DEVELOPMENT OF NATIONAL DIGITAL CADAstral DATABASE (NDCDB) IN JUPEM PERAK

SR JOHN ELVIS KOH, S.I.S., P.P.T., F.R.I.S.M.
PENGARAH JABATAN UKUR & PEMETAAN NEGERI PERAK
VISION
MAKING JUPEM’S AN EMINENT ORGANISATION IN PROVIDING OUTSTANDING SURVEY AND MAPPING SERVICES AS WELL AS GEOSPATIAL DATA MANAGEMENT TOWARDS FULFILLING THE NATION’S VISION.

MISSION
PROVIDING A QUALITY SURVEY AND MAPPING AND SERVICES AND GEOSPATIAL DATA MANAGEMENT VIA FIRST-RATE SYSTEM, COMPETENT HUMAN RESOURCE AND CONducIVE WORKING ENVIRONMENT.

MOTTO
THE CATALYST FOR NATIONAL DEVELOPMENT AND CITIZEN’S PROSPERITY

OBJECTIVES
• TO ENSURE THE PRODUCTS AND LAND SURVEY AND MAPPING SERVICES MEETS THE QUALITY ACCEPTANCE AND CUSTOMER’S NEEDS.
• TO ENSURE A WELL MAINTAIN, UP-TO-DATE CADASTRAL AND MAPPING DATABASE TO MEET NEEDS OF THE NATIONAL GEOSPATIAL INFRASTRUCTURE.
• TO MAKE JUPEM AS AN EXCELLENT REFERENCE CENTRE IN THE FIELD CADASTRAL SURVEY AND MAPPING.
• TO SURVEY DETERMINE, DEMARCATE STATE AND INTERNATIONAL BOUNDARIES.
What we produce now?

- Ultimate cadastre product: B1.tiff for Title
- Title wt B1

B1 plan
Then

- Cadastral survey activities carried out to produce Certified Plan (Pelan Akui)

- Certified Plan was painstakingly hand-drawn and produced in hardcopy.
What we produce then?

- [Photo of historic CP]
- hardcopy
• Survey activities carried out in a digital environment.

• Survey ASCII is imported and processed in a GIS environment and stored in database.

• Certified Plans are extracted from database.

• This database is called NDCDB.

Total Station: measure distances and angles of lines

Toughbook: equipped with eTSM for data recording
eKadaster

• RMK-9 Project

• Three main components:
  • Virtual Survey System (SUM)
  • Cadastral Data Integrity System (SKDK)
  • Coordinated Cadastre System (CCS)
Concepts of eKadaster
eKadaster Objectives

• The objective of eKadaster project is to drastically improve the time frame of delivery system of land title survey.
• To develop National Digital Cadastral Database (NDCDB) for Peninsular Malaysia and W.P. Labuan.
• To develop Strata/Stratum/Marin Database (PDUSSM)
• To integrate eKadaster with e-Tanah in spatial information sharing
• To provide GIS ready infrastructure and information
• To apply GNSS technology in cadastral survey
**Milestone to NDCDB**

1. **eKadaster** started in 2009 for 13 states. Include NDCDB & Strata database. Revamp workflow
2. **SAPD Upgrade** started in 2002. Improve handshake between District Office & State HQ
3. **SPDK Upgrade** started in 2002. Include automated checking of LLS jobs
4. **Sistem Automasi Pejabat Ukur Daerah** started in 2000. Automation of field survey & District Offices
5. **Sistem Pengurusan Data Kadaster** started in 1999. Generate PDUK & CP Image database
6. **Mini Computer Assisted Land System** 1993 after CALS Johor. For all States with PDUK via keyboard entry
7. **Computer Assisted Land System** 1985 for Johor only. Database generated via digitisation of Standard Sheets
CREATION OF NDCDB

• Since 2010.
• GIS-ready homogeneous database with geocentric datum.
• To adapt the use of GNSS technologies.
• NDCDB is the gist of eKadaster
• NDCDB developed under eKadaster Project (RMK9) to replace DCDB (PDUK) which is not homogenous and isolated.
GIS Interface in NDCDB:

lot layer
Stone layer (stn)
Boundary (bdy) layer
WHY NDCDB?

RIGID COORDINATE
Homogenous and Systematically Adjusted

PLOTTING COORDINATE
For cadastral map plotting purposes

SYSTEM COORDINATE
System/Software generated coordinate based on features location
How is NDCDB established?

- Cleaning CP by CP
  - Add Connection line
  - Cleaning
    - Direction
    - Bearing
    - Distance

- R&R Block Adj

- Adjust CP by CP using LSA

- Repopulation of Pre-NDCDB and Field Validation

- Re Coordination

- Append Traverse and Point

- CCI-Layer

- Validation By PPSME

- Adjust Block Using 4 control points and re-coordination based on GDM 2000

- Re Population

- QC

- NDCDB

- Reconnaissance

- Monumentation

- Tie-Up

- GPS-Obs

- How is NDCDB established?
<table>
<thead>
<tr>
<th>New_NDCDB Parameters</th>
<th>30&lt;sup&gt;th&lt;/sup&gt; April 2012</th>
<th>19 July 2016</th>
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<tbody>
<tr>
<td>Adjustment Blocks</td>
<td>644 Blocks</td>
<td>644 Blocks</td>
</tr>
<tr>
<td>Cadastral Control Marks</td>
<td>2,591 Points</td>
<td>6431 Points</td>
</tr>
<tr>
<td>NDCDB Lots</td>
<td>961,468 Lots</td>
<td>1,012,064 Lots</td>
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<tr>
<td>NDCDB Lots (3&lt;sup&gt;rd&lt;/sup&gt; Class)</td>
<td>40,217 Lots</td>
<td>36,744 Lots</td>
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<tr>
<td>Boundary Marks</td>
<td>2,548,208 Points</td>
<td>2,598,279 Points</td>
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</tbody>
</table>
Establishment of Cadastral Control Infrastructure (CCI)
CRM Distribution for Perak (until 15 July 2016)

6431 points
CRM

644 Blocks
1. Adjustment
Stone ID: 7281747956
U: 64797.675
T: -37278.512

2. GNSS Observation
Stone ID: 7281747956
U: 64797.675
T: -37278.467

3. Difference:
Jarak: 0.045
Bearing: 270.0000

Ground Proofing

Concept of GP
The way forward

- Upgrading of eKadaster
- Strengthening Infrastructure of eKadaster
- SmartKadaster phase II
- Study on Development of 3D Cadastral Database and Land Administration Domain Model (LADM) in Open Source
- Outsource the upgrading of substandard lots (Demarcation and 3rd class)
Conclusion

- GIS technology increases cost-effectiveness and result in significant improvement in productivity.
- GIS technology significantly changes and improves JUPEM delivery system.
- Important role of Cadastral layer in SDI
THANK YOU

Johnkoh@jupem.gov.my