



# *The Advanced Proposal for the Successful Cadastral Resurveying in South Korea*

**Presenter : JANG, Bong-Bae**



**KIM, Soon-Tae**



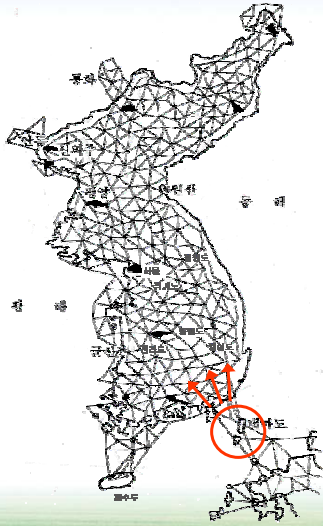
**JANG, Bong-Bae**

## **I. INTRODUCTION**

- ❖ The Korean modern cadastral system was established by a Japanese land survey project in early 1900s
- ❖ Korean cadastral maps have been used for about 100 years (since 1912); these have caused many problems
- ❖ As a result, a new survey has been increasingly requested by surveyors.
- ❖ This presentation proposes **establishment of new cadastral infrastructures** and **advanced KOPOSS** to solve the current problems and to lead the successful cadastral resurvey in Korea



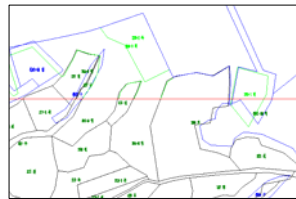
## II-1. The Problems



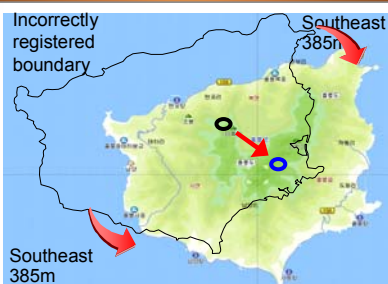
- ❖ The original Korean reference point net was established by Tokyo datum
- ➡ It has original control point errors (to the south 290m and east 400m)
- ❖ Korea has many different local control nets that are originated from different local coordinate datum
- ➡ The cadastral survey results are neither homogeneous nor accurate

3

## Incorrect Digital Maps



## Existence of the Incorrect Islands



The paper maps were galled, damaged, and warped. Korea has made digital maps incorporating these original problems.

The Ulleung-do was registered with a 385m position error

4

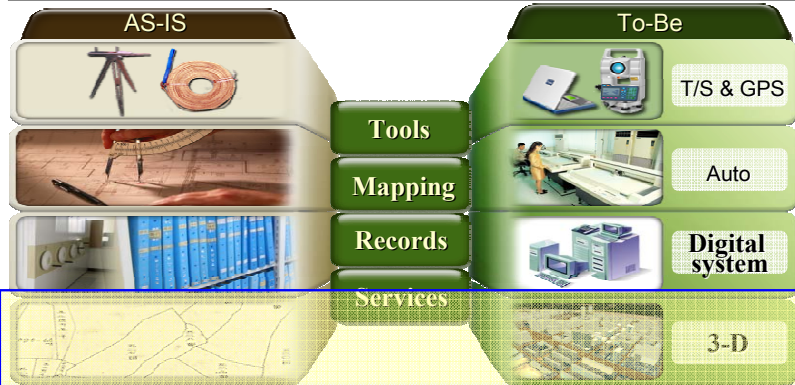
## II-2. The Resurvey Project

Years	History of Resurvey	Others
1992 ~ 1994	Preliminary and experimental research on cadastral resurvey	
1995	Establishment of basic plan of the cadastral resurvey project	The Ministry of Home Affairs
1996	Legislative special bill of the cadastral resurvey was formulated and proposed	
2006	Presentation of the New Survey Bill to the National Assembly	Rejected because of disagreement among the involved departments
2007	Reported to government on making a digital cadastral project plan	Changed the project name from resurvey to digital cadastre
2008	<b>Started the Digital Cadastral Pilot Project</b>	MLTM

5

### The Model Project of the Cadastral Resurvey

Project Period	2008 ~ 2010	3 years
Project Scope	17 districts	Nationwide scale
Project Capacity	8,874 / 5,559 m <sup>2</sup>	Parcel / m <sup>2</sup>
Project Budget	\$10.7 million	US Dollar



6

### III-1. Positioning Service

The Positioning Service divides two kinds of Systems such as KOPOSS for the land area, and DGNSS Office for the coastal area

#### **KOPOSS**

##### Raw Data Service

**The Raw data for the Post-processing can be downloaded on <http://gps.ngii.go.kr>**

- Type : RINEX format
- Fee : Free of charge
- Observational Interval Time : 30 seconds
- Mask angle : 15°

7

##### Quality Control Service

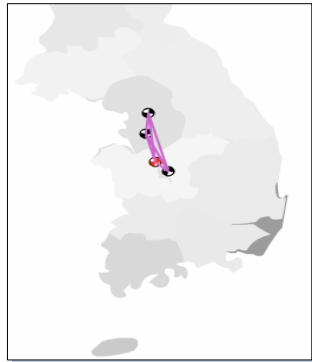
**The Quality Control Service can be used to check Data Quality for GNSS on a web site**

- Analysis of the satellite signal L1 & L2
- Analysis of the DOP(GDOP, PDOP, etc.)
- Analysis of the Satellite altimeter
- Flash video with satellite location or time phased display
- Save results to text file

8

## Automatic Computation Service

The Automatic Computation Service system calculates static point positions. A user can get an **unknown point position automatically** within 1~2 minutes on the web site. It is very valuable & convenient for **unskilled users**.



### Result data

관측명	X(m)	Y(m)	Z(m)	관측일
CNUJ	-3117076.205	4067949.797	3784300.502	2008/4/8 3
SUWN	-3062023.544	4055449.045	3841819.21	2008/4/8 3
SOUL	-3049402.747	4035000.351	3873010.167	2008/4/8 3

9

## Network-RTK Service

- 2003 : Planned the Network-RTK by NGII
- 2006 : First service started with 14 permanent reference stations
- 2008 : Added 18 permanent stations (now it operates with 32 permanent reference stations)



- The current RMS Error of the Network-RTK is 3.1 cm within 50 km, and normal RTK is 2.0cm

10



### III-2. DGNSS Central Office

The main role of the DGNSS Central Office is to provide not only **the DGNSS service** for the safe seafaring in coastal areas but also for **the Raw Data Service**. Moreover it serves the original role as **lighthouse** for the safe sailing.

	Primary role	DGNSS
	Expected error	Within 1 m
Coverage area	The coast area	185km
	The inland area	80km
Stations	Coast Reference Station	11 stations
	Integrity Station	9 stations
	Inland Reference Station	5 stations

11

## IV. The Advance Proposal

### IV-1. Establishment of the Cadastral Infrastructures

#### 1. Re-establishment of the Cadastral Control Net

This project was started in March 2009, and will be finished at the end of this year using a \$1.5 million budget. The Primary objective is the re-establishment of a cadastral control net that is the **first unified control net**. Moreover, it will be used for the cadastral resurvey starting in 2011.

Advantages:

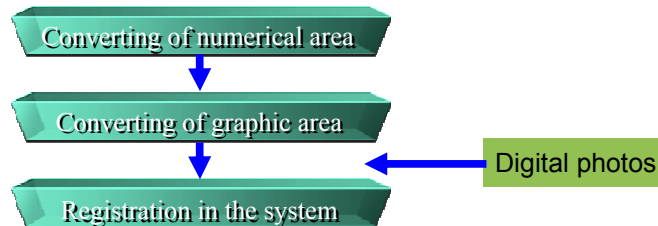
- Providing the same survey results and good accuracy
- Laying the groundwork for the successful cadastral resurvey

12

## IV-2. Introduction of the World Geodetic Reference System

The current geodetic and the cadastral sectors will be introduced into the global coordinates system in 2010.

Items	AS-IS	To-Be
Reference Ellipsoid	Bessel 1841	GRS 80
Coordinate	2-D plane	3-D ITRF



13

## IV-3. Legislation of the New Survey Bill

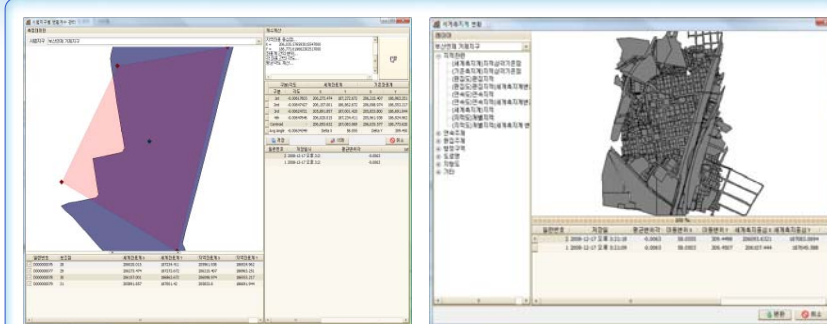
- 2009 : Preliminary research and making a drafting special bill for cadastral resurvey(first half year)
- 2009 : Hold a public hearing(second half year)
- 2010 : Enactment of the law by government legislation
- 2011 : Begin the cadastral resurvey
- 2020 : Finalize the project

### TIP

Until now, the National Assembly legislation was used to regulate the cadastral resurvey bill because of simple method and quick processing. However it was in opposition to involved departments. So, this presentation recommends the government legislation to enact the bill due to easy agreement with related government departments.

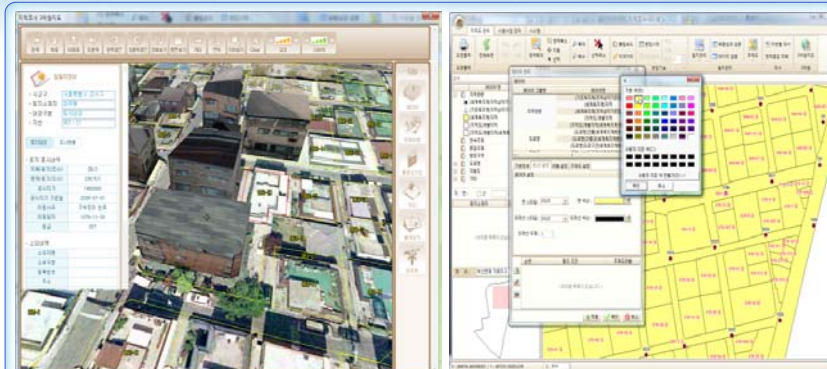
14

## IV-4. Making of the Conversion System



The KOPOSS can not serve the conversion to global coordinates. Hence, this presentation made a suitable new conversion system. It carries out cadastral map conversion from local to global coordinates or vice versa. In this year, the system will be upgraded to utilize more diverse functions and increase accuracy.

## IV-5. 3-D Registration and Management System



This new system will be applied to the KOPOSS after that the KPOSS will carry out important roles for the Korean cadastral resurvey project



## V. CONCLUSIONS

Until now, Korea **has insisted** on commencing with the cadastral resurvey project with national scale on whole land **at one time**. However this method requires a huge budget, manpower, equipment, technology, etc. Therefore it is difficult to get an agreement from the government.

This presentation proposes cadastral infrastructures and development by way of the KOPOSS. Using these advanced proposals, **Korea can carry out the resurvey project step by step**, much like doing a puzzle, from urgent areas on the basis of these particular needs. These infrastructures and advanced KOPOSS should play **important roles** in Korea cadastral resurvey project.

Thanks for your attention!

[jangbb@hotmail.com](mailto:jangbb@hotmail.com)