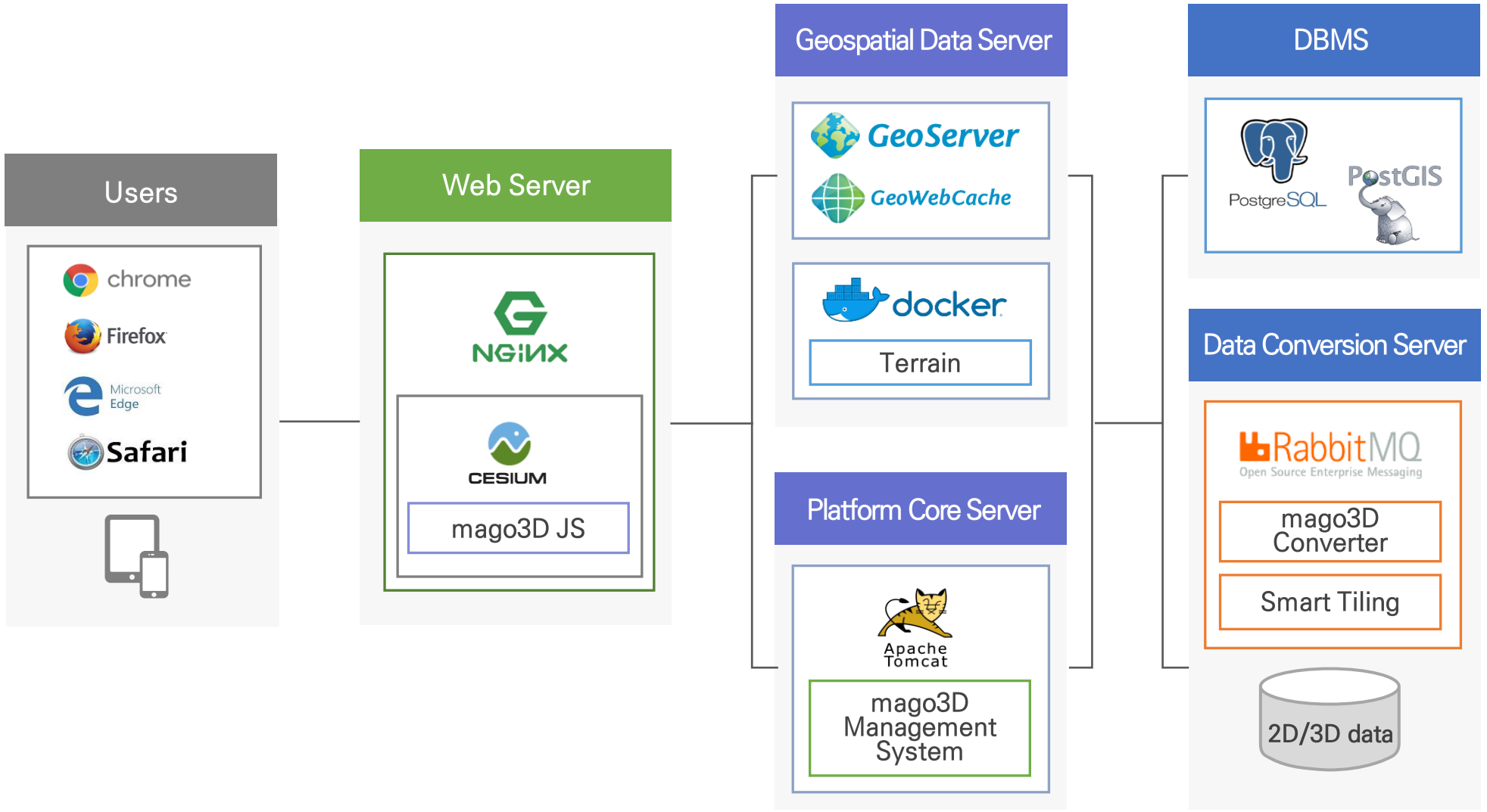
6 Collaboration

Web based data, issue, and process collaboration

mago3D - System Layers



mago3D - System Architecture



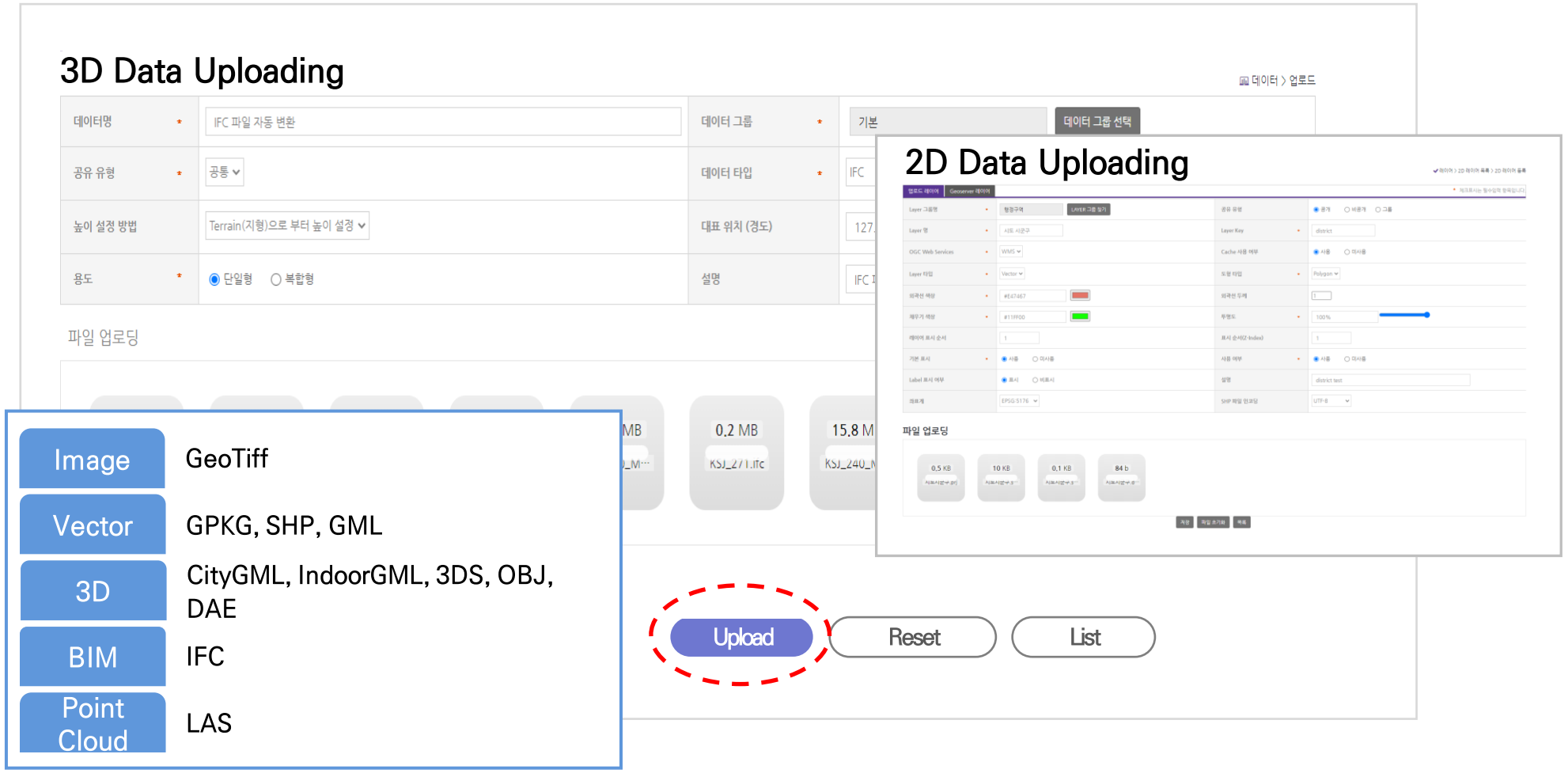
mago3D - Software Components

BackOffice	Log/Build	Logback / Gradle 6
	Schedule/Report	Quartz 2.4.0 / JasperReports 7.5
Presentation Layer	View	HTML5 + Thymeleaf 3.0.11 + Chart js 2.9.3
	WebGL Globe	CesiumJS 1.70 + mago3D JS
Persistence Layer	RDBMS	PostgreSQL 12 + PostGIS 3.0
Data Conversion Layer	Message Queue	HTML5 + Thymeleaf 3.0.11 + Chart js 2.9.3
	Data conversion Server	CesiumJS 1.70 + mago3D JS
Geospatial Data Layer	Terrain Server	GeoServer 2.17.0 + GeoWebCache 1.15.0
	Geospatial Data Server	Docker Engine – CentOS(Community) / window 2.3.0.2
Business Layer	Business Server	mago3D Management System (User, Admin)
	Framework	Spring 5 (Spring boot 2.3) + Mybatis 3.5.4
Infrastructure Layer	Language	Java (OpenJDK 11.0.2)
	WAS	Tomcat 0.0.35
	Web Server	Nginx 1.16
	OS	Linux Centos 7.6 / Window Server 2019

mago3D - Main Features

Automatic Data Conversion	Hassle free data display(Data Uploading –〉 Automatic Data Conversion –〉 Data Display)
Various Formats Supporting	3DS, OBJ, FBX, IFC, CityGML, IndoorGML, LAS, SHP, GPKG, GeoTiff, etc.
Rule Based Management System	Rule based 2D/3D data management for flexible system
Smart Tiling	Increasing large size 3D data streaming speed and rendering quality
Simulation	Sunlight, Shadow, Air pollution, Wind, Town design simulation, etc.
API	Rest, Restful APIs for data, screen handling
Dashboard	Dashboard for monitoring user activities, data, APIs, system health, schedules, etc.
Standard Compliance	Compliant with OGC, buildingSMART, W3C's standards.

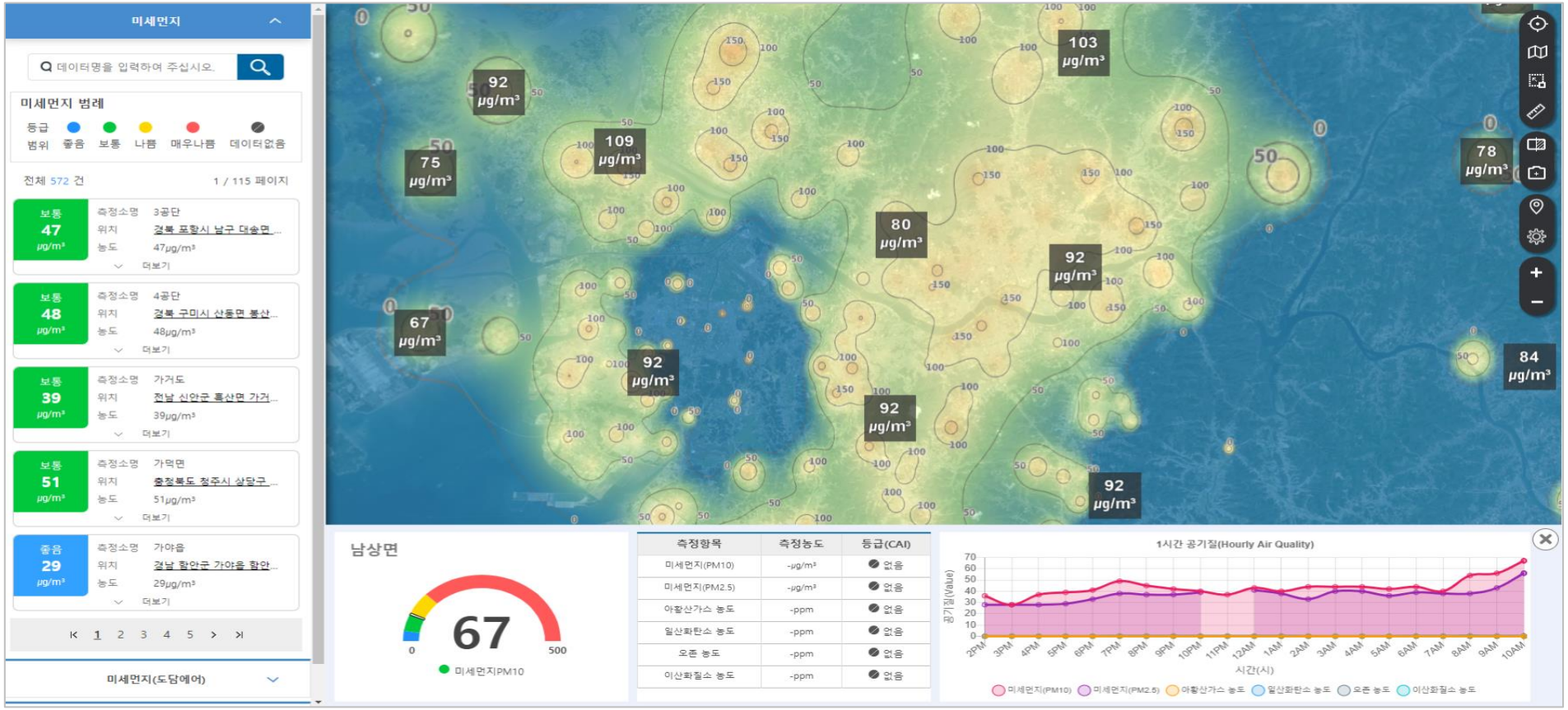
2D/3D Data Upload and Automatic Conversion



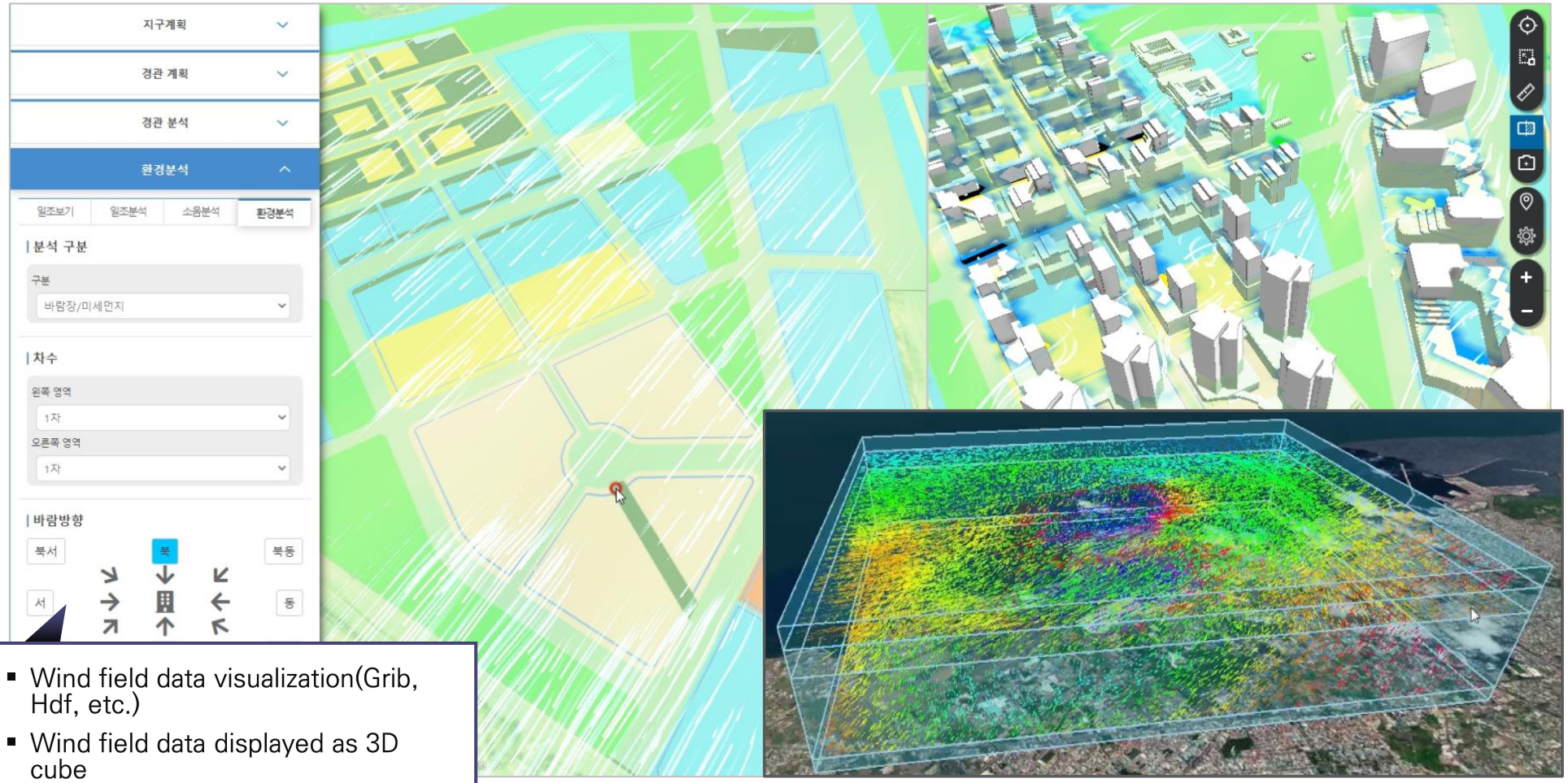
2D/3D Display

IoT – SensorThings API

- GDAL Grid : Create 2D grid from scattered sensor data
- GDAL Contour : Extract isoline from grid data

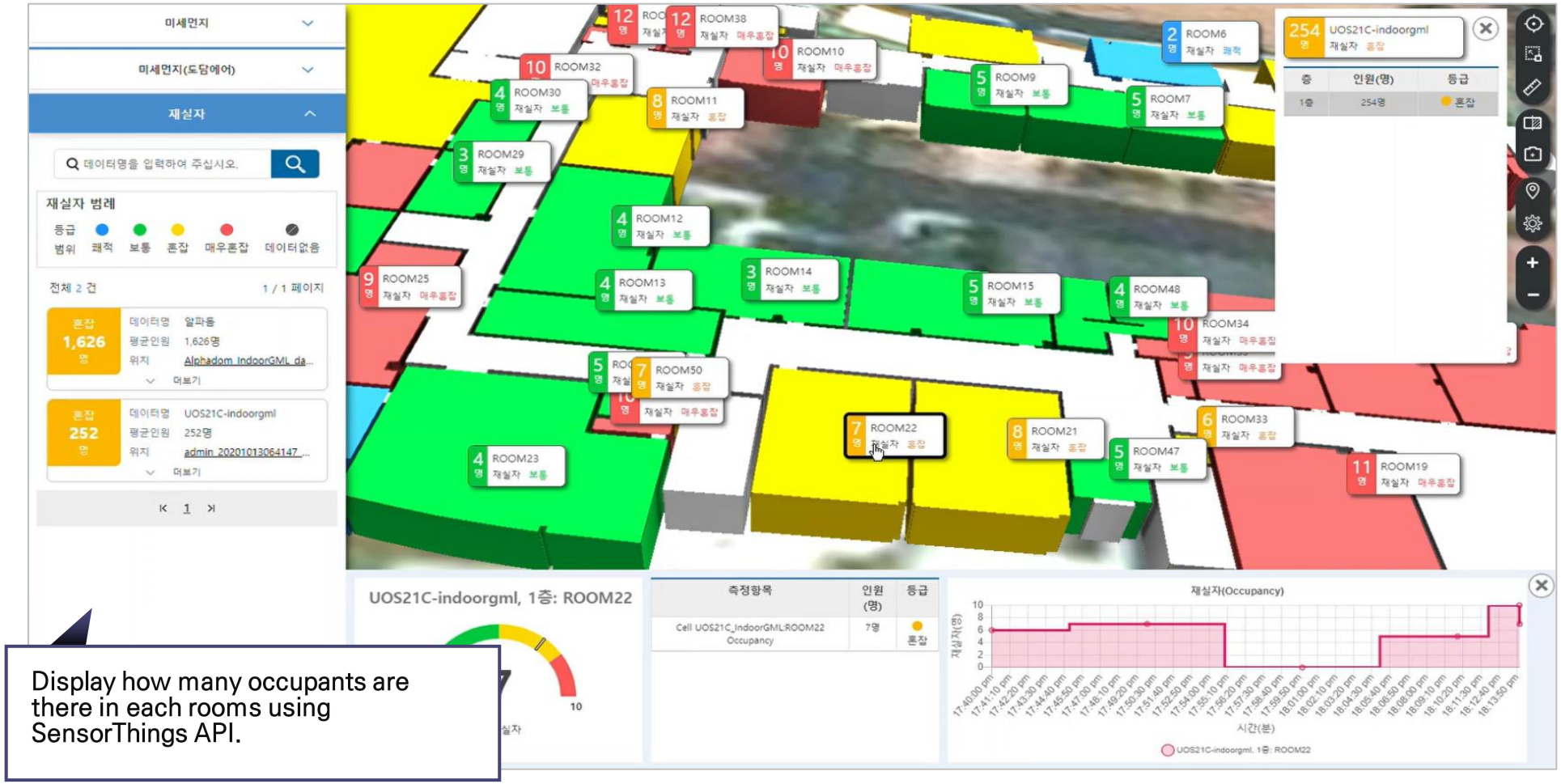


Wind



- Wind field data visualization(Grib, Hdf, etc.)
- Wind field data displayed as 3D cube

Indoor Occupant(SensorThings API)



Display how many occupants are there in each rooms using SensorThings API.

Point Cloud

Optimized performance using pyramidal data structure

Town Planning

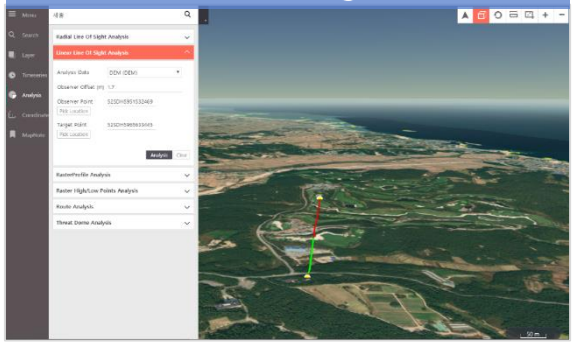
Town Planning Simulation using 3D Library

Trees	Lights	Buildings
벚나무, 소나무, 은행나무	양날형, 현날형	고층, 저층, 주상복합 등

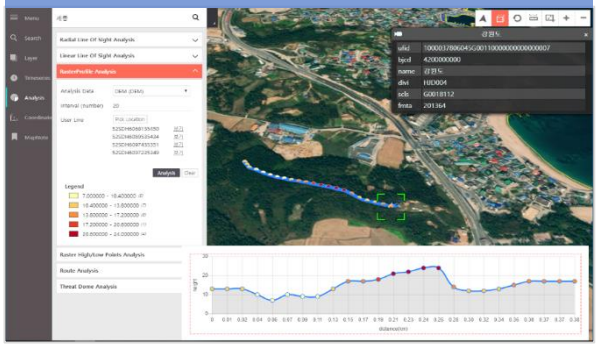
2D/3D Analysis

Expand analytical functions using OGC WPS

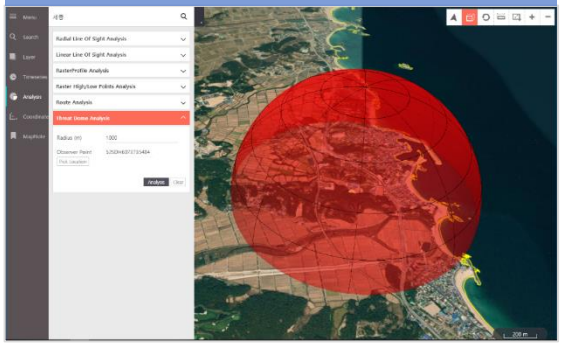
Line of Sight



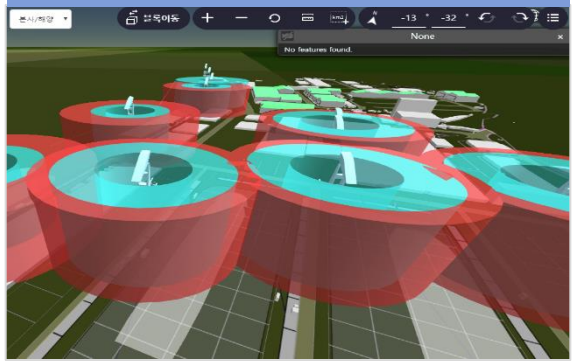
DEM Profile Analysis



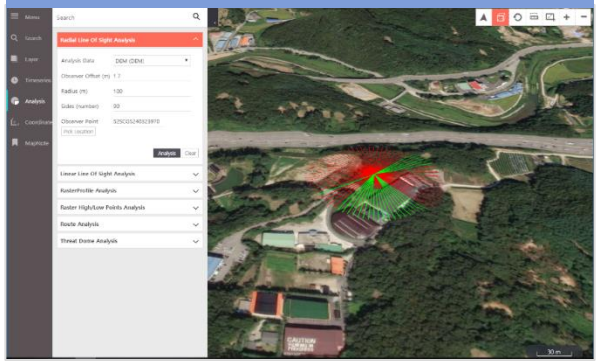
Threat Dome Analysis



Crane Arm Radial Analysis

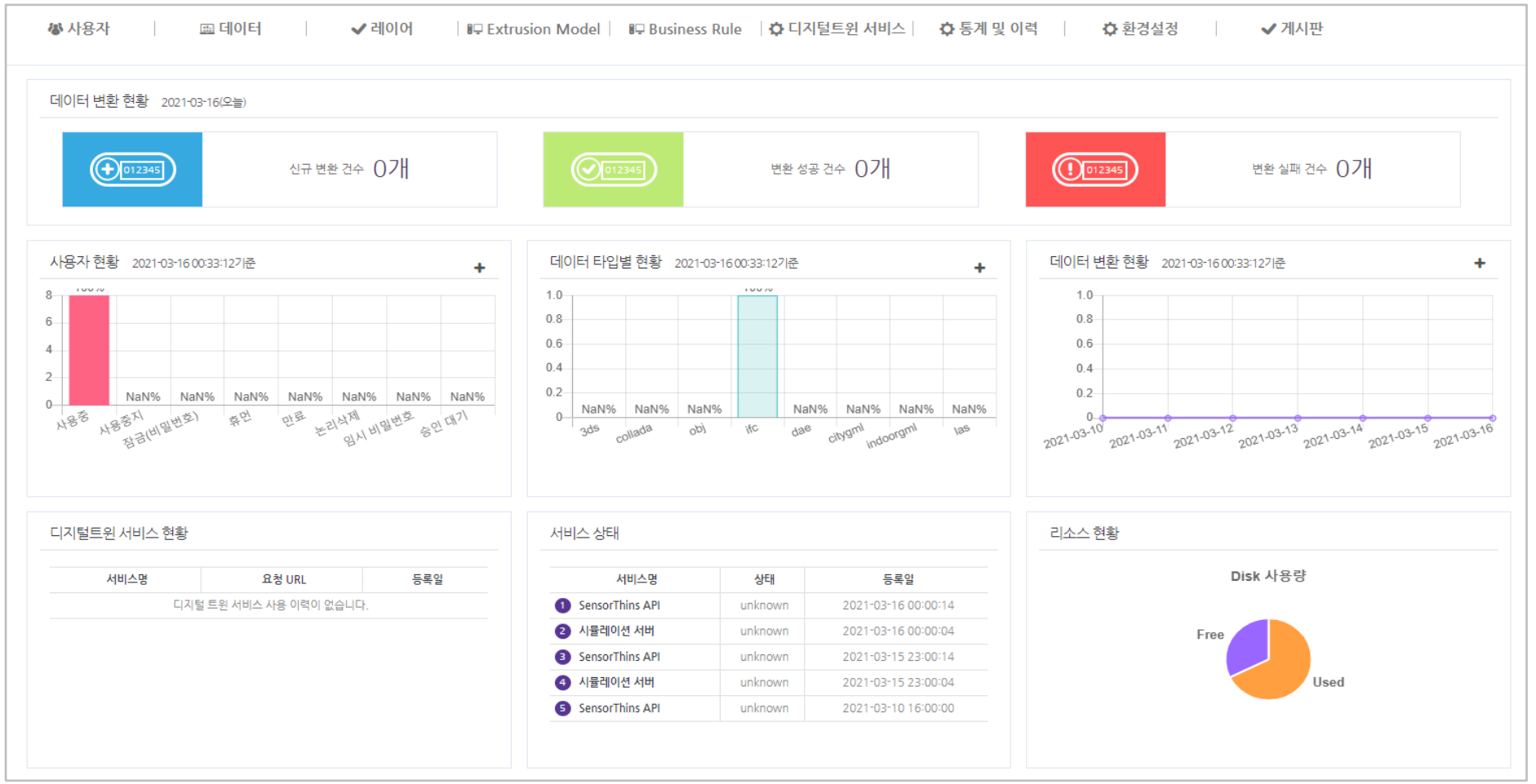


Visibility Analysis



Autonomous Vehicle Monitoring

Dashboard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통계 및 이력
환경설정
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만료
논리삭제
임시 비밀번호
승인 대기
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Free
Used

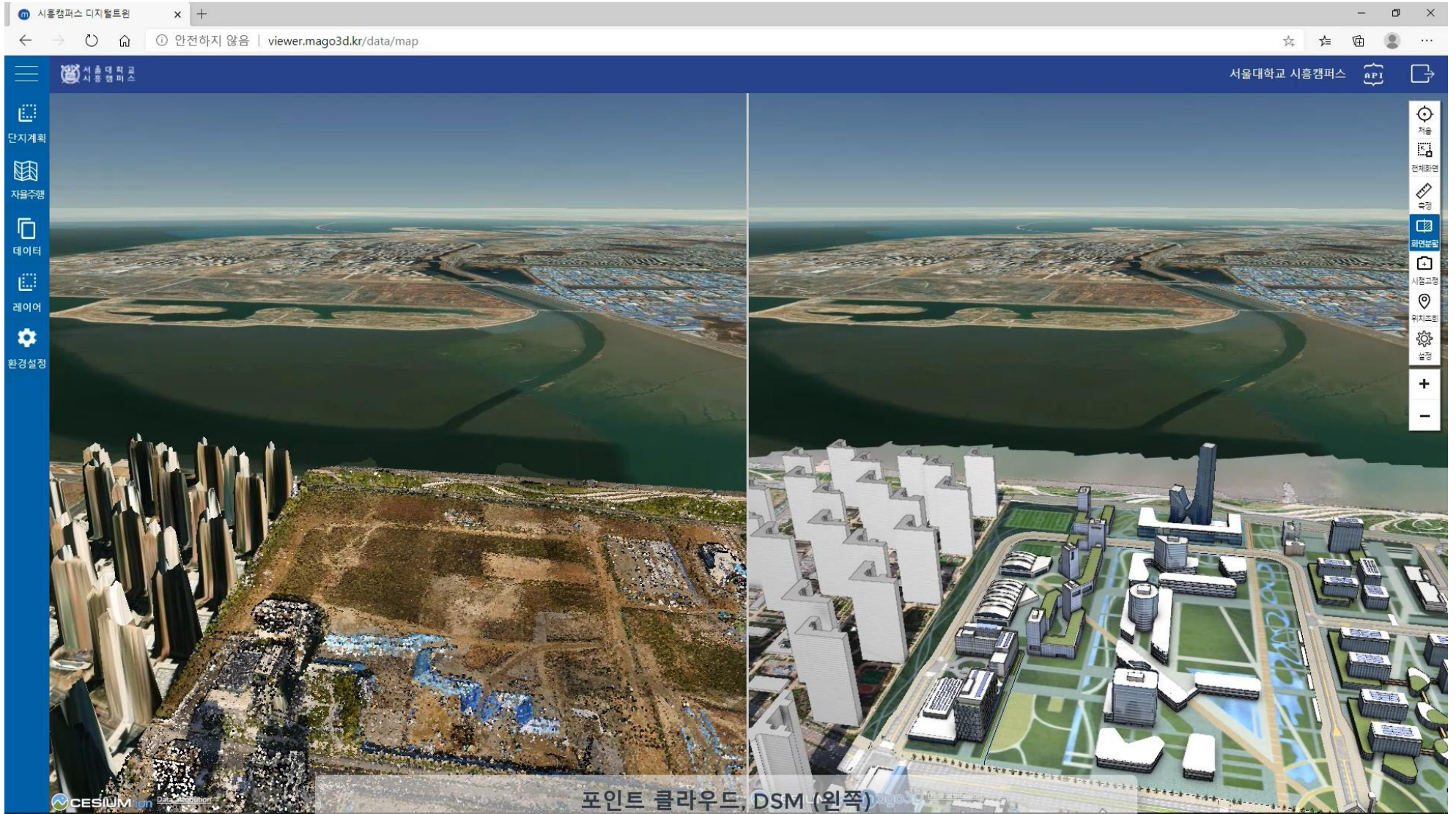
Real Cases - BIM Integration

Building | Locale | Neighborhood | City | Region | Nation

BIM (공장 시설)

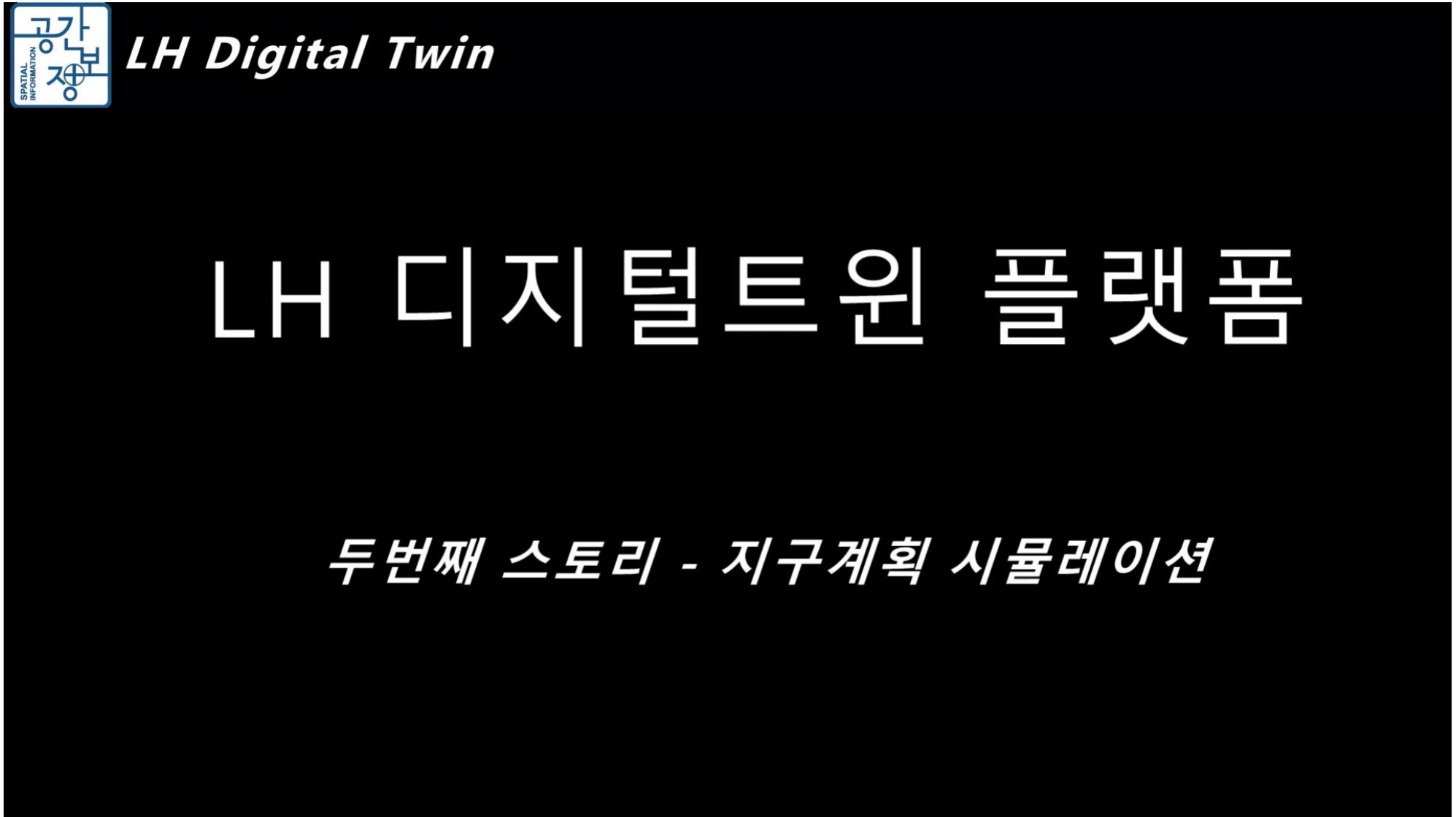
Real Cases - Before & After Construction

Building | Locale | Neighborhood | City | Region | Nation



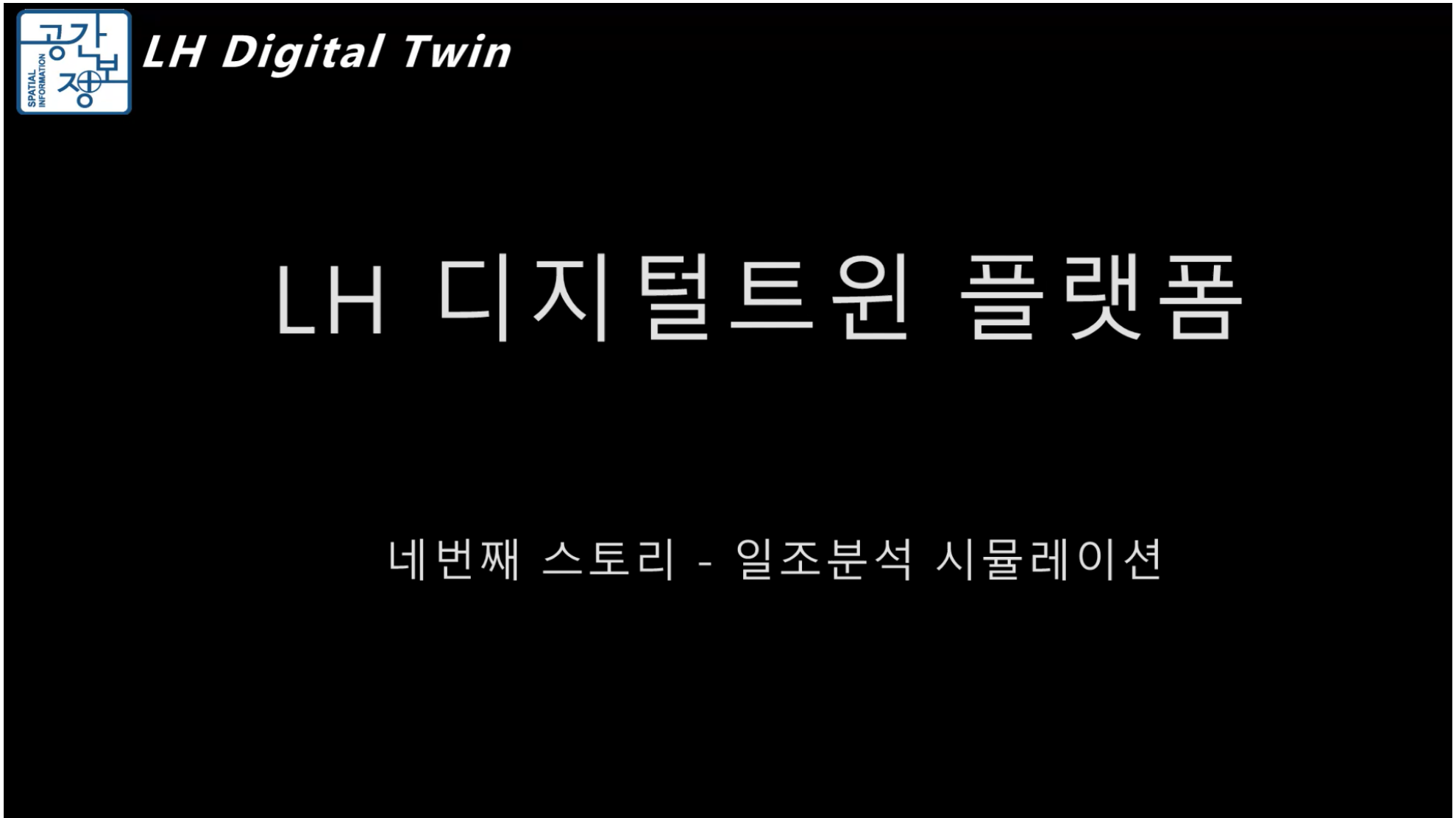
Real Cases - Town Planning

Building | Locale | Neighborhood | City | Region | Nation



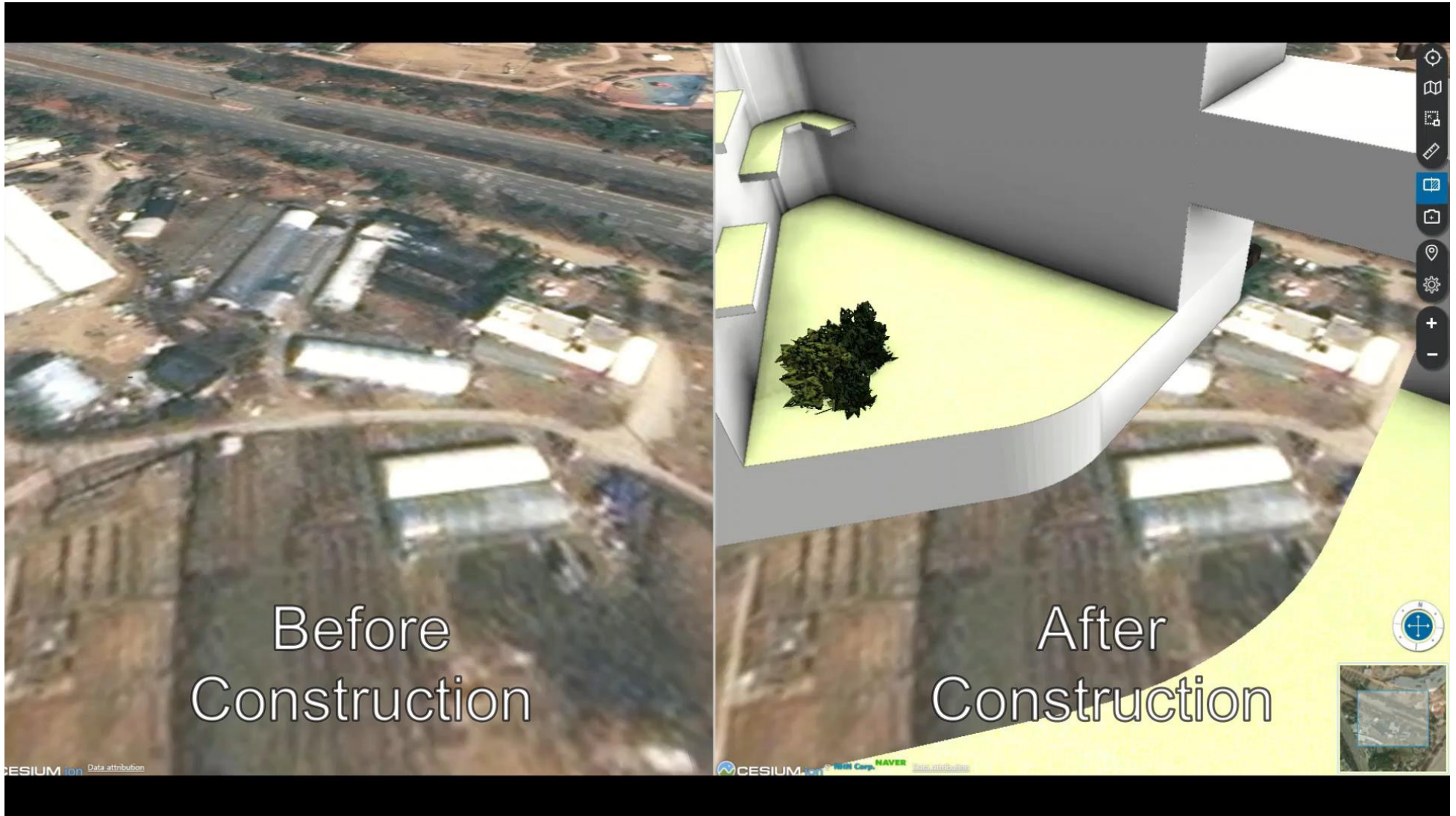
Real Cases - Town Planning

Building | Locale | Neighborhood | City | Region | Nation



Real Cases - Wind Simulation

Building | Locale | **Neighborhood** | **City** | Region | Nation

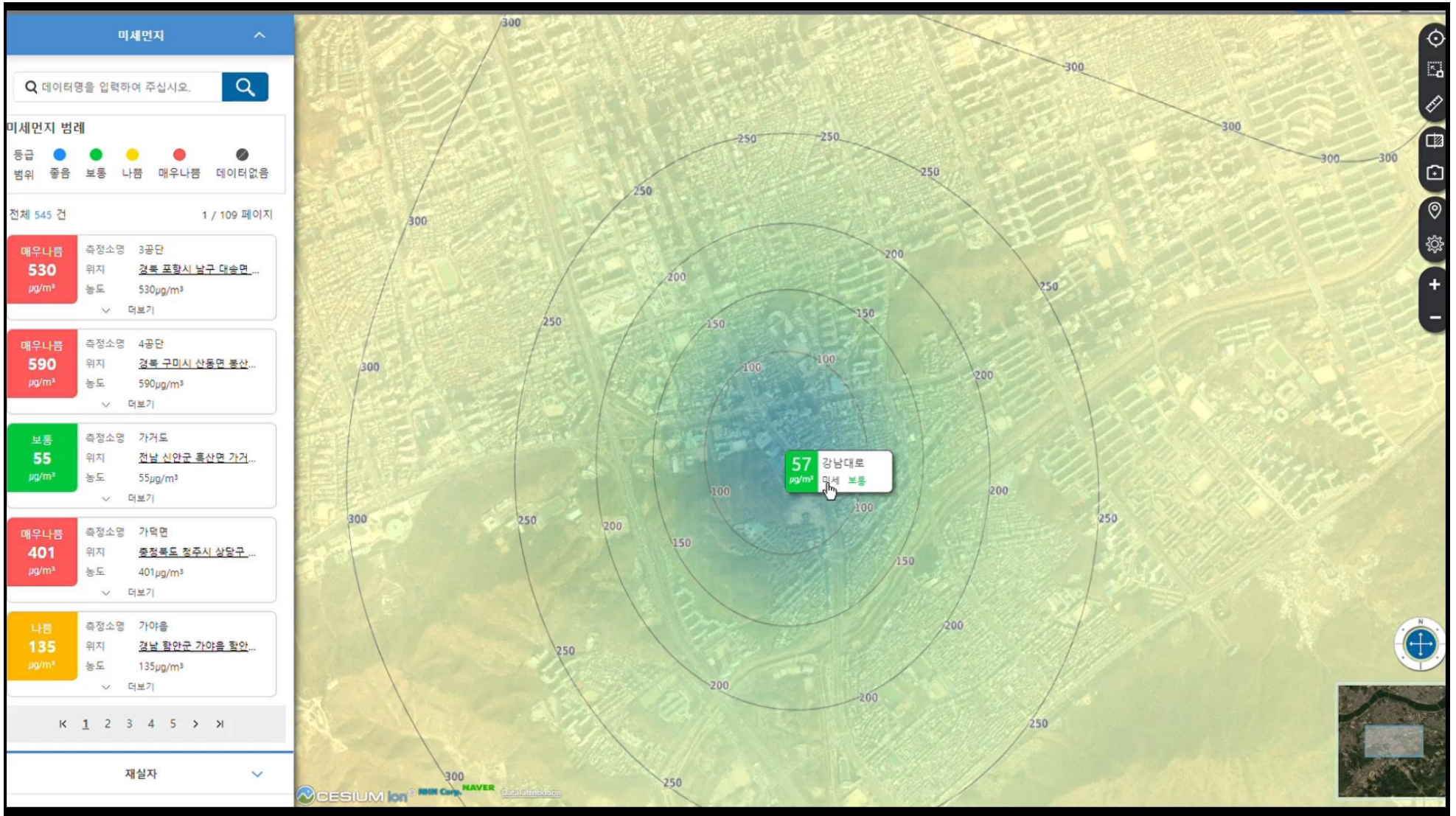


Real Cases - Wind Field

Building | Locale | Neighborhood | **City** | **Region** | Nation

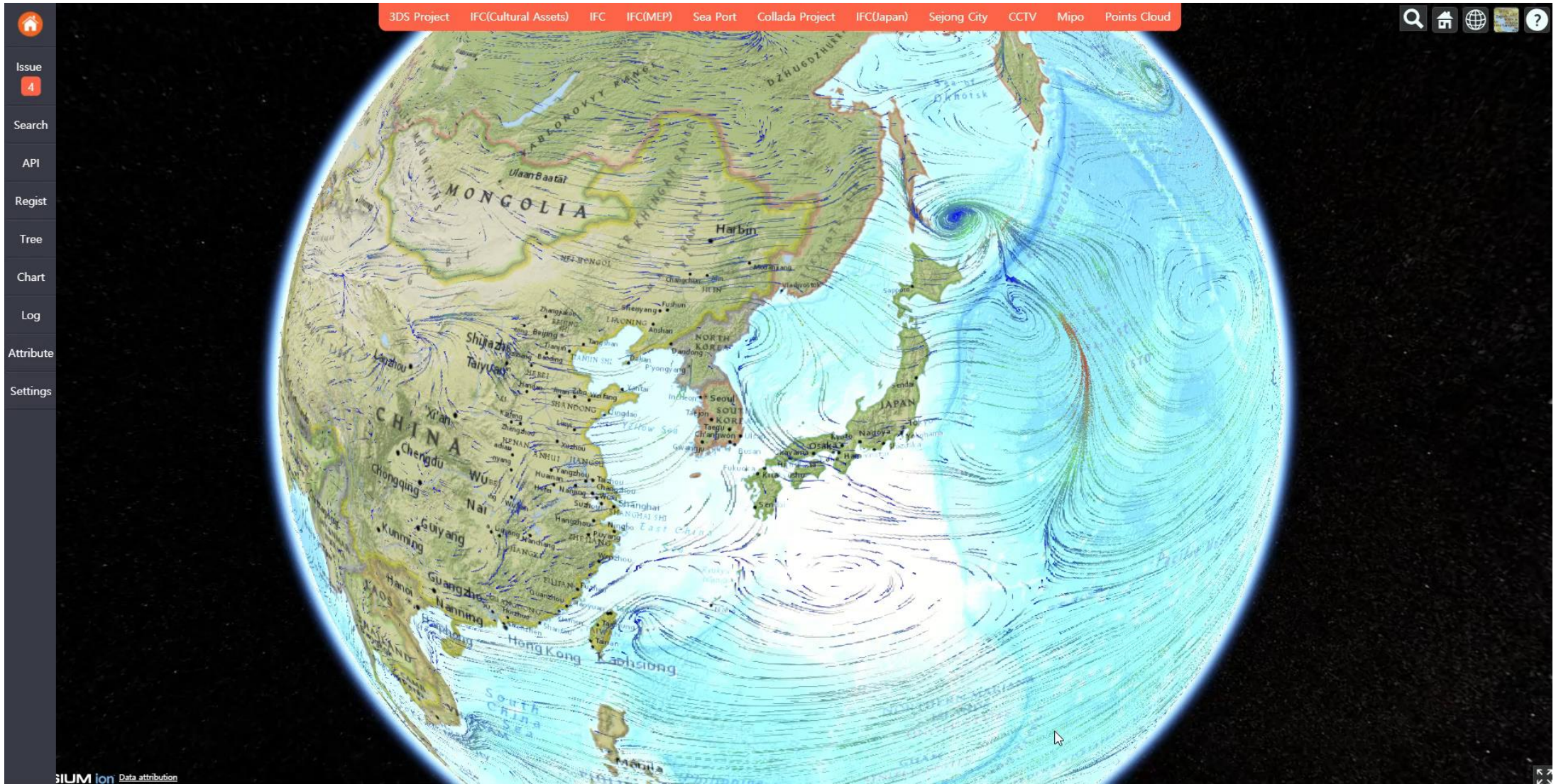
Real Cases - Fine Dust

Building | Locale | Neighborhood | City | Region | Nation



Real Cases - Global Weather

Building → Locale → Neighborhood → City → Region → Nation…



Bright and Dark Side

- Increased visibility in the Korean market
- Successful large-scale projects
- Reference sites
- Improved rendering speed and quality
- Expanded to enterprise solution
- Many experiences about data and other systems
- …

- Almost isolated only in Korea
- Small number of core programmers with little community
- Hard to deploy due to much dependencies on other projects
- Getting more complicated, complex, and huge
- Lack of manuals, guides
- Lack of clear roadmap
- …

mago3D

For more information, please visit http://mago3d.net
All the source codes are here:
https://github.com/Gaia3D/mago3d

Thank you!

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