GEO-INFORMATICS AND SPACE TECHNOLOGY FOR PROPERTIES DIGITAL TAX MAP : CASE STUDY ON LOCAL ADMINISTRATIVE "WONG KONG MUNICIPALITY", PHITSANULOK, THAILAND

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ABSTRACT :

Thailand government had distributed the administrative authorities to the local regions. One of the government policies is using Geo-Informatics and Space Technology for planning and administration, which is emphasized on application Geo-Informatics and Space Technology for properties (lands, real estates and signboards) tax information in digital system. Study area belongs to Wong Kong municipality and covered 3.27 square kilometers. The first step was interviews the owners, surveying and checking signboards sizes, places, locations sizes and positions of agricultural landuse, lands and houses by using global positioning system (GPS). The second step was application ArcGIS 8.3 program and input the spatial data. The orthophoto with scale 1:25,000 was supported by Ministry of Agriculture and Cooperatives Thailand, was transferred to raster and vector data. The third step was application Microsoft access program and input attribute data. Microsoft Visual Basic and Map Object Component had been processed which had the objective to link between ArcGIS 8.3 program and Microsoft access program. The first version of digital tax map for Wong Kong municipality was created by Regional Center of Geo-Informatics and Space Technology (Lower Northern Region) Naresuan University. This program was namely TAX MAP OF CGISTNU. TAX MAP OF CGISTNU program is able to calculate, manage, edit or update the new records and query database anytime with highly working efficiency system. Finally, the local government will have the collect database, which is convenient and fast for local tax management.

1. INTRODUCTION

The main income of the local administrative came from local tax such as lands, real estates signboards tax and others fee. All of the properties tax data on the local administrative in Thailand are keep on hard copies and not available on query. Properties digital tax is the systematic and advance technology for the local administrative. In 2003, Thai government policy has concentrated on provide digital tax for the whole country. Regional Center of Geo-Informatics and Space Technology, Naresuan University had a pilot project on Geo-Informatics and Space Technology for Properties Digital Tax Map : Case Study on Local Administrative "Wong Kong Municipality" Phitsanulok, Thailand.

Wong Kong municipality is located on Phrompiram District, Phitsanulok province which covered 3.27 square kilometers. The Northern boundary are E-Pear and Tar Hund canals, the western boundary is irrigation canal, the southern boundary is Ma Tong Sub-district Administrative Organization and the

eastern boundary is Don Sa Hnarm canal. Existing data was done in the field survey for correction and got more completely data. High efficiency computer system had introduced to supporting local administration for high efficiency tax collection.

2. OBJECTIVES

2.1 To create principle database and relational database structures for properties management of local administration.
2.2 To create the digital tax map for Wong Kong municipality.
2.3 To create the new program is able to calculate, manage, edit or update the new records and query database anytime with highly working efficiency system.

3. RESEARCH SITE AND AREA

3.1 Experimental site is Wong Kong municipality, Phrompiram District, Phitsanulok province.
3.2 Experimental area covered 3.27 square kilometers.

4. PROCEDURE

4.1 Principle database had consisted of the water bodies, transportation, administrative boundary, pollution areas, public area, conservation area, land use, parcels, buildings/houses and signboard layers.
4.2 Database system of properties digital tax map such as lands, real estates and signboards and fee and relational database structures.
4.3 Experimental site is Wong Kong municipality which the experimental area covered 3.27 square kilometers.
4.4 **Method**
4.4.1 Review literatures and analyze on tax management from the

financial unit under local administration
4.4.2 Interview the properties owners
4.4.3 Develop the efficiency program
4.4.4 **Database layers**
a) Ground Control Point (horizontal/vertical) of aerial photo of study areas had been referred on 4 point of Global Positioning System. Rectified the affine aerial photo
Model $X' = A*$ column $+ B*$row $+ C$
Model $Y' = D*$ column $+ E*$row $+ F$
b) Rectified the aerial photo by using UTM system (Universal Transverse Mercator) Zone 47 Geodetic Datum Indian 1975. (Figure 1)
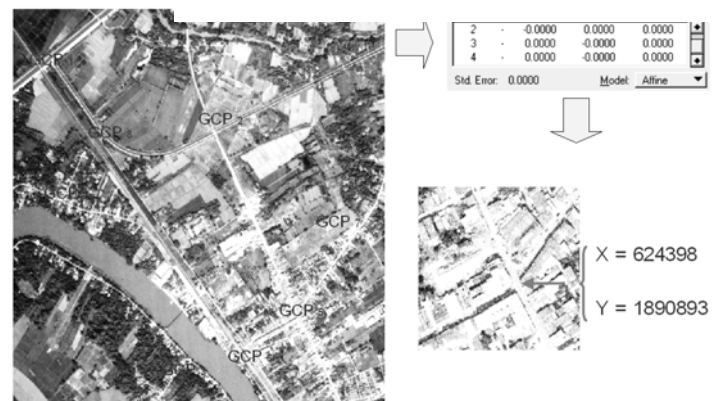

Figure 1 Aerial photo by using UTM system (Universal Transverse Merator) Zone47 Geodetic Datum Indian 1975

c) The orthophoto with scale 1:25,000 was supported by Ministry of Agriculture and Cooperatives Thailand, was transferred to raster and vector data. Digitized all of the spatial data from aerial orthophoto scale 1:4000 which consisted of the layers of water bodies (canals, rivers, irrigation canals, ponds and reservoirs), transportation (laterite road, asphaltic road, concrete pavement, railways, bridges), administrative boundary (villages, sub-district, districts, and province), infrastructures (schools, temples, cottage hospitals, market, post offices, village water supplies), polluted areas (siting sanitary landfills and factories), public area (public parks), conservation area, land use (paddy

field, field crops, orchards, barren land, wet land, village areas and building areas), parcels, buildings/houses (houses, warehouse, storage houses, town houses, bungalow, flat, apartment, commercial building) and signboard layers (Figure 2).

Figure 2. The orthophoto with scale 1:25,000 was transferred to raster and vector data. Digitized all of the spatial data from aerial orthophoto scale 1:4000.

d) Microsoft access program was applied. Input the attribute data, which consisted of the properties owners and land use owners, tax payments and income system, from field survey

e) Microsoft Visual Basic and Map Object Component had been processed which had the objective to link between ArcGIS 8.3 program and Microsoft access program. Developing the new tax map program is able to calculate, manage, edit or update the new records and query database anytime with highly working efficiency system (Figure 3).

Figure 3. Developing the new tax map program is able to calculate, manage, edit or update the new records and query database

anytime with highly working efficiency system.

TAX MAP "CGISTNU" PROGRAM:
Main menu will show the theme of land, building and signboard tax (Figure 4).
This program could retrieve all the database for annual report and over all of the land use.

Figure 4. TAX MAP "CGISTNU" PROGRAM version 1.0

Figure 5. Starting of the TAX MAP "CGISTNU" PROGRAM

Figure 6. TAX MAP "CGISTNU"
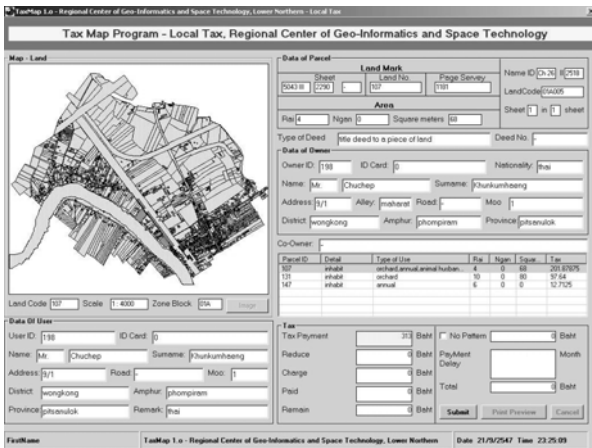PROGRAM show the theme of land and
building

Figure 7. TAX MAP "CGISTNU"
PROGRAM show the database for annual
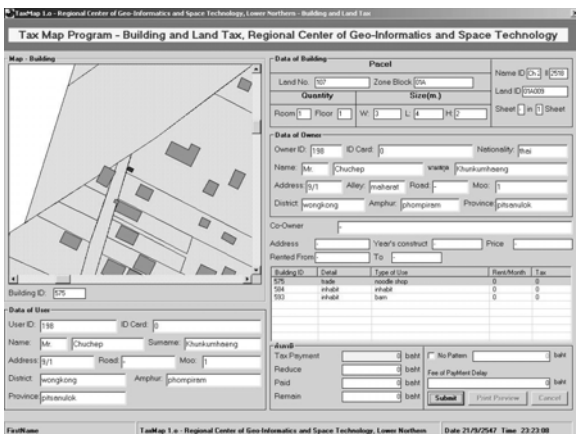report of taxation of house and land use

Figure 8. TAX MAP "CGISTNU"
PROGRAM show the database for annual
report of signboard tax and building

5. RESULT AND DISCUSSION

Field survey data was analyzed and processed by Arc GIS 8.3. All Geo-data was in processed on Microsoft access program, Microsoft Visual Basic and Map Object Component. The first version of digital tax map for Wong Kong municipality had been developed and it was namely TAX MAP OF CGISTNU (Regional Center of Geo-Informatics and Space Technology, Lower Northern Region, Naresuan University) (Figure 4). The users need to log on for accessing the program by their user name and password (Figure 5). The program will be selected to display the boundary of water bodies or railway or road or land mark or sign board or building or land which appeared on the high resolution imagery. The more details will be show by click on each of the items (Figure 6). Financial officer can use the program for display the taxation data of land owner including of size, places, house ID, and utilization (Figure 7). Financial officer also can use the program for display the data of building owner including of size of the sign board, places, land ID, address and utilization (Figure 8).

6. CONCLUSIONS

Digital tax map is one importance policy of Thai government. Geo-Informatics and space technology for properties digital tax map is very high technology for the local administrative especially "Wong Kong Municipality". CGISTNU program is not only calculate, manage, edit or update the new records and query database anytime with highly working efficiency system but also it could be using for municipality financial planning and policy. From this program, revenue office will know the locations and sizes of the properties and signboard. They can estimate the future tax income. Municipality could use the linkage digital tax map for urban planning and zoning.

7. ACKNOWLEDGEMENT

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