MULTIPURPOSE CADASTRE: EFFECTIVENESS AND UPGRADING OF GIS LAYER MANAGEMENT SYSTEM (GLMS)

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Abstract

DSMM is responsible in providing land related records through the Cadastral Database Management System (CDMS). The system will extract or retrieve cadastral information from the Digital Cadastral Data Base (DCDB) which is the main product of DSMM. In order to comply with the increasing demands from government agencies, private firms and publics, therefore DSMM has took proactive measures in improving the system by introducing GIS Layers Management System (GLMS). With the introduction of GLMS, various layers in GIS ready environment can be provided to the private entities and public usage. GLMS will facilitate the government’s vision towards the establishment of modern cadastre in Malaysia. GIS Layer Management System (GLMS) has been introduced under the “SPDK Upgrade” project since 2002 by Department of Survey and Mapping Malaysia. GLMS facilitates the creating, capturing and maintaining of spatial data using layers approach. GLMS will become an important system for land development management because of its functionalities and increasing of demands of land-related datasets. Main objective of this research is to study the effectiveness of the GLMS. New layers (GLMS 2) such as building, gazette area, Malay reserved, railway, hydrographic and election region have been created. Analyses shown that GLMS 2 is an effective mechanism towards the development and realization of multipurpose cadastral and e-Cadastre in Malaysia.

Keywords: e-Cadastre, DCDB, GLMS, Multipurpose Cadastre

1.0 INTRODUCTION

In Malaysia, cadastral survey is a responsibility of the federal government but land is exclusively a state matter. Therefore, the Department of Survey and Mapping Malaysia (DSMM) is a federal department that been given responsibility for carrying out cadastral survey Malaysian’s state. DSMM is responsible in providing geospatial data through the Cadastral Database Management System (CDMS). The system will extract or retrieve data from the Digital Cadastral Data Base (DCDB) which is the main product of DSMM.
DCDB consists of lot, boundary and station layers which does not comply to the public demand as well as to the private entities. Therefore DSMM has to take proactive measures in improving the system. With the introduction of GIS Layer Management System (GLMS), various layers in GIS ready environment can be provided to the private entities and public usage. GLMS will facilitate the government’s aim towards the establishment of a multipurpose cadastral system. In order to realize the concepts of multipurpose cadastral in Malaysia, improvement of existing GLMS has to be conducted in the next ten years. This study is intends to evaluate the effectiveness of the current GLMS in providing information to the various applications and purposes and recommend the GLMS upgrading exercise for creating Multi Purpose Cadastre in Malaysia.

2.0 MULTIPURPOSE CADASTRE

The increasing of difficulty level in planning, development and management of land has introduced the needs for complex geospatial that cannot be handled by conventional procedure. Parallel to the rapid development in this country and the current trends in management of accurate land related records then few optimum management and implementation concepts have been introduced for instances e-cadastre and multipurpose cadastre. The concepts of e-cadastre involved the use of information technology and survey accurate cadastral record for title generation and can be integrated with other land-related information.

E-cadastre is the Basic component towards the development of multipurpose-cadastre. Multipurpose-cadastre involves the integration of land related records with taxation/fiscal, utility, land registration, natural resource record, and other cultural record as shown in Figure 2.0.

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<thead>
<tr>
<th>E - CADASTRE</th>
<th>MULTIPURPOSE CADASTRE</th>
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</thead>
<tbody>
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<td>• Malay Reserve</td>
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<td>• Marine Cadastre</td>
<td>• Malay Reserve</td>
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<td>• Land Related layers</td>
<td>• Marine Cadastre</td>
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Figure 2.0: Multipurpose Cadastre Data Themes
2.1 GIS Layer Management System (GLMS)

GIS layer management system (GLMS) has been introduced under the *SPDK upgrade* project since 2002. In GLMS module information like cadastral first class and second class surveys, are stored in CDMS using spatial data layers method. This information can be used to determine boundaries, town/village names and road name. GIS-based GLMS is an important tool for planning, natural resources, efficient land management, government administration and executive decision making processes.

3.0 IMPLEMENTATION OF RESEARCH APPROACH

The research methodology is basically a series of research activities in order to complete the research. Figure 2 shows the research flow in graphic representation.

![Figure 4.0: Research Methodology](image-url)
4.0 ANALYSES OF STUDY

The effectiveness of the existing GLMS and the upgrading process of GLMS (GLMS 2) have been evaluated and developed. Analysis will be based on few aspects such as:

i. Questionnaires to government agencies, privates and public users.
ii. Recommended of upgrading existing GLMS to GLMS 2.

4.1 GLMS Questionnaire Statistic

Questionnaires have been conducted to 20 samples which comprises of government agencies, land office, local authority (DBKL), licensed land surveyor firms and public users. Feedbacks from above mentioned agencies and firms are tabulated in Table 4.2.

Figure 4.1 Respondent Percentage

Based from Table 4.2, it shows that 20 respondent feedback questionnaires from Government department, Boards, Licensed Land surveyors, Private sector and Personals in charts format. Contents of Questionnaire cover few aspects of existing development of GLMS, the use of digital data, usage and recommendation of new layers in GLMS upgrading process.
Based from the information on Figure 4.2, 18 respondent use to acquire standard sheet issued by JUPEM and 2 respondent never use standard sheet in their applications.

Based on the information visualized Figure 4.3, it shows that GIS application is the main driven factor for upgrading the existing standard sheet followed by location finding purpose. Land Valuation discipline also used standard sheet for land appraisal purpose. Surveying firms use standard sheet to identify the location of the particular land parcel and standard sheet also been used for academic research purposes.
According to the respondents, layers information in GLMS did not 100% satisfy the users requirements. Almost 90% (Figure 4.4) users need more information attached with the layers.

According to respondents, 8 primary new layers has been suggested in order to improve existing GLMS. New suggestions are road layers and certified plan (building) PA(B), which get 17 respond out of 20 respondent. JUPEM WPKL/PUTRAJAYA is one of the state’s JUPEM to produce more PA(B) than other state. Table 4.6 shows 8 new additional layers recommended by the respondents.
4.2 Analysis of New Layers (GLMS)

Newly upgraded layers and updated data created a new system that easy to browse and read by users. It is because attribute data in layers can be browsed in table format. Users can view information in Table and also can view plans at same time. It makes easier to users, to view spatial data and attribute data at same time. New road layers, building layers, election boundary layers and including other layers are added in GLMS database (Figure 4.5).

4.2.1 Building Layer

The following figure are the examples of spatial data and attribute for building layer through GLMS 2 Upgrade using MapInfo professional software (Figure 4.6).

Figure 4.6: Building Layer with attribute data and image display
4.2.2 Election Boundary Layer

Due to the high demand in additional layer purposely for political application, GLMS 2 will provided election boundary layer as shown in the following figures below (Figure 4.17 and Figure 4.18).

**Figure 4.17:** Attribute data for election boundary layer

**Figure 4.18:** Display of name and areas election location
4.2.3 Malay Reserved Layer

A lot of development have been conducted on malay reserved parcel. As a result, a systematic management of this entity should be implemented (Figure 4.19 – 4.20).

![Figure 4.19: Attribute data for malay reserved layer](image1)

![Figure 4.20: Display of name and areas of malay reserved](image2)

4.2.4 Pejabat Tanah dan Galian (PTG) Gazette Layer

Gazette areas are bound by government laws. Gazette are cannot be demolished or developed without permissions from the government therefore gazette area should be maintained and managed consistently. GLMS 2 provide the gazette layer for that purpose (Figure 4.21 – 4.22).
4.2.5 Railway Layer

Figure 4.23 – Figure 4.24 show additional information included in new GLMS 2 System Transportation layer (Railway) is needed for few government agencies and utility firm for future land development and construction planning.
4.3 Data Quality

All new layers are based on the existing plans: gazette plan and standard sheet in 1:8 scale (chain) or 1:6336 scale (chain). The digitizing process shows the RMS of control point (reference point) is acceptable (below 0.05 pixel).

5.0 CONCLUSION AND RECOMMENDATION

GLMS concepts is one initiative towards the development of Multipurpose Cadastral in Malaysia. The integration between Digital Cadastral Database and GLMS has provided a good infrastructure for many Geomatic and GIS Communities. Due to the high demands and request from public users, GLMS has been improved in this study with additional layers. The new layers are:

i) Building Layer
ii) Hydrographic layer
iii) Road layer
iv) Railway layer
v) Gazetted layer
vi) Political layer
vii) Malay reserved layer
Evaluation of the GLMS has been executed based on few aspects such comparative study, questionnaire, and spatial database. Analyses show that the new GLMS is able to satisfy public requirements and demands. GLMS can be a model for government authority to enhance the existing GLMS towards the realization of Multipurpose Cadastre in Malaysia.

6.0 REFERENCES AND BIBLIOGRAPHIES


