



FIG WORKING WEEK 2013

Abuja, Nigeria
6th – 10th May 2013

**DISCOVERING POSSIBILITIES OF
IMPLEMENTING MULTIPURPOSE CADASTRE
IN MALAYSIA**

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DEPARTMENT OF SURVEY AND MAPPING MALAYSIA






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MALAYSIA



- Total land mass of 329,847 square kilometres (127,350 sq mi)
- Peninsular Malaysia, Sabah and Sarawak - Separated by the South China Sea
- Population - 28.3 million

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DEPARTMENT OF SURVEY AND MAPPING MALAYSIA (JUPEM)



- Geodetic
- Topographical
- Mapping
- Underground Utility Mapping
- Cadastral Survey
- Demarcation of State and International Boundaries

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CADASTRAL SURVEY SYSTEM IN MALAYSIA




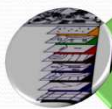
-  Torrens System
-  Cadastral Coordinated System
-  Survey Accurate Coordinate System
-  National Digital Cadastral Database (NDCDB)

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MULTI PURPOSE CADASTRE (MPC)




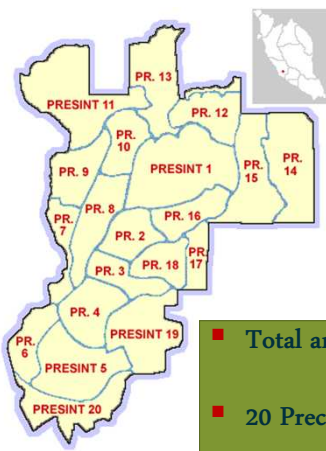
-  JUPEM's effort to enhance the Cadastral System in Malaysia
-  Cadastral map and Associated Registers and other land information registers such as planning and valuation information
-  Pilot Project in Federal Territory of Putrajaya

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FEDERAL TERRITORY OF PUTRAJAYA



- Total area of 4931 hectare
- 20 Precint
- 10,580 land parcels

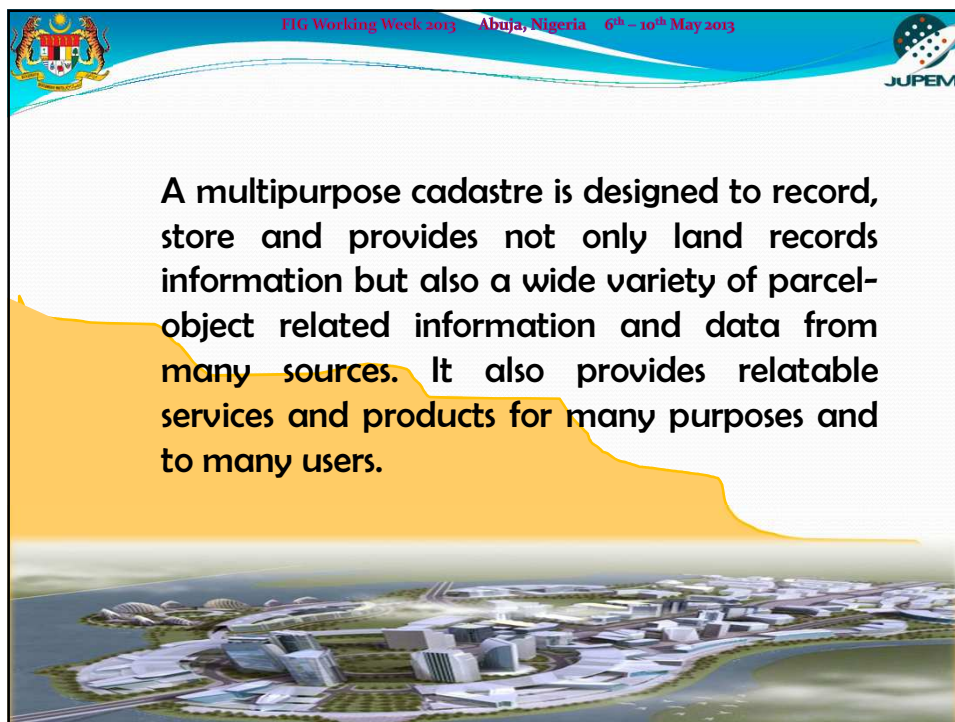






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MPC PILOT PROJECT IN PUTRAJAYA

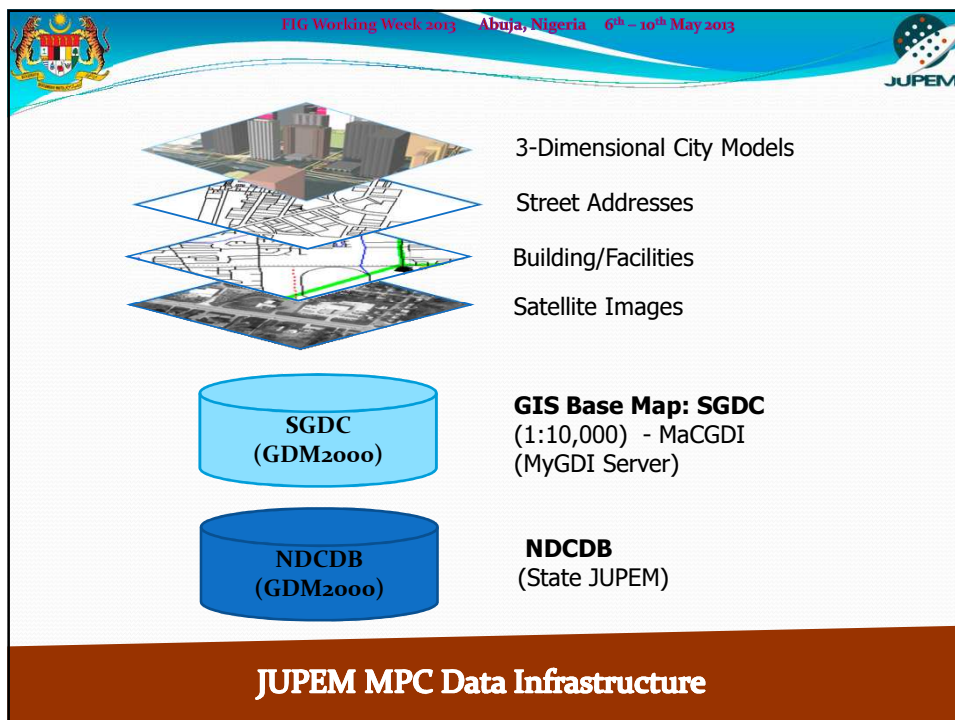
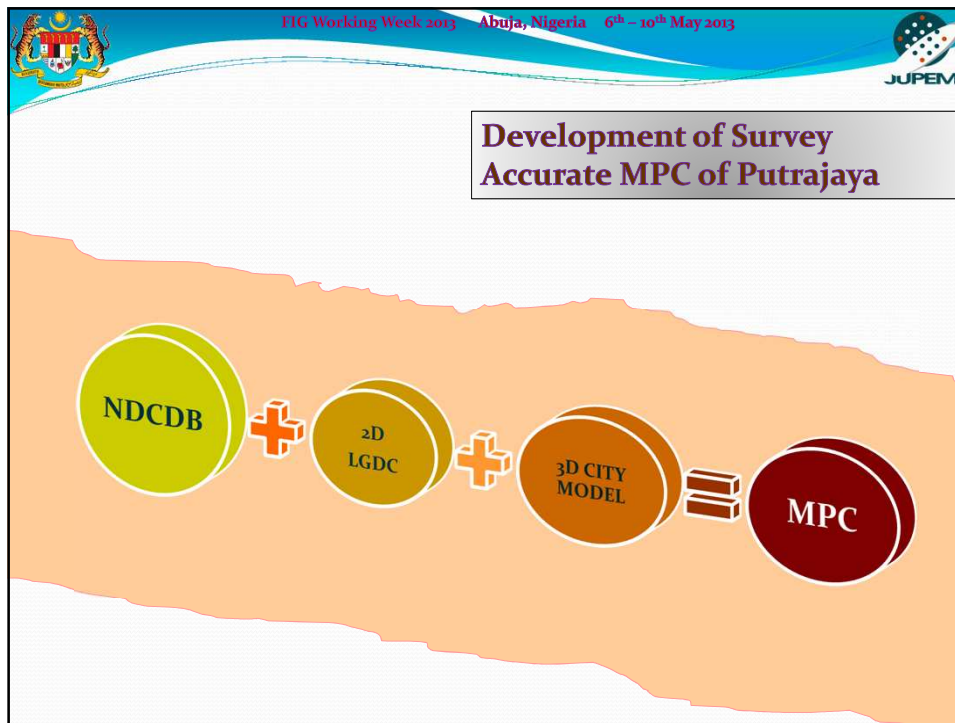
- Development of Large Scale Geospatial Data for existing geospatial data with NDCDB
- Data acquisition using Mobile Terrestrial Laser Scanning (MLTS)
- Data fusion comprising high resolution satellite image, LIDAR and terrestrial point cloud data to generate 3D city model and 3D SDI

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MPC PILOT PROJECT IN PUTRAJAYA (Cont..)

- Development of MPC Application Module
- Integration with Street Addresses
- Development of Ubiquitous Multipurpose Cadastral System incorporating Service Oriented Architecture (SOA)
- Development of Online Web Access



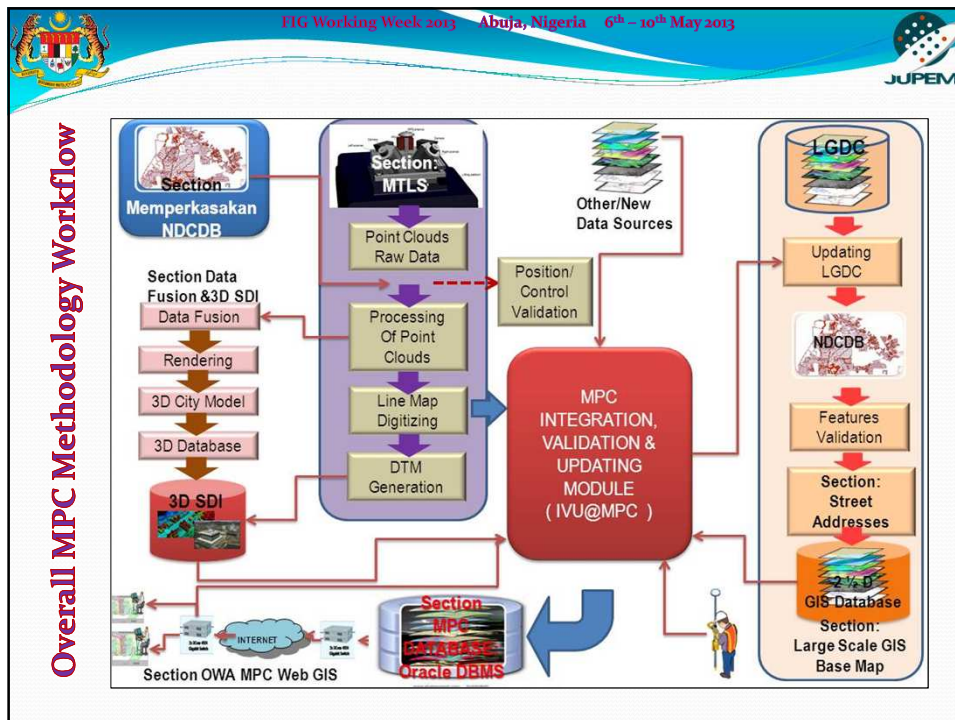


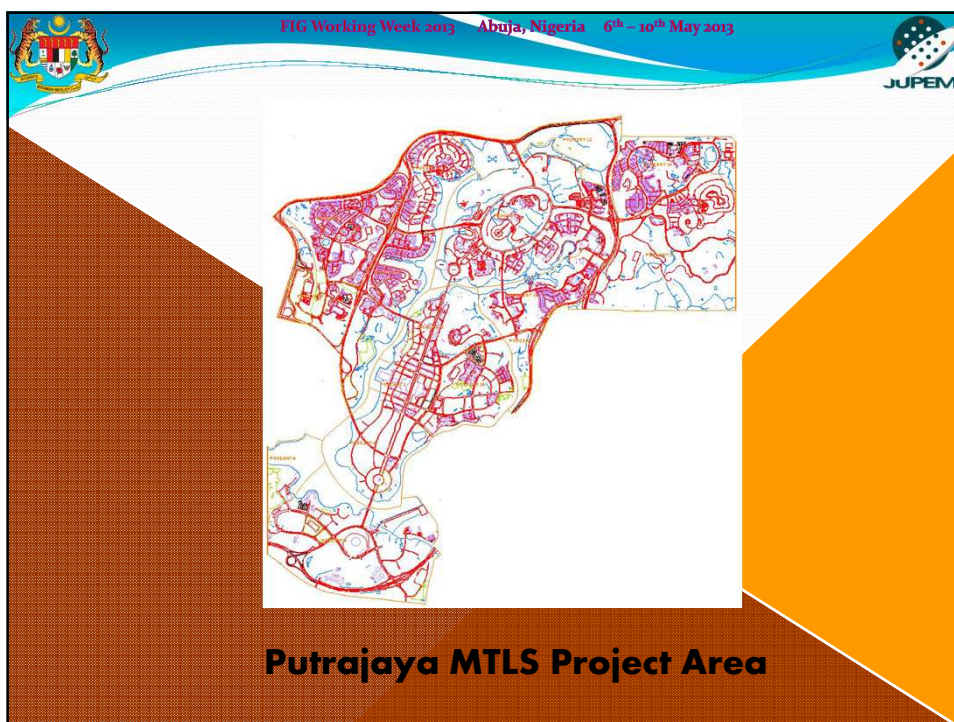
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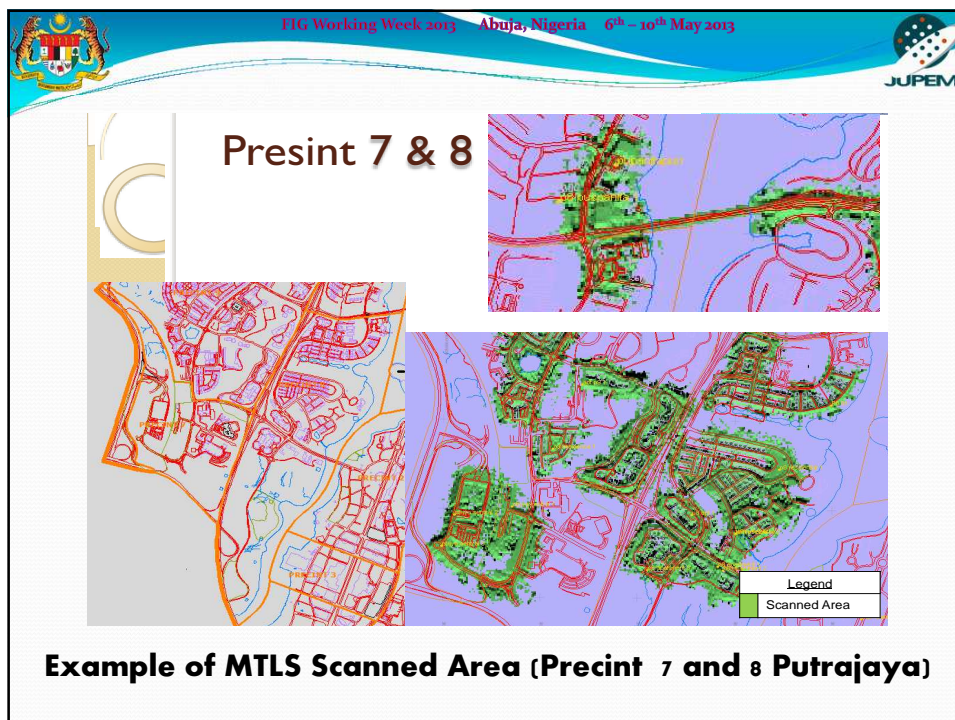
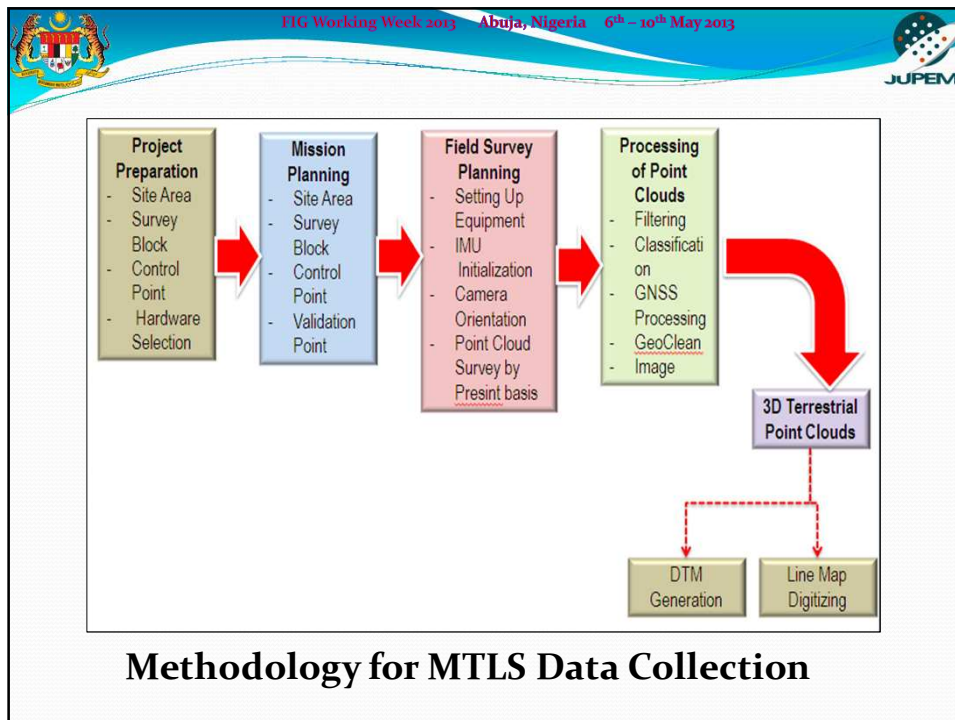
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- GLMS Layers
- Large Scale Mapping Data
- Digital Elevation Model
- High Resolution Satellite Image
- Airborne LiDAR Data
- Orthophoto
- Utility Data
- Street Addresses
- Textual Data
- MyGeoid Putrajaya
- MyRTKnet Station Coordinates
- Levelling Benchmark Values

The screenshot shows a GIS application window titled 'MPCIntegrat1 - ArcMap - ArcGIS'. The map displays a 2D LGDC (Large Scale Mapping Data) for Putrajaya, featuring various layers such as 'Aeromedical', 'Utility', 'Built Environment', 'Topography', 'General', 'Hydrography', 'Relief Postmap', 'Contour (Line)', 'Cutting', 'Embankment', 'Vegetation', and 'Demarcation'. The map shows a detailed urban layout with roads, buildings, and topographic features.

2D LGDC For Putrajaya





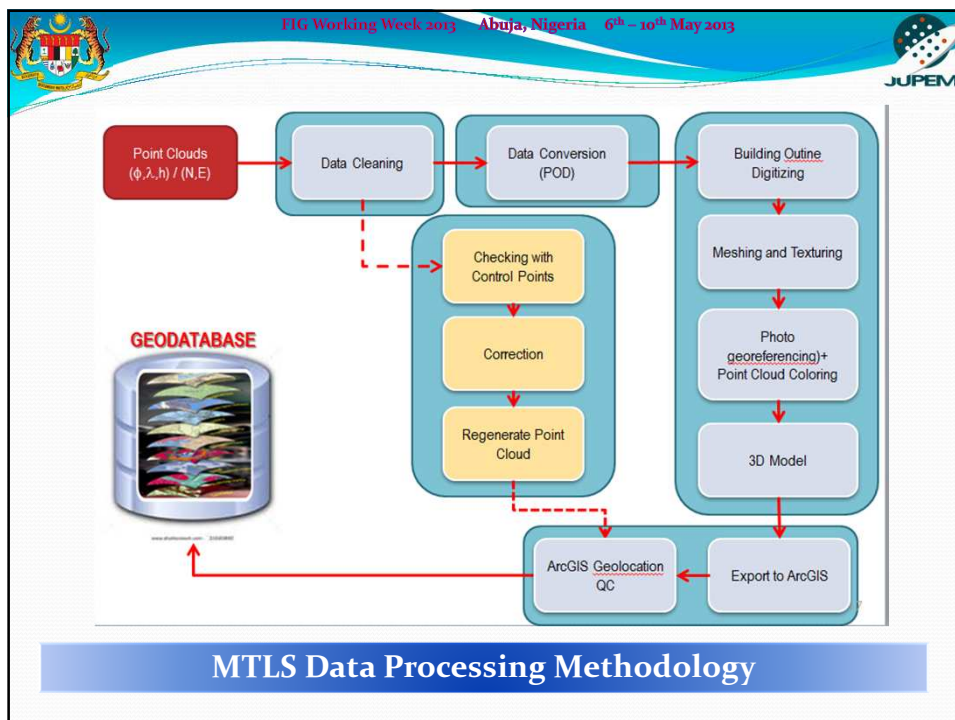
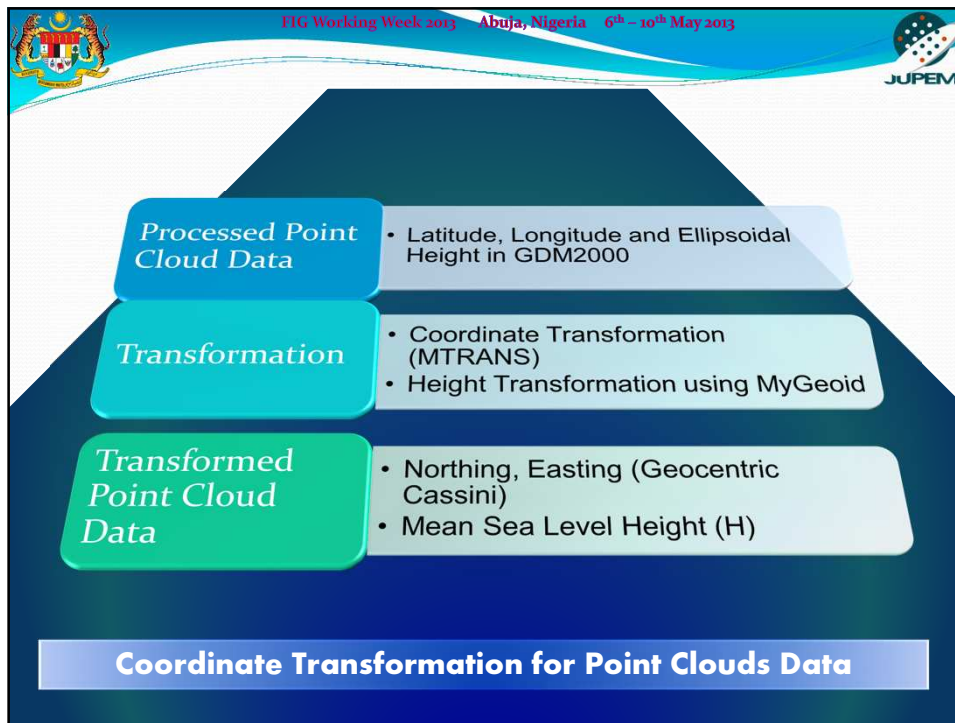


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Five (5) Level of Detail (LoD)

LoD 0
A DEM with superimposed ortho-rectified aerial and satellite imaging

LoD 1
Basic block-shaped depictions of buildings are placed over LoD 0

LoD 2
LoD 2 adds to LoD 1 detailed roof shapes

GENERATING 3D CITY MODEL

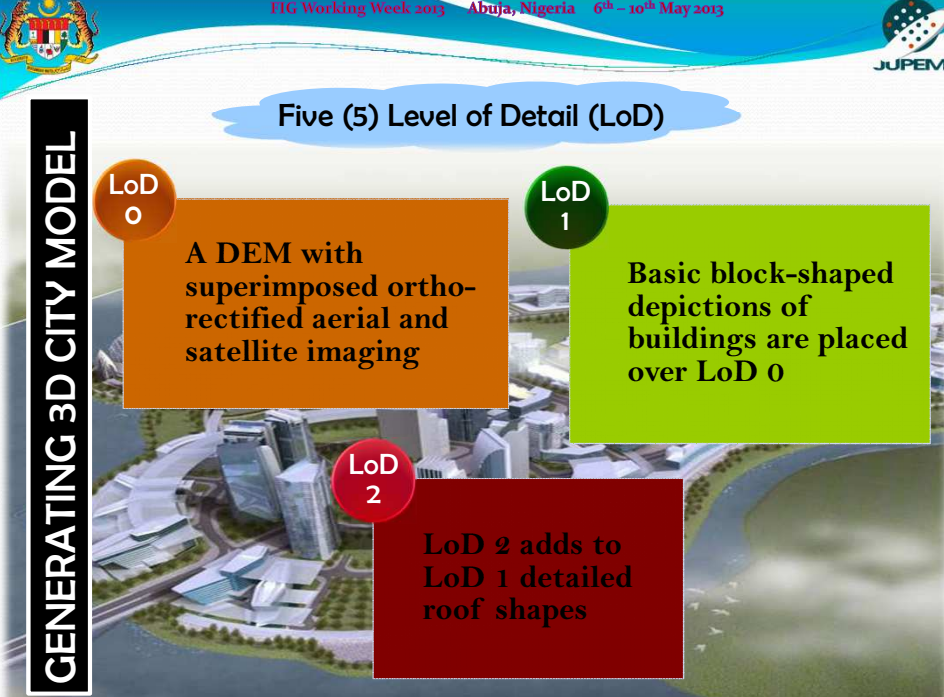


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LoD 3
Represent further expansion by adding to LoD 2 structural elements of details such as facades and pillars and draping all objects with photo texture

LoD 4
The highest level is achieved when building can be virtually visited and viewed from the inside

GENERATING 3D CITY MODEL (Cont..)





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**3D
MODEL
OF
PART
OF
PUTRAJAYA**



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**3D CITY MODEL OF A
BUILDING IN PUTRAJAYA**

Google Sketchup and Arc GIS Desktop Explorer has been used to drape the related image to 3D city model

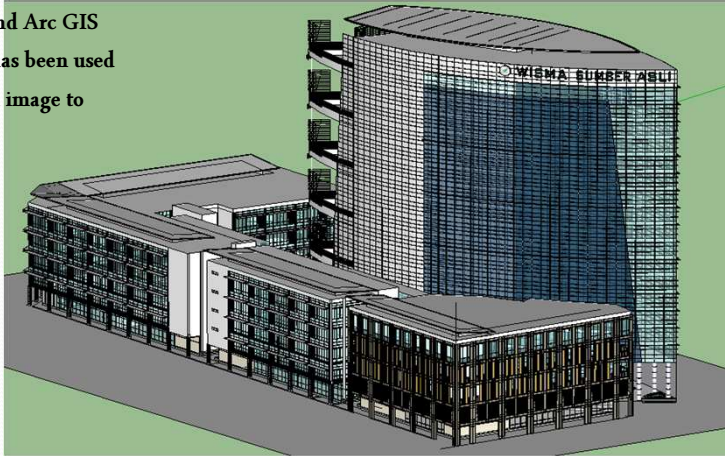


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OBJECT ATTRIBUTION OF 3D CITY MODEL

Data fusion from multiple geospatial datasets contains attributes information that can enrich the 3D city model

Identify

Identify from: <Top-most layer>

PICC
└ NoName

Location: 101.676499 2.894460 Decimal Degrees

Field	Value
OBJECTID	1
SHAPE	Multipatch
SUSourceFeatureID	<null>
SUSourceFeatureClass	<null>
SUInstanceName	NoName
Building Name	Putrajaya International Convention Centre
Address	Dataran Gemilang, Precint 5,62000 W.P Putrajaya
Area Coverage	135000
Website	www.picc.gov.my

Identified 1 feature

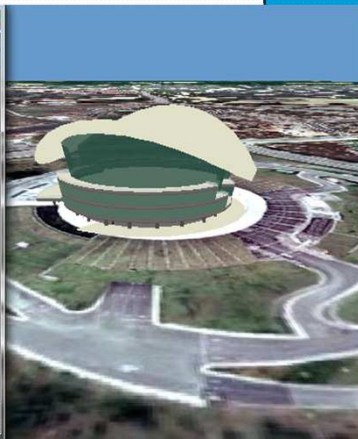


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PUTRAJAYA MPC DATABASE

- NDCDB as a basic map
- Local Geospatial Data Centre data
- Geographic Information – Based of Standard Feature and Attributes Codes MS1759
- Malaysia metadata Standard
- National Geonames Database
- 3D City Modeling
- 3D Spatial Data Infrastructure

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MPC ONLINE WEB ACCESS

MPC ONLINE WEB ACCESS
Jabatan Ukur dan Pemetaan Malaysia
Department of Survey and Mapping Malaysia

Help Learn More

The concept of a multipurpose reference source was presented as a basis for action to enhance our current reference service. This business supports customers, readily available, and comprehensive provides not only full records and hard reference information for other a wide variety of point-of-use information and data from many sources, but it also provides reliable services and products for general public. Multipurpose Reference (MPC) can be defined as an integrated LIBRARY, GEOGRAPHIC INFORMATION SYSTEM, GIS, STATISTICAL, LEGAL, HISTORICAL and CULTURAL information in a COORDINATE ACCURATE REFERENCE FRAMEWORK.

A multipurpose reference is designed to record, store, and provide not only hard records and hard reference information but also a wide variety of point-of-use reference information using large scale data. It is not only reference in that it not only records information and data from many sources, but it also provides reliable services and products for general public. Multipurpose Reference (MPC) can be defined as an integrated LIBRARY, GEOGRAPHIC INFORMATION SYSTEM, GIS, STATISTICAL, LEGAL, HISTORICAL and CULTURAL information in a COORDINATE ACCURATE REFERENCE FRAMEWORK.

LOGIN

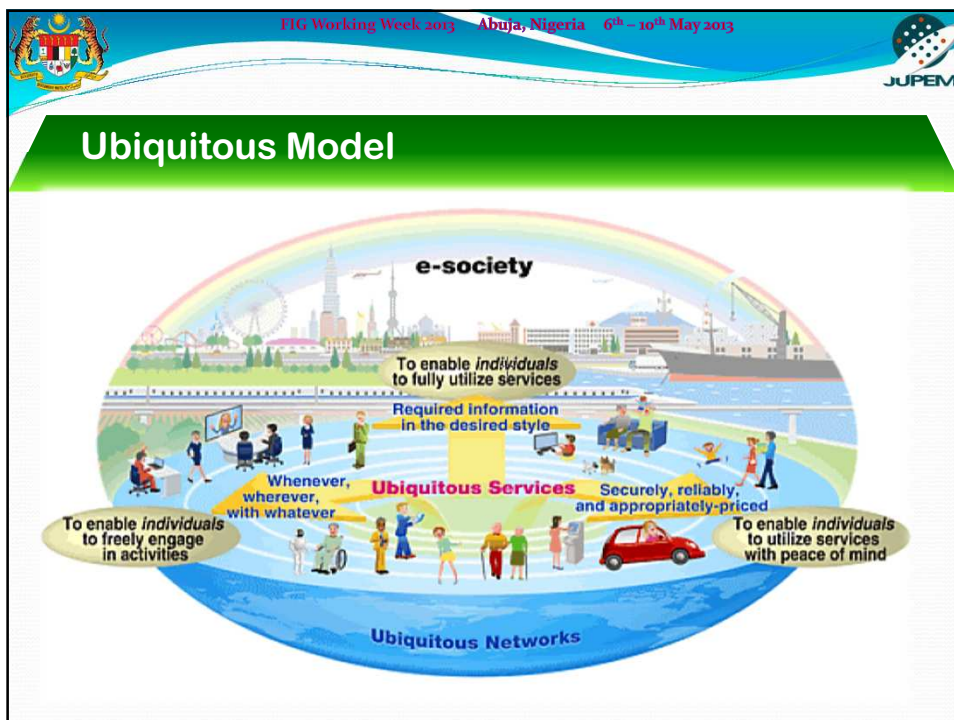






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FINDINGS AND RECOMMENDATIONS

1. Existing geospatial data need to be referenced in respect to NDCDB
2. Data need to be correct and complete
3. Survey grade MTLS system need to be employed to achieve higher accuracy. The accuracy of DynaScan MTLS system:
 - Horizontal accuracy $\pm 5\text{cm}$
 - Vertical accuracy $\pm 7\text{cm}$

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FINDINGS AND RECOMMENDATIONS (Cont..)

4. Urgent need to develop a program of large scale basemap at 1:500 to 1:1000 in urban and density populated areas, 1:5000 to 1:10,000 in semi-urban areas
5. The scope of cadastral survey should include collection of building foot-print, drain, fire-hydrant, access road etc.

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FINDINGS AND RECOMMENDATIONS (Cont..)


6. SOA concept should be used for updating information from other databases such as mapping database, underground utility database and other databases from other agencies


7. Public assessment and feedback should come from other government agencies private sector and the public to access the relevancy of the MPC Database

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BENEFITS OF MPC

 Incorporate the recent advances in computer and GIS technologies as well as the latest MTLs 3D geospatial data acquisition technology

 Will revolutionized large scale geospatial data utilisation








MPC APPLICATION



- Utility mapping
- Land administration
- Urban and regional planning
- Land valuation
- Flood mapping
- GIS for local authorities
- Emergency responses
- Crime GIS
- Environmental and coastal management





CONCLUSION

Enabled JUPEM to understand the complexity in implementation of MPC in Malaysia

Enhance the concept of spatially enabled government and society in Malaysia and fulfilling the nations's vision

