

User experience oriented design for mobile data collector



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Agenda

- ✦ Introduction about Kokusai Kogyo(KKC)
- ✦ KKC Mobile GIS suit
- ✦ What is Post-disaster safety evaluation of buildings?
- ✦ Our approach for designing the data collector
- ✦ Achievements and Future plan
 - On App store
 - For Android



INSPECTED
LAWFUL OCCUPANCY PERMITTED

This structure has been inspected and
found safe and sound and is permitted for
occupancy as described below.

Inspected Exterior Only
 Inspected Exterior and Interior

Report any unsafe condition to local
authorities. Inspection fees to be required.

Inspector Comments: _____
Date: _____
Time: _____

Caution: Whenever your inspection
may involve damage and/or

This facility was inspected under
emergency conditions for

Inspector ID / Agency: _____

Facility Name and Address: _____

Do Not Remove, Alter, or Cover this Placard
until Authorized by Governing Authority



RESTRICTED USE

This structure has been
inspected and found to be damaged as
indicated below.

Caution: Whenever your inspection
may involve damage and/or

Entry, occupancy, and lawful use are
restricted as indicated below.

Facility Name and Address: _____

Date: _____
Time: _____

This facility was inspected under
emergency conditions for

Inspector ID / Agency: _____

Do Not Remove, Alter, or Cover this Placard
until Authorized by Governing Authority



UNSAFE
DO NOT ENTER OR OCCUPY
(THIS PLACARD IS NOT A DEMOLITION ORDER)

This structure has been inspected found to
be seriously damaged and is unsafe for
occupancy as described below.

Date: _____
Time: _____

This facility was inspected under
emergency conditions for

Inspector ID / Agency: _____


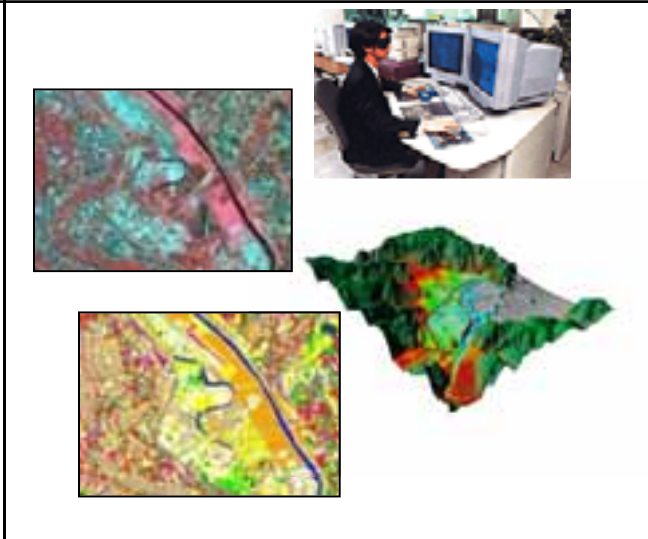

Do not enter, work on, or specifically
authorized in writing by competent
authority. Entry may result in death or injury.

Facility Name and Address: _____

Do Not Remove, Alter, or Cover this Placard
until Authorized by Governing Authority

Introduction about Kokusai Kogyo

- ⊕ KKC can provide the total solution from Data capturing to Consulting
- ⊕ KKC has high technology on three processes with perfect balance

1 Data Capturing	2 Data Processing & Analysis	3 Consulting & Engineering Services
<p>Various kind of sensors and ability to capture geospatial data</p>	<p>High quality data processing technology and ability to interpret it</p>	<p>Ability to utilize a processed data and its technology consulting</p>
<p>Various Satellite Sensors 4 Lidar sensors 4 Digital Image Sensors(DMC2) 7 Mobile Mapping Systems</p>	<ul style="list-style-type: none"> •10 PhDs, 271 registered surveyors •Specialties Photogrammetry, Remote Sensing, GIS Analysis, Geospatial DB design 	<ul style="list-style-type: none"> •6 PhDs, 254 Professional Engineers •Specialties Disaster Prevention, River Planning, Road Planning, Urban Planning & Design etc.
 <p>Digital Aerial Photography</p> <p>LIDAR</p> <p>Satellite Remote Sensing</p> <p>GPS</p> <p>Mobile Mapping</p> <p>Narrow Multi-Beam</p>		 <p>Consulting Services</p> <p>GIS Solutions</p>

What is KKC mobile GIS suits(KMA)

Trigger of Development

- Great Hanshin Awaji Earthquake in 1995
- Review of internal workflow
- 12+ years R&D experience



What is KMA?

- Geospatial data collection tool on site
 - Geospatial data : position + Multiple data(Attribute, photo, record, video and so on)
- Easy to use
- Know-how oriented design
- Patent as effective DB creation on limited device



KMA on Windows Mobile

Line up

- On Windows Mobile(through Palm/WindowsCE)
- On iPhone/iPad(Using iOS Mapkit)



KMA on iPhone/iPad

KMA software Line up

KMAView

- Update and share the acquired data
- Manage the data on WebGIS



KMALocal

- All the data on iPhone/iPad
- Use this tool for National reconstruction Project
- Shape file in/out



Inhouse Tool

Progress Management tool

- Manage the progress of survey of the city and share the progress with client

Post-disaster safety evaluation of buildings

- Digitize the procedure like e-paper
- Update acquired data to WebGIS

3D Representation tool for Structure of city

- Represent statistical data such as population on 3D(using OpenGL ES)

K-Utility Management tool

- Stored huge amount of as-built drawing data in just iPad and check these data(Water supply, road) on site

Tourist guiding support tool

- Tourist guiding support tool for professional guide

Customized product



What's Post-disaster safety evaluation of buildings in Japan?

- ⊕ Post Disaster safety evaluation of buildings is:
 - Evaluate the extent of damage to structures after an earthquake
 - Placard buildings to inform owners, occupants and the public if a building is safe to enter and occupy
 - Provides information to local, regional and state governmental agencies and others as to the extent and location of damaged structures
- ⊕ the voluntary cooperation of (10,000+ Registered Architects or Local municipality)
- ⊕ Same as ATC-20 in US



Our approach

✦ Target User

- Local municipality people and professional Architects
- 102,610+ people is certified building inspector in Japan
- Well-trained with paper based procedure

✦ Target device

- iPhone/iPad(iOS)

✦ Our Approach for Smooth data input

- Adopt same evaluation procedure of paper-based work
- User experience Oriented Design for reducing the time to master the operation by non-GIS user
- Specialized design for safety evaluation of buildings

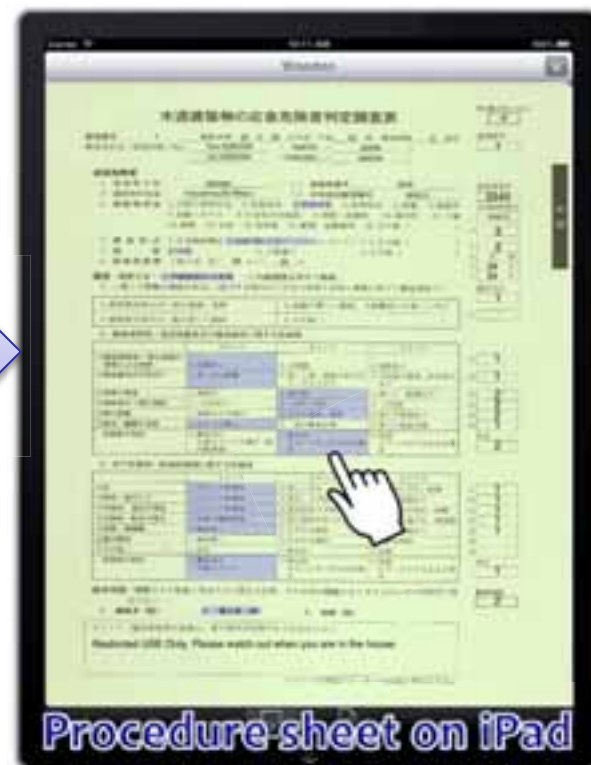
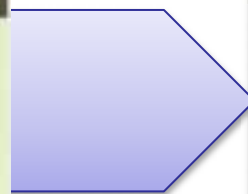


Digitizer onto check procedure

- ✦ Added the transparent boxes to react the operation of user
- ✦ Create the boxes for variable number and store the data operated by user



Original procedure sheet



Procedure sheet on iPad

Advantages of using the tool 1

- ✦ Easy to check the **current position** during surveying on site using GPS

Conventional method using paper	Proposed method using mobile device
Read a Paper map and check the current position	Mobile terminals (iPhone/iPad) have a GPS module Inspector can easy to access to the target area even if they are not familiar with the area



Current location and Orientation

Advantages of using the tool 2

- Support evaluation activity with data input on site for non-GIS user and reduce the human error

Conventional method using paper	Proposed method using mobile device
Write it down the evaluation result on procedure form	Specify the position and its attribute data directly Automatic input function for routine entry area Check the result of evaluation and remind to user



Tap the target building on map



Evaluation data input

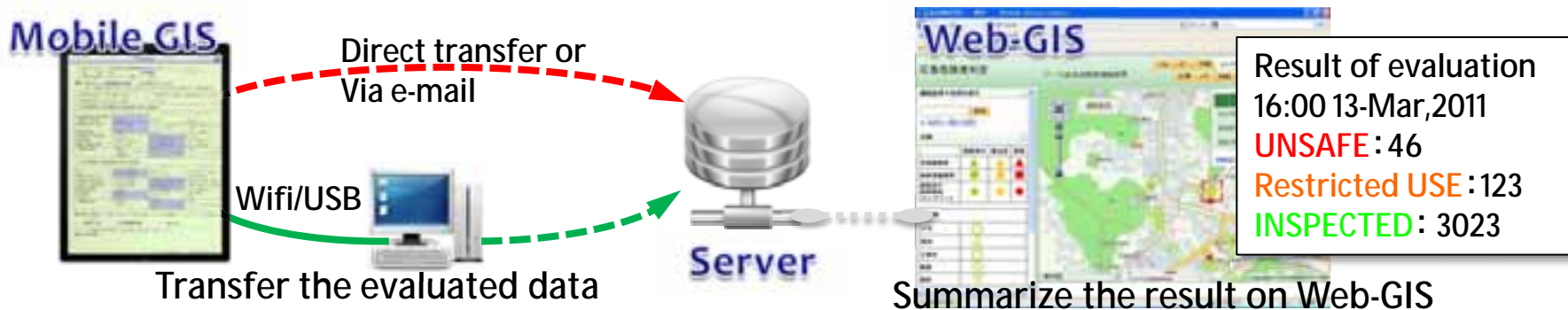


Display the result of evaluation

Advantages of using the tool 3

✚ Reduce the organizing time for result of evaluation

Conventional method using paper	Proposed method using mobile device
Re-enter the data from paper procedure in office	Directly transfer the evaluated data to the server Calculate summary on Excel without manual work Reduce the time and miss typing
GIS data creation at headquarter, again	Analyze the specific theme on ArcGIS or Google Earth Easy to find out each evaluation result from GIS





Support tool for Post-disaster safety evaluation of buildings

DEMONSTRATION



Conclusion

✦ KKC could;

- accomplish the primary purpose of this study enabling smooth data input and editing on site
- Reduce the time for investigators to master the method of operation
- Support disaster counter response by local municipality using ArcGIS server

✦ Important things

- Redesign GIS by collecting required resources from a group of main functions depending on on-site needs or circumstances

Future Plan

✦ Near Future;

- “Support tool for Post-Disaster safety evaluation of Buildings” will soon be available to download on AppStore **in Japan** by Building Research Institute
- Saved at local device or connecting to ArcGIS server
- Use this tool for regular training with local government and Architects

✦ Future Plan;

- We will support Regular updates and flexible use
 - **English Version if possible**
- Expanding for multi-OS(Blackberry, Android)

The image shows a screenshot of the 'ATC-20 Rapid Evaluation Safety Assessment Form'. The form is divided into several sections: 'Inspection' (with fields for ID, date, and location), 'Building Description' (with fields for name, address, and type of construction), 'Building Characteristics' (with fields for number of floors, area, and other details), 'Evaluation' (with checkboxes for various damage types and a table for estimated damage percentages), and 'Posting' (with a section for notes and a 'POSTING' checkbox). The form is titled 'ATC-20 Rapid Evaluation Safety Assessment Form' and includes a 'POSTING' section at the bottom.





Question or comments?

✚ Contact at:

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