New Technological Challenge of Geospatial Information Platform (V-world) in South Korea?

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May 25, 2015

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Contents

- V-world overview
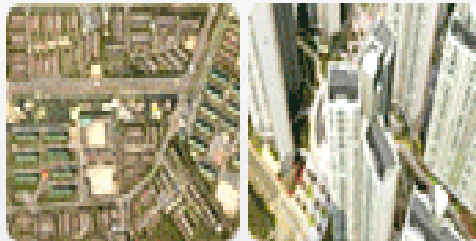
- Study overview

- Study results

- Concluding Remarks

Definition

National Geospatial Information Open Platform for Private (V-World)

Real World imagery

Physical component

Logical component
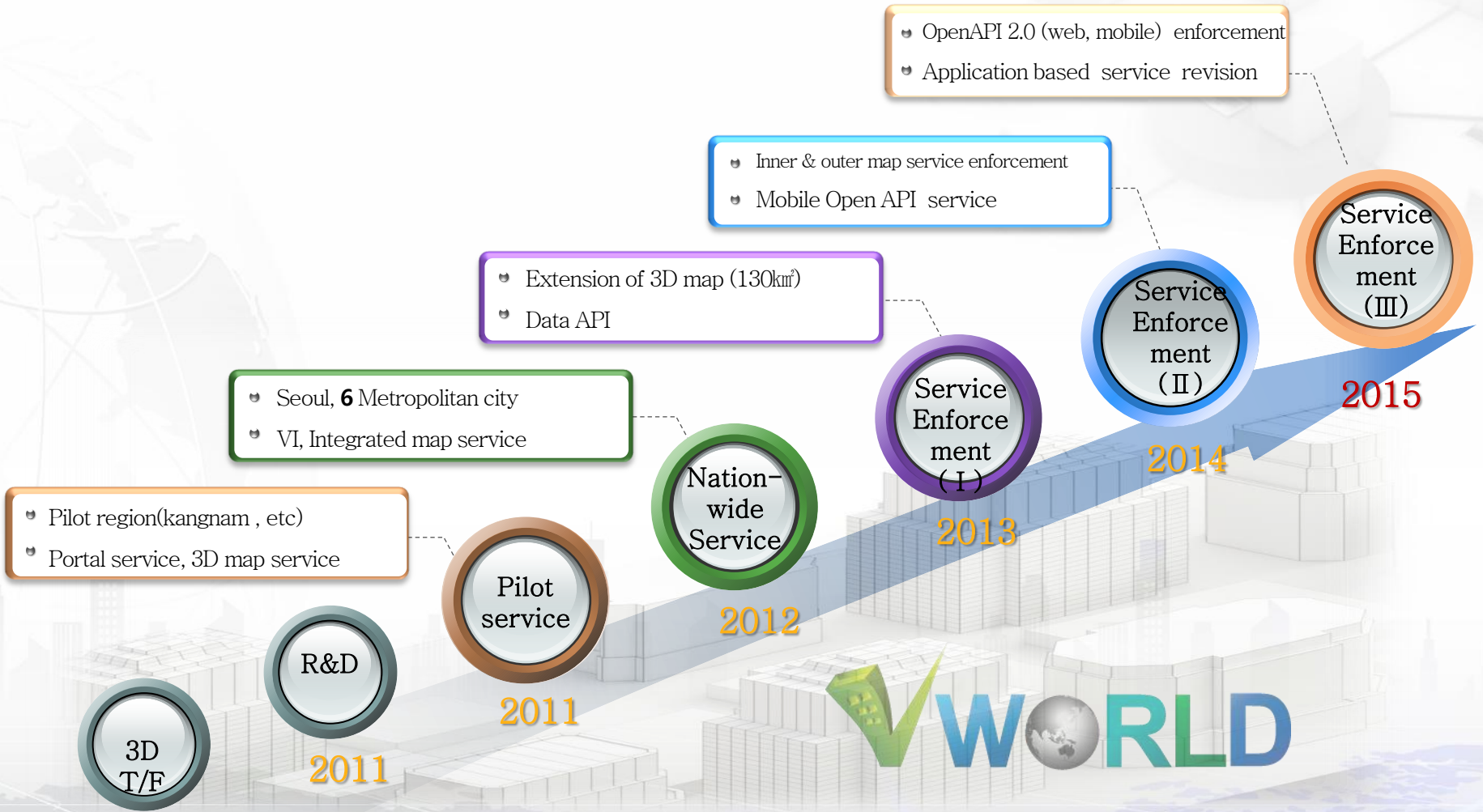
Concept

V-World

Service

New Service

User

| Personnel | Idea | Enterprise | Contents · Biz | Public institution | Public service |

New Service Infra

Platform

Service	map	SW	Data	VI
GI		**2D** GI	**3D** GI	
Infra	HW	SW	N/W	

History

OpenAPI 2.0 (web, mobile) enforcement

Application based service revision

Inner & outer map service enforcement

Mobile Open API service

Extension of 3D map (130㎢)

Data API

Service Enforcement (III)

Seoul, **6** Metropolitan city

VI, Integrated map service

Service Enforcement (II)

2015

Pilot region(kangnam , etc)

Portal service, 3D map service

Nation-wide Service

Service Enforcement (I)

2014

2013

Pilot service

2012

R&D

2011

2011

3D T/F

2010

- **Data provided**

Imagery	3D Building & Topo.	Boundary& Traffic	Cadastral Map	Background map & Facility
Korea	3D Bildg.	Korea	Cadastral Map	Map
Baekdusan	Topo.	N.Korea	Themes	Facility
World				
Seabed				
N.Korea				

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6

Data provided - overseas

Supporting the overseas expansion strategy

Satellite Imagery (World)	Overseas' country

GSD 15m

GSD 500m

(Tokyo Station, Japan)

(Sydney, Australia) (London, England)

Data provided − Antarctic base

Satellite Imagery	▪ **GSD : 50cm** ▪ **Area : 242㎢** ▪ **Date : 2013**
POI	▪ **204 POI**
3D GI	▪ **3D Bldg. LOD 2** ▪ **DEM : 5m**

<Korea Antarctic Research Program

<Jang Bo-go Antarctic Research Station>

정보고과학기지(2014년 3월 완공예정)

공간정보 오픈플랫폼 인프라 고도화 기술 개발

공간정보 오픈플랫폼
인프라 고도화 기술 개발 연구단
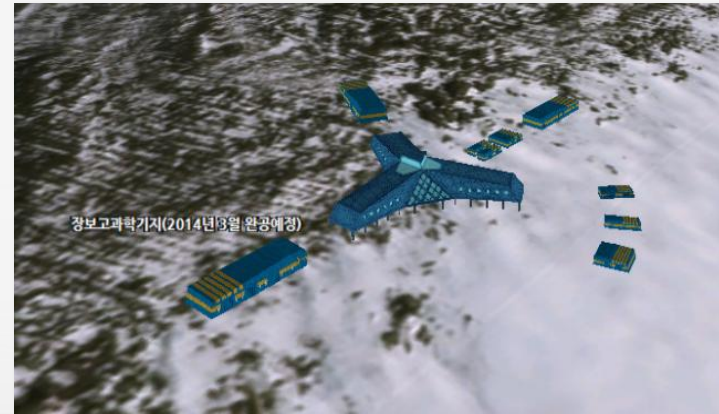
Data provided – N. Korea

Satellite Imagery	▪ GSD : 50cm ~ 1m ▪ Date : 2011~2012 ▪ Area : 10,800 ㎢
POI & Hybrid map	▪ (Approx. 29) POI ▪ Hybrid map & update

\<Satellite imagery\>

\<Hybrid map\>
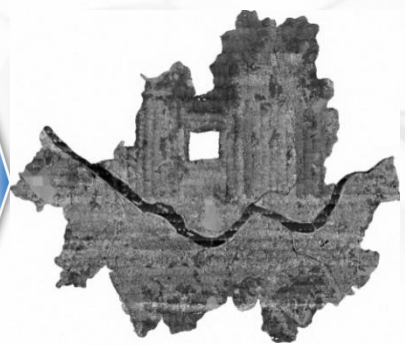
Data provided – Time series aero photo

Time series (Seoul/Busan/N.Korea)

• Map By Times series

• Orthophoto mapping by chronicle

• Loading Times series map to V-world
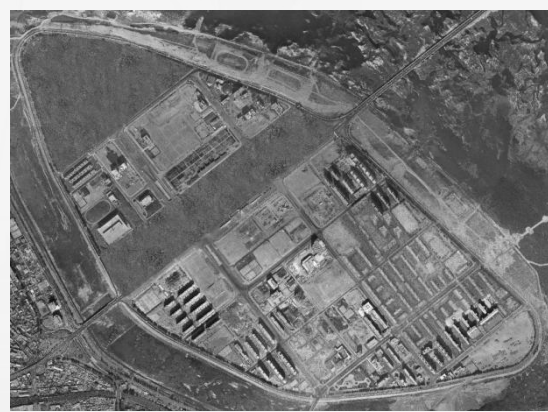
※ Seoul(78, 89), Seoul(50)), Pyongyang.(50) #15 regions
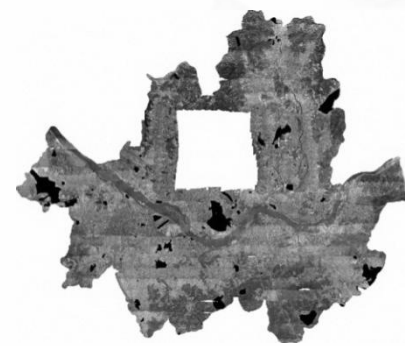
<1978, Seoul: aero photo>   <1989, Seoul>

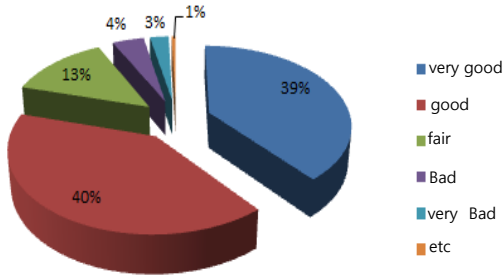## Inquiry service

<1978, Yeouido>   <1989, Yeouido>   <2009, Yeouido>

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인프라 고도화 기술 개발 연구단

Data provided – Fundamental GI

● 6 GI (2015.3)

#	GI themes		Attributes1)
1	Aero photo		R
2	Satellite imagery		R
3	Topography		R
4	3D Building		3D
5	POI		P
6	Map	Background	R
		Hybrid map	R

● 39 GI w.r.t administration (2015.3)

#	GI themes	Attributes1)
1	Zoning2)	G
2	용도지구도3)	G
3	용도구역도4)	G
4	연속지적도	G
5	건축물정보	A
6	토지이용현황	A
7	산사태위험지도	G
8	사업지구경계도	G
9	토지이용계획도	G
10	공시지가	A
11	교통CCTV	G
12	소방서관할구역도	G
13	등산로	G
14	산업입지도	G
15	농업기반시설도	G
16	보호시설도	G
17	도로명주소	G
18	행정구역도	G
19	보행우선구역	G
20	국가교통정보	G

Courtesy of SPACE[N]

Background (1)

Map service

- very good 39%
- good 40%
- fair 13%
- Bad 4%
- very Bad 3%
- etc 1%

Service data

- very good 17%
- good 50%
- fair 28%
- Bad 4%
- very Bad 1%
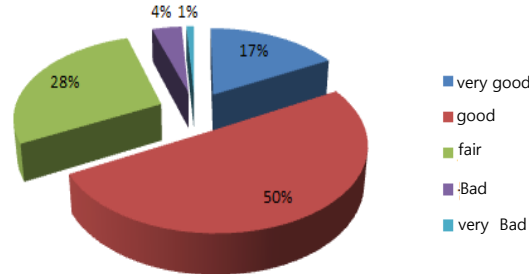
2013 late (courtesy of survey by SpaceN)

Service data quality

- very good 18%
- good 47%
- fair 29%
- Bad 5%
- very Bad 1%

기타 23% (국토API 카이네스, 서울시 데이터 지도, 엘아이룩스, Whereis)

Daum 13%

Naver 17%

Google 47%

~ Background map (2013)

현황	제약 요인	발전 방안
브이월드 접속자 수 꾸준히 증가하나 여전히 낮은 인지도	낮은 인지도	공공분야 확산을 통한 신뢰도 확보
지도서비스에 대한 비교적 높은 만족도	유입 채널의 한계	대국민용 주제도 활용 모델 제시
데이터의 종류와 품질에 대해 비교적 높은 만족도	API를 활용한 서비스 개발의 태생적 한계	민간업체의 활용유도를 위한 BM 제시
2D API 사용량 지속적 증가하나 여전히 낮은 인지도	국외 지역에 대한 데이터 문제	브이월드 활용을 위한 교육자료 개발
공공에 편중된 V-World 컨설팅	서비스 API에 대한 지원문제	국가공간정보 중요성 관련 교육 실시
부,청에서 59%가 컨설팅 수행	비즈니스 모델에 대한 고민 부족	장기적인 VWorld 활용을 위한 기초 인력양성
글로벌 기업의 높은 지도 점유율	낮은 신뢰도	사용자 편의를 위한 기술개발,시스템 안정화
브이월드의 유입경로로는 언론매체, 포털사 순		

브이월드 문제점 도출

Background (2)

V-world* server, almost
down for due to a keen
interest, N. Korea's image
open, and
the multi-access of user
at the same time.

2013. 9 (254 #)

* National Geospatial Information Open Platform

Aims

- **Dealing with new challenges** of V-world

- Re-adjustment of its architecture

- SW performance reinforcement

- Introducing web standard

- Data interoperability technology

- **Suggesting the reasonable Plans**

Scope of V-World technology enforcement

① INFRA

2D/3DEngine	OpenAPI enforcement **OpenAPI**
Mobile	Web standard
Architecture	OpenAPI Based on Web Standard

Stable service providing & Applying for next generation's web service

② DATA

Manufacture	Crowd sensing
Editing Tool	Hybrid DB
Hyper Spectral Imaging	

Acquiring & manufacturing the stable data

③ STRATEGY

Strategy development

➕
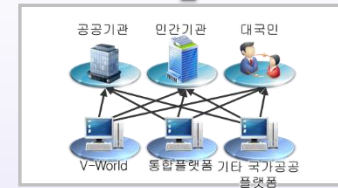
Connecting with Public Platform

➕

Overseas' exporting

Application Increase in Private/Public sector

INFRA - Architecture & SW enforcement

V-World Infra

Use of ActiveX Plug-in (3D GI service providing)

Error in Plug-in setting
Plug-in service stopping for Web browser
Security concern for Plug-in

Lack of High precision 2D/3D GI Data processing technologies

High precision and bulk of GI data

Extension of system since pilot project (2001)

Lack of system architecture
Incompletion of system performance/capacity,
Obstacle management in real-time

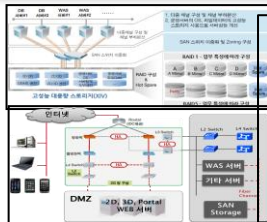**Cross OS Platform/Browser, Mobile**

Displaying high precision 2D/3D GI Data simply

**Incensement of user & contents
Difficulties of system extension**

Engine · S/W · Architecture of V-World

INFRA - Architecture & SW enforcement

V-world GI Architecture

- Service delay due to traffic
- **Lack of data security and response**
- Lack of architecture roadmap in system extension

V-world GI SW

Vworld 2D 지도 (IE/Windows)   Vworld 영상지도 (IE/Windows)   Vworld 3D 지도 (IE/Windows)

- **MS Windows based GI service (Plug-In)**
- **Few Open API, Web Service API connection**

High precision 2D/3D GI processing

- **Speed slowness in 2D data when combined**
- **Lack of combining vector with topography**

Architecture enforcement

Security, Emergency Response | Real-time resource monitoring | Roadmap for architecture | **Stable service infra construct ration**

V-world SW development based on web standard

2D Maps API
3D Maps API
Maps API Web Services
확장/고도화

No Plug-In
Cross Platform
Cross Browser

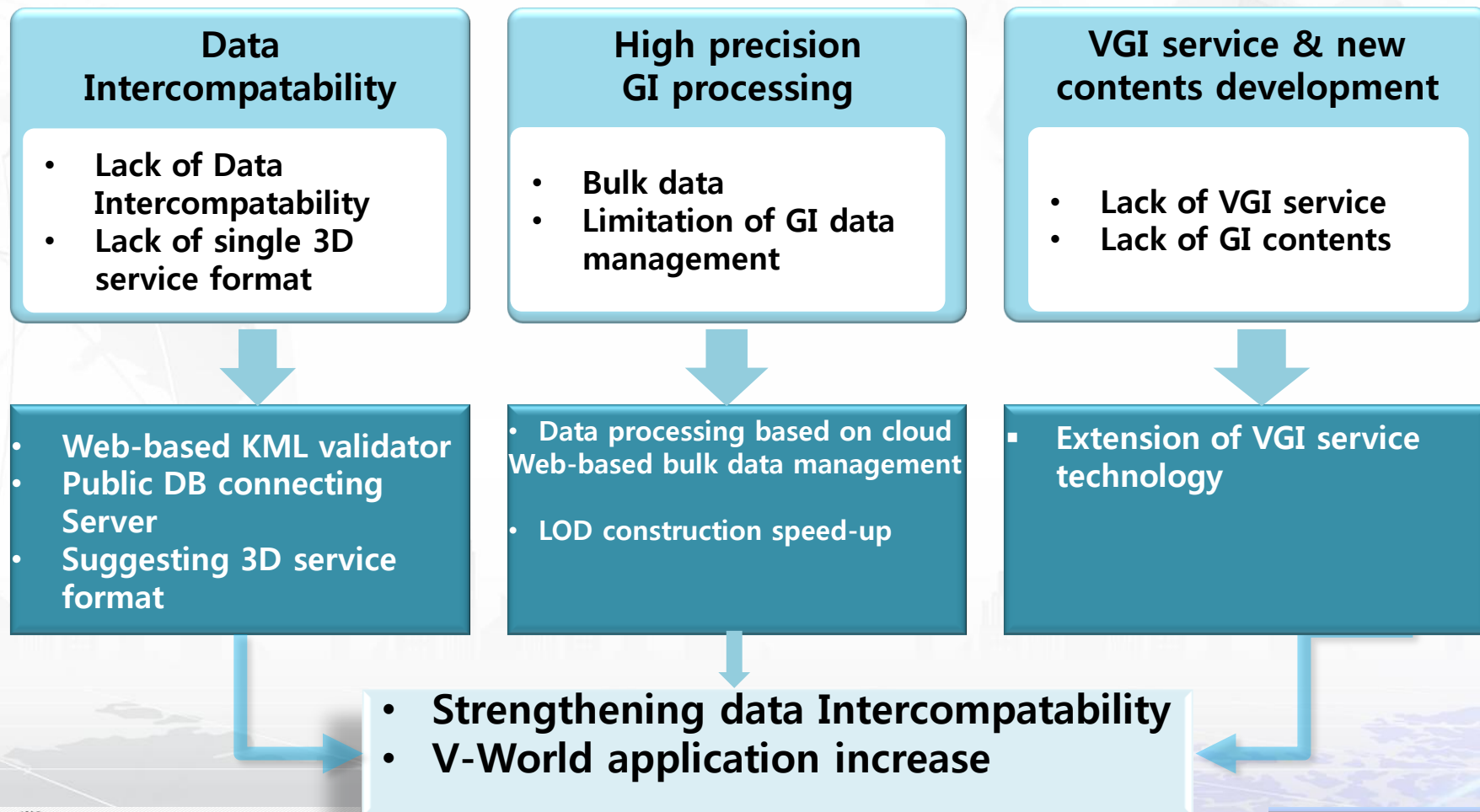HTML5   WebGL   JavaScript   nodeJS

- **Open Platform based on web standard (No Plug-In)**
- **2D/3D service (+mobile) based on Cross platform/browser**
- **Extension of Open API based on web standard**
- **(HTML5)**

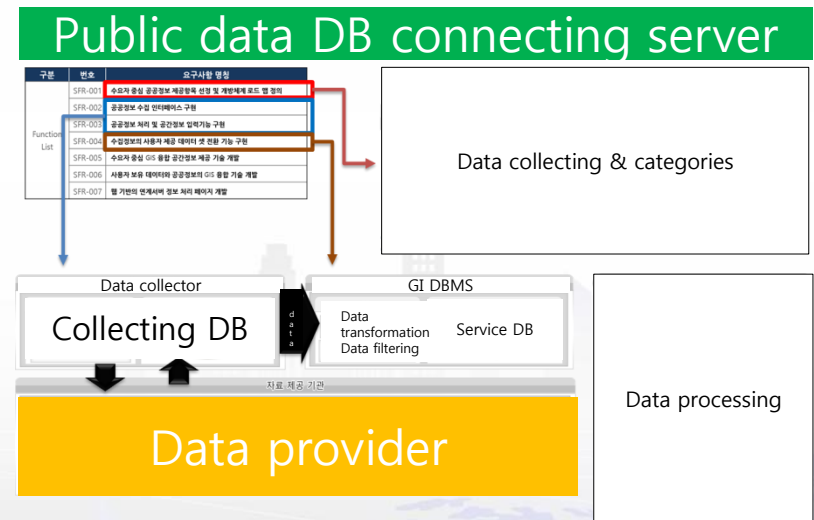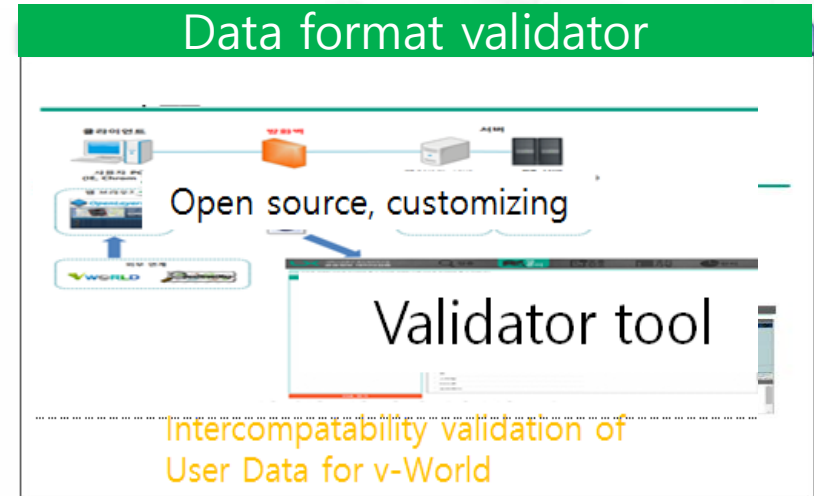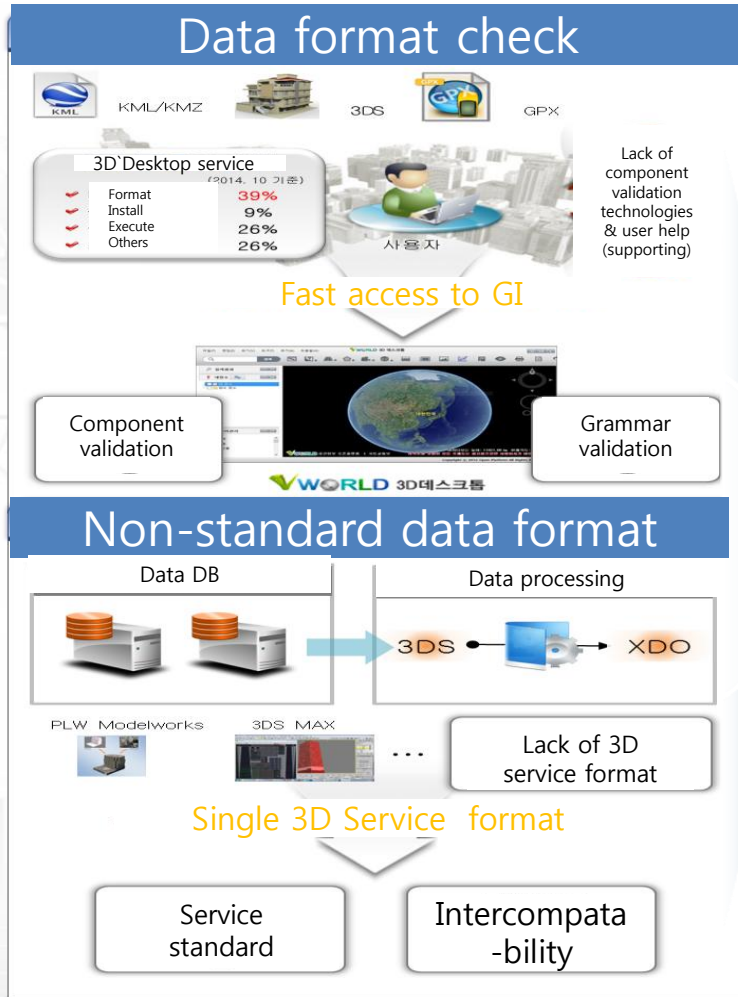## Speed-up of mash up of high precision 2D/3D
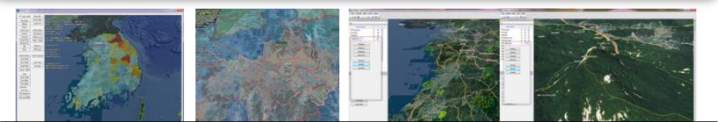
- **Speed-up when combine 2D data (20%)**
- **Combination of vector with 3D topography in real-time**

DATA - Intercompatability, Validation, Public Data Connection Processing technology, VGI service

V-World Data & Contents

Data Intercompatability	High precision GI processing	VGI service & new contents development
• Lack of Data Intercompatability • Lack of single 3D service format	• Bulk data • Limitation of GI data management	• Lack of VGI service • Lack of GI contents
• Web-based KML validator • Public DB connecting Server • Suggesting 3D service format	• Data processing based on cloud Web-based bulk data management • LOD construction speed-up	▪ Extension of VGI service technology

• **Strengthening data Intercompatability**
• **V-World application increase**

DATA – Intercompatability, Validation, Public Data Connection

Data format check

KML/KMZ   3DS   GPX

3D`Desktop service
(2014. 10 기준)

- Format — 39%
- Install — 9%
- Execute — 26%
- Others — 26%

사용자

Lack of component validation technologies & user help (supporting)

Fast access to GI

Component validation

Grammar validation

VWORLD 3D데스크톱

Non-standard data format

Data DB

Data processing

3DS → XDO

PLW Modelworks   3DS MAX   …

Lack of 3D service format

Single 3D Service format

Service standard

Intercompata-bility

Data format validator

Open source, customizing

Validator tool

Intercompatability validation of User Data for v-World

Public data DB connecting server

구분	번호	요구사항 명칭
Function List	SFR-001	수요자 중심 공공정보 제공항목 선정 및 개발체계 로드 맵 정의
	SFR-002	공공정보 수집 인터페이스 구현
	SFR-003	공공정보 처리 및 공간정보 입력기능 구현
	SFR-004	수집정보 사용자 제공 데이터 셋 전환 기능 구현
	SFR-005	수요자 중심 GIS 융합 공간정보 제공 기술 개발
	SFR-006	사용자 보유 데이터의 공공정보의 GIS 융합 기술 개발
	SFR-007	웹 기반의 연계서버 정보 처리 페이지 개발

Data collecting & categories

Data collector

GI DBMS

Collecting DB

data

Data transformation Data filtering   Service DB

자료 제공 기관

Data processing

Data provider

DATA – Manufacturing automation & Speed-up

DATA – GI analysis & prediction, VGI

USER → Passive

VWORLD

http://www.vworld.kr

VGI

NEW

Data & contents Sharing 3D modeling,

USER → very Active

Crowd sensing

Data dispaly

Platform

User/public data

Data analysis on V-World

Central / Local government

Mobile

GI manufacturing

2D

Sharing & Manufacturing

GI manufacturing

3D

GI manufacturing

Private management
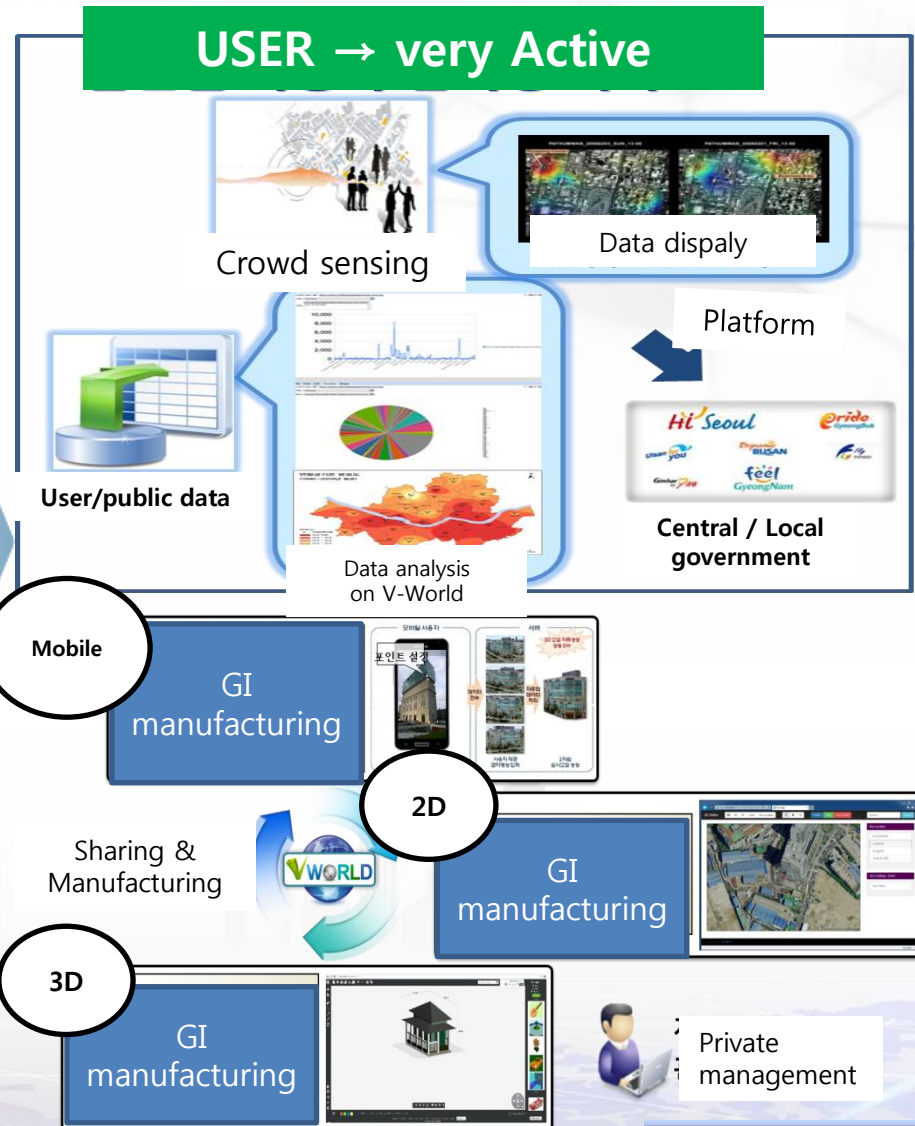
2D/3D / Bldg Rendering SW prototype based on WebGL

Courtesy of
ETRI

공간정보 오픈플랫폼 인프라 고도화 기술 개발
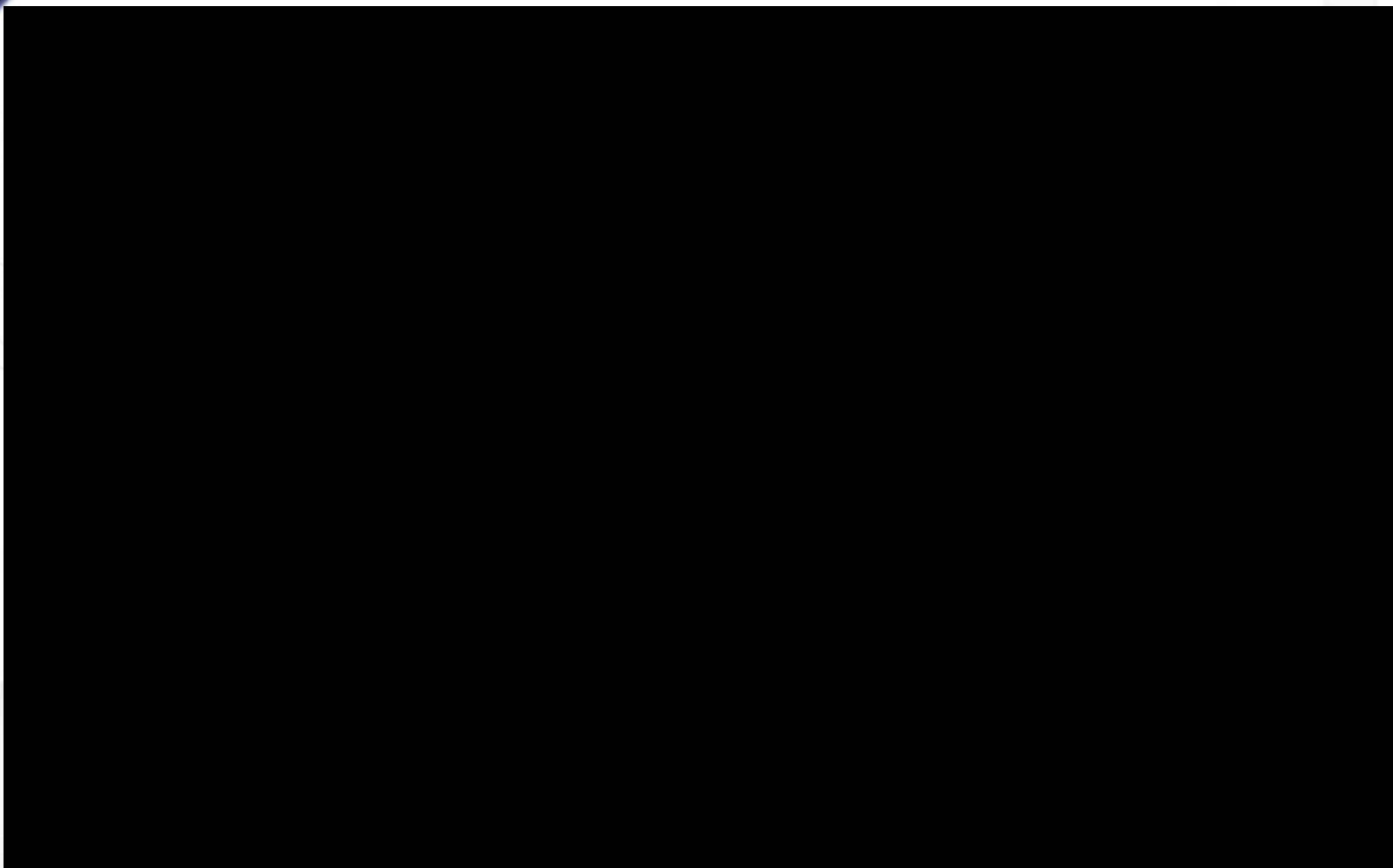
OpenAPI extension SW based on HTML5

Courtesy of
ETRI

공간정보 오픈플랫폼 인프라 고도화 기술 개발

공간정보 오픈플랫폼
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High precision 3D topo+
User GI Mash-up S/W prototype

이미지 메시업

Courtesy of
EGIS

공간정보 오픈플랫폼 인프라 고도화 기술 개발

공간정보 오픈플랫폼
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Web-Based KML Validator
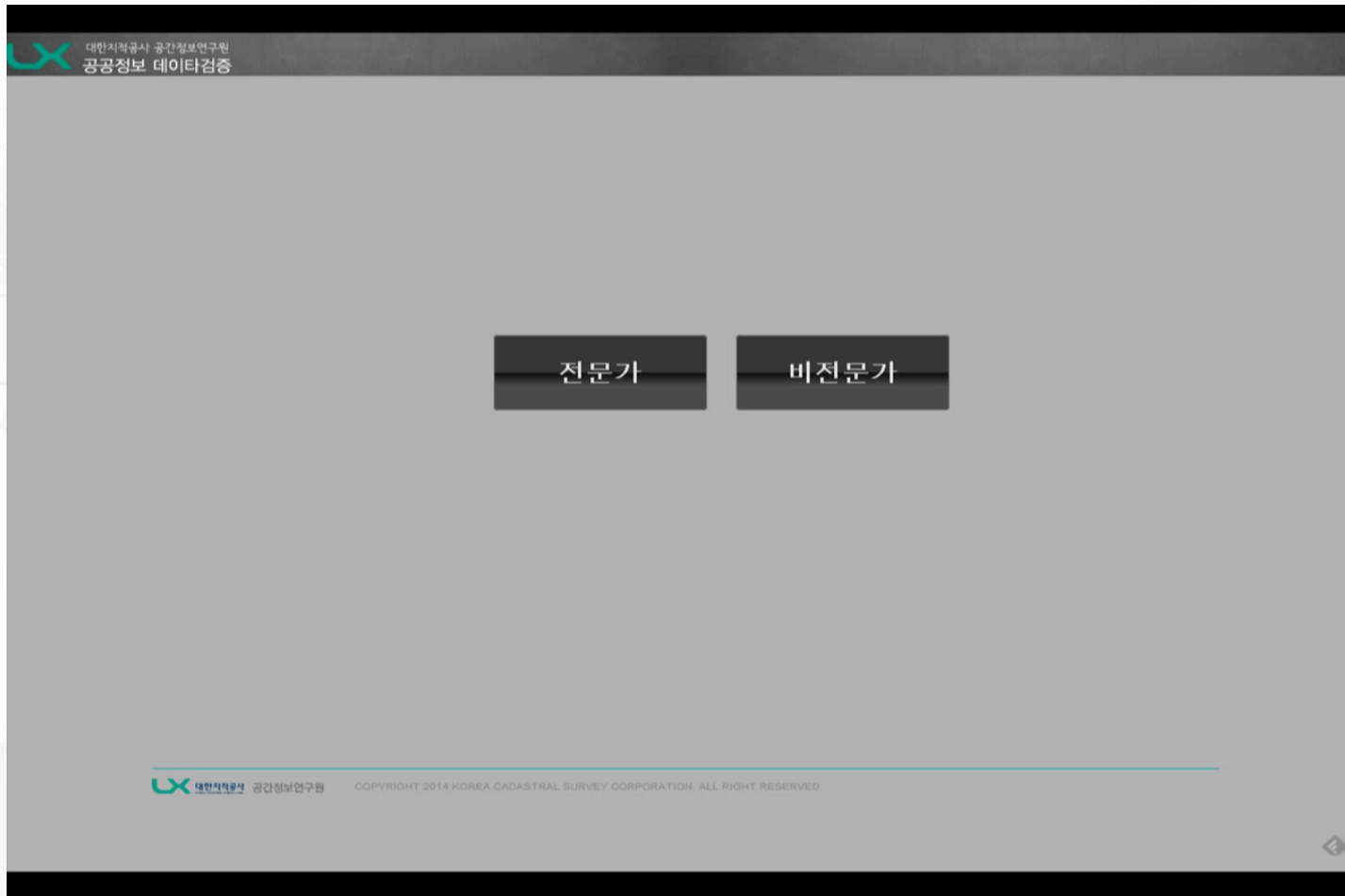
Courtesy of
LX SIRI

2D/3D GI generation and update based on Web Browser
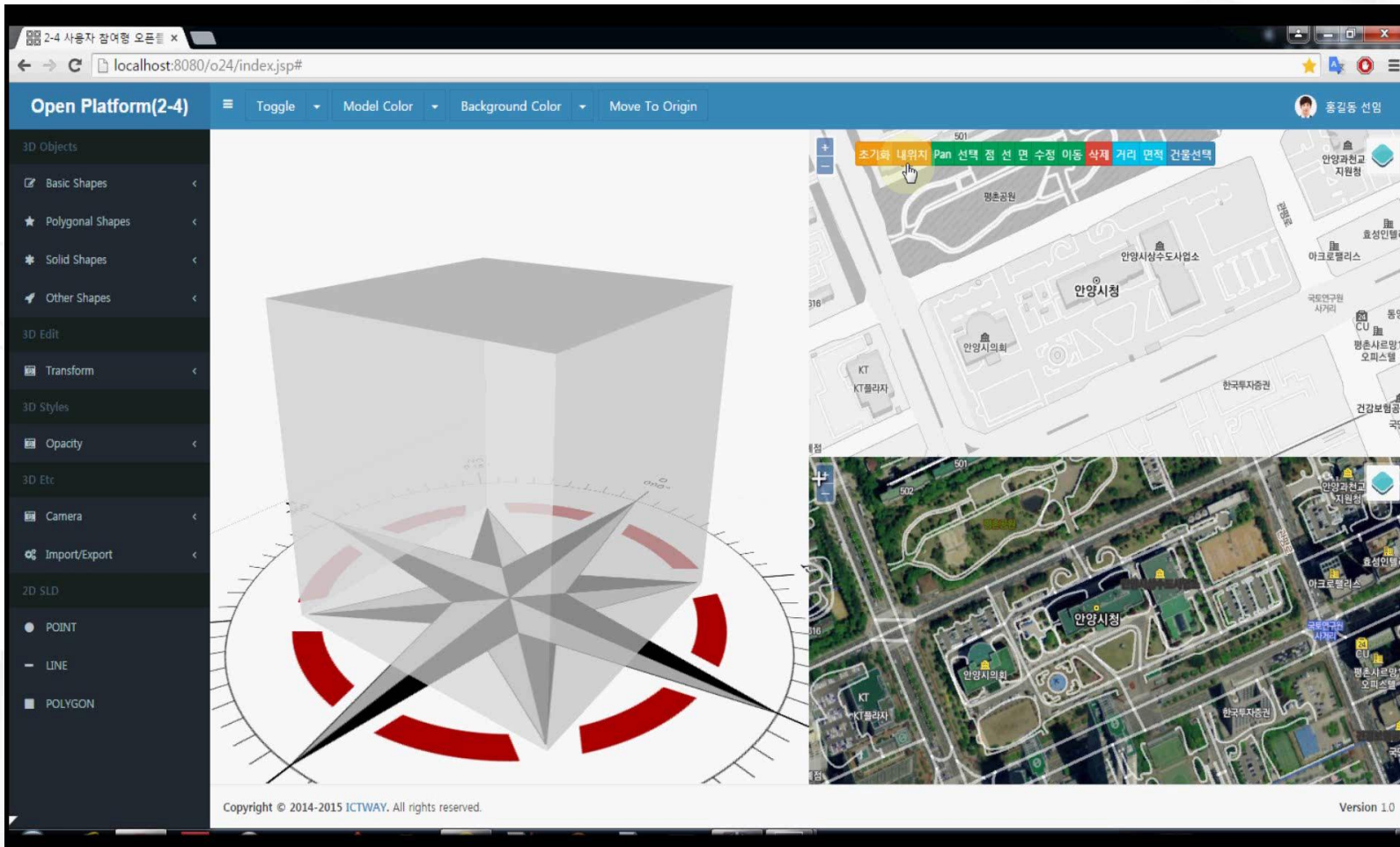
Courtesy of ICTWAY

Concluding Remarks

Developed V-World

Service
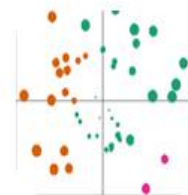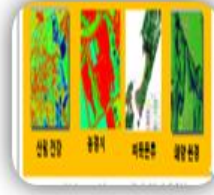
New Service

User

| Personnel | Idea | Enterprise | contents · Biz |

New Service Infra

Platform

| Service | map | SW | Data | VI |

| GI | 2D / 3D. Spatial-Temporal | Attribute/VGI/HSI |

| Infra | HTML5/WebGL | Cloud | Open Source & standard |

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Acknowledgement

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