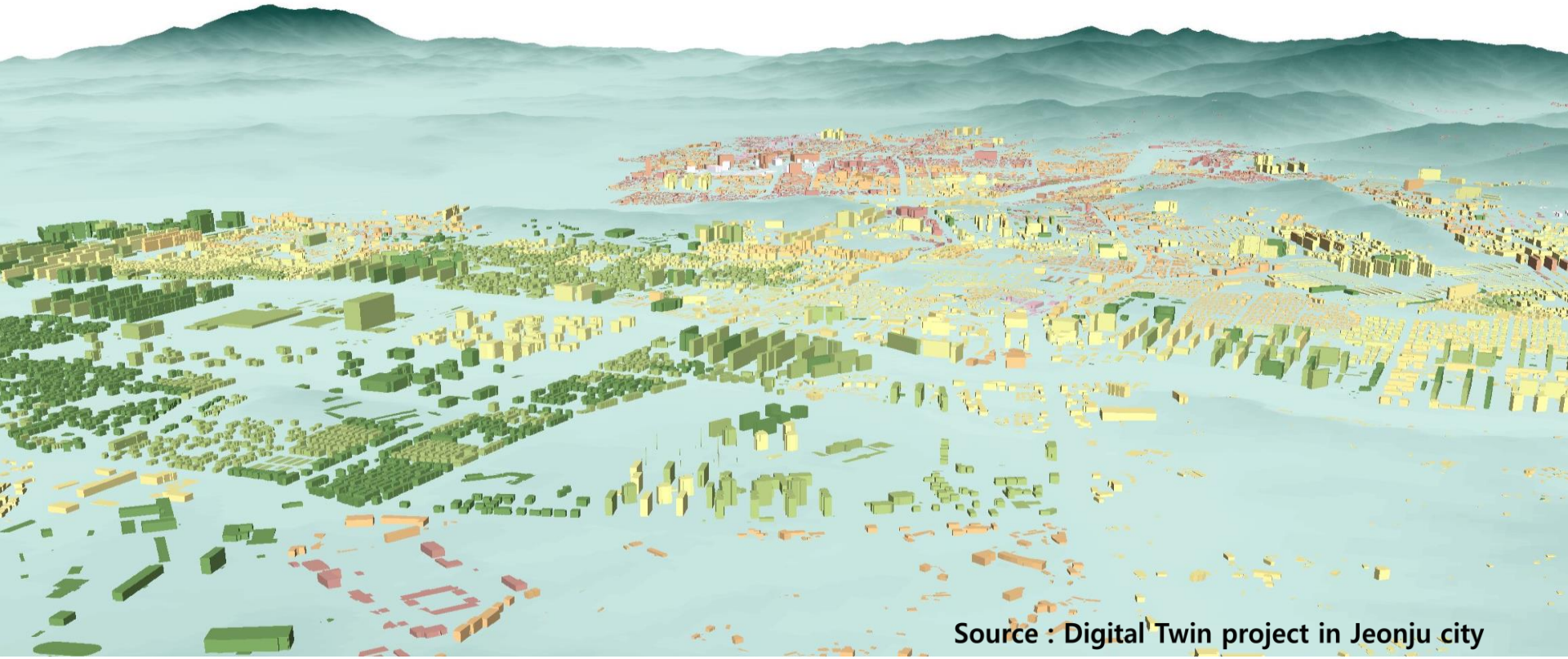
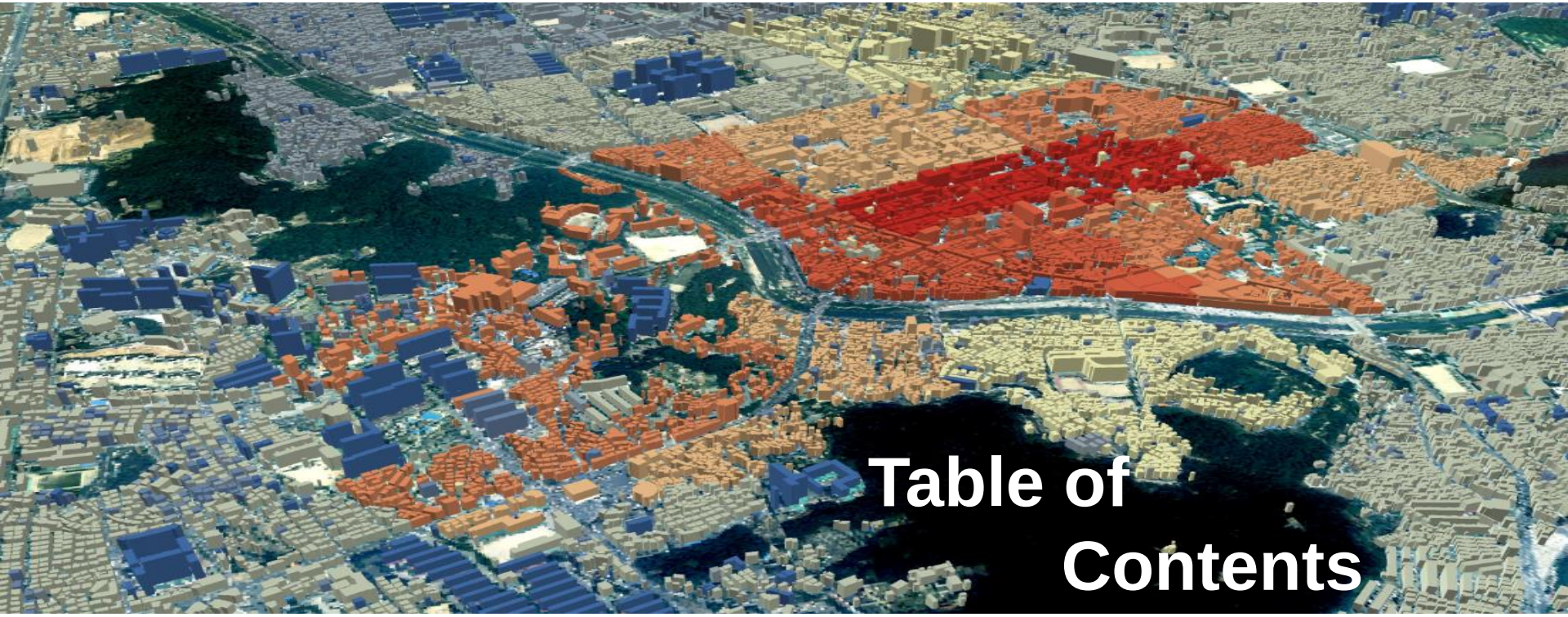
A Digital Twin-based Approach for Land Administration



ByungYong, Kwak

(Nov 4th, 2019)

Korea Land and
Geospatial InformatiX Corporation



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about LX

~ the early of 1990s | the 1990s to the 2000s | 2015 ~ present

Change Name(LX)

Cadastral survey + Geospatial Information = Overseas Projects, Cadastral survey, Geospatial Information Projects

Cadastral Survey Corporation

2015

Land and Geospatial InformatiX Corporation

- Consulting & Surveys
- Establishment of LIS
- Education

- Smart City & Digital Twin
- National Address System
- Property, Natural Disaster,
- National Heritage
- Management System…

Established

1977

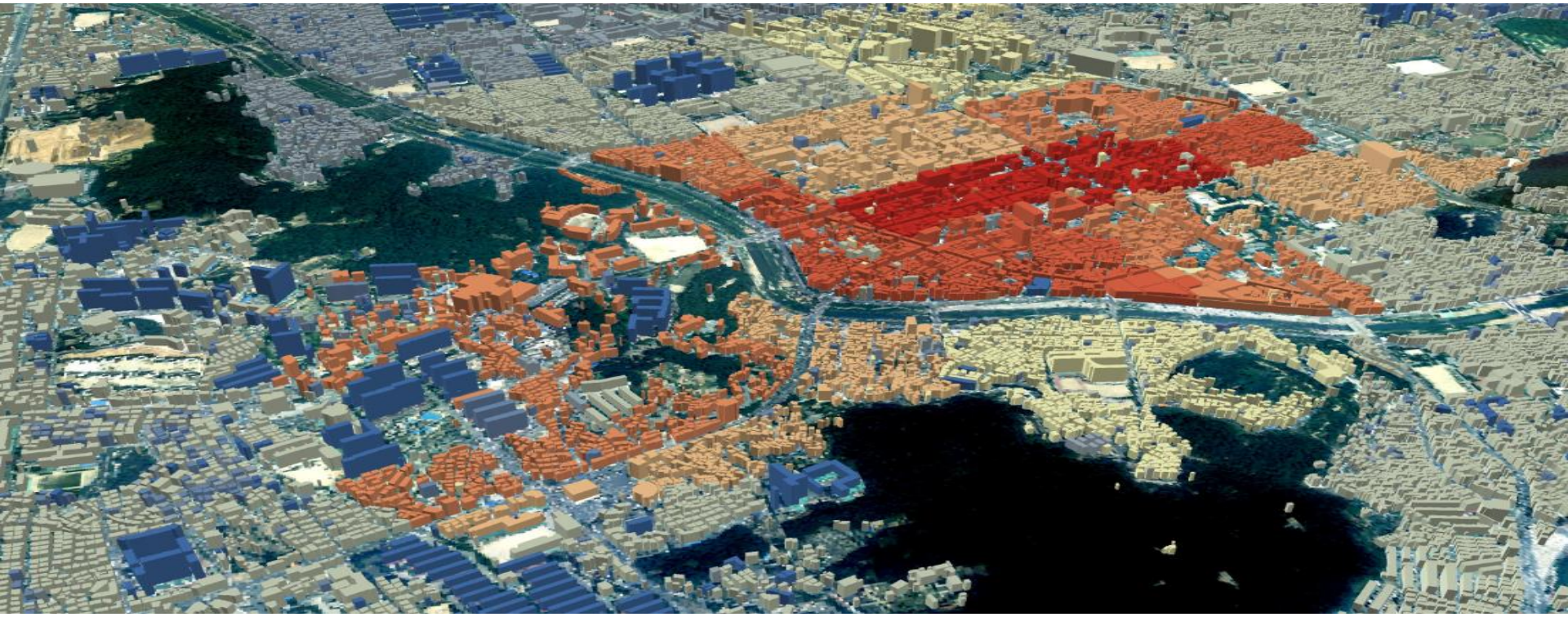
Number of Employees

4075

Overseas Project

30 Countries

1. Background & History



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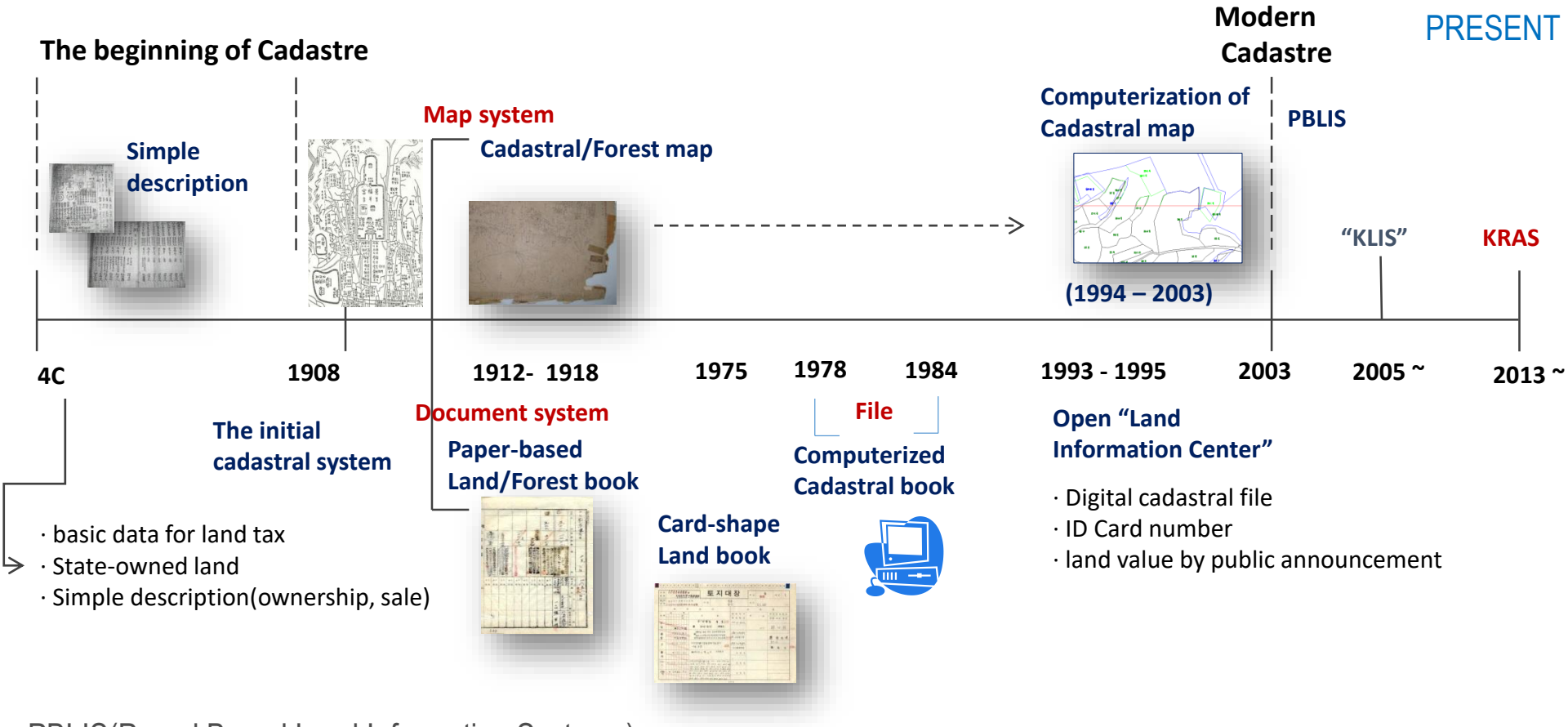
1. Background & History



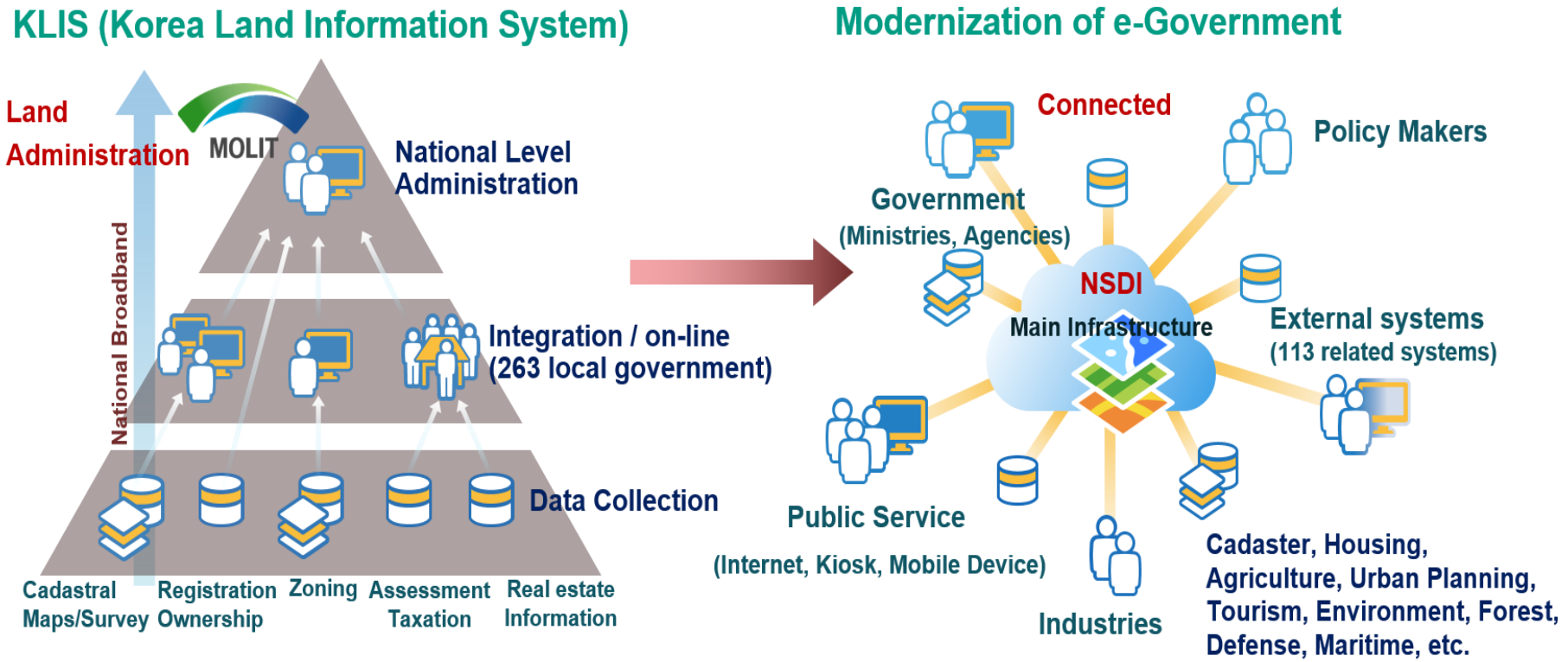
PBLIS(Parcel Based Land Information Systems)

LMIS(Land Management Information Systems)

KLIS(Korea Land Information Systems)

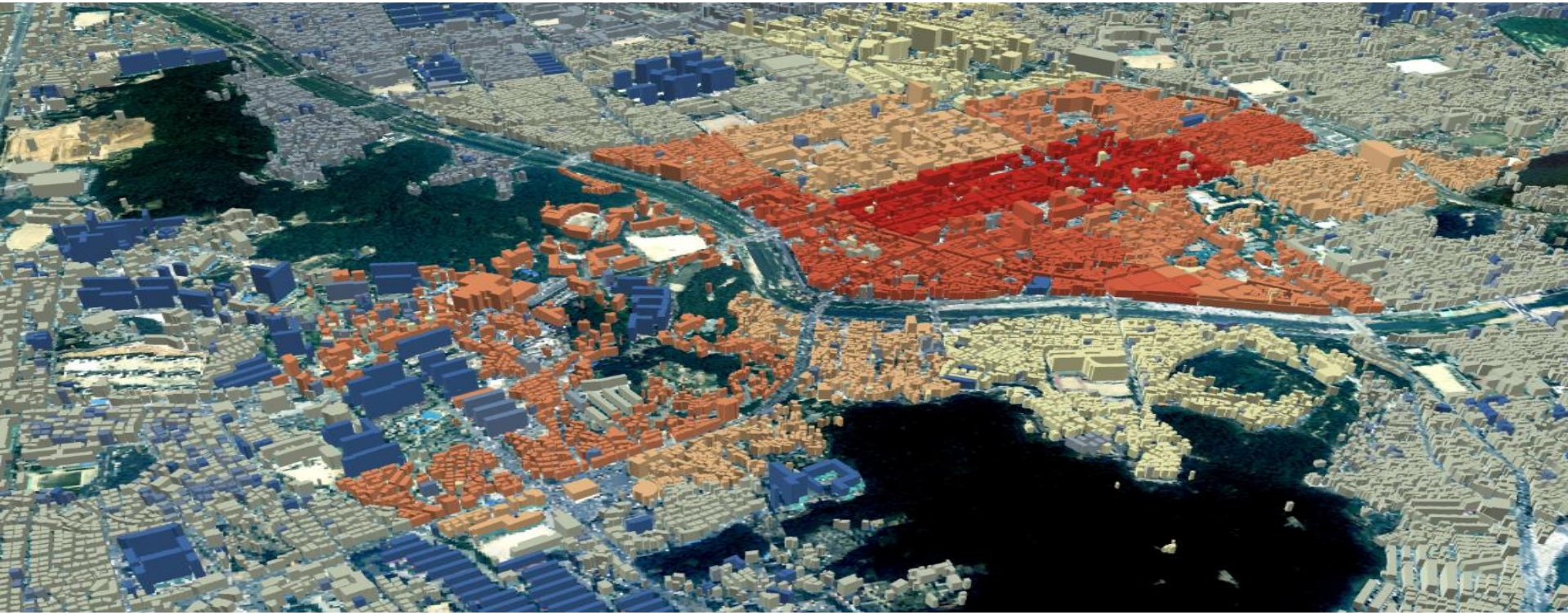
KRAS(Korea Real Estate Administration Intelligence System)

1. Background & History



Awarded the 1st prize in E-Gov. sector (In 2010, 2012, 2014 by UN)

2. Current Procedure



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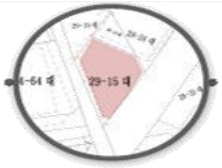
2. Current Procedure

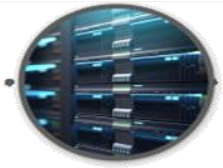
Construction Plan

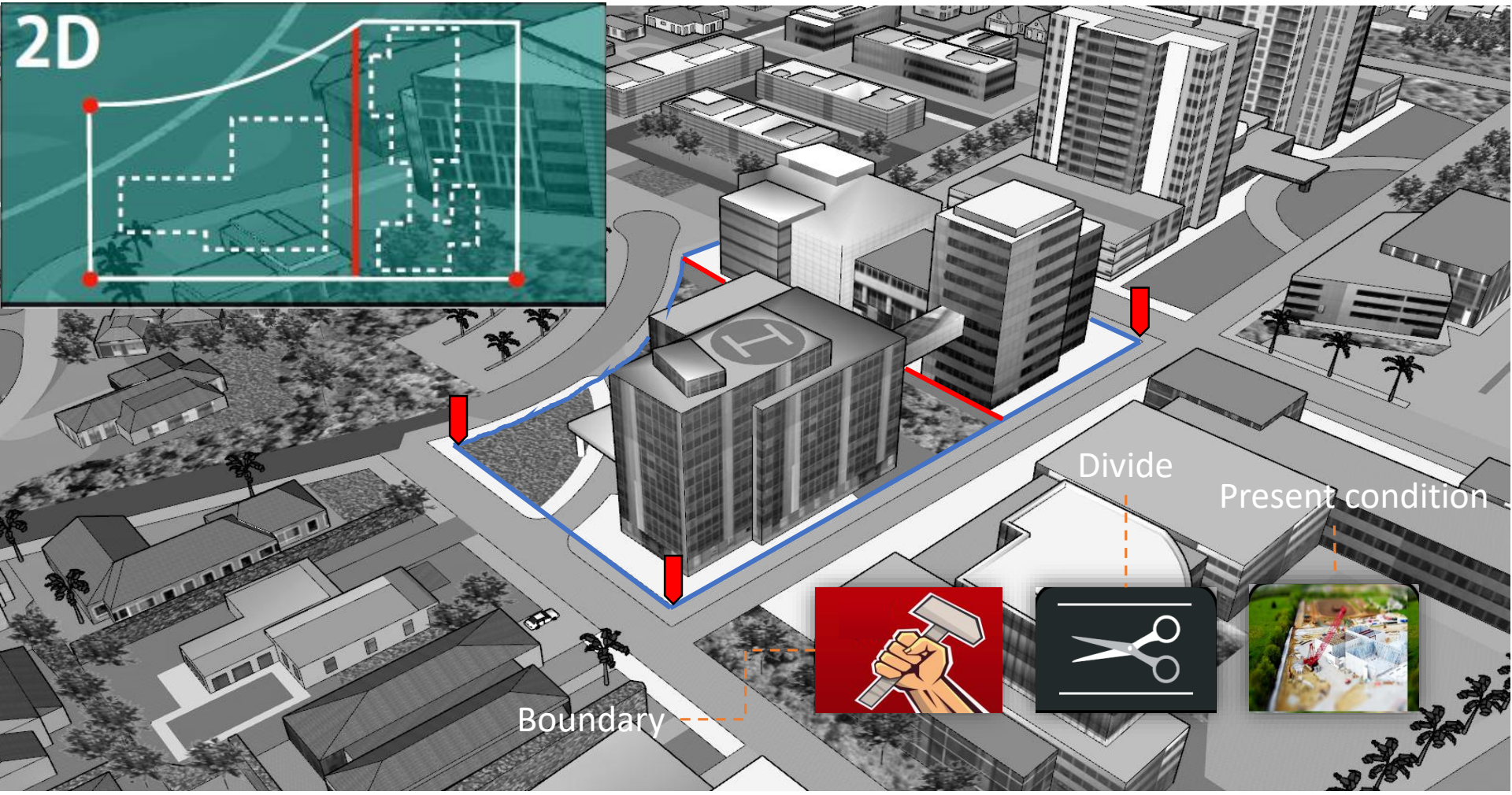
Request Survey

Data Collection

Data Refined


Data Update


Data Sharing

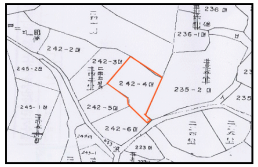


2. Current Procedure

Management of Real property Information

Cadastral Register

일사편리
부동산종합공부시스템

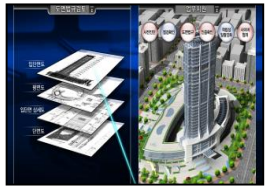


- Land Parcel
- Boundary
- Land price

MOLIT

Architecture

세움터
건축행정시스템



- Blue Print
- Building Info.
- Building price

MOLIT

Administration

Immovable Property Registry

대한민국 법원
인터넷등기소

- Ownership
- Mortgage
- Other rights

SUPREME COURT OF KOREA

Registry

MOLIT : Ministry of Land, Infrastructure and Transport

2. Current Procedure

Application Service (Public, Private)

Application Distribution

Utilizing integrated real estate information

Administration Innovation
Spatial-Big data
Cloud Service
Service platform
Mobile APP
Mash-up Service
OPEN API
Updating Portal maps

Providing integrated real estate information

Creating Integrated Real Estate Information

Integrated real estate information

Integrated DB of whole real estate

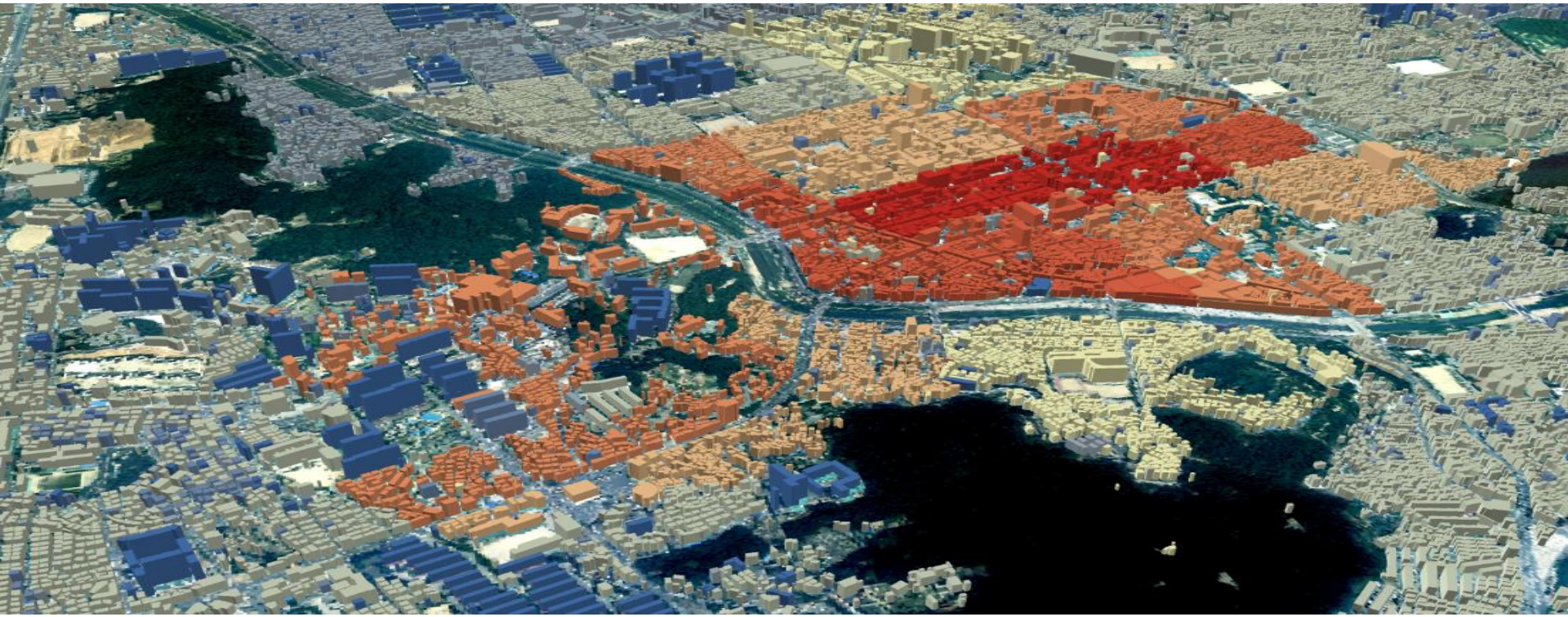
Real Estate Spatial Information + Real Estate Attributes

Administrative DB Link into other divisions

Permission Civilians Tax Business

3. New Approach for Land Administration

(feat: Digital Twin, Jeonju city project)



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Geospatial InformatiX Corporation

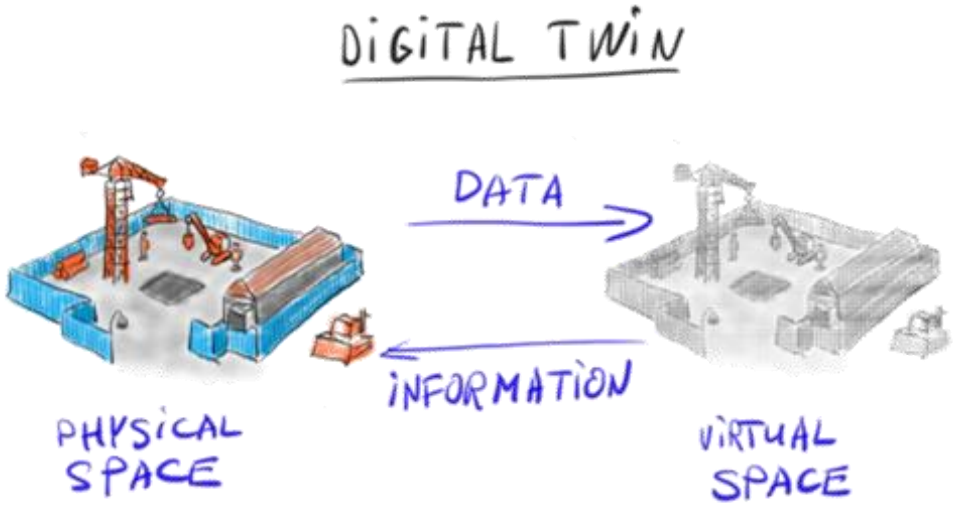
Digital representation of physical world

- Digital Twin
  - Represents all objects of the Universe of discourse
  - 3D representation of the built environment

  - Sensors monitoring current situation
    - Environment(Air quality, etc…)
    - Progress of construction site ….

  - Predictions of the future situation
    - Simulation
    - Deep Learning / AI

  - Actors
    - Government, Public Organizations, Citizens



Levels of Digital Twin

Level 1

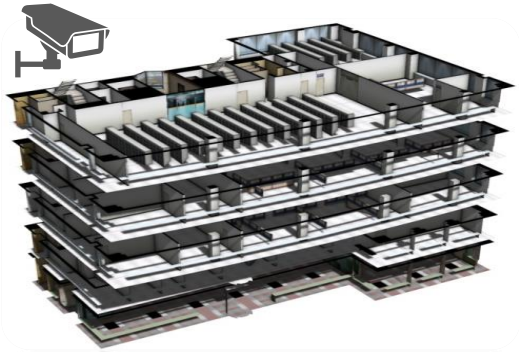
3D Modeling & Visualization

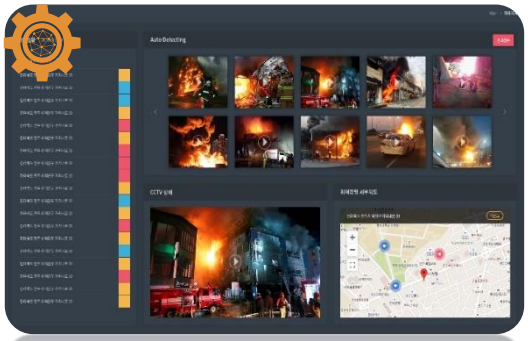
Level 2

Real-time Monitoring

Level 3

Analysis, Prediction, Optimization





* Source: Use the IoT Platform Reference Model to Plan your IoT Business Solutions, 2016 Gartner

3. New Approach for Land Administration

➢ Visualization from Real world to Digital world

- ✓ Classified physical object(FEATURE) in CITY
- Buildings(Shape with X.Y.Z and Texture)
- Underground utilities(water supply and Drainage, Telecom line, etc…)
- Ground (Road lane, Traffic light, Bus station, etc…)

❖ OGC-CityGML Standards

LoD 0 LoD 1 LoD 2 LoD 3 LoD 4

3. New Approach for Land Administration

Buildings

3. New Approach for Land Administration

- ➢ Underground Utilities
- Utilities data (water supply and Drainage line, Telecom line), Topographic map
- Utilities Blueprint..

3. New Approach for Land Administration

➢ Ground Facilities

- Facilities data (Collected MMS, Drone, Surveyed), Topographic map

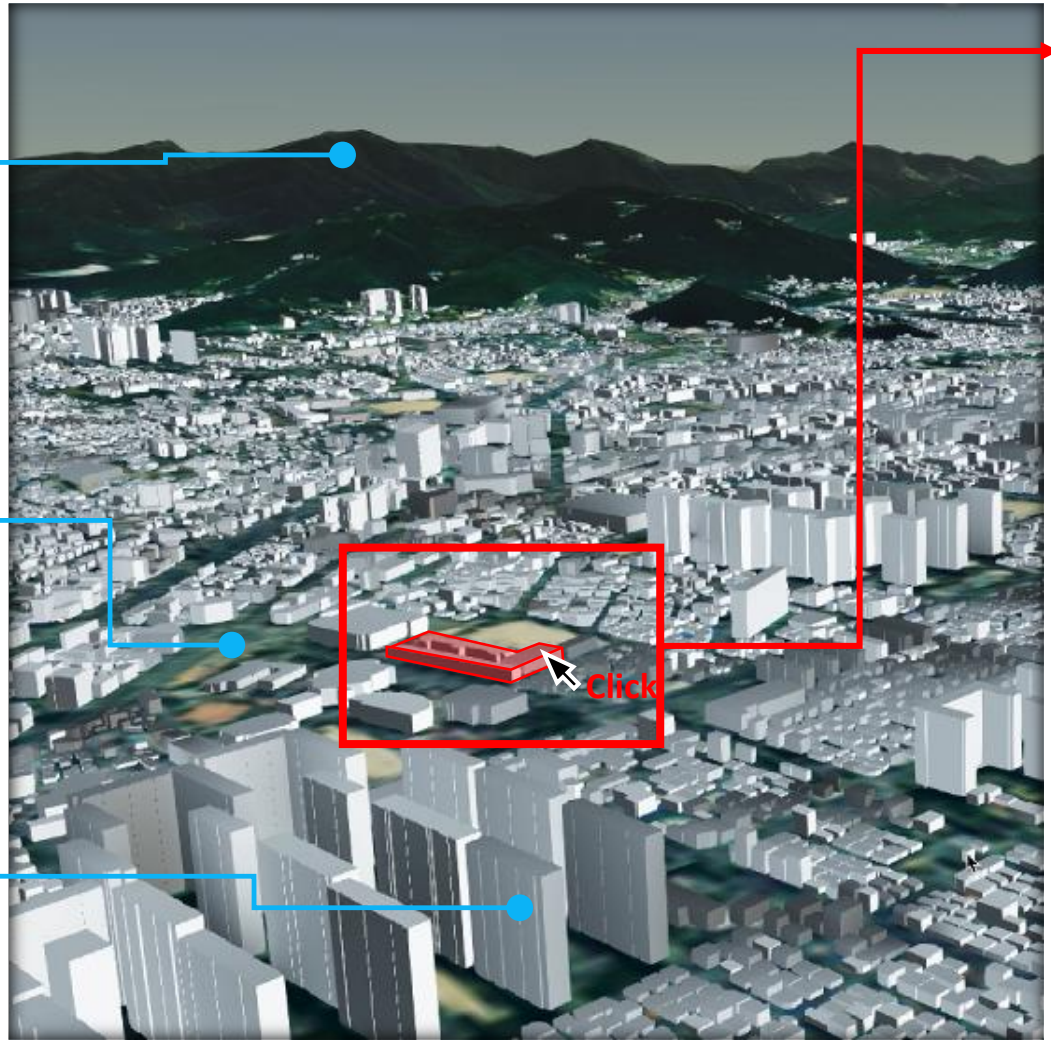
3. New Approach for Land Administration

➢ Data Integration

DEM

digital ortho-image

digital topographic map (LOD1)



Linked Data

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(상속하는 속성)	
(액션)	
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K_ID	6816
AREA	0.000
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BD_MGT_SN	45111142001000100000012046
BSI_INT_SN	10297
BSI_ZON_NO	54968
BULD_MNNM	225
BULD_NM	전라북도청
BULD_NM_DC	
BULD_SE_CD	0
BULD_SLNO	0
BUL_DPN_SE	M
BUL_ENG_NM	Jeollabukdo Provincial Office
BUL_MAN_NO	8904
EMD_CD	142
EQB_MAN_SN	2701
GRO_FLO_CO	18
LI_CD	00
LNBR_MNNM	1
LNBR_SLNO	0
MNTN_YN	0
MVMN_DE	
MVMN_RESN	도로명기본도위치정확도개선사업에 따른 기...
MVM_RES_CD	71
NTFC_DE	20110729
OPERT_DE	20100125
POS_BUL_NM	전라북도청
RDS_MAN_NO	86
RDS_SIG_CD	45111
RN_CD	3266087
SIG_CD	45111
UND_FLO_CO	2

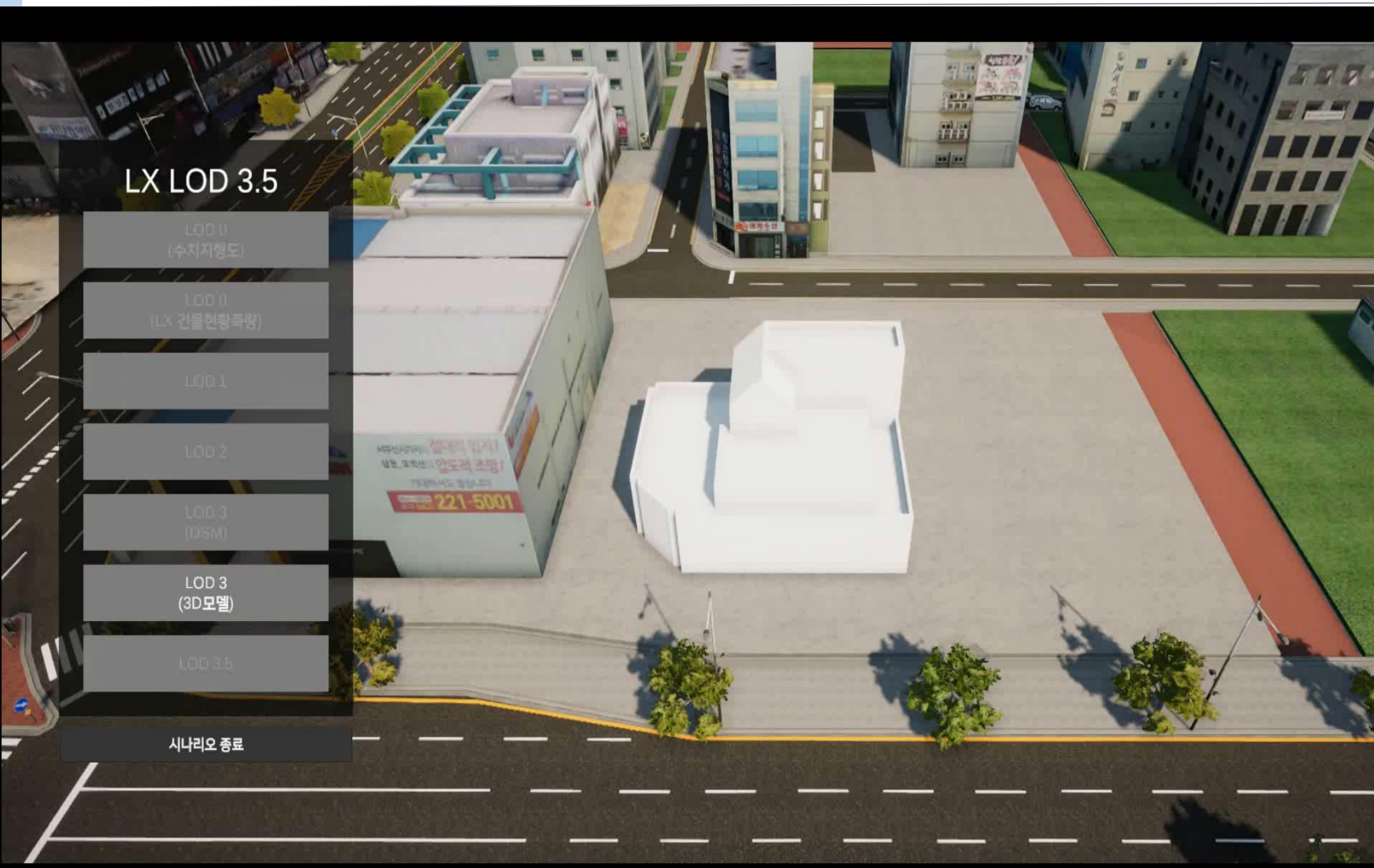
Street address

Building energy

Building register

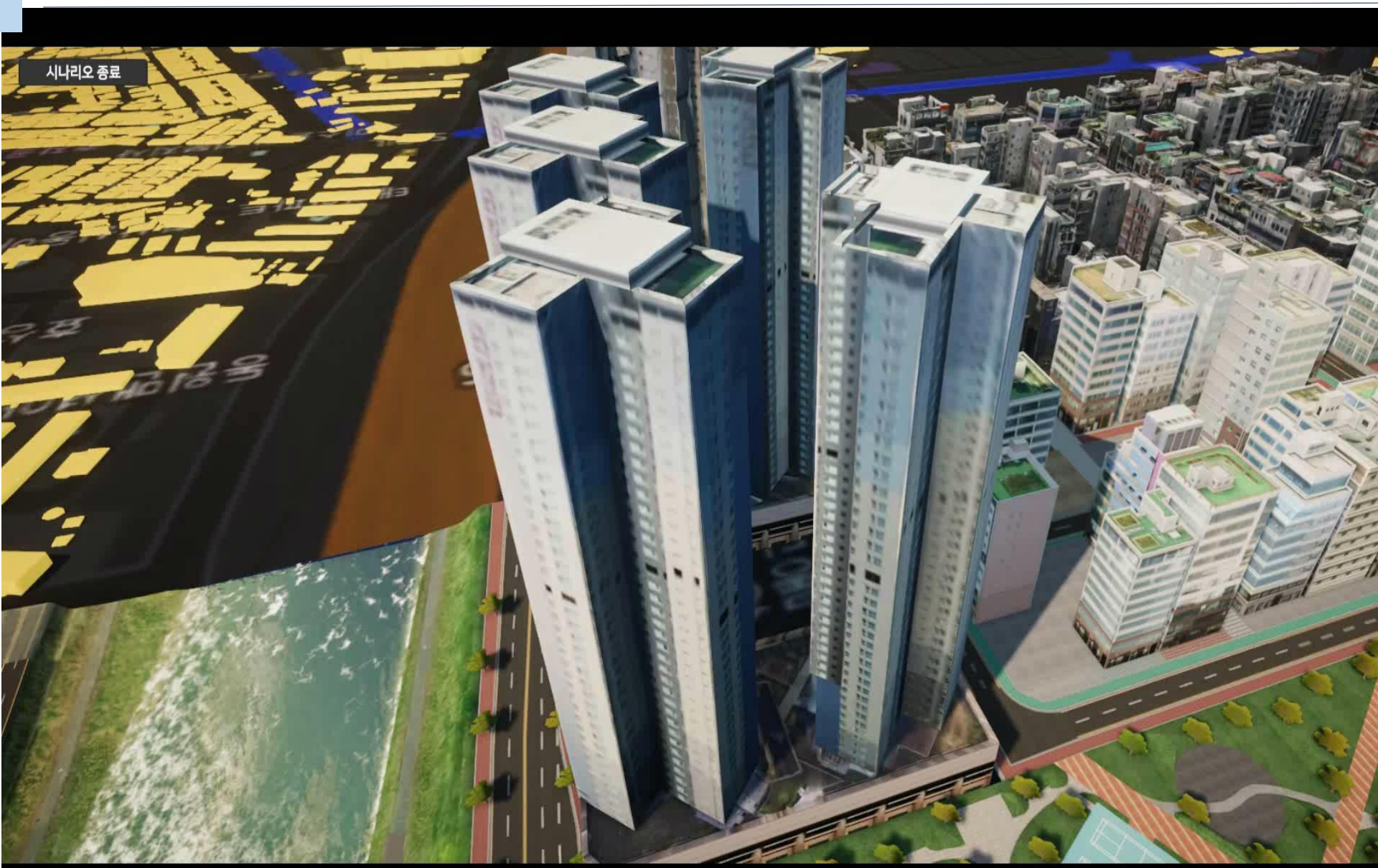
Cadastral

3. New Approach for Land Administration

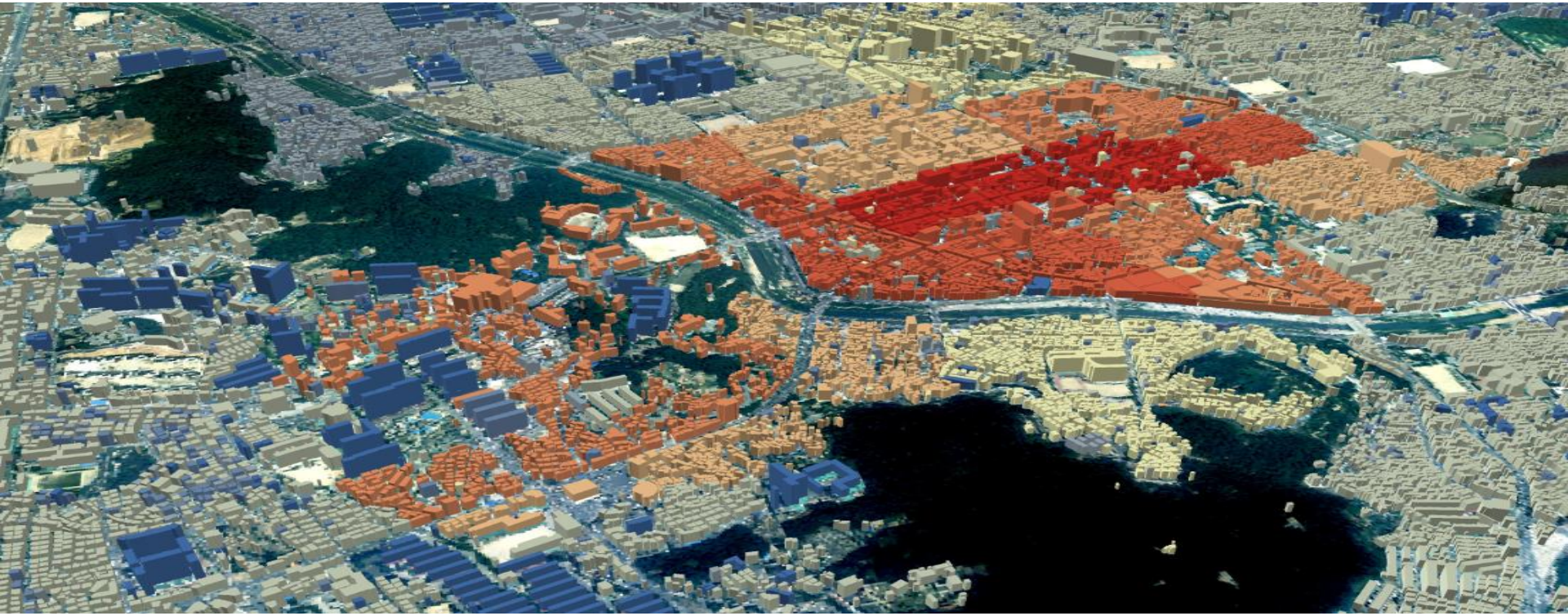


3. New Approach for Land Administration

House information



4. Application Case



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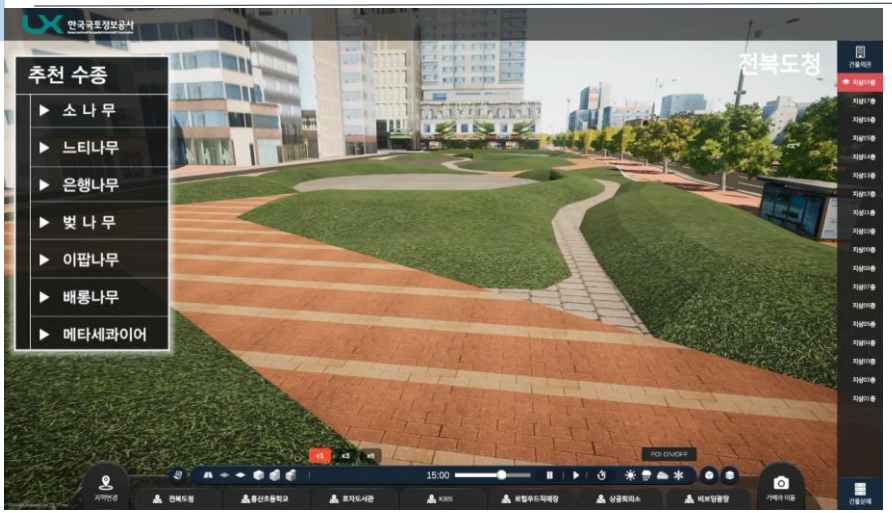
4. Application Case

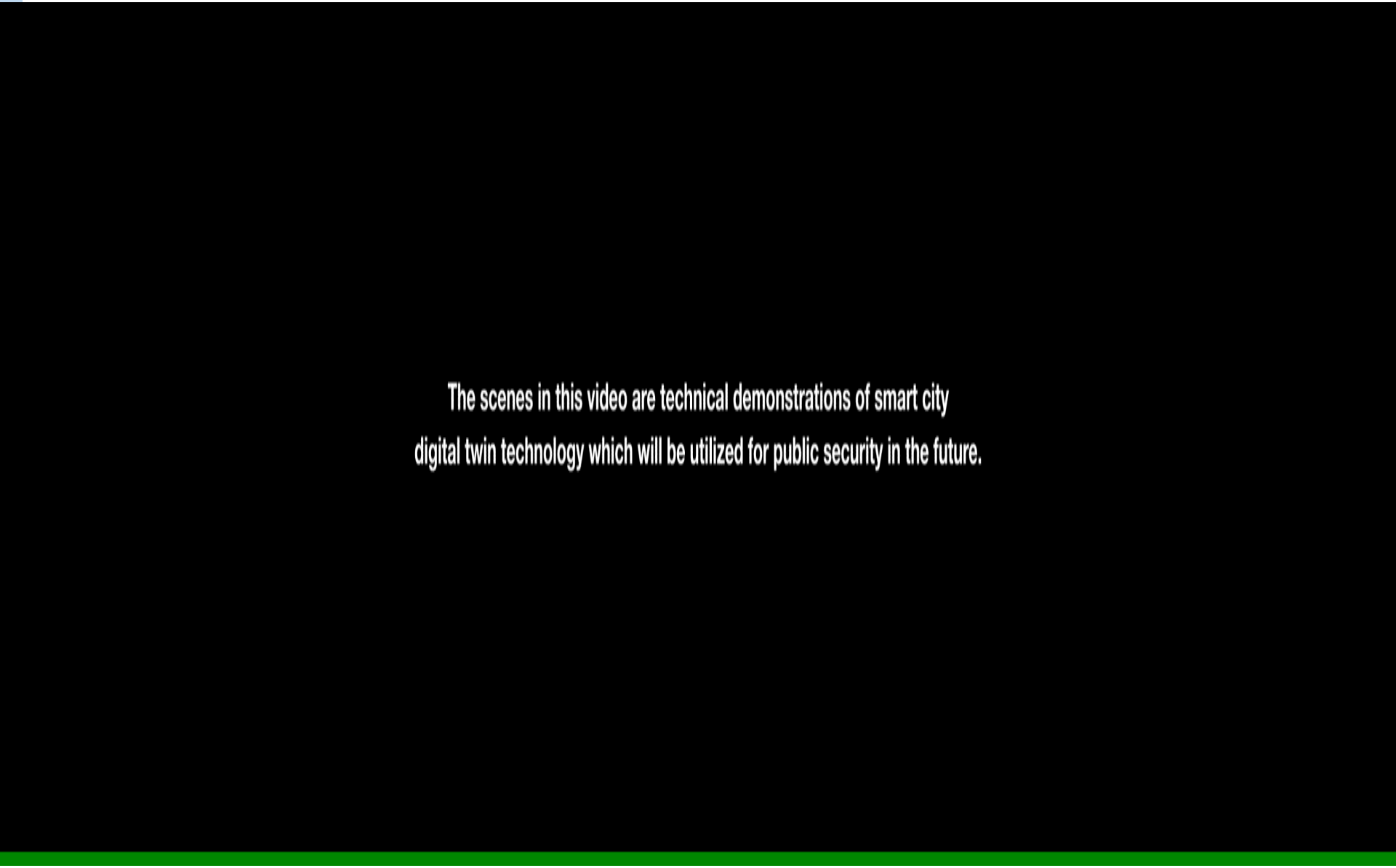


Planting Simulation

House Sola Installation Simulation

Path way Simulation for Fire Engine

4. Application Case



Thank you!!

kby05@lx.or.kr