



Emerging Geospatial Trends in Smart City Development

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What is a Smart City ?





Smart City components





Technology Contributors -3D City Modeling

Computer Hardware

- Parallel/ Multi CPU/GPU processing /Graphic Cards
- Storage and Memory
- Data Bandwidth

Software / Sensors/ Algorithms

- High level lossless image compression techniques
- Object Oriented Programming
- Knowledge base/ Expert systems
- Photogrammetry Aerial (incl obliques), Satellite, Lidar,UAV
- Digital Integration multi scale /n dimensional
- Interoperable intelligent virtual 3D worlds
- Mobile Apps and Mobile data capturing Technologies
- Industry Standards OGC

How to Obtain the Data



- Aerial Photos/Satellite images/UAV:
 - Terrain model, block models of buildings, roof structures, wall textures (limited)
- Airborne laser scanning:
 - Terrain model, block models, roof structures, vegetation
- Terrestrial survey:
 - Terrain model to building interiors (high costs)
- Mix:
 - Car-mounted fisheye cameras
- Architectural maps:
 - Building interiors, underground structure (not for old structures)

Standards and Interoperability



Key Interoperability Tools





Interoperability Value Chain

Interoperability

- Ontology
- Semantics
- Standards and specifications

Leads to interoperable systems

Software

Databases

Leads to seamless

 Design, construction, operations, maintenance, management

Leads to

increased efficiency, cost savings, time to objective

Level of Details



LoD	Described features	LoD0 LoD1	
0	DTM + FootPrint from aerial image		
1	Block model w/o roof structures		
2	Building model with texture and roof model	LoD2 LoD3 LoD4	LoD4
3	Detailed architecture model with external doors and windows		
4	Interior model including rooms, stairs, windows, doors, furnishings		

Level of Details





LOD0







LOD1



LOD3

Integration of Utility Networks – Smart Buildings models





Types of Building Models











Rolta Solutions -3D Modeling – Smart City



- Rolta has developed a very sophisticated IP that integrates geospatial and mainstream IT
- IP is at the heart of numerous solutions for BI, big data and analytics tailored to suit smart city applications
- Our effort has been to build industry specific solutions that combine vertical domain knowledge with geospatial and IT enterprise – providing a cost effective solutions
- Rolta assists various organisations to establish their spatial data infrastructure standards
- Platform agnostic solutions

Rolta Automated Photogrammetry workflow





The Optimization Parameters of RAPID ensures that the difference in z (height) values are within 3m, if only the sensor information of Geoeye and Ikonos are considered, without considering GCPs and Tie points in DSM Generation.

Workflow Adopted to Build 3D City Model





Level of Detail











LOD 2





Assigning Building Attributes



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Viewing and Editing Building Attributes

File Tools Scene View Navigate Terrain Earth Hillshade Help



Built In 3D City Model





Smart City 3D Modeling - Applications





3D City Models with the pace of growth



1960

1970

2018

...an advanced 3D city model is essential to support: urban planning & development, public safety & homeland security, tourism and city promotion, and communication with citizens.

2008

Wrap-up



- "Smart Cities" has become a very big topic worldwide, as local government seeks to bring a wider range of services to its citizens, and greater efficiency to its own operations
- Intelligent 3 D Building Modeling Importance
- This is most notable in India, where significant political commitments have been made to invest in Smart Cities
- Rolta is extremely well positioned to capitalize on these opportunities, both in India and Internationally





Partnerships with Technology Firms

IBM – Prepared the integrated Communication Technology (ICT) Master plan for Dighi Port Industrial Areas

Cisco – ICT Master Plan for four smart cities – Dholera in Gujarat, Shendra in Maharashtra, Manesar Haryana and Khushkera in Rajsthan

-- In Bangalore – 5 km around Electronics city is getting converted into Smart City

Government Initiatives

India Plans 100 new smart cities (govt allocated budget Rs. 70.6 billion in 2014-15 budget)

• Smart Governance; Smart Energy; Smart Environment