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3D Spatial Data in Lands Department, HKSAR Government

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3D Spatial Data in Lands Department

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1. Background

- ✓ 3D visualization of spatial data has been widely used in public consultation and public participation for land development, public works and environmental assessment projects.
- ✓ Increasing demand for 3D spatial data from Government departments and general public.
- ✓ In late 2005, Lands Department conducted a study on the workflow to create 3D model in Hong Kong.

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2. Current user Requirements for 3D Model

- ✓ Computer animation - engineering proposals, visual impact assessment for planning proposal.
- ✓ Real-time visualization applications - 3D noise models.
- ✓ Common Data Features – façade of buildings, terrain, road.
- ✓ Positional Accuracy – metre to centimetres.
- ✓ Coordinate System – majority Hong Kong 1980 Grid, minority local coordinate system.

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3. Specifications of Prototype 3D Model

- ✓ Building
- ✓ Infrastructure
- ✓ Terrain

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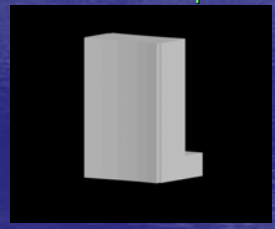
3. Specifications of Prototype 3D Model

- ✓ Building – Level 1, Level 2 & Level 3
- ✓ Level 1 – model extruded from the footprint to the general roof top



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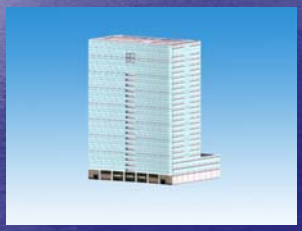
3. Specifications of Prototype 3D Model

- ✓ Level 2 – enhanced Level 1 Building with facades



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3. Specifications of Prototype 3D Model

- ✓ Level 3 – model with detailed architectural characteristics with facades

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3. Specifications of Prototype 3D Model

- ✓ Infrastructure – Level 1 & Level 2
- ✓ Level 1 – modeling of surface roads

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3. Specifications of Prototype 3D Model

- ✓ Level 2 – modeling of major bridges and flyovers

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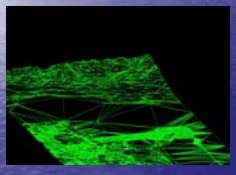
3. Specifications of Prototype 3D Model

- ✓ Terrain – TIN draped over Orthophoto



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3. Specifications of Prototype 3D Model

- ✓ Horizontal ± 0.3 metre and vertical ± 0.4 metre for the creation of models of Building and Infrastructure.
- ✓ surveyed points of the Terrain have to attain ± 1 metre in both horizontal and vertical positional accuracy.
- ✓ Hong Kong 1980 Grid
- ✓ Hong Kong Principal Datum

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4. Spatial Data for Prototype Model

- ✓ Base Map (1:1000) from Lands Department

Map Features	Height Related Attribute
Building Polygon	Building Top Level, Building Base Level
Contour	Contour Value
Podium Polygon	Podium Top Level, Podium Base Level
Road	Level Value
Spot Heights	Level Value

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4. Spatial Data for Prototype Model

- ✓ Digital Orthophoto DOP5000 from Lands D
- ✓ Ground pixel size 0.5 m x 0.5 m

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4. Spatial Data for Prototype Model

- ✓ Building plans from Building Department
- ✓ Survey plans and engineering drawings from engineering departments
- ✓ Photograph of buildings
- ✓ 3D Models from various department (CEDD, HyD, PD)

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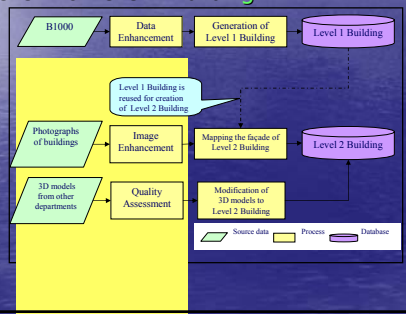
5. Design workflow for Creating 3D model

- ✓ Level 1 & Level 2 Building



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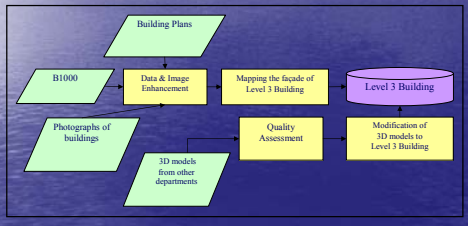
5. Design workflow for Creating 3D model

- ✓ Level 3 Building



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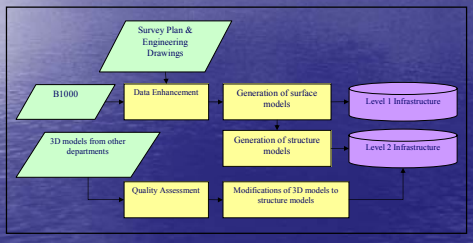
5. Design workflow for Creating 3D model

- ✓ Level 1 & 2 Infrastructure



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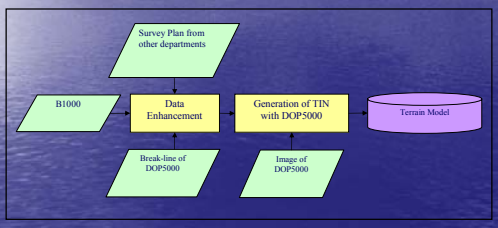
5. Design workflow for Creating 3D model

- ✓ Terrain model



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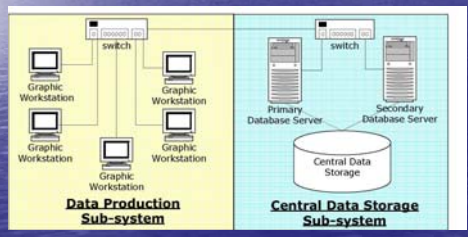
6. Architecture of Proposed Data Processing System



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7. Prototype 3D Model of West Kowloon

Project Area	6.4 km²
Buildings	Level 1 Building: 2,890 Blocks
	Level 2 Building models: 41 Blocks
	Level 3 Building models: 46 Blocks
Terrain model	No of Triangles: 27,402
Format	3DMax 7

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7. Prototype 3D Model of West Kowloon

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8. Technical Difficulties

- ✓ B1000 map features are stored and presented as 2D geometry. Level values are stored as attribute.
- ✓ Mapping Specifications of B1000 limits the survey of ground features in 3D geometry.
- ✓ Source data, such as building plans and engineering drawings are mainly in paper form or in raster image, manual extraction of the data is required.
- ✓ Lack of proper sources of digital terrain information.

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9. Conclusions

- ✓ Common user requirements of existing applications are addressed, 3D models components: Building, Infrastructure and terrain.
- ✓ Source of existing sources are identified for the creation of 3D model.
- ✓ The workflow of creating the Prototype 3D Model is designed.
- ✓ The architecture of the proposed Data Processing System is designed.
- ✓ The Prototype 3D Model of West Kowloon is created.

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10. Recommendations

- ✓ Proposed components in the prototype 3D Model are recommended to form the basis of the territory-wide 3D Spatial Database.
- ✓ The workflow of creating Prototype 3D Model is recommended.
- ✓ The proposed Data Processing System is recommended to implement.
- ✓ Workflow and administrative framework is recommended to setup for the exchange of 3D models between government departments.
- ✓ The current mapping specifications and data structures of Base Maps are recommended to be revised in order to support the creation of 3D models.

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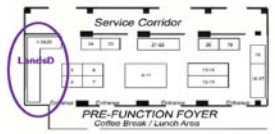
Further Enquires:

Briefing for FIGWW2007 Exhibition

1. **Event Details**
   - 1.1. Venue: Orchid Room, Lower Level Two (LL2)
     The Kowloon Shangri-La Hotel
     64 Mody Road, Tsim Sha Tsui
   - 1.2. Date: 14 May 2007 (Mon)- 16 May 2007 (Wed) - 3-days
   - 1.3. Number of Booths: Four
   - 1.4. Opening Time:
     - 1.4.1. 14 May (Mon) 12:00 hours – 19:30 hours
     - 1.4.2. 15 May (Tue) 09:00 hours – 17:00 hours
     - 1.4.3. 16 May (Wed) 09:00 hours – 14:00 hours

2. **Layout Plan**
   (Booth Location)



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Thank You

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