FIG WORKING WEEK 2025
AND Locate25 THE NATIONAL GEOSPATIAL CONFERENCE
Collaboration, Innovation and Resilience: Championing a Digital Generation
FIG Geospatial Council of Australia
Brisbane, Australia 6–10 April

Review of Data Policy and Common Spatial Data Infrastructure (CSDI) in developing Hong Kong as a Smart City

Wing Shuen HAU Miki
The Hong Kong Institute of Surveyors (HKIS)

7 April 2025

ORGANISED BY FIG Geospatial Council of Australia
PLATINUM SPONSORS Australian Government CHCNAV esri THE SCIENCE OF WHERE Leica Geosystems HI Meter Surveyors Australia

The most relevant SDGs related to the presentation and theme of this session

SUSTAINABLE DEVELOPMENT GOALS

International Federation of Surveyors supports the Sustainable Development Goals

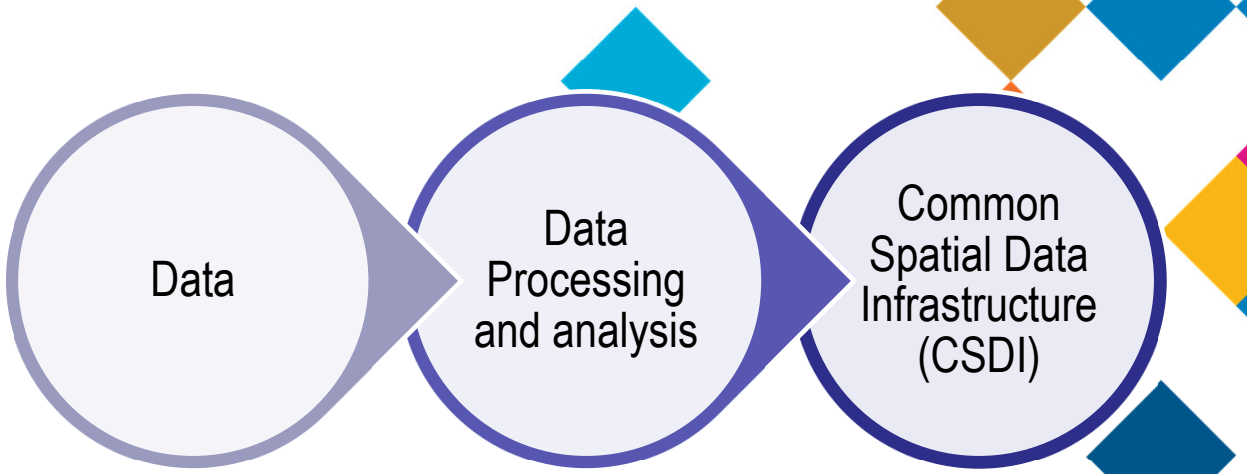
Something about me

- Land surveyor specializing in cadastral and engineering surveying
- Keep abreast of latest surveying technologies through studies

- **Master of Science in Integrated Project Delivery** at The University of Hong Kong
- Bachelor of Science in Geomatics (**Land Surveying**) from The Hong Kong Polytechnic University

- **Professional member of HKIS, RICS, HKInstES**
- Vice-Chairman of the Young Surveyors Group at The Hong Kong Institute of Surveyors
- Council member of the Land Surveying Division, HKIS

Importance of Spatial Data in Urban Contexts



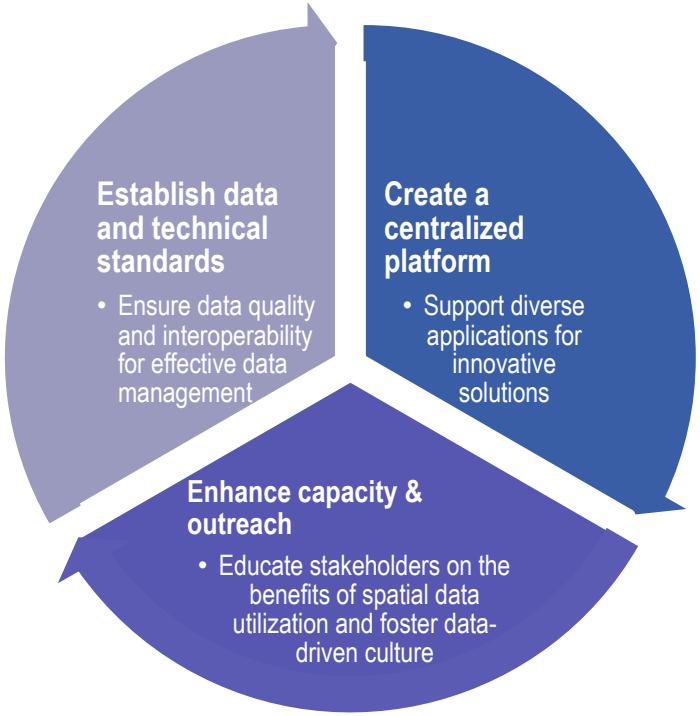
- 80% is spatial Data
- Scattered and stored in different parties without standards

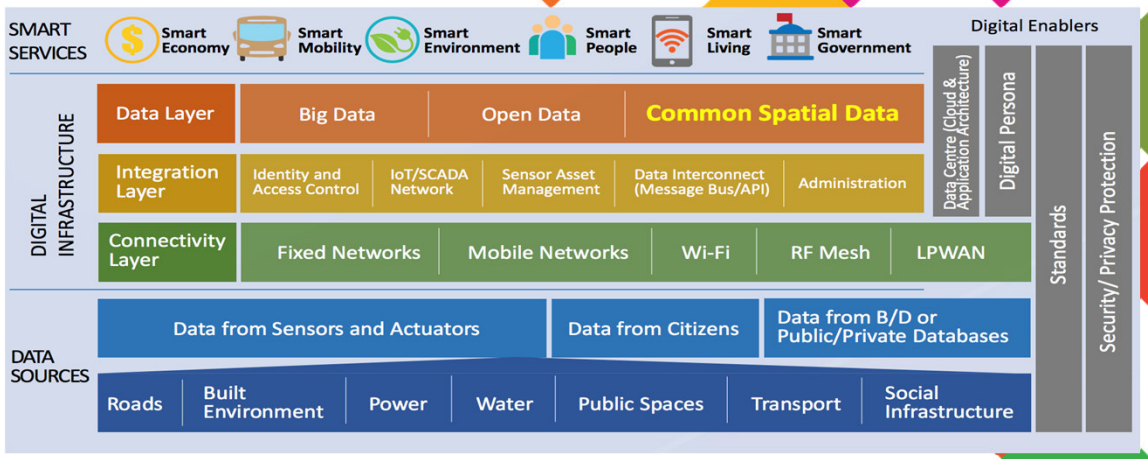
- Crucial for urban planning and decision making in city management
- Analysis of traffic patterns to improve mobility

- Integrate data and technology for advocating urban solutions

Development of Common Spatial Data Infrastructure (CSDI) and its framework

Facilitates sharing of spatial datasets for innovation and development





CSDI Portal

A comprehensive data "supermarket"

- Launched in December 2022
- Over 298,000 datasets available for download in 2025

Common Sharable Spatial Data (CSSD)
Framework Spatial Data Theme (FSDT)

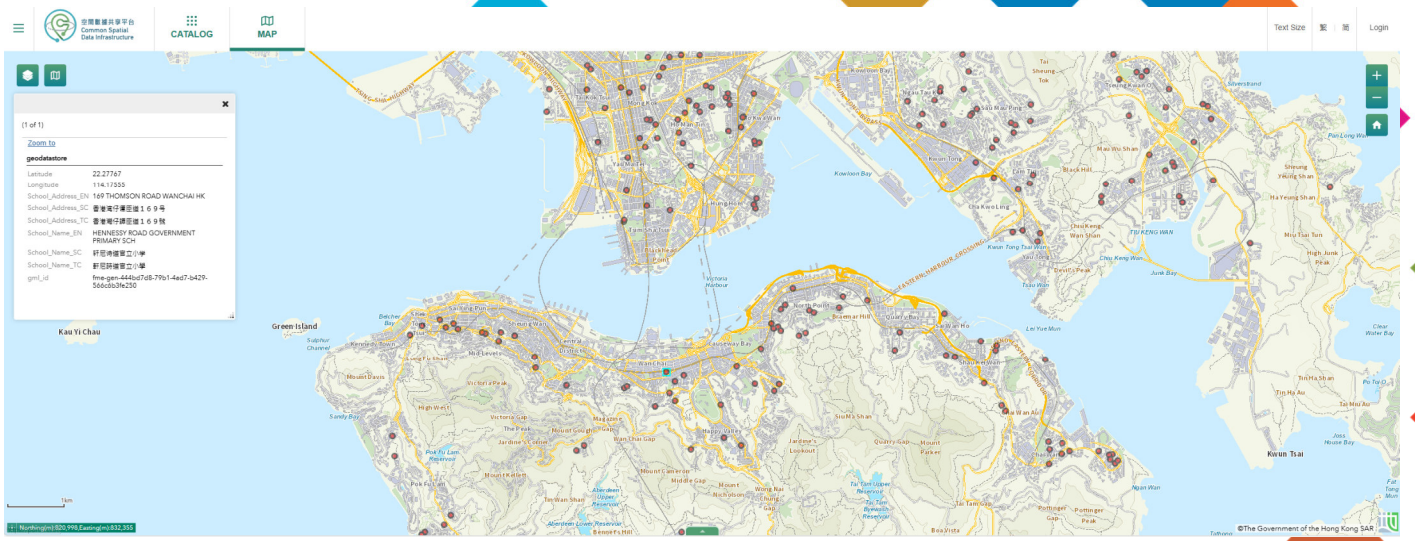
- Geo-tagging of non-spatial data
- Documentation of data specification
- Documentation of metadata
- Establishment of Application Programming Interfaces (APIs)
- Conversion of spatial data to an open and machine-readable format

Includes maintained by their respective departmental owners

specific geographic framework for geo-coding or referencing other datasets

Preview of Data in CSDI Portal

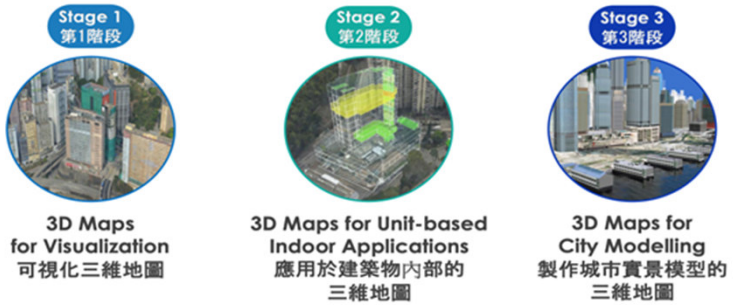
- Classified datasets are labeled with geographic locations on a map
- Retrieve information in tabular formats, .e.g. universal coordinates, address and even GML ID



Sources of Spatial Data

Foundation for territory-wide city modeling

- Collects extensive city-wide spatial data using advanced technology
  e.g. large-scale aerial imaging and mobile mapping systems with sensors
- Online platform, “Open3Dhk” to facilitate visualization and interaction with mapping data
  e.g. present of profile graphs featuring bathroom and transport sites along hiking trails



Utilization of Geo-spatial Data

Application Programming Interfaces (APIs)

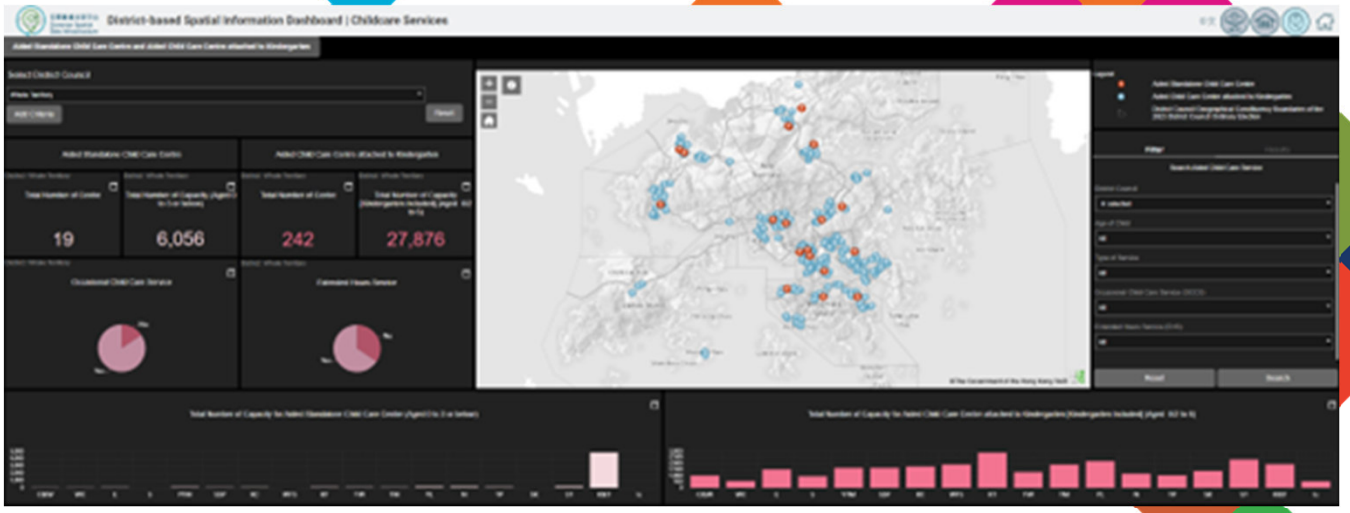
- Map APIs and Dataset APIs facilitate the retrieval of diverse mapping data with open standards, i.e. WFS, WMS

Geo-spatial application and tools

e.g. Geo-tagging tool to create and alter users' geo-spatial data

District-based Spatial Information Dashboard

- A user-friendly and interactive representation of thematic data with analytical tools online



Utilization of Geo-spatial Data in a Case Study

Integration of spatial data and information for creating models for analysis and management

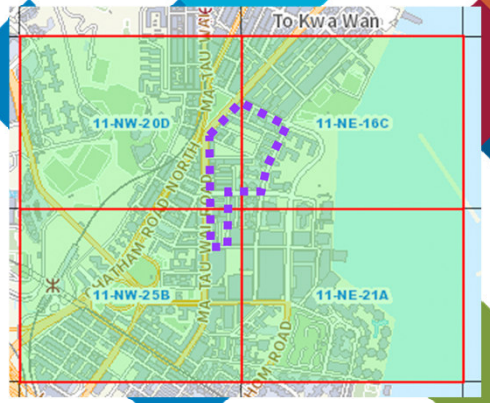
- Common spatial data and environmental information available from CSDI Portal for planning and assessment in construction projects
  - 3D Spatial Data
  - Digital Land Boundary Map
  - Digital Orthophoto
  - Digital Topographic Map
  - Digital Surface Model from 2010 / 2020 LiDAR Survey
  - 3D Visualization Map
  - Digital Planning Data
  - Ambient environmental data: temperature, humidity, solar radiation, wind speed and direction
  - Country Park boundary
  - Road network
  - Traffic flow
  - Digitized Traffic Aids Drawings
  - Short Term Tenancy

Dataset Name	Data Format	File Extension	Provider Name	Update Frequency	Accuracy	Cases Applied
3D Spatial Data 3D-BIT00	3D	GeoPackage, GeoJSON, GML, SHP, KML	Lands Department	Every 2 months	Unspecified	General use
Digital Land Boundary Map iC1000	2D			Every 2 weeks	N/A	
Digital Orthophoto DOP5000	2D			On as-needed basis	0.2m	
Digital Topographic Map iB1000	2D			Every 2 weeks	5m	
Digital Surface Model from 2010 / 2020 LiDAR Survey	3D		Civil Engineering and Development Department	As and when there is update	0.3m	
3D Visualization Map	3D	GeoPackage, GeoJSON, GML, KML	Lands Department	As and when there is update	1m	
Digital Planning Data	2D	GML, GeoJSON, SHP	Planning Department	As and when there is update	N/A	
Ambient environmental data: - temperature - humidity - solar radiation - wind speed - Wind direction	2D	GeoPackage, GeoJSON, FGDB, SHP, KML, CSV	Hong Kong Observatory	Hourly / monthly / when there is update	N/A	Geotechnical Study, Traffic and Environmental Impact Assessment
Country Park boundary	2D	GeoPackage, GeoJSON, SHP, GML, KML, CSV	Agriculture, Fisheries and Conservation Department	As and when there is update	N/A	
Road network	2D	GeoPackage, GeoJSON, GML, SHP, KML	Transport Department	Monthly	Unspecified	Traffic Impact Assessment
Traffic flow	2D	GeoPackage, GeoJSON, GML, SHP, KML	Transport Department	Yearly	N/A	
Digitized Traffic Aids Drawings	2D	GeoPackage, GML, SHP, KML	Transport Department	Monthly	N/A	
Short Term Tenancy	2D	GeoPackage, GeoJSON, GML, KML	Lands Department	Quarterly	Unspecified	Premium Assessment and Property Valuation

Utilization of Geo-spatial Data in a Case Study

Integration of spatial data and information for creating models for analysis and management

- Scenario – a family of three—father, mother, and child—plans to relocate their home in To Kwa Wan
- Get familar with the new environment without going on spot



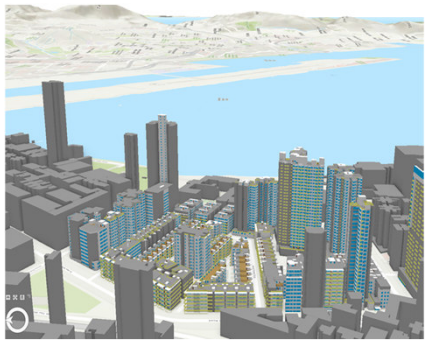
What we need from CSDI Portal:

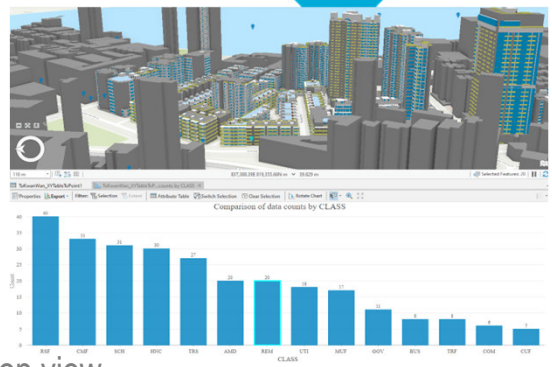
1. 3D building model of their new home
2. other 3D polygonal models without textures serving the surrounding environment
3. Digital topographic map
4. GeoComminuty database, e.g. train station accessibility, street furniture, libraries, schools, and grocery stores

Dataset Name	Data Format	File Extension	Provider Name	Sheet no.
3D Spatial Data 3D-BIT00	3D	SHP	Lands Department	11-NW-20D
				11-NE-16C
				11-NW-25B
				11-NE-21A
3D Intelligent of an area in To Kwa Wan	3D	OBJ, OSGB	Urban Renewal Authority	N/A
Digital Topographic Map iB1000	2D	SHP	Lands Department	11-NW-20D
				11-NE-16C
				11-NW-25B
				11-NE-21A
GeoCommunity Database	2D	CSV	Lands Department	N/A

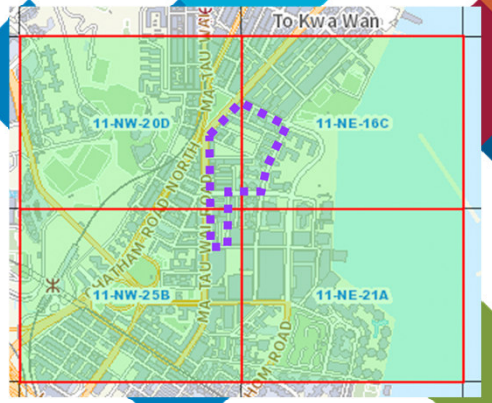
Utilization of Geo-spatial Data in a Case Study

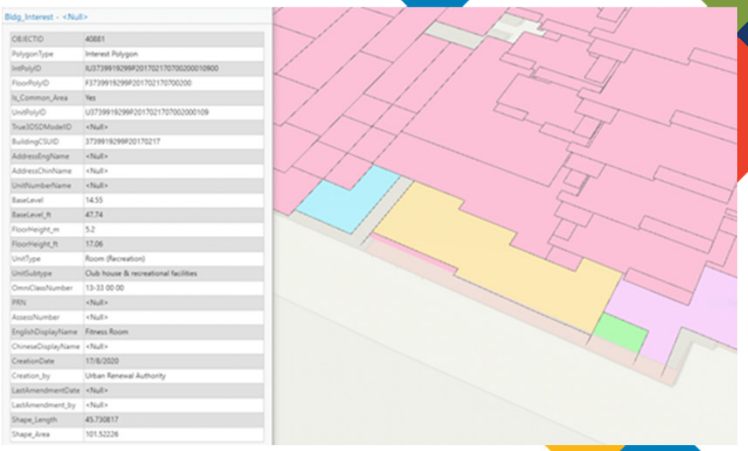
Integration of spatial data and information for creating models for analysis and management



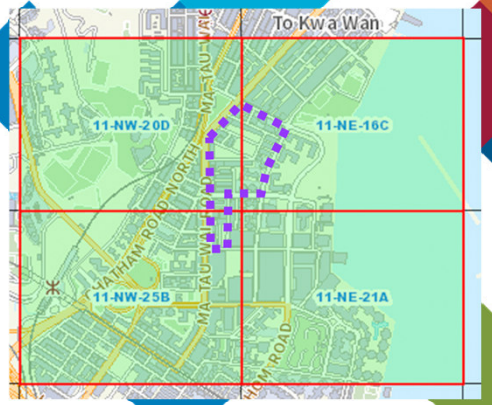


Left top: 3D building model in top view
Center: 3D building model in side view
Right top: schools nearby was identified and sorted
Left bottom: Viewshed analysis tool used
Right bottom: 3D indoor maps with details





Findings from the Case Study



1. **Limited Datasets and Restricted Access**
   - Only data from government/semi-government organizations
   - Datasets accessible only upon request
2. **Outdated Datasets**
   - Datasets do not reflect current site conditions, requiring on-site surveys for details
3. **Gaps in Community Service Data**
   - Certain areas have minimal community service items recorded, indicating data inadequacies
4. **Privacy Concerns**
   - 3D models, i.e. building texture, raise privacy issues, hindering public engagement
5. **Restricted access of specialized platform**
   - GIS Platform for data input and analysis might be not be well-known for general users
   - Recent online dashboards limited to 3 specific subjects, i.e. temporary vacant government properties, elderly services and childcare services

Evaluation of existing Data Policy and CSDI Portal

1. **Frequency of Dataset Updates**
   - Different schedules for different parties
   - Balance the demand with financial consideration
   - Community service data shall be updated more often
2. **Quality of Datasets**
   - Each dataset has distinctive information sheet, yet not all include accuracy details
   - Better to have guidelines for determining accuracy requirement for widely used data
3. **Public Privacy**
   - Masked human faces and car plate numbers for privacy
   - Ensure privacy and security uphold under legislation and official Independent Security Risk Assessment and Audit

Way Forward

Data Sharing Mechanism in Future

✓ Collaboration with private sectors

- Geospatial Lab foster partnership between government and private entities, academic and professional groups

✓ Online 3D City Models and Tools

- Establish online platform allowing general users to integrate datasets for their use of interest, i.e. for community services
- Authority to professional users for obtaining sensitive data

The End and Thank you