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Large-Scale Regional Imaging Acquisition and Utilization Using Fixed-Wing Drones

ADB WORKSHOP | 2024.11.6.

SISTECH

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CONTENTS

Large-Scale Regional Imaging Acquisition and Utilization Using Fixed-Wing Drones

Ⅰ. Company Introduction

Ⅱ. Large-scale Immersive Video Production

Ⅲ. Application Example

Ⅳ. International Collaboration Project

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CONTENTS

Large-Scale Regional Imaging Acquisition and Utilization Using Fixed-Wing Drones

Ⅰ. Company Introduction

Information and History

Features and Advantage of Service

Features and Advantage of Technology

Technical Workforce Competence

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CEO	Seongjin Park
Est.	Feb. 2011
Staff	24
Address	1206, DMC R&D Center, Mapo-gu, Seoul, South Korea
Shareholder Composition	CEO[52%] Related Parties, Key Management Personnel

SCI Paper 2	Domestic Paper 4	Core Patents 8
Trademark Regs. 3	Winner of the Best New Product Award in South Korea 3 Years	Business Achievements >30

History

2014.12	2015.9	2017.10	2018.7	2018.11
Add an industry	Business Registration	Add an industry	Headquarters/ Factory Expansion	Factory Registration Certificate
Drone Manufacturing And Sales And Aerial Photography Business	Ultralight Flying Gear Register Your Business	Software Development & Supply	DMC Industry-university Cooperation Center Room 1206	Unmanned Aerial Vehicles And Unmanned Aerial Vehicles
2020.4	2022.1	2023.5	2024.8	2024.9
Add an industry	Establishment of the research institute	Add an industry	Relocation of the institute	Add an industry
Image Processing	Drone Company-affiliated Research Institute Headquarters	Robot Development And Manufacturing	Drone Company-affiliated Research Institute Incheon	Surveying

Technology And Business Prospects

The World's Leading Large-area 3D Modeling Technology

- Large-area 3D Model Realization Technology
- Shutter Control Technology According To The Speed Of The Drone
- Drone Sensor Calibration Technology

Holistic Business Skills

- Possess The Ability To Manufacture And Operate Self-developed Drones
- Fully Automated Post-processing And Object Recognition Technology
- Wideband 3d-model Data Service Technology

B2G

(Business Order)
Local Government, National Defense, Facility Management, Agriculture/fishing/forestry, etc.

B2B

(Continuation Project)
Mapping, Navigation, Simulation, Marketplace, Model Data Sale, Etc.

(Other)
Drone sales, design, etc.

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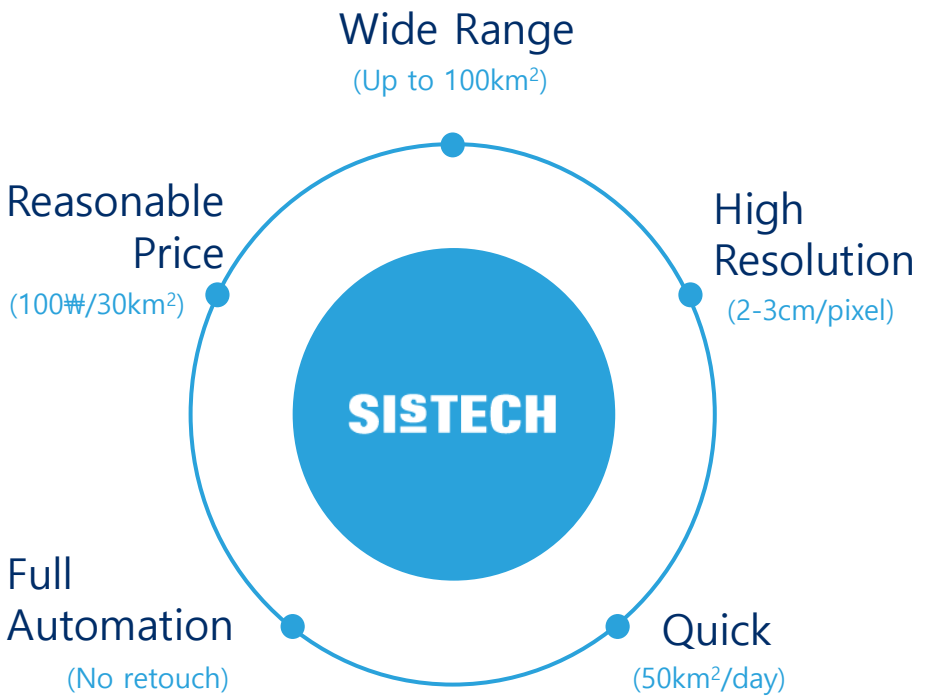
City-scale (100km²) Immersive 3D Data Service

5 Advantages of Service



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Features and Advantage of Technology

Self-developed Drones Provide City-scale 3D Model Data Services

Self-developed Drone Production & Operation Capability 01

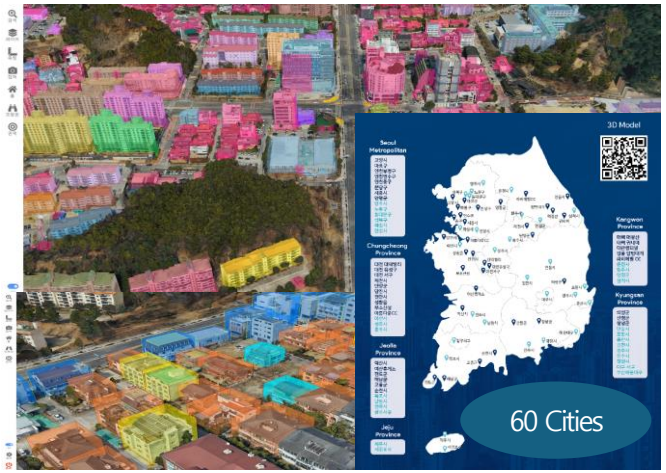
Optimize Long-haul Flights

- Self-development and production of drones
- Drone swarm flight technology – 30 km2 per 4 units at a time
- Up to 150 km per flight, up to 3 hours

City-scale 3D Modeling 02

Create a Wideband Range Model

- 200 km2 3D model of one plate
- Post-processing fully automated technology
- Object Recognition Technology



Broadband 3D Model Data Service 03

Expand Your Business by Providing a Variety of Services

- Providing market-tailored services
- Public information-based 3D model utilization service
- Time series analysis, safety management services, etc.

A Team Of Business Execution Experts

3D Model Production and Development 01

3D Model Geospatial Information Specialist

General Manager.
Sungchang Hong

- 12 years of experience in 3D Model construction/geospatial data
- Former 3D model instructor at Bentley
- Surveying and Geospatial Information Engineer Qualification

Drone Manufacturing & Operations 02

Drone Systems Technician

CEO. Seongjin Park

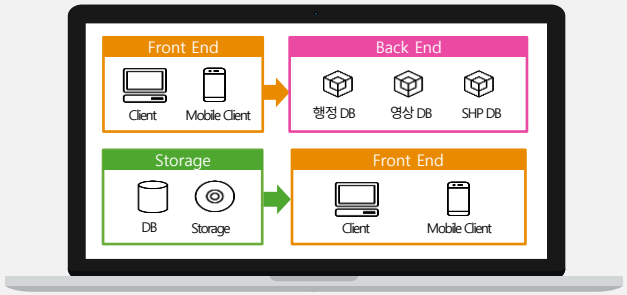
- 15 years of experience as a fixed-wing/multicopter first-class operator
- 15 years of experience in 3D model data

Drone Piloting Technician

Executive Director. Dubyeong Son

- Fixed-wing/Multicopter Class 1 Operator
- 25 years of flight experience (over 2,000 flights)

Front/Backend Development 03



S/W Development Specialist

Executive Director. Sangsoo Yi

- 20 years of experience in spatial information/3D visualization development
- Registered 3 types of spatial information S/W

Data Development Specialist

Manager. Byeonghak Jang

- 10 years of experience in data Backend development
- Web Service Development Technician/Information Processing Engineer Qualification

Company	**SISTECH Co., LTD**
CEO	Seongjin Park
Business Area	Data Producer Drone Manufacture Solution Provider Environment Design Service Platform
Address	No.1206 DMC R/D center, 37 Maebongsanro, Mapogu, SEOUL, Rep. of Korea
E-mail	ceo@sistech.seoul.kr
Website	www.sistech.seoul.kr

YouTube

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CONTENTS

Large-Scale Regional Imaging Acquisition and Utilization Using Fixed-Wing Drones

Ⅱ. Large-scale Immersive Video Production

Production Steps

① Drone Photography Plan

② Drone Imaging

③ Data preprocessing

④ Video Matching

⑤ Realistic model production

⑥ Visualization Optimization

⑦ Fast processing for streaming

⑧ Steaming Visualization Example

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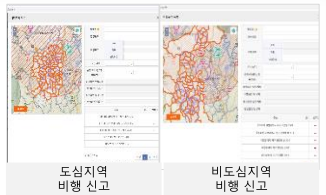
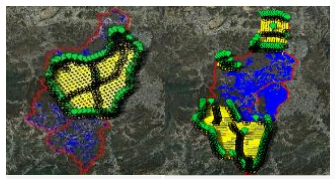
Production Steps

Plan Drone Shooting

For Risk Assessment
Survey of the planned area



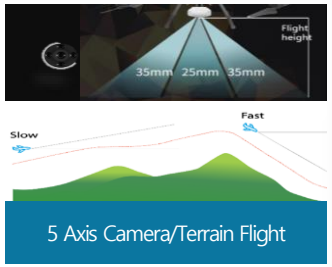
Site Selection&One-stop application for drones



Mission Crafting

Drone Filming

Through the flight path
Automatic flight and real-time control



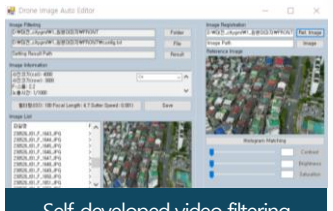
5 Axis Camera/Terrain Flight

Long-distance platooning

Data Preprocessing

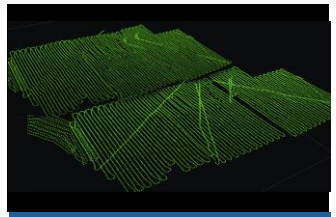
Real-time image preprocessing

Position and posture data entry



Self-developed video filtering
S/W pre-processing

Video Matching



Video & Enter metadata

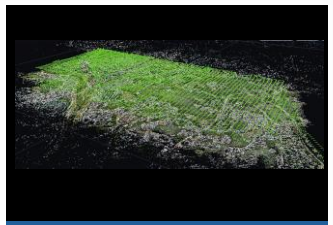


Image Data Matching

Position Editing

3D Realistic Models

Create a Point Cloud

Mesh and Texture Creation

3D Model

Ⅱ. Production Steps

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Production Steps - ① Drone Photography Plan

Filming Approval Process

[소방안전도시 구축을 위한 3D 실내외 모델 데이터 구축]
비행 및 촬영 계획

1. 무인비행장치에 관한 사항

가. 무인비행장치 제원 및 성능

신 고 번 호	C2CP0002020 ☑ 영리 ☐ 비영리	소유자(연락처)	㈜시스테크(02-2636-3222)
비행장치 종류	무인비행기	비행장치 형식	FIXWING
최대이륙중량(MTOW)	7kg	자체중량	5kg
순항속도/실속속도	16m/s , 13m/s	크기(가로x세로x높이)	2450*1450*400㎜
장치 사진 (전체)		장치 사진 (측면)	

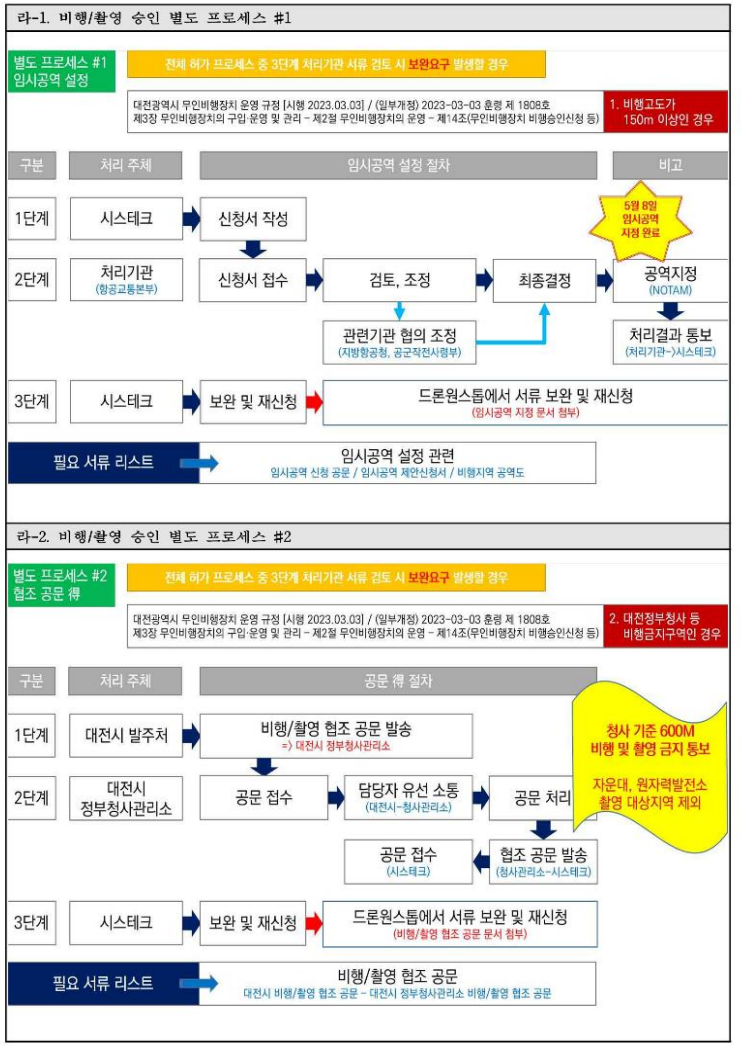
나. 무인비행장치 기능 및 운용한계

최대비행고도	300m		최대운영시간	약 150분	
자동안전장치(Fail-Safe)	☑ 장착	☐ 미장착	충돌방지기능	☐ 탑재	☑ 미탑재
영상촬영 카메라 (장착되는 경우)	종류	SONY A 6000	무게	344 g	
	형식	DSLR	크기(가로x세로x높이)	120 X 66.9 X 45.1 ㎜	

다. 비행 조종사에 관한 사항

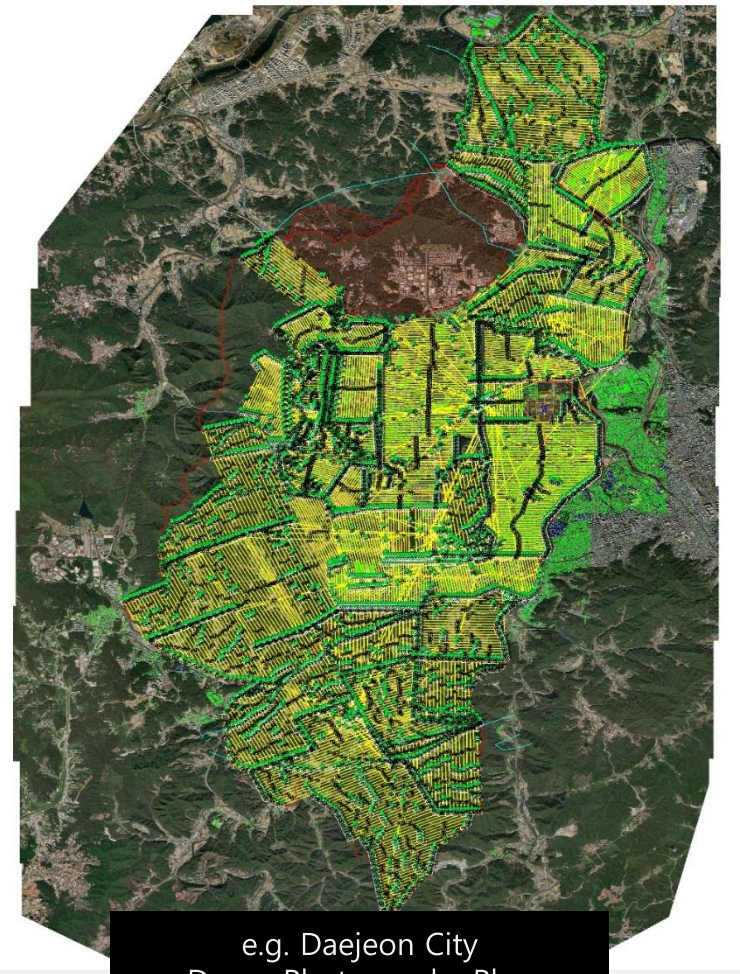
성명	자격명	자격번호	교부일	기타
손두병	초경량비행장치 조종자	91-007451	2018.03.12	
이종화	초경량비행장치 조종자	91-061587	2021.10.14	

라. 비행/촬영 승인 전체 프로세스



Production Steps - ① Drone Photography Plan

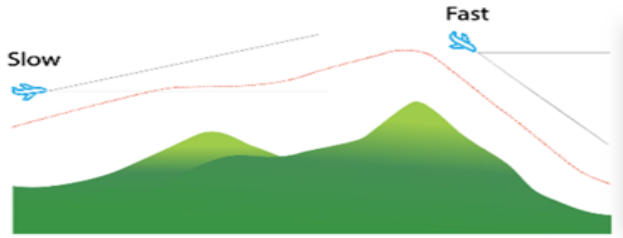
Applicable Technical Matters



e.g. Daejeon City
Drone Photography Plan

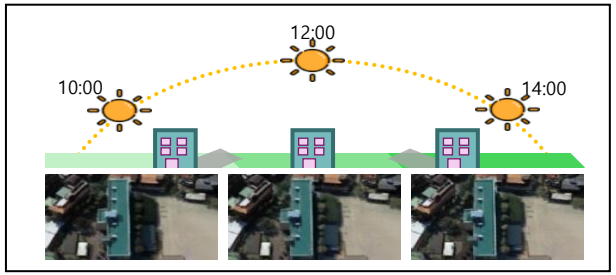
Shooting Plan with Consistent Quality through Terrain Flight

- Establish a shooting plan to have uniform quality with terrain flight considering elevation differences such as mountains and flatlands
- Establishment of a shooting plan that applies fixed-wing drones for rapid filming of city-sized areas



Shooting Plan to Minimize Occluded and Shadowed Areas

- Establish a shooting plan to express narrow alleys and minimize blind spots
- Considering the shadows, minimize the shaded area and establish a shooting plan



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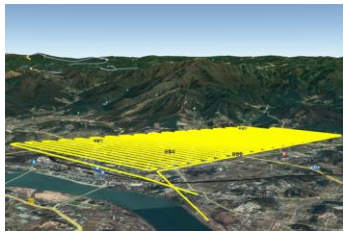
Production Steps - ① Drone Photography Plan

Applicable Technical Matters

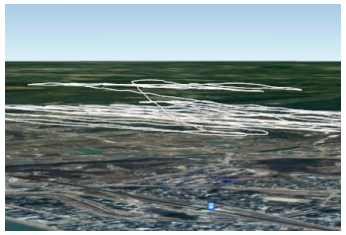
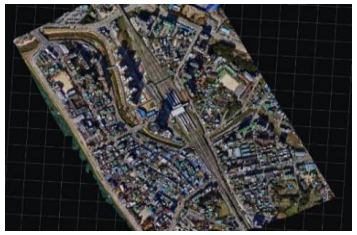
Examples of Incorrect Shooting Plan

Plan → Mission → Result



Examples of Improved Shooting Plan

Plan → Mission → Result

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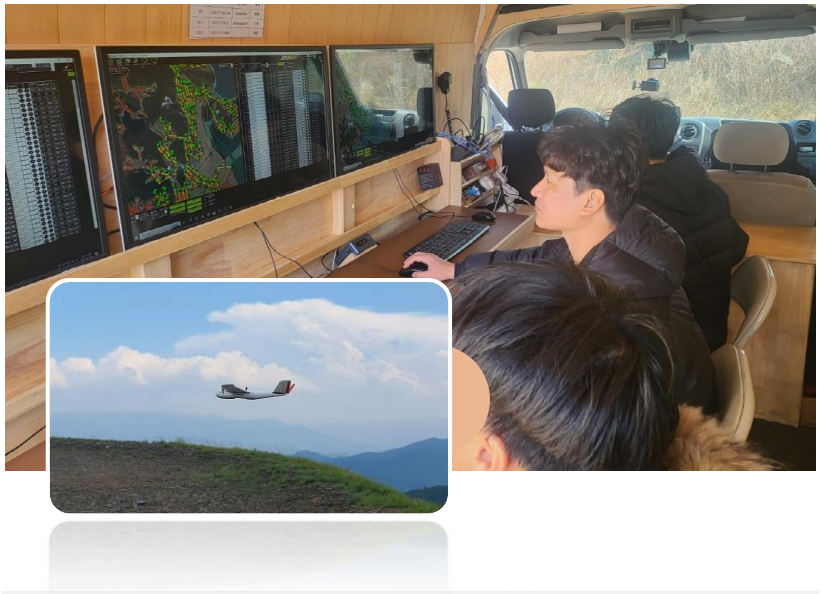
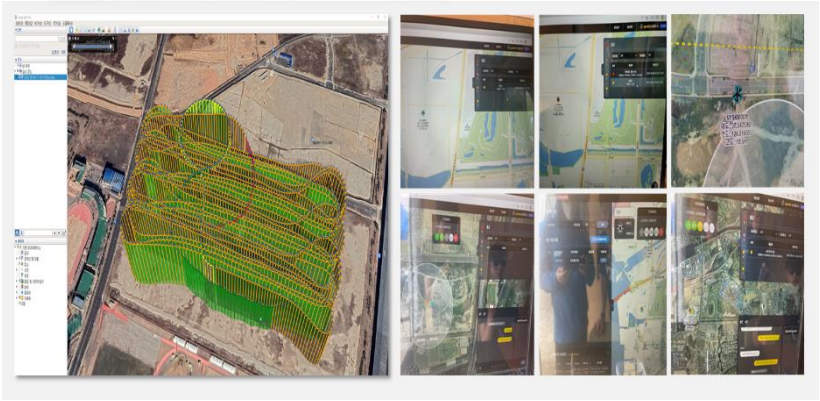
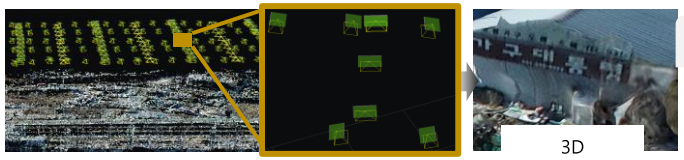
Production Steps - ② Drone Imaging

Applicable Technical Matters

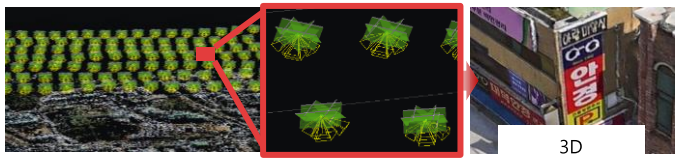




Drone Imaging with a Five-angle Camera for High-quality Deliverables



Double grid shooting using a single camera to shoot cross-strip



Single-grid shooting using a 5-Angle camera to shoot in a single strip

Benefits of this way

- It is possible to obtain a large number of photos compared to the shooting course
- Relatively in-depth filming, complete in one flight for all areas
- Easy to acquire slopes such as the walls of buildings

Rapid Drone Imaging through Large-scale Fixed-wing Swarm Flight

- For rapid large-area photography, multiple fixed-wing drones are flown at the same time to acquire data.
- Stable data acquisition even when flying multiple planes at the same time using the automatic airplane method

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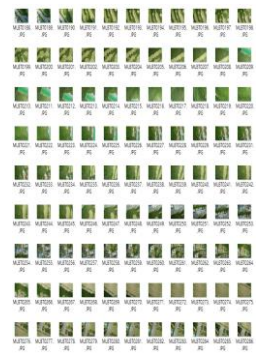
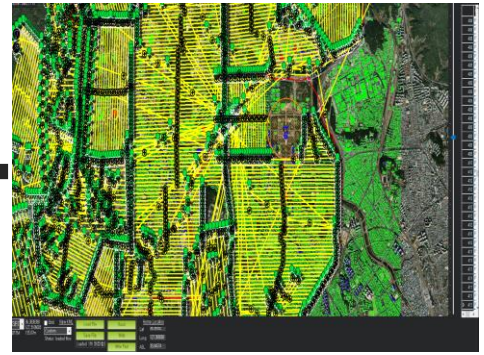
Production Steps - ③ Data preprocessing

Applicable Technical Matters

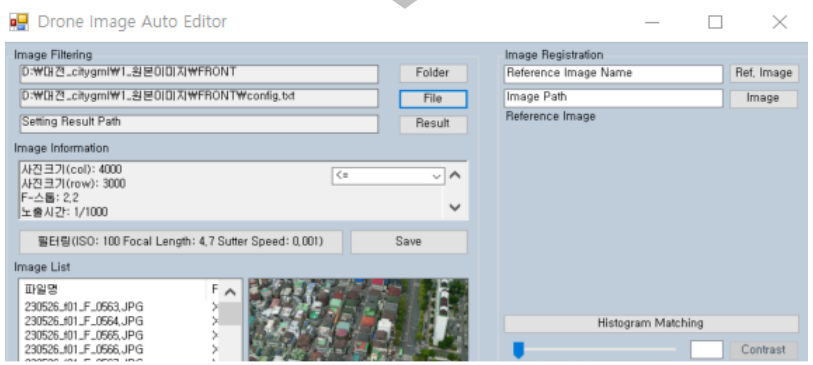


Image



Route

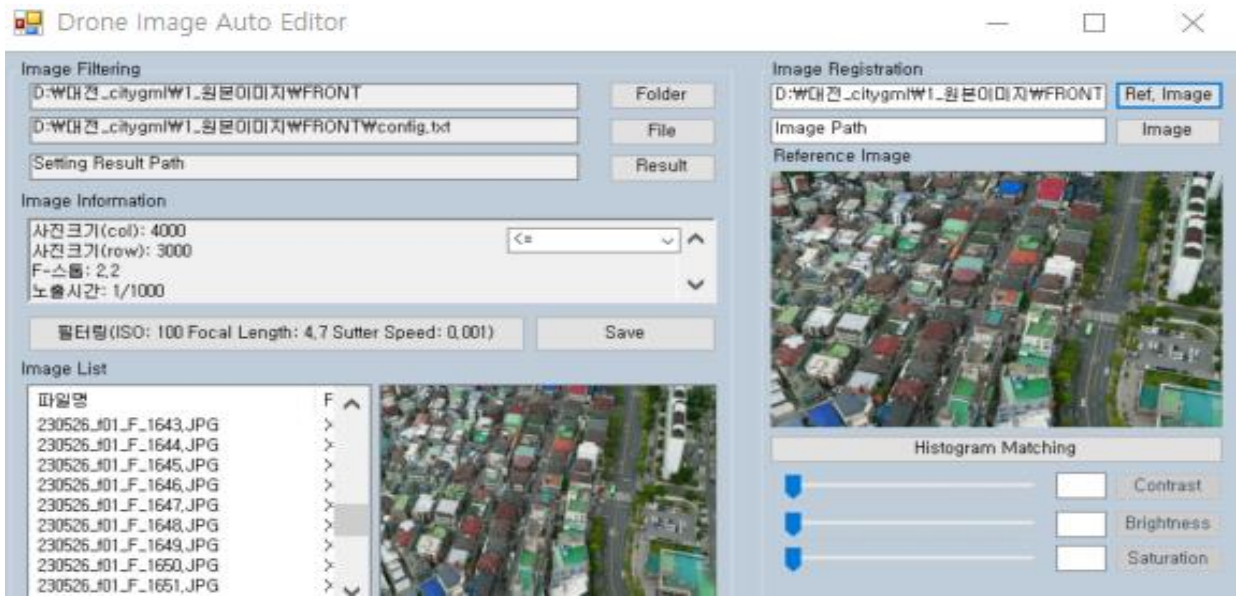
Geotagging



Self-produced video filtering S/W-based pre-processing

Optimize the Quality of the Original Photo with Filters and Color Correction

- Self-developed image filtering S/W-based pre-processing improves the quality of the original drone photo



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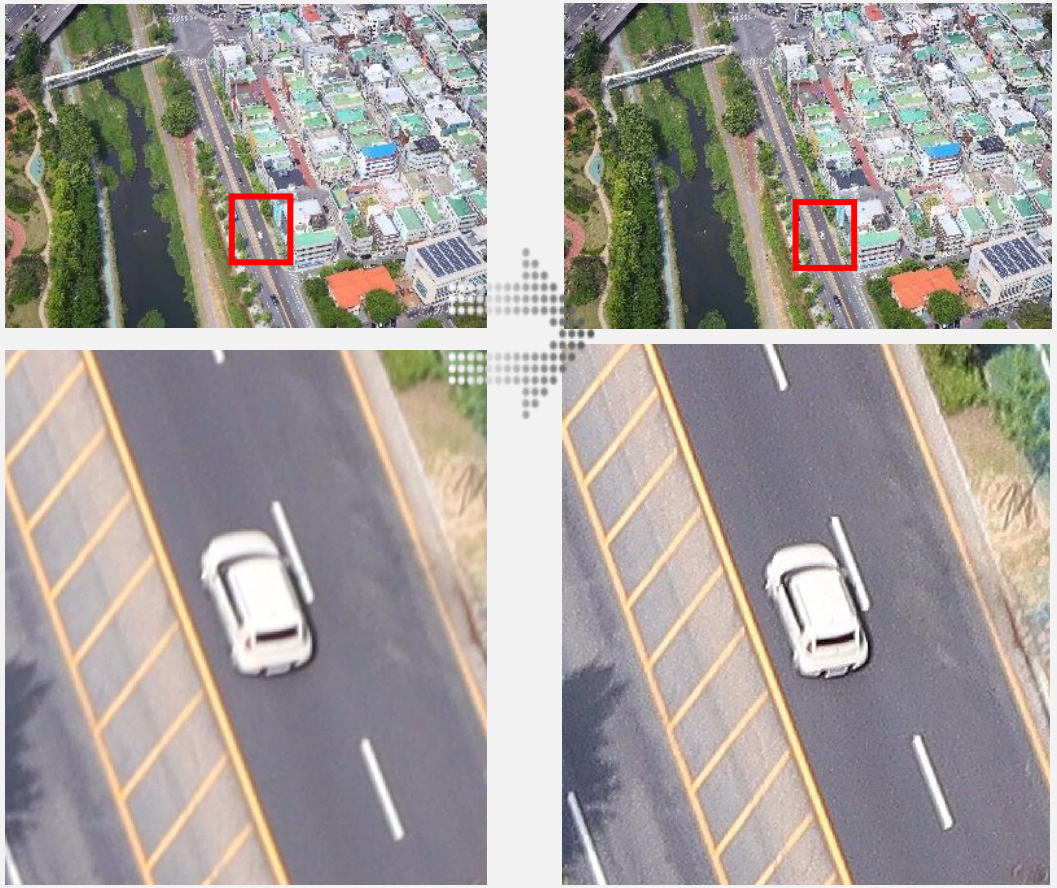
Production Steps - ③ Data preprocessing

Comparison of Auto-improvement Results and 3D Model Auto-production Results

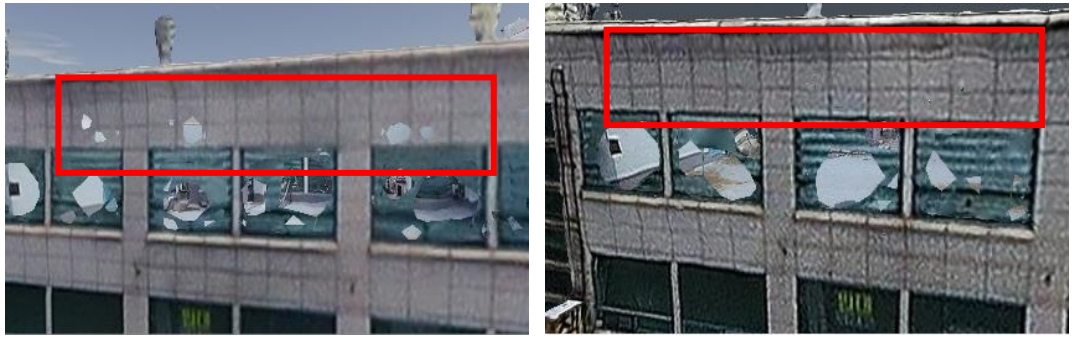
Source

Quality Improvement



Improve Model Clarity

Improving the Quality of Automated Building Models



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Production Steps - ④ Video Matching

Distributed Processing Process for City-Scale 3D Mesh Model

Data Acquisition and Preprocessing

Aerial Triangulation by Sortie

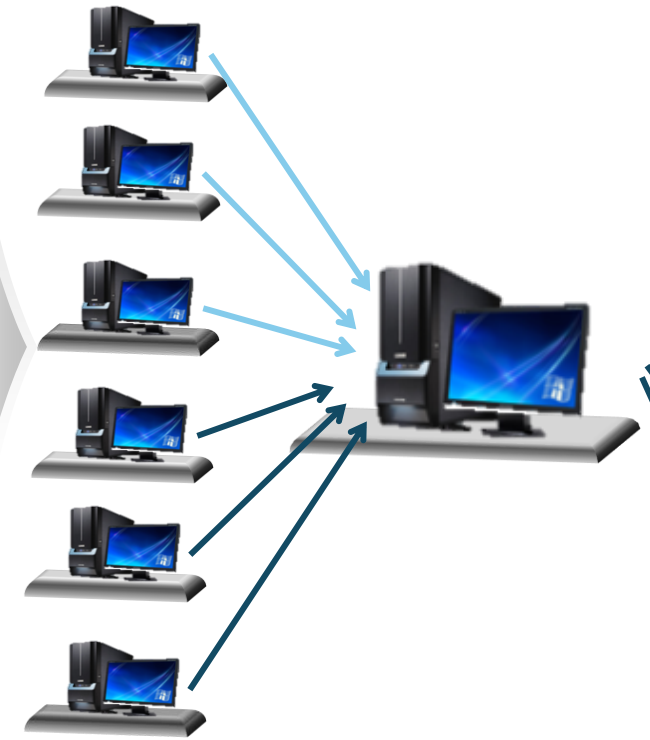
Integrated Image Registration in All Areas

Tile Division and Automatic Distribution

Large-scale Urban Mesh Fabrication and Integration

Acquiring Swarm Drone Footage

Automatic Image Pre-processing



Tile 1
Tile 2
Tile 3
Tile 4
Tile 5
Tile 6

Computers

More than 30 units

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Production Steps - ④ Video Matching

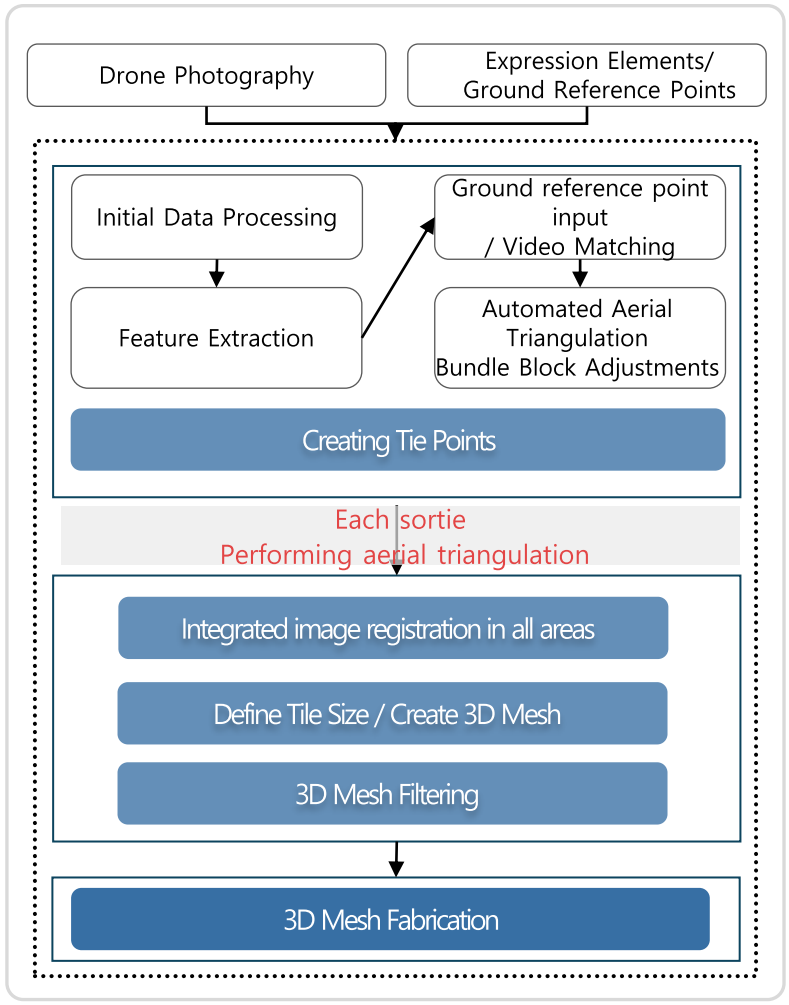
Video Registration & Production Process

Data Entry

Each sortie
Performing aerial triangulation

Integrated image registration in all areas

Crafting Deliverables



Data Entry and Ground Control Point Preemption

01

Aerial triangulation by each sortie

02

All-zone integrated video registration

03

Tiling and distributed processing

04

Create a 3D model

05

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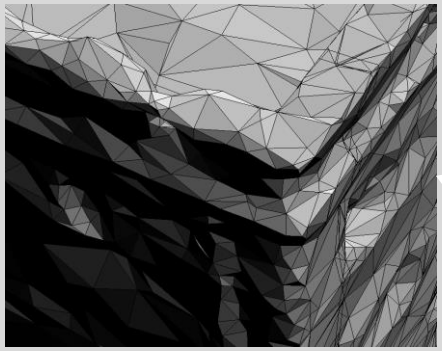
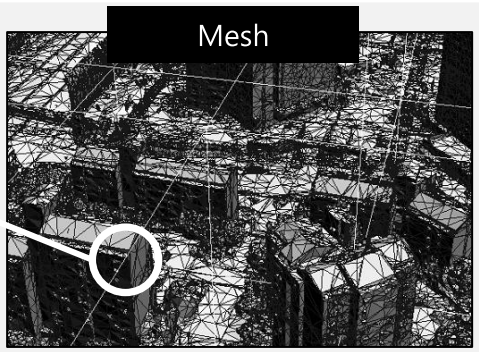
Production Steps - ⑤ Realistic 3D Model Production

City-scale 3D Realistic Model





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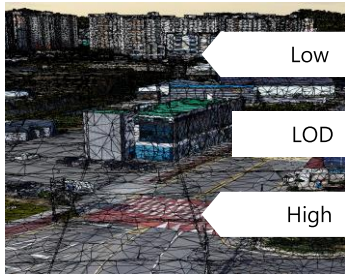
Production Steps - ⑥ Visualization Optimization

Optimization Technology For Streaming 3D Models

Development of Drone Modeling Result File Input Module

Input of 3D Model



Modeling Result File Formats

B3DM, 3MXB

Tileset metadata

Entering the metafile for streaming processing

Input Module Development

Common Metafile Definitions

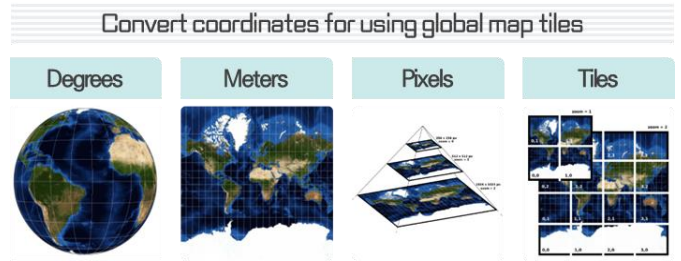
tilesets.json, metadata.xml

Creating a Tile Pyramid Structure

Development of Optimization Technology for Streaming

Handling the Tilemap Standard Coordinate System

Use most open source and commercial map API providers

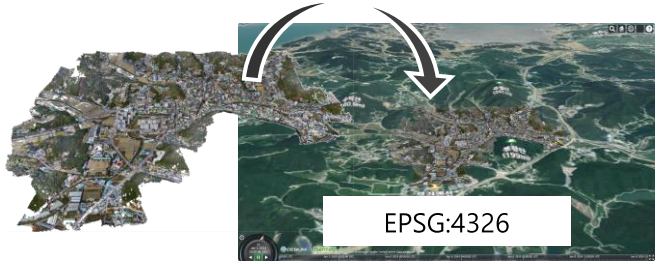


Older Mercator:
Google Development, Local Standardized Coordinate System

Platform Operational Coordinate System Conversion

Urban Area 3D Model and For nesting visualization

Coordinate System Unification



National Geospatial Information Service Standard Coordinate System: Central Origin (GRS80)

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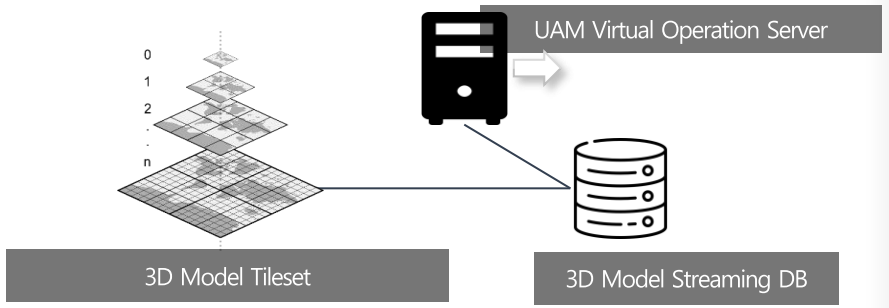
Production Steps - ⑦ Fast processing for streaming

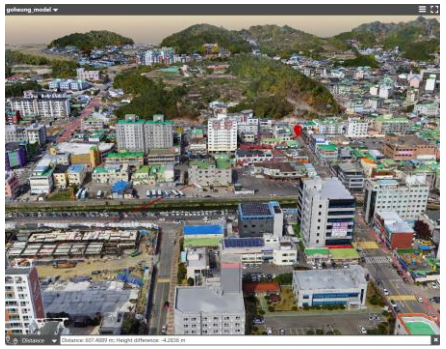
Development of Streaming Model 3D Visualization Module

Support for Optimal Visualization of 3D Model linked to the Operation Server in the City Center

Indexing Metadata Files and Dependent Subfiles

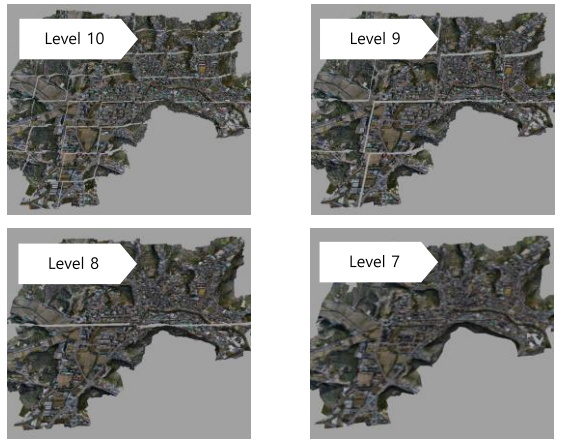


Fast Downloads and Screen Rendering with Real-time Streaming

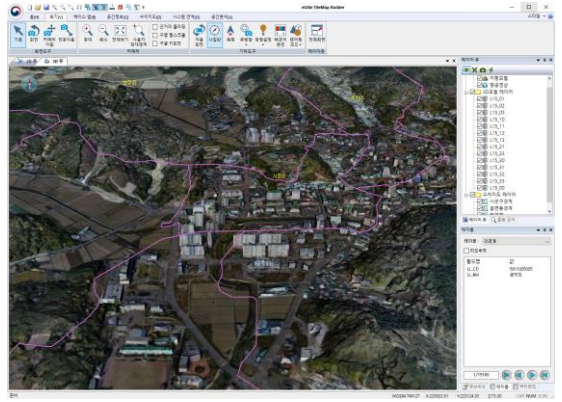


Support Visualization of 3D Model of Urban Areas Stored in Files

Visualize a Local Storage File System 3D Model



Indexing processing and screen rendering



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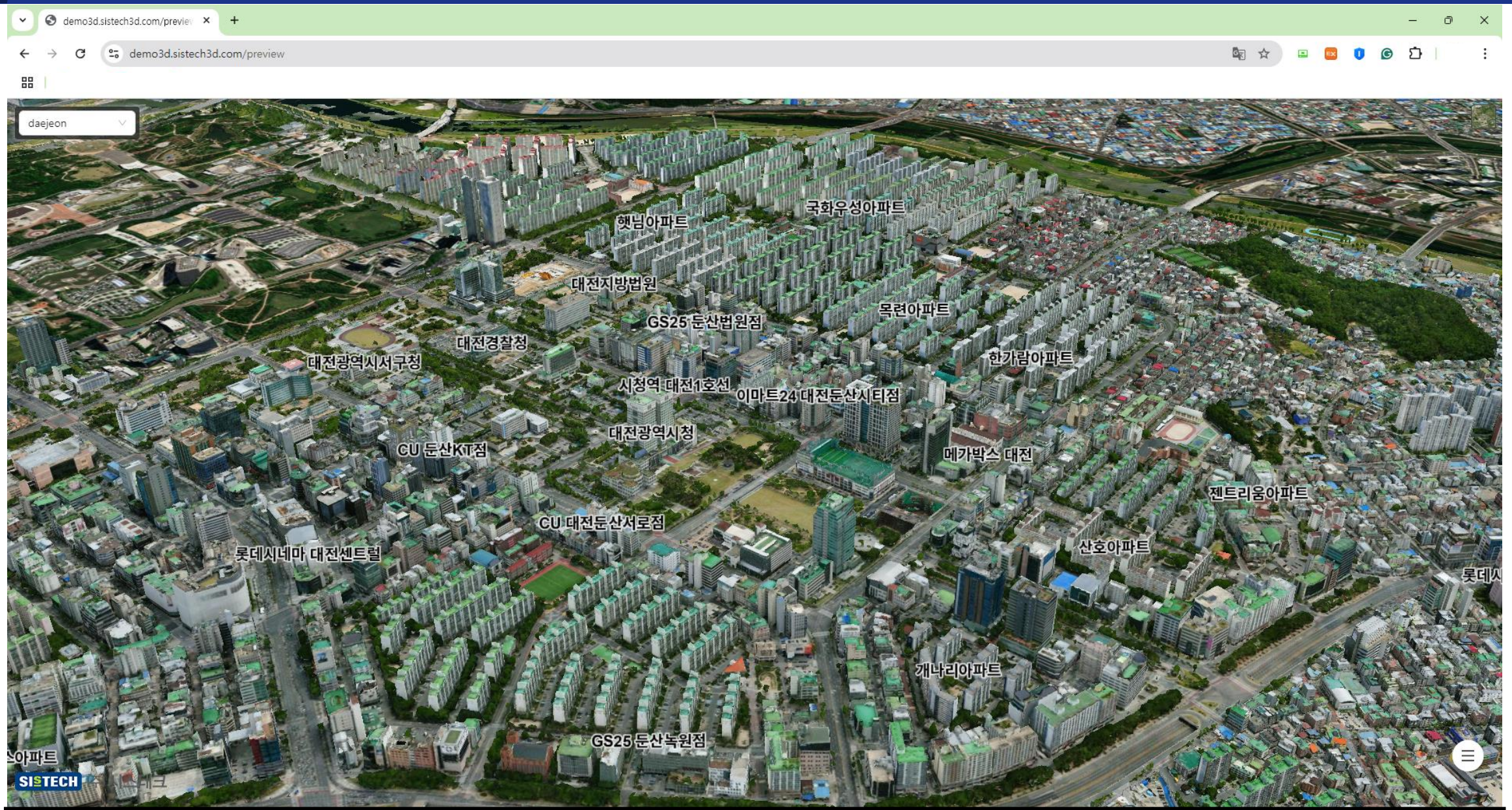
Production Steps - ⑧ Steaming Visualization Example



CONTENTS

Large-Scale Regional Imaging Acquisition and Utilization Using Fixed-Wing Drones

Ⅲ. Application Example

Building a 3D Surveillance Platform

Operation of Traffic Situation System

Drone-based High-resolution Precision Drone Traffic Model

Rural Customized Flood Damage Management Platform

Region-specific Crop Classification and Cultivation Area Survey

Administrative Services

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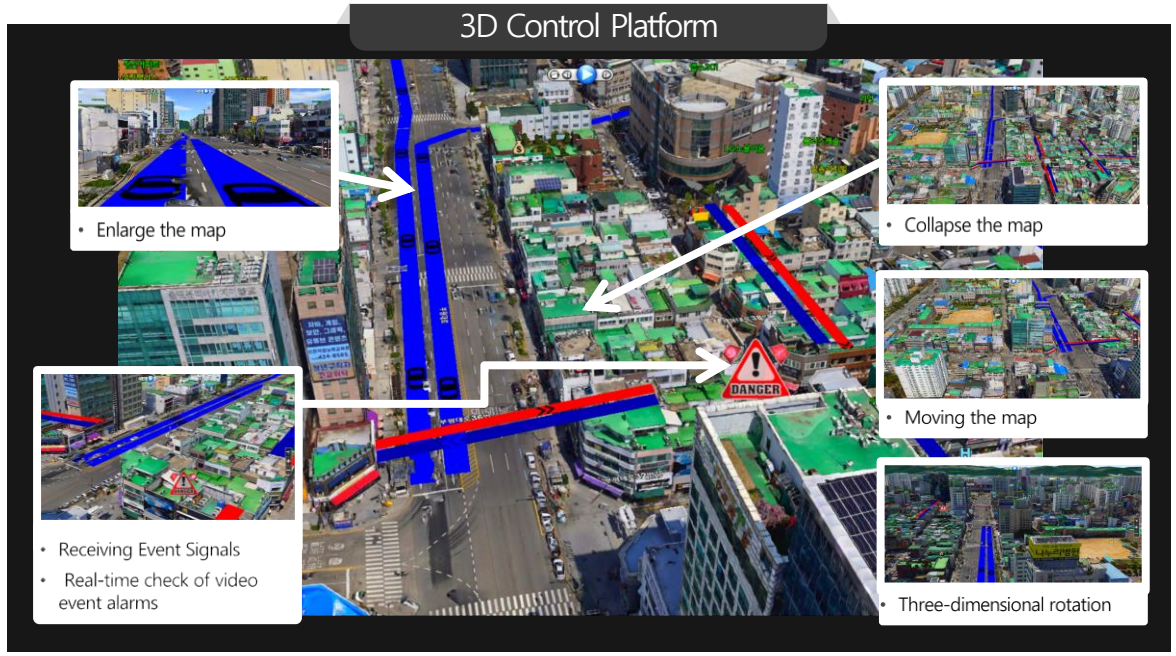
3D Surveillance Platform

The 3D space of the 3D Control Platform enables
the Realization of Realistic Scenarios and Simulators



01 Contingency Implementation

In case of emergency, nearby CCTV control

(1) Display nearby CCTV footage
(2) Move in the direction of the emergency point
(3) Pen tilt control and situational information display

02 Implement Scenario Features

Build at least 3 scenarios for the event

(1) Display of the location control of the driving vehicle
(2) Sudden situation and normal situation control
(3) Scenario layer on-off function

03 Implementing Simulator Functionality

Running a 3D simulator based on setup information

(1) Vehicle Information Settings
(2) Pedestrian information settings
(3) Set simulator launch information

Implement Scenario Features 02

Emergencies are displayed and confirmed

(e.g.) Traffic accident

Executing contingency scenarios

(e.g.) Police car/fire truck

Status Reporting and Management

(e.g.) Situation Resolution Screen

Implementing Simulator Functionality 03

Vehicle Information Settings

Vehicle

Type, Route, Property(excel/brake, Etc.)

Pedestrian Information Settings

Pedestrian

Type , Object, Event

Vehicle Information Verification

About Driving Settings
About Pedestrian Settings

Reset Function According To Verification Results

3D Information Mapping

Suitable for vehicle routes
3D Static Object Information Mapping

Suitable for pedestrian locations
3D Static Object Information Mapping

Setting Execution Information

Execution Information

Timer, Execution Speed Etc.

Run the simulator

Ⅲ. Building a 3D Surveillance Platform

3D Surveillance Platform

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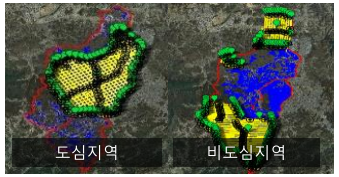
Operation of Traffic Situation System

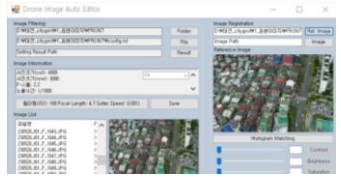
Building A Drone-based High-resolution Digital Twin

01 Plan Drone Shooting

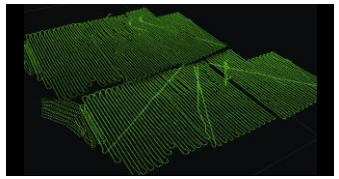


02 Drone Footage

03 Data Preprocessing

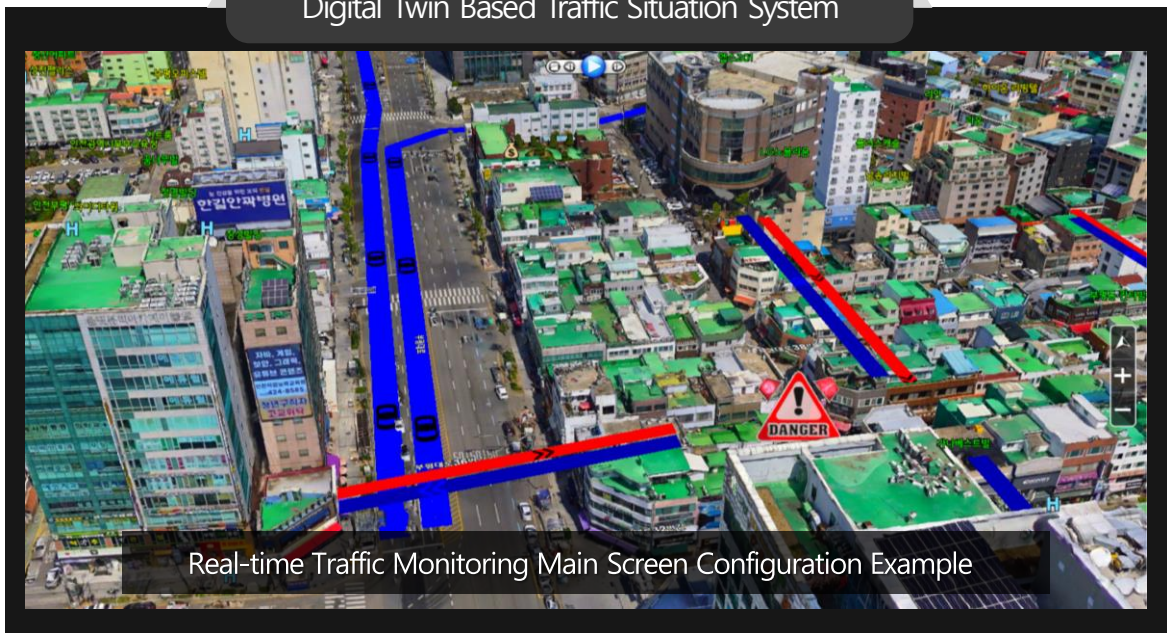


04 Video Matching



05 3D Model Creation

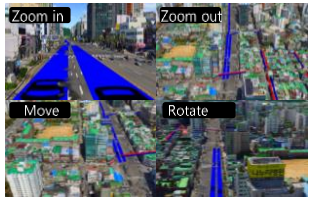
Digital Twin Based Traffic Situation System



Real-time Traffic Monitoring Main Screen Configuration Example

01 Traffic-based Lane Information Display

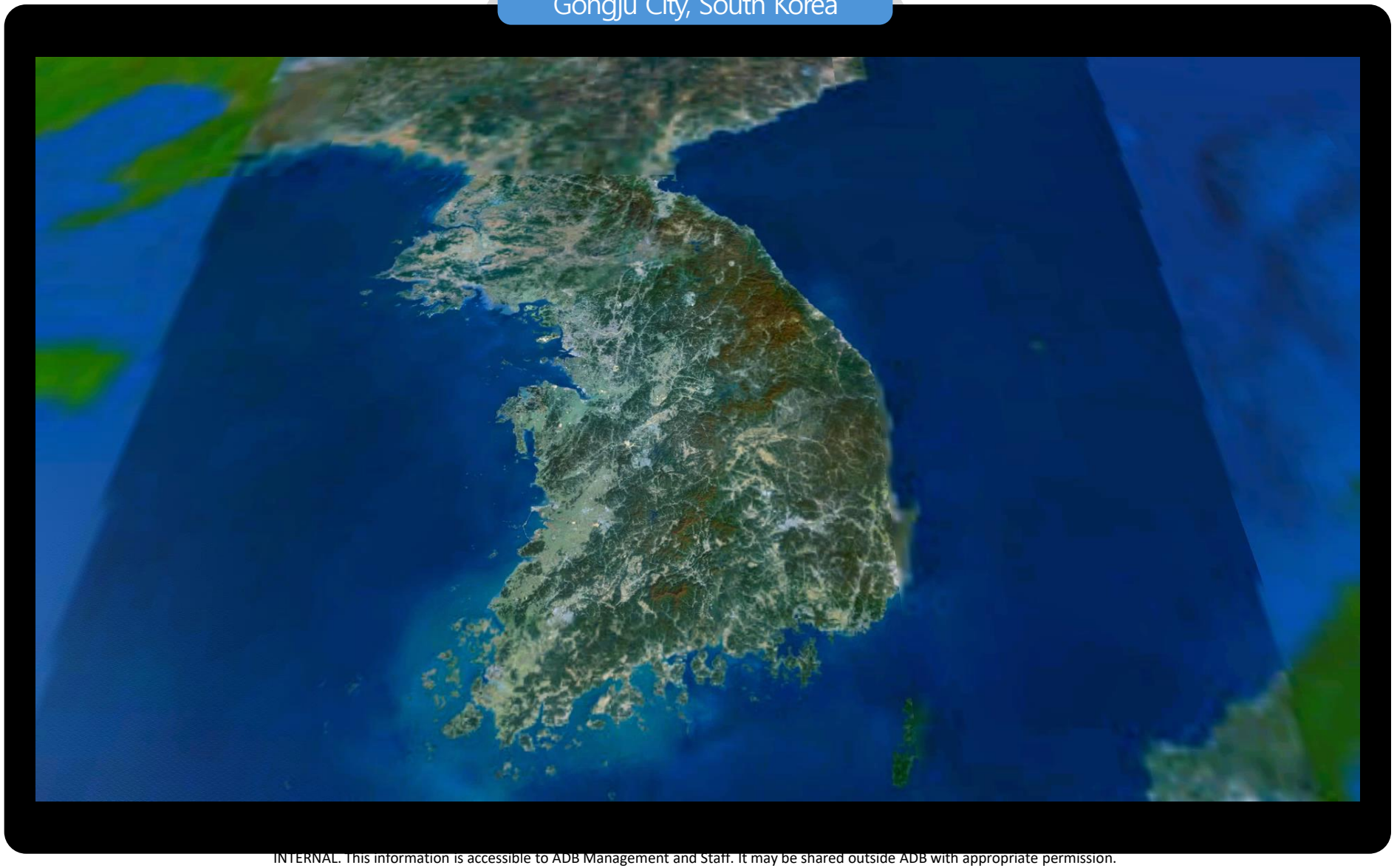
02 According to the Zoom Level Screen Adjustment



03 Precision Map Vector Map Registration, Modification, Inquiry And Visualization

Ⅲ. Operation of Traffic Situation System - Example

Gongju City, South Korea



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Drone-based High-resolution Precision Drone Traffic Model

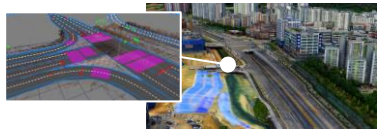
Drone Traffic Model

Drone-based High-resolution Highway Map Data Construction

01 Fundamental Data Analysis
- User Needs Analysis
- Data Format Analysis

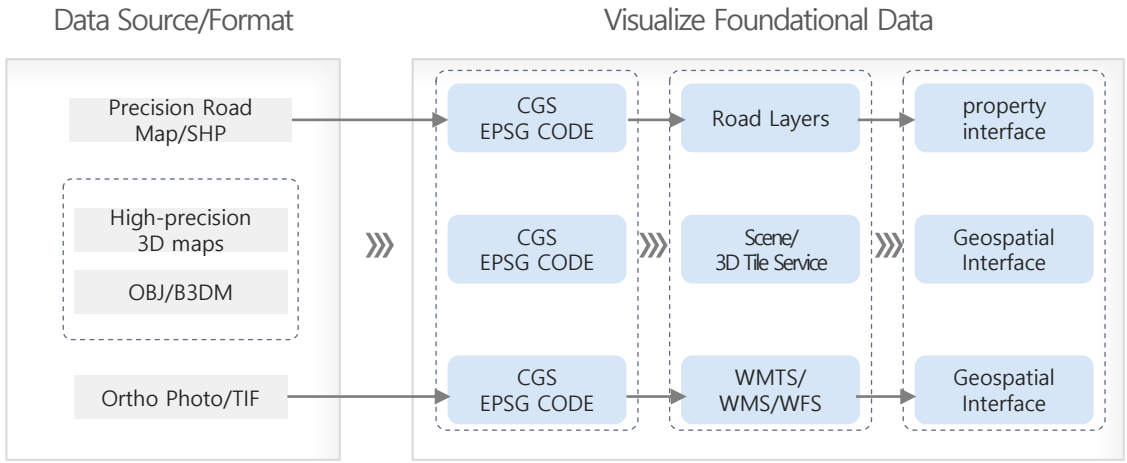
02 Drone-based High-precision 3D Map Construction

03 Spatial And Attribute Data Coordinate-based Nesting



04 Build Map Data

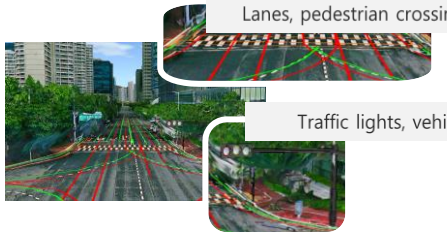
Digital Twin Map Data Construction Process



Data Map Configuration: Classification and Visualization Scheme by Map Layer Topology

	Entry	Layer	Format	Content
1	Attribute Layers	Status boards, milestones, and other road structures and object attribute layers	SHP	Exists at the top of the topology
2	Precision Road Map Layer	Dynamic Objects	3DS (XPL)/DB	Traffic lights, vehicle signals, and other dynamic object layers and data
		Stop lines, lanes, crosswalks, center lines, traffic islands, etc.	SHP	Each layer is positioned individually without influencing the topology
3	3D POINT CLOUD	MMS-based point clouds (if required)	LAS	Sub-position for map layer representation with precision
4	3D MESH	3D Immersive Map Data	3d Tiles (b3dm)	Based on a 3D tilemap, it is located on top of the orthoimage in terms of topological relationship
5	Ortho Photo	Satellite, aerial, drone-based 2D tilemaps	PNG/GEO TIFF	Based on the lowest position in terms of topology

Example of building map data with data attribute-based precision



Drone-based High-resolution Precision Drone Traffic Model

Long-distance drone use highway and coastline construction case

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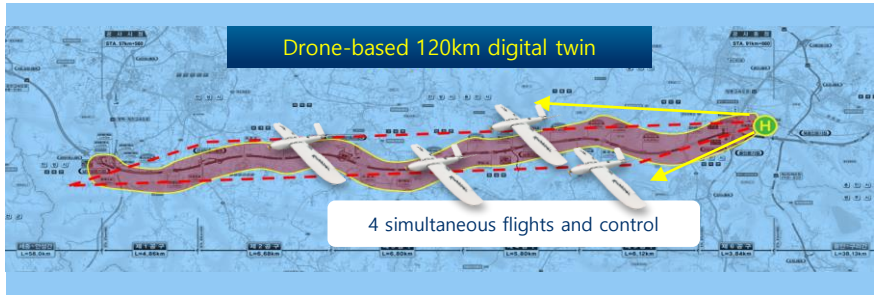
Drone-based High-resolution Precision Drone Traffic Model

Precision Road Traffic Model – Expressway



Demonstration section 120km 1 day shooting

1 team, 4 drones shooting at the same time

3cm-class high-resolution realistic image

You can check the road condition

Map overlay with vector precision

SHP-based vector support

Maps with 3D precision

A map that depicts the real world in 3D

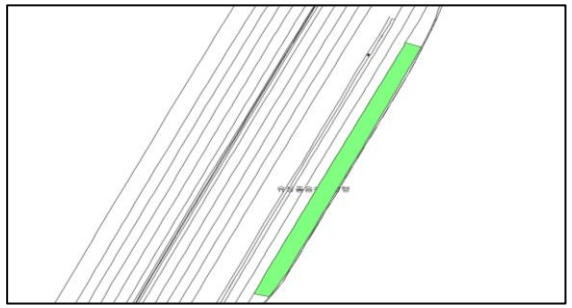
(e.g.) Part of the Western Inland Expressway and Highway 251

Drone-based High-resolution Precision Drone Traffic Model

Precision Road Traffic Model – Expressway Production Result

Supports Both Standardized Vector Map-based Precision Maps and 3D Digital Twin Maps

Expressway Precision Map



01 Sleepy shelter

02 Vehicle Protection Safety Facility Median

03 Soundproofing Wall/Fence

Digital Twin Map

Rural Customized Flood Damage Management Platform

Overview of Agricultural Infrastructure and Disaster Response Technology Development

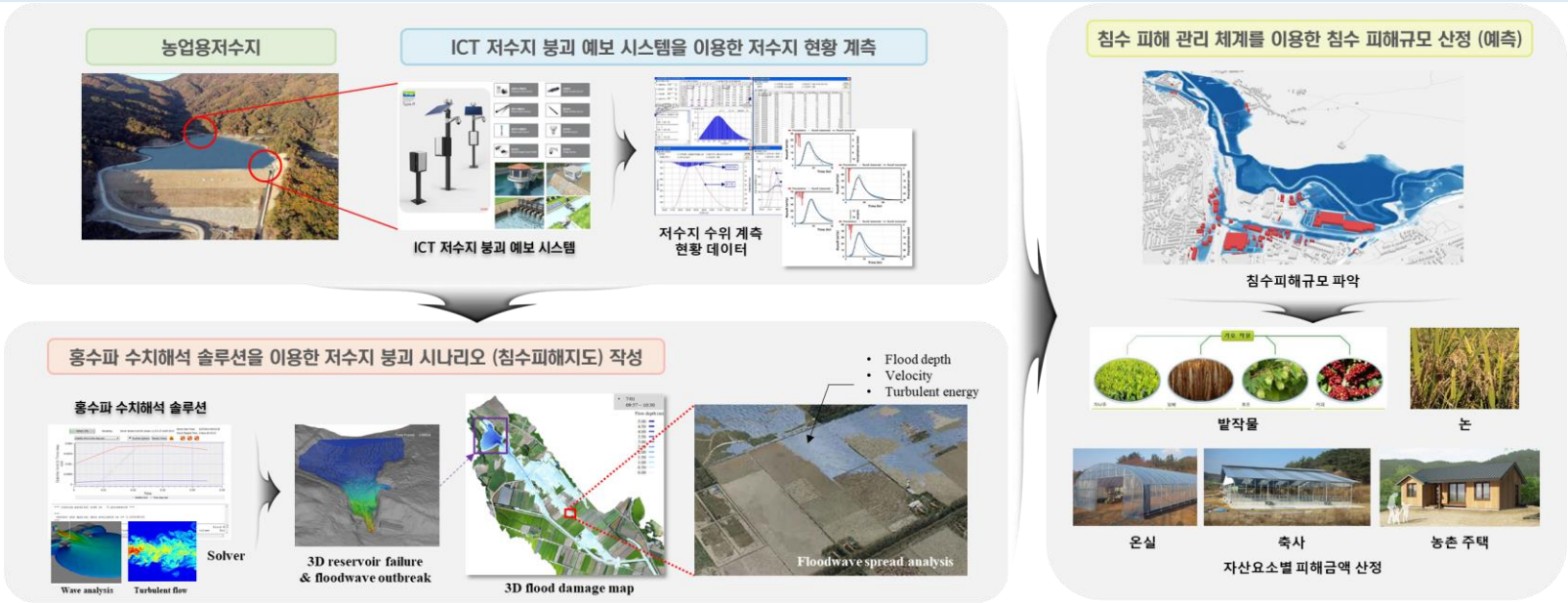
Project	Agricultural Infrastructure and Disaster Response Technology Development Project
Breakdown Business Name	Climate Change and Agricultural Disaster Response Technology
Central Administrative Agencies	Ministry of Agriculture, Food and Rural Affairs
Assignment Type	Designated open call for participants
Technical classification	Agriculture, Forestry and Food Environmental Ecology – Agriculture and Forestry Civil Engineering – Agriculture and Forestry Facilities
Project title	Development of ICT-based Flood Risk Management Platform for Rural Areas

R&D	Development
Principal Investigator	Won Choi (Associate Professor, Department of Regional Systems Engineering, Seoul National University)
Participating Researchers	Munseong Kang (Associate Professor, Department of Regional Systems Engineering, Seoul National University)
Co-Principal Investigator	Sangsoo YI (Director, Sistech Co., Ltd.)
Service Research Officer	Soonyeon Kim (CEO, Hermesis Co., Ltd.)
Period of study	2021.4.~2023.12.(2Y 9M) - STEP 1: 2021.4.~2022.12.(1Y 9M) - STEP 2: 2023.1.~2023.12.(1Y)

Rural Customized Flood Damage Management Platform

Overview of Agricultural Infrastructure and Disaster Response Technology Development

✓ According to the current status of the water level of dams and reservoirs, we present a reservoir collapse scenario
✓ The scale of flood damage includes the area of damage, depth of flooding, and property factors.

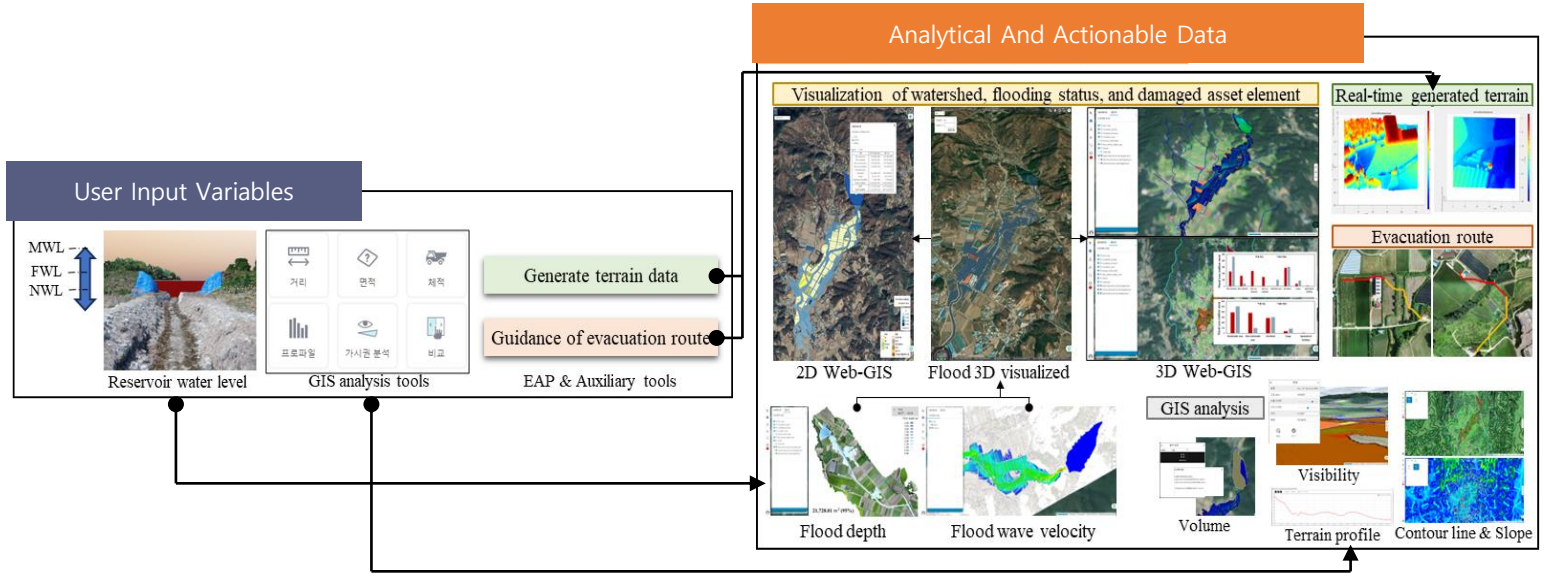


- **[Development Goal]** Focus on a disaster management analysis platform that can predict the scale of damage in the event of an agricultural reservoir collapse and establish a disaster response strategy
- **[Definition]** A system that gathers various data together and provides results quickly and easily through real-time analysis
- The **[User-friendly]** platform allows users to freely access information to analyze problems and establish efficient disaster management strategies.
- **[Improvement of Analysis Method]** Avoid the existing inaccurate analysis method and use the improved flood wave analysis method to establish the exact extent of the damage and evacuation plan
- **[Numerical analysis utilization]** Numerical analysis results such as flood damage area and flow velocity distribution can be used to prepare proactive response strategies

Overview of Agricultural Infrastructure and Disaster Response Technology Development

✓ Prototype Design

- **[Google Earth-based 3D visualization]** Configure existing geospatial data and Google Earth-based terrain to be interactive within the platform UI
- **[Web-GIS function]** Layer data such as satellite map and land cover can be used by overlapping with the flood risk
- **[Analysis of individual flood damage]** It is possible to calculate the amount of individual flood damage according to the desired asset type by sorting the land cover composition by asset elements according to the purpose
- **[Analysis of damage area by inundation time]** It also provides a function that can analyze the status of flood damage according to the elapsed time from the beginning of the reservoir collapse in 3D
- **[GIS Analysis Tool Support]** Use GIS analysis tools to calculate terrain slopes, distances, areas, volumes, and more

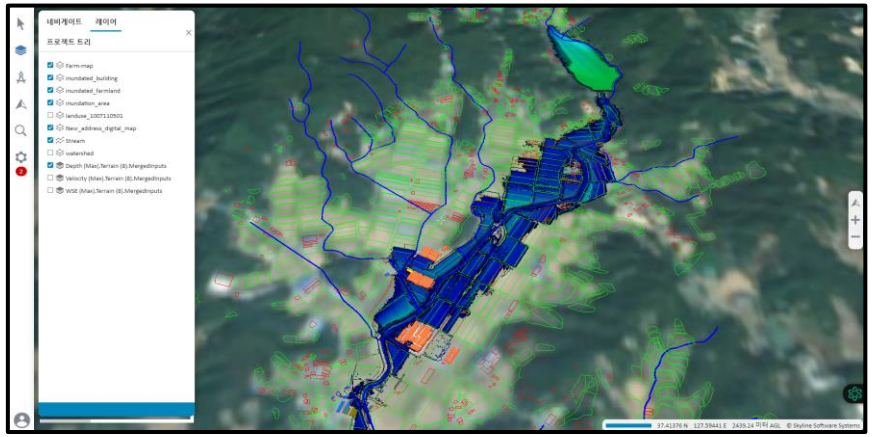


Rural Customized Flood Damage Management Platform

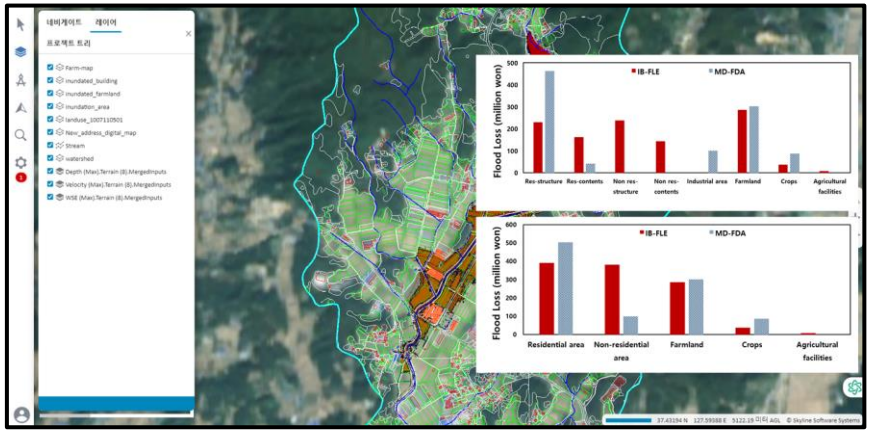
Overview of Agricultural Infrastructure and Disaster Response Technology Development

✓ Prototype Design

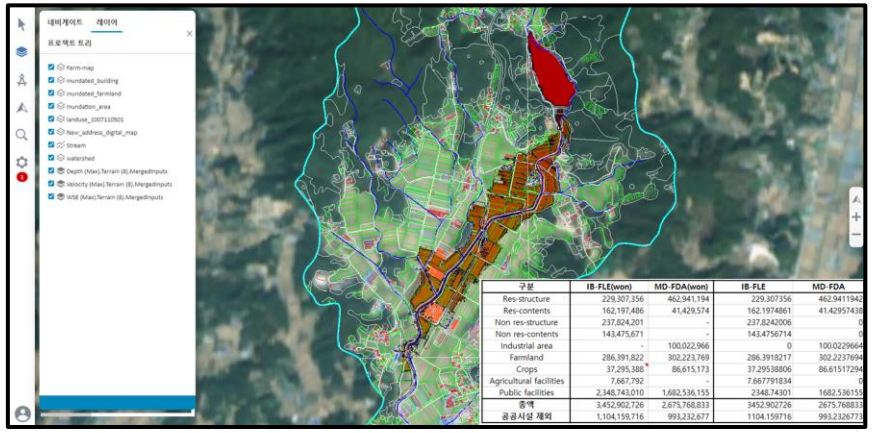
- Visualization - Analysis of flood damage by asset element



[Analyze satellite maps and land cover overlapping with the risk of inundation]

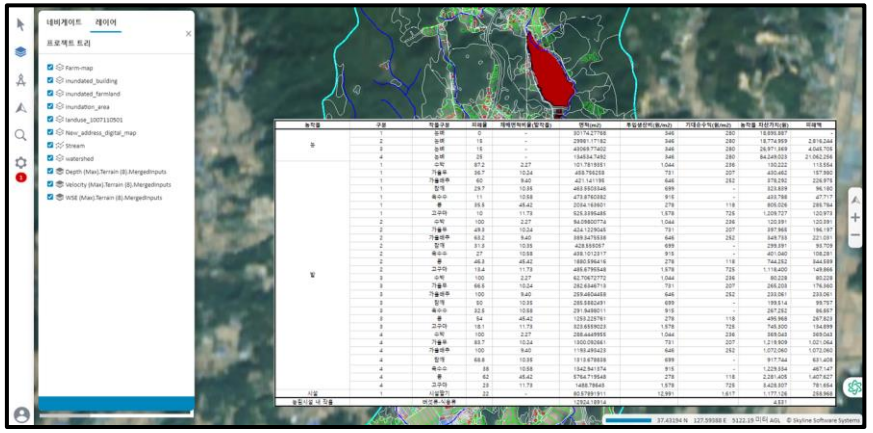


[Damage by Asset Element (Graph)]



구분	IB-FLE(won)	MD-FDA(won)	IB-FLE	MD-FDA
Res-structure	229,307,356	462,941,194	229,307356	462.9411942
Res-contents	162,197,486	41,429,574	162.1974861	41.42957438
Non res-structure	237,824,201	-	237.8242006	0
Non res-contents	143,475,671	-	143.4756714	0
Industrial area	-	100,022,966	0	100.0229664
Farmland	286,391,822	302,223,769	286.3918217	302.2237694
Crops	37,295,388	86,615,173	37.29538806	86.61517294
Agricultural facilities	7,667,792	-	7.667791834	0
Public facilities	2,348,743,010	1,682,536,155	2348.74301	1682.536155
종액	3,452,902,726	2,675,768,833	3452.902726	2675.768833
공공시설 제외	1,104,159,716	993,232,677	1104.159716	993.2326773

[Damage by Asset Element (Table)]



[Amount of damage to individual crops (table)]

Overview of Agricultural Infrastructure and Disaster Response Technology Development

✓ Prototype Design – Additional Achievements

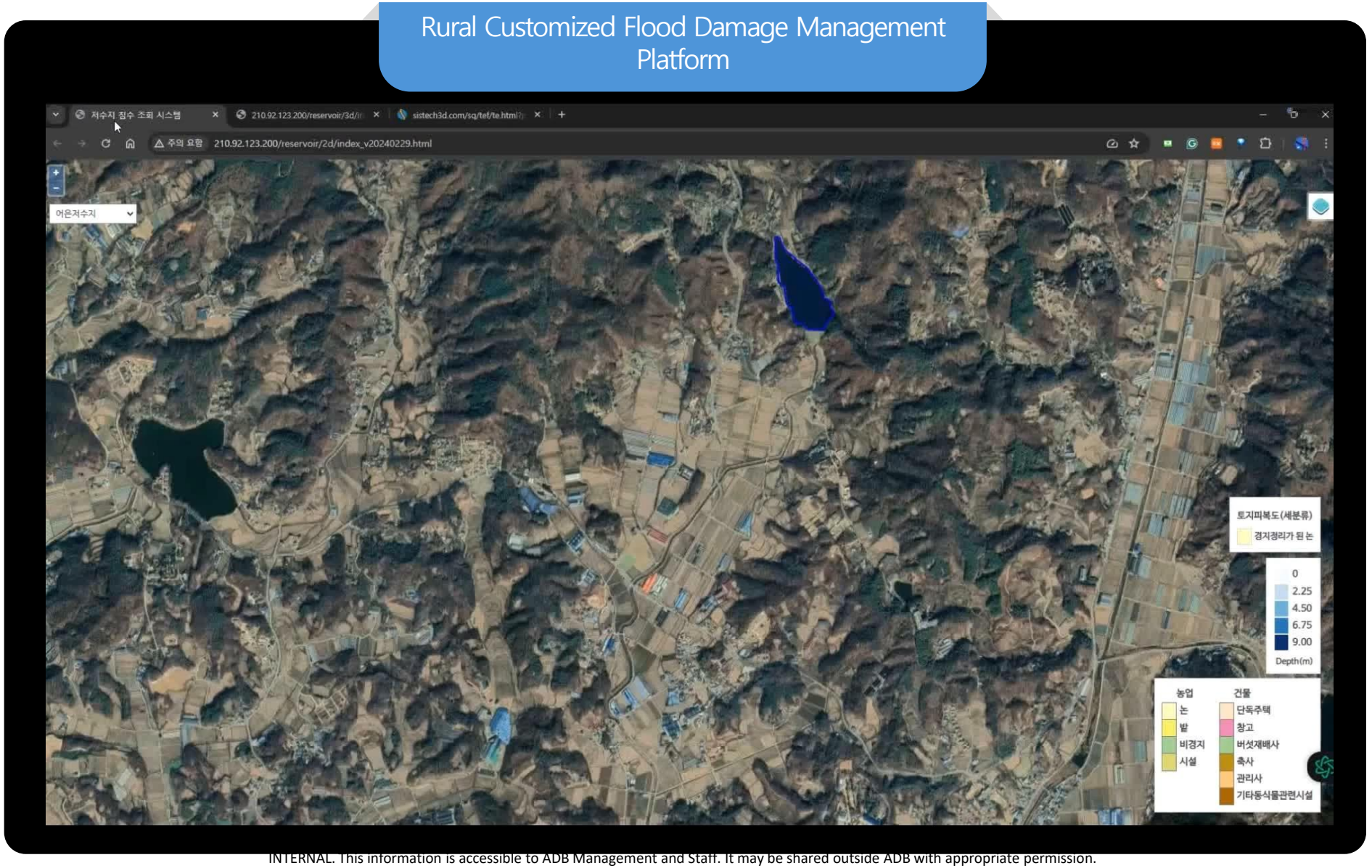
- Visualization – Enhancement Function

1) Using point cloud terrain data, a precision terrain visualization system is also piloted
2) Utilize LOD (Level of details) optimization techniques to effectively visualize large-scale terrain data
3) LODs are used when working with 3D models or scenes to balance visual quality and rendering performance, dynamically adjusting the complexity of objects
   - As the user's field of view gets closer to the object, a model with a higher level of detail (more polygons, more precise textures, etc.) is used.
   - Conversely, when an object moves away from the user, it is replaced with a model with a lower level of detail, reducing the rendering load
4) CAD and IFC (Industry Foundation Classes) data can be fused, enabling seamless sharing of building information during design, construction, and operation phases
5) It suggests that additional development is possible with a village-level BIM management model that manages flood-related disasters in advance, such as tourist attractions and landscape sites scheduled for construction that integrates flood damage analysis.

[Effective visualization using LOD optimization techniques (conducted by this research team)]

[Topographic data fused with IFC data (conducted by this research team)]

Rural Customized Flood Damage Management Platform



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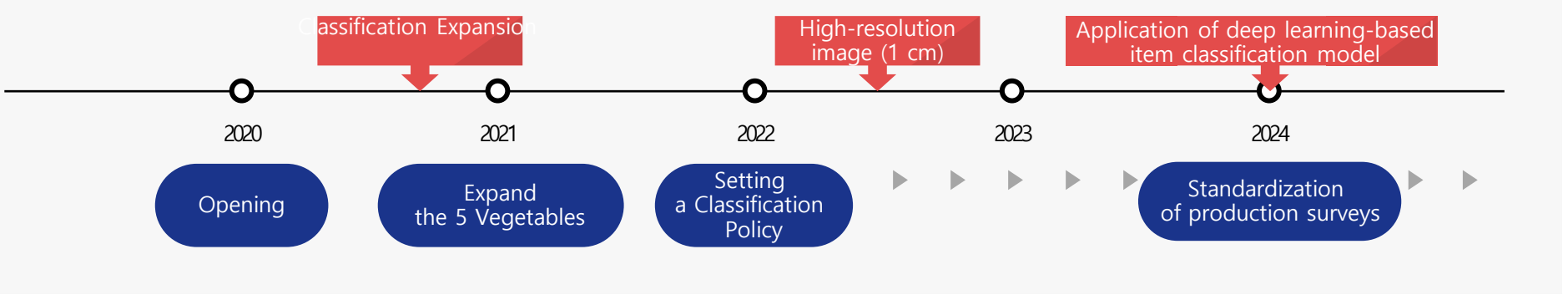
Region-specific Crop Classification and Cultivation Area Survey

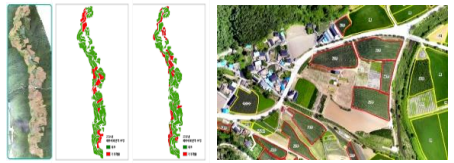
Crop Classification and Cultivation Area Survey

The need to collect and analyze
rapid and standardized agricultural field information for crop cultivation status survey



Scientificization of Agricultural Observation Information and Changes in Agricultural Information Services

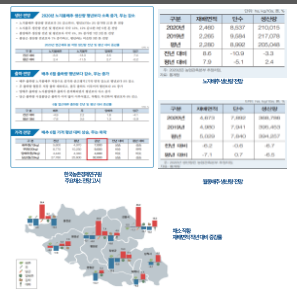
Drone Applicability Demonstration Stage (2020-2021)



Establishment of Agriculture DB	Highland vegetable forecast
Time Series DB Effect	Agricultural Policy Support

Application of remote sensing techniques

Expansion of the 5 major vegetables and advancement of the agricultural observation system



Rapid information provided
by the Korea Rural Economic Institute

Transforming Information Services

High-resolution video +
Ai classification

Expand to standardization surveys

Region-specific Crop Classification and Cultivation Area Survey

Crop Classification and Cultivation Area Survey

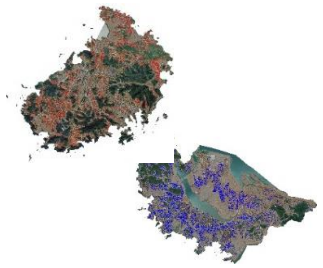
Implementation of a 7-day process from the date of filming
to delivery Comply with the delivery date with optimal scheduling

<Filming ~ Delivery 7 days process system>

Day1	Day2	Day3	Day4	Day5	Day6	Day7
Plan and conduct drone photography		Overlap with Itemized Parcels		Survey of mixed crops and shipping area	Shipping area and DB construction	Create a Legend Table
Allow 2 days		Allow 2 days		Allow 1 day	Allow 1 day	Allow 1 day

Plan your work by farm map

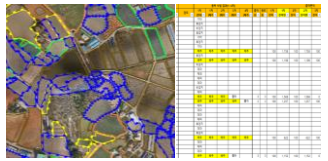
Drone Photography Plan



Overlap with Itemized Parcels

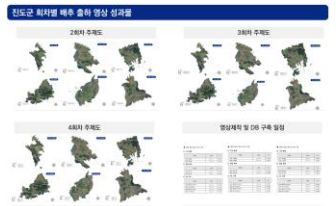
FMAP_ID	품목 분류
07777743	배추
품목 점유율	혼작 분류
20	대파

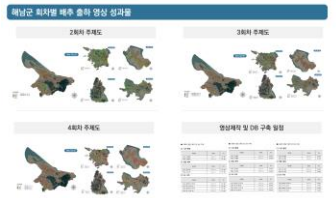
- Classification of items, occupancy and mixed crop items in mixed crop sites
- Maintain the farm map of the mixed crop site
- It is possible to grasp the cultivation area of overwintering vegetables



Item classification and DB construction

Shipping

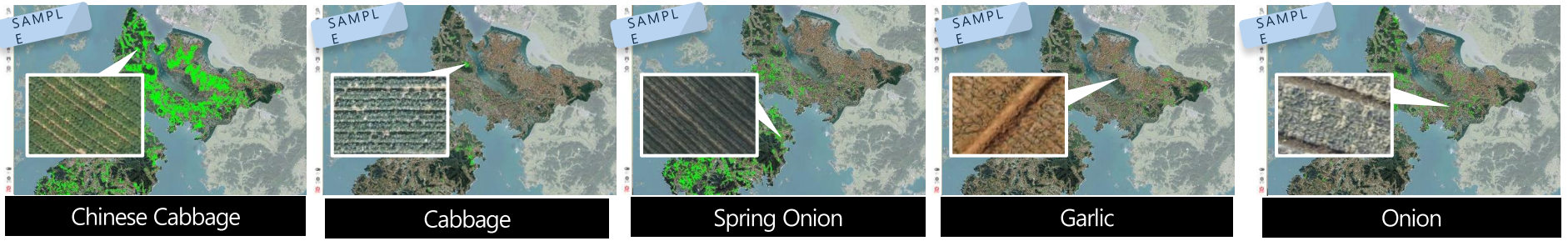




Region-specific Crop Classification and Cultivation Area Survey

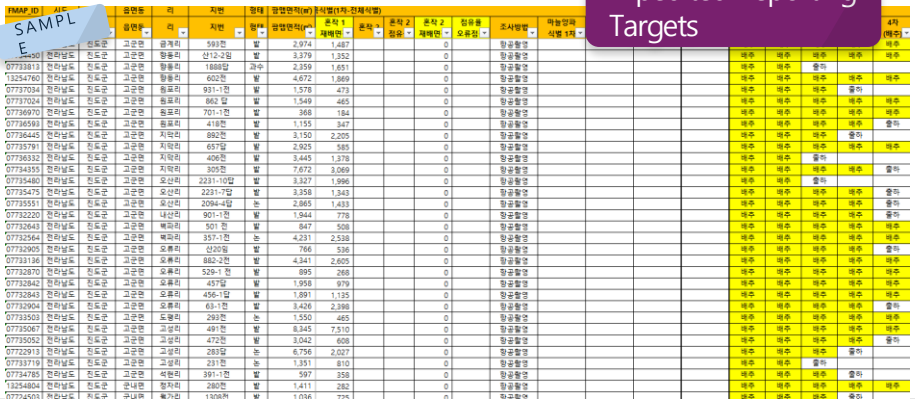
Crop Classification and Cultivation Area Survey

01 High-resolution photos of crops by parcel and cultivated area

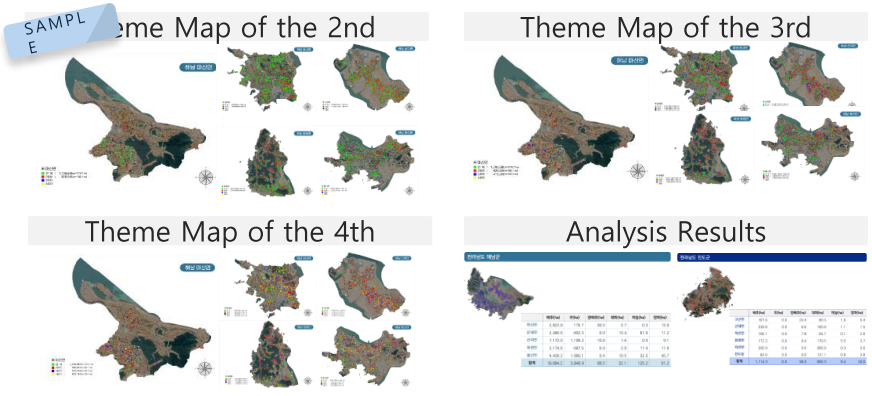


02 Orthographic

03 Classification Excel file



04 Images of analysis results and observations



Region-specific Crop Classification and Cultivation Area Survey

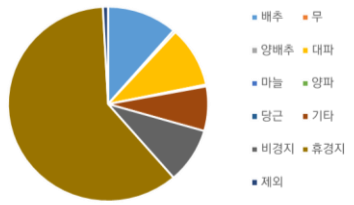
Crop Classification and Cultivation Area Survey

01 Distribution of winter vegetable cultivation using business results

SAMPLE

전라남도 진도군

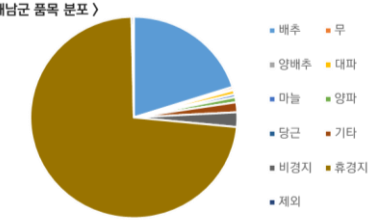
〈 진도군 품목 분포 〉



품목	배추	무	양배추	대파	마늘	양파	당근	기타	비경지	휴경지	제외	합계
분포 비율	11.4	0	0.4	10	0.1	0.2	0	7.4	9.2	60.5	0.8	100.0

전라남도 해남군

〈 해남군 품목 분포 〉

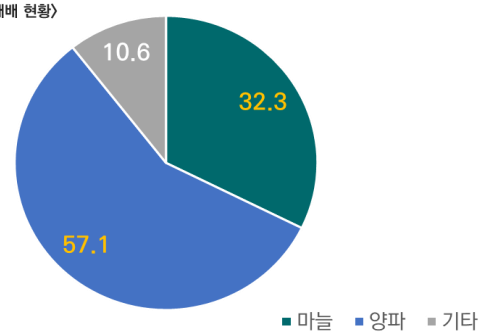


품목	배추	무	양배추	대파	마늘	양파	당근	기타	비경지	휴경지	제외	합계
분포 비율	20.1	0.4	0.2	0.7	0.5	0.8	0	1.6	2.4	73.1	0.4	100.0

02 Analysis of garlic and onion shooting sites using business results

SAMPLE

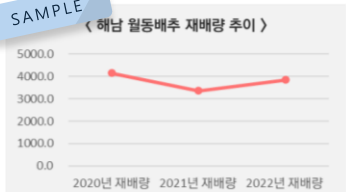
〈 마늘·양파 촬영 대상지의 재배 현황〉



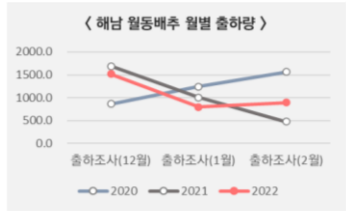
03 Analysis of annual cabbage cultivation and shipping area in Haenam County using QGIS

SAMPLE

〈 해남 월동배추 재배량 추이 〉



〈 해남 월동배추 월별 출하량 〉



		재배조사(11월)	출하조사(12월)	출하조사(1월)	출하조사(2월)
2020 해남	마산면	190.1	97.8	33.3	19.7
	문내면	773.0	232.9	185.9	221.6
	산이면	1298.7	230.1	435.3	507.6
	화원면	645.2	221.0	138.1	152.6
	황산면	1232.1	83.7	454.1	661.8
	합계	4139.1	865.5	1246.7	1563.3

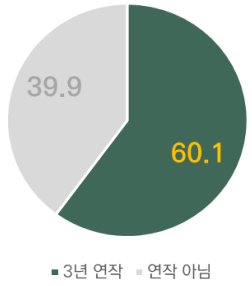
		재배조사(11월)	출하조사(12월)	출하조사(1월)	출하조사(2월)
2021 해남	마산면	155.9	107.9	31.6	12.4
	문내면	717.6	346.5	217.2	111.7
	산이면	1013.9	575.9	280.3	108.5
	화원면	616.0	300.5	163.7	108.1
	황산면	852.2	356.7	313.8	137.1
	합계	3355.6	1687.5	1006.6	477.7

		재배조사(11월)	출하조사(12월)	출하조사(1월)	출하조사(2월)
2022 해남	마산면	170.7	82.1	41.5	26.3
	문내면	802.3	266.0	157.4	241.9
	산이면	1108.2	480.0	241.9	229.0
	화원면	687.5	295.8	144.5	124.0
	황산면	1080.1	397.2	209.3	272.4
	합계	3848.9	1521.0	794.5	893.7

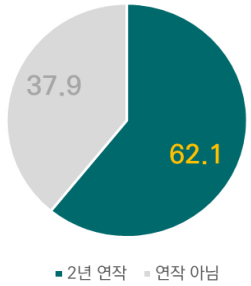
04 QGIS Cultivation Status of Haenam County Cabbage Series

SAMPLE

〈 최근 3년 해남 배추 연작 현황 〉

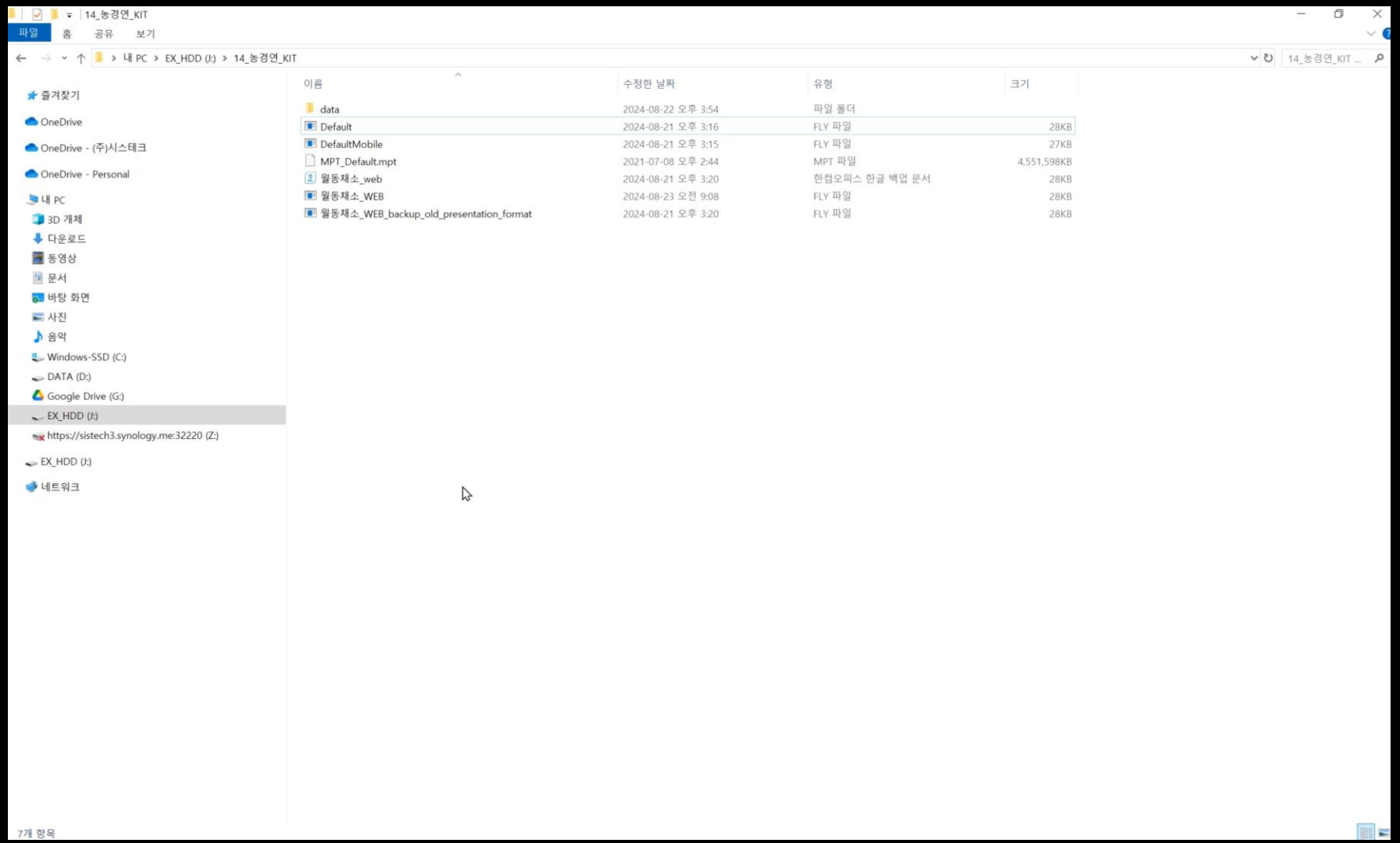


〈 최근 2년 해남 배추 연작 현황 〉



Region-specific Crop Classification and Cultivation Area Survey

Crop Classification and Cultivation Area Survey



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2024 Drone Demonstration City Construction Project – Namwon City

City Model 3D Spatial Information and Attribute DB Construction

Create a 3D terrain basemap

- Namwon City Total 700 km²

Swarm Drone Mission Flight-Based Building Model

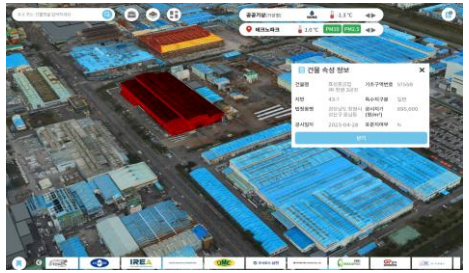
- Namwon City Center 100km²

Craft at least 8,000 DB building attributes and 5 DB attributes

- Building Information, Land Value Information, Building Name, Address Information, Site Shape

City Administration Utilization Service Establishment

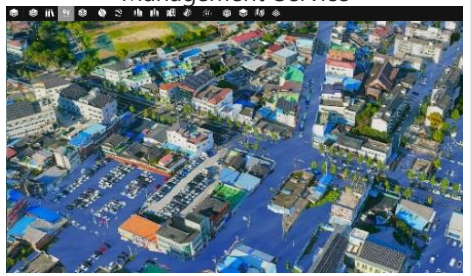
Industrial Complex Digitalization and Administrative Services



Visualization of industrial complex company portal linkage and attribute information

Visualization of land use-based complex planning in the complex

Industrial Park Disaster Safety Management Service



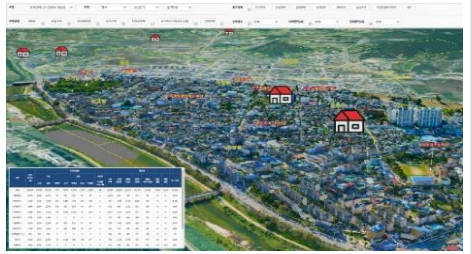
Establishment and utilization of industrial complex disaster damage information

Visualization of CCTV in preparation for flooding

Basic S/W for using public information-based city model

Urban administration utilization service basic S/W production

Vacant House Management Service



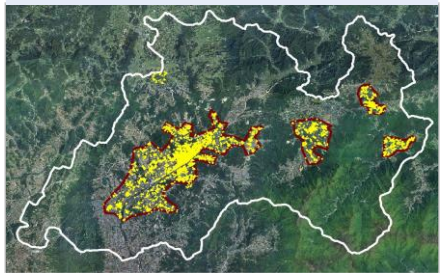
Visualization of finding vacant houses for vacant house survey

Namwon vacant house utilization support administrative support service

2024 Drone Demonstration City Construction Project – Namwon City

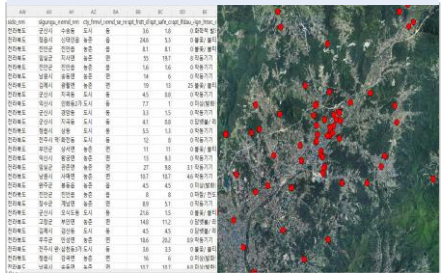
Namwon Building Public Information DB Production

Public Information DB Structuring



Construction of 8,000 buildings in Namwon

DB Attribution



Building information/Land value information/
Building name/
Address information/Site shape

Coordinate address information

Construction by building address information

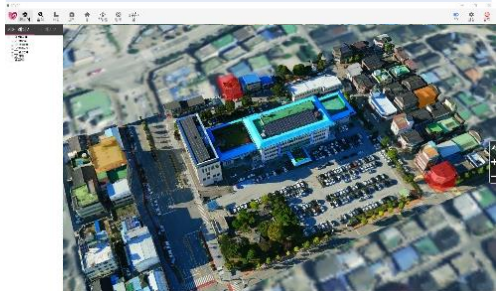
Spatial coordinates

Proceed with in-place editing

2024 Drone Demonstration City Construction Project – Namwon City

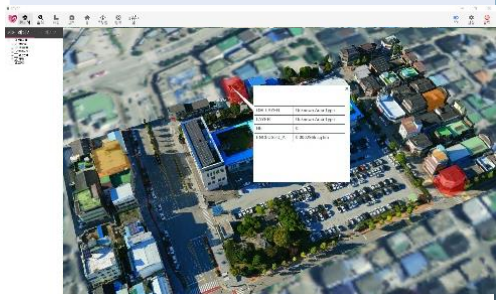
Vacant House Management Service

Visualization of Vacant House Risk Management Group



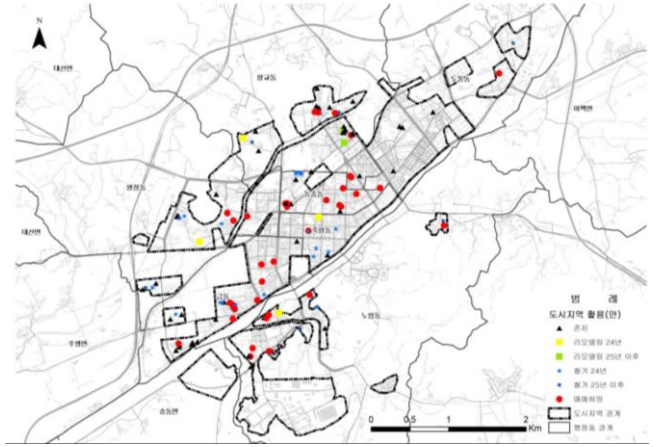
Linking address information and usage data

Visualization of buildings targeted for vacant house utilization service



Visualization of target buildings in Namwon

Vacant House Demolition and Utilization Plan Example



Administrative Services

Administrative Services Application

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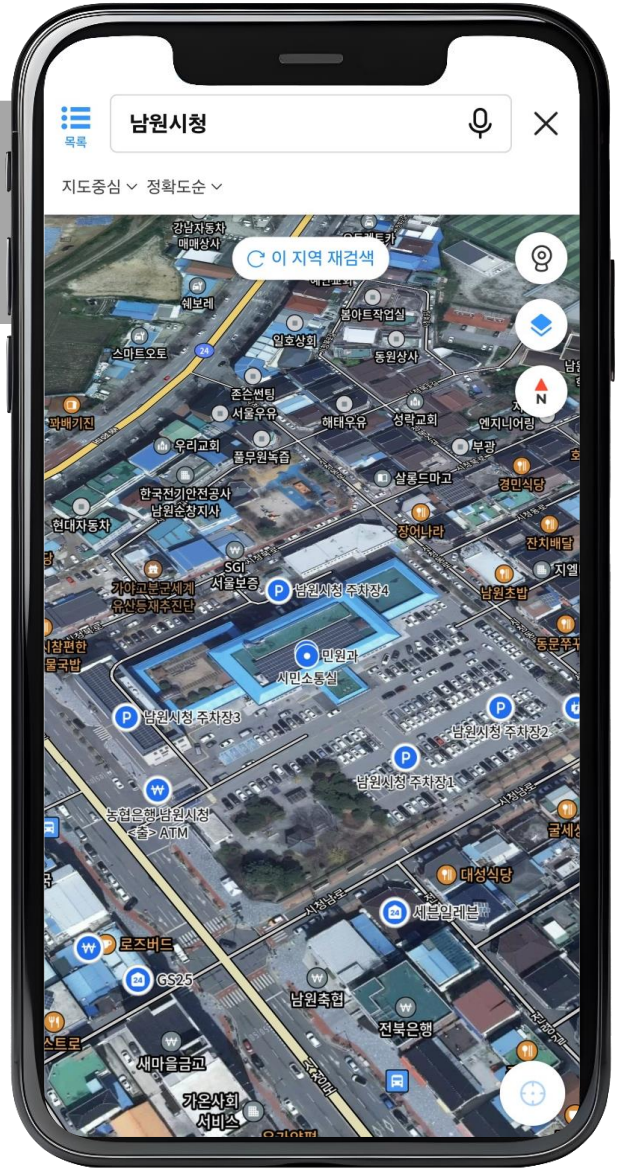
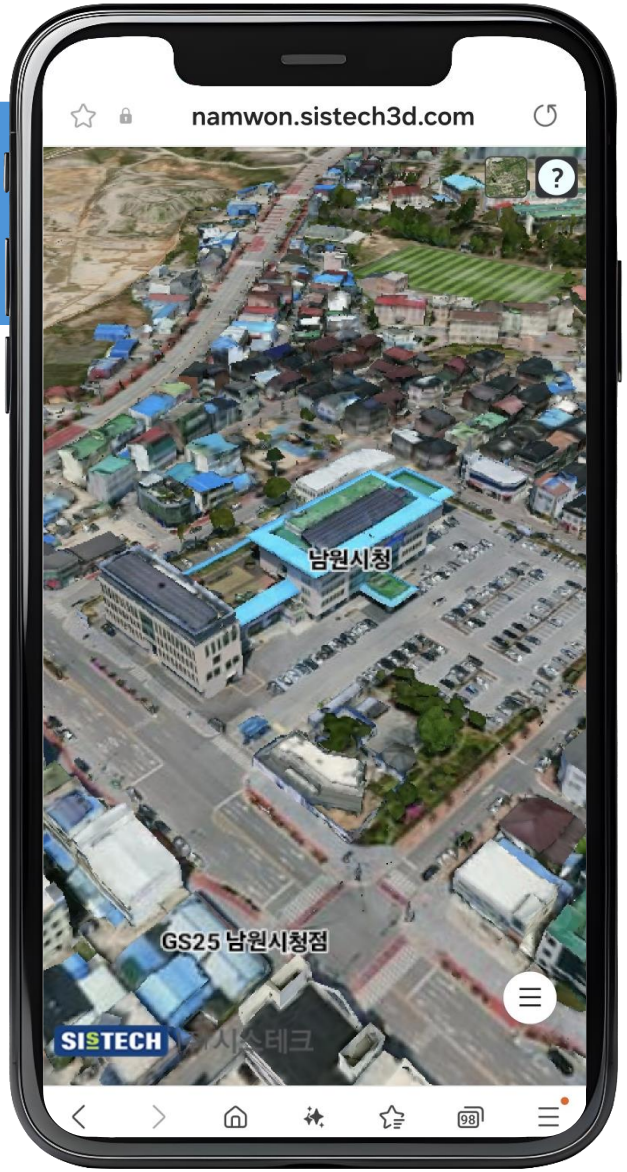
Ⅲ. Administrative Services

Kakao Map



Mobile Namwon



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Mobile
Namwon

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CONTENTS

Large-Scale Regional Imaging Acquisition and Utilization Using Fixed-Wing Drones

IV. International Collaboration Project

Local Training and Application Cases

In Kazakhstan – Long Distance Highways

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Local Training and Application Cases In Kazakhstan – Long Distance Highways

Technology transfer completed, Kazakhstan is producing the drone

Self-owend Drone Technology

Kazakhstan Drone Launch

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Local Training and Application Cases In Kazakhstan – Long Distance Highways

Wide Area High Resolution 3D Model Data Set

Can Build 1,000km in 3 Days

1 Team Operating 4 Drones

High Resolution at 2cm

Crack, Porthole Aware

Compatible with CAD Drawings

Linking to Existing Drawings

Simultaneous inspection of road surfaces and road facilities

Reduce Inspection Costs

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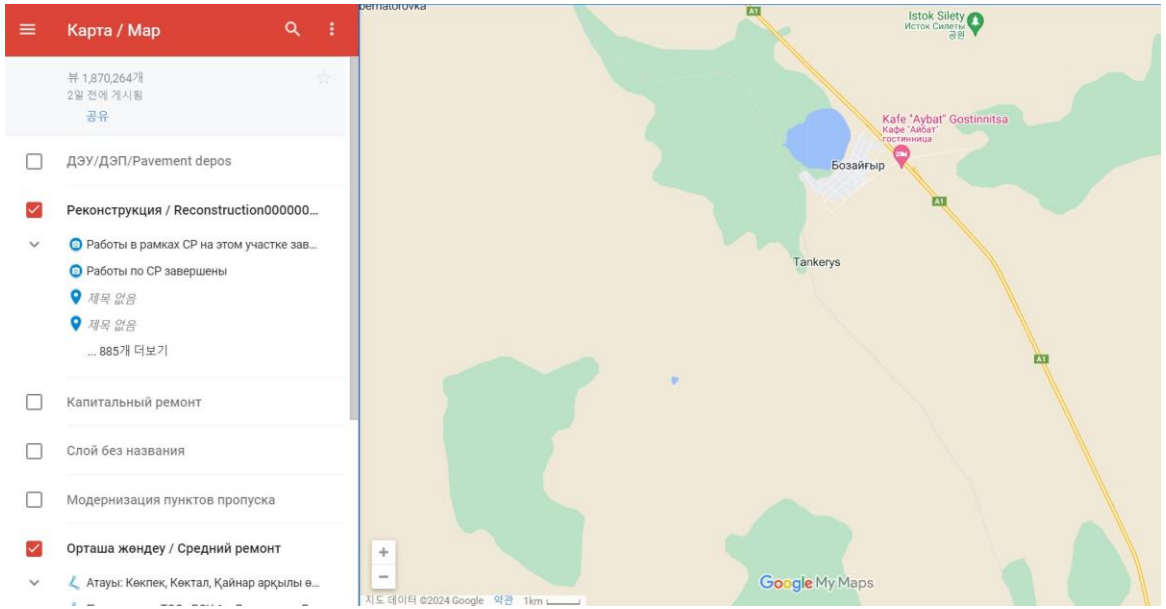
Local Training and Application Cases In Kazakhstan – Long Distance Highways

Google Maps-based Maps vs 3D-based Homebrew Maps

Relying on Google for map building timing

Build it yourself when you need it



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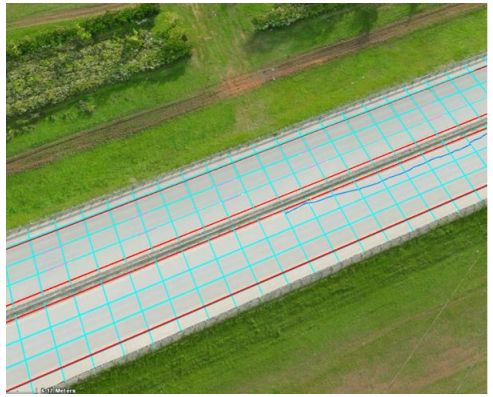
Local Training and Application Cases In Kazakhstan – Long Distance Highways

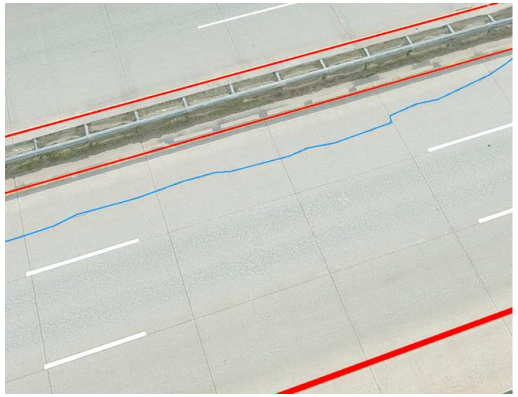
Automated and Manual Creation of Road Maintenance Blocks

- Serializing Road Surface Management
- CAD Drawing Linkage Digitization(Manual/Semi-Automatic)



Crack Detection and CAD Drawing

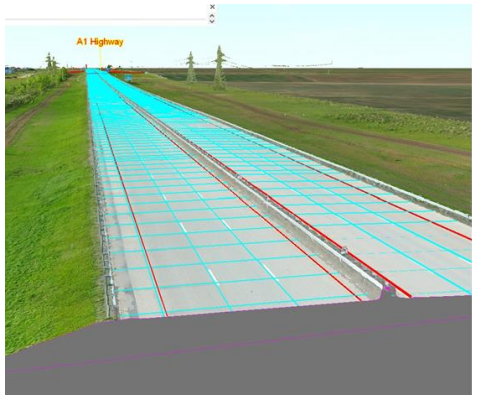
- Crack Management Serialization/Crack Size Change Detection
- CAD Drawing Linkage Digitization(Manual/Semi-Automatic)

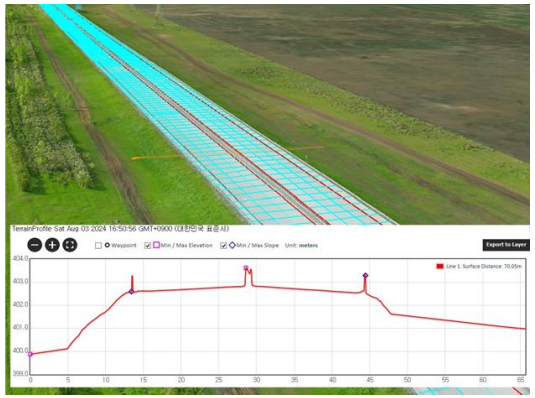


Check Roadside Billboards

- Billboard Maintenance (Serialization)
- Check Installation Status

Road Surface Cross-Section·Slope Analysis





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Local Training and Application Cases In Kazakhstan – Long Distance Highways

On-site training Examples of Practical Flights

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Thank you ☺

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