



transforming the way the world works



Geospatial Information Driving Smart Cities

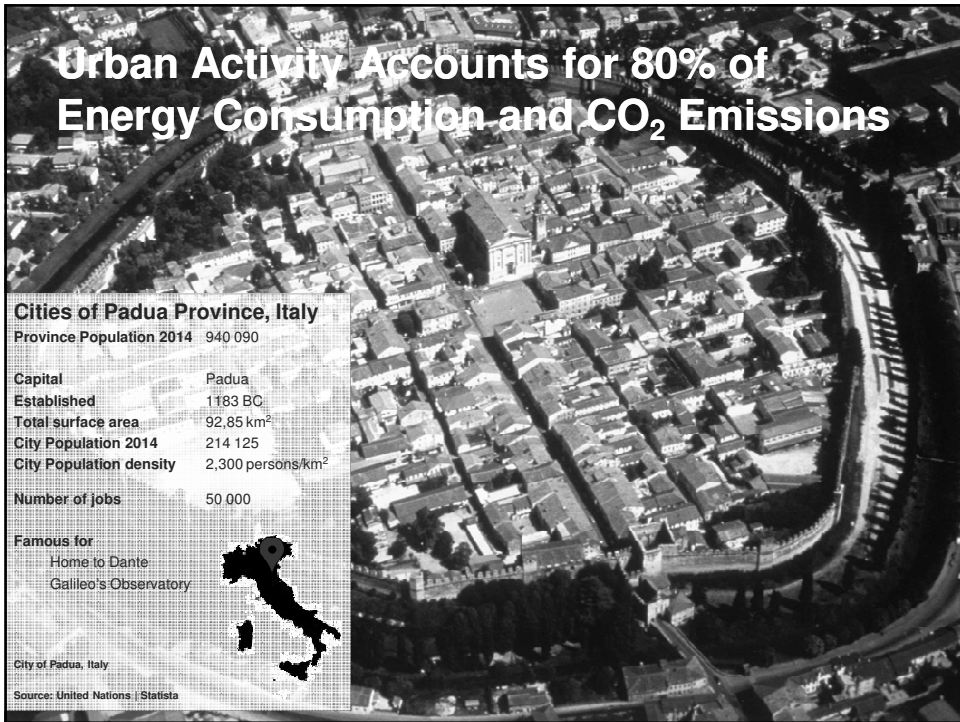
Ron Bisio
General Manager, Geospatial
Trimble



Use Case 1 – Mass Data Collection Solutions

**GEOSPATIAL SOLUTIONS HELP
REDUCE LIGHT POLLUTION AND
ENERGY USE**

Urban Activity Accounts for 80% of Energy Consumption and CO₂ Emissions




Cities of Padua Province, Italy

Province Population 2014 940 090

Capital	Padua
Established	1183 BC
Total surface area	92,85 km ²
City Population 2014	214 125
City Population density	2,300 persons/km ²
Number of jobs	50 000

Famous for
Home to Dante
Galileo's Observatory



City of Padua, Italy

Source: United Nations | Statista

Baseline Needed: Lack of Authoritative Data for Built Environment



- EU committed to 20% reduction by 2020 through Sustainable Energy Action Plans (SEAP)
- Cities needed to measure and monitor CO₂ emissions from streetlights
- Hired Gemmlab to census streetlights in several towns
- Original census: 4 operators using Juno handhelds
- Challenge was:
 - Collecting mass data, for a reduced cost
 - Processing data quickly
 - Resource requirements

Mass Data Collection: Integrated Solution Doubles Productivity; Halves Resource Requirements

- Evolved census: 2 operators using vehicle mounted Trimble MX2 and Trimble AP20 GNSS – Inertial System
 - Supported by Junos (when manual collection necessary)
- Office staff use
 - Trimble POSPac to improve GPS accuracy
 - Trimble Trident for object classification and extraction
- Rapid and authoritative (8cm) street lighting baseline inventory for policy analysis
 - GIS and CAD deliverables
 - Census 40% more efficient


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Use Case 2 – Geospatial Analysis Solutions

USING GEOSPATIAL DATA ANALYTICS TO ADDRESS ILLEGAL VERTICAL BUILD INFRACTIONS

Asian Cities are Growing; Demand for Housing Driving Rapid Development

Chinese Cities	
China Population 2014	1.35 B
Worlds Urban Population	53 %
Total surface area	
World area	9.6M km ²
	7.5 %
Population density	
	141 persons/km ²
Number of jobs	
Services	764M
	39 %
Agriculture	31 %
Industry	30 %



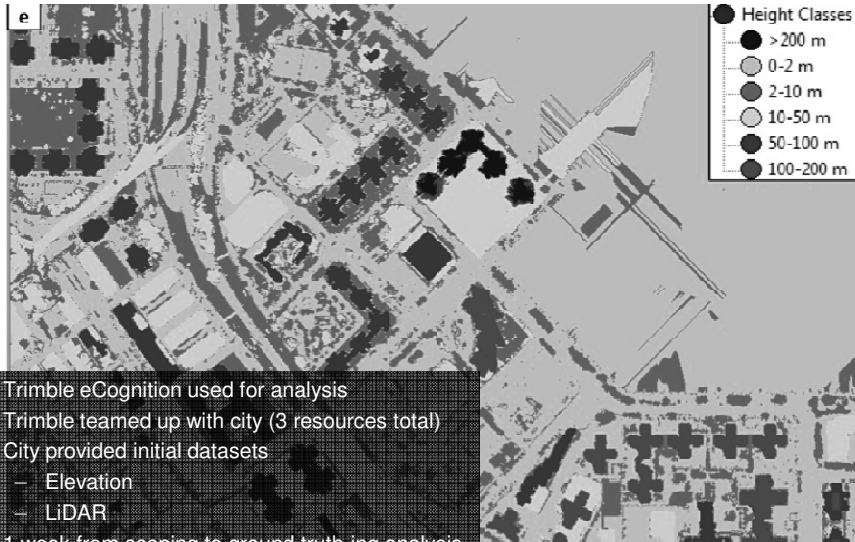
Central Chinese Television CCTV Headquarters
Designed with Trimble BIM Technology

Source: United Nations | World Bank | Statista

5 to 10% of Residential Housing Estimated to Have Illegal Vertical Build

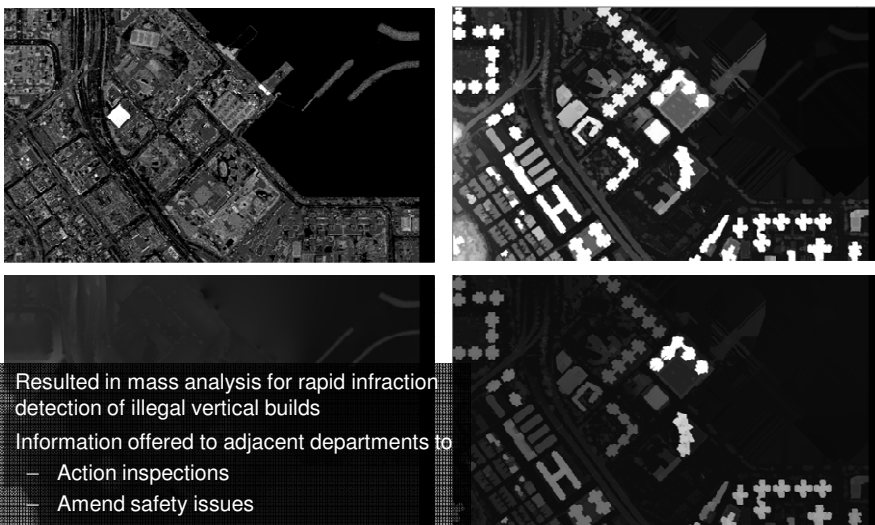
- Limited ability to detect infractions
- Undetected illegal Vertical Builds Cause:
 - Safety Issues
 - Emergency Response Issues
 - Loss of City Revenues
 - Fees
 - Fines
 - Taxes

Geospatial Analytics Enables Rapid Identification of Vertical Build Infractions



- Trimble eCognition used for analysis
- Trimble teamed up with city (3 resources total)
- City provided initial datasets
 - Elevation
 - LiDAR
- 1 week from scoping to ground truth-ing analysis

Geospatial Analytics Enables Rapid Identification of Vertical Build Infractions

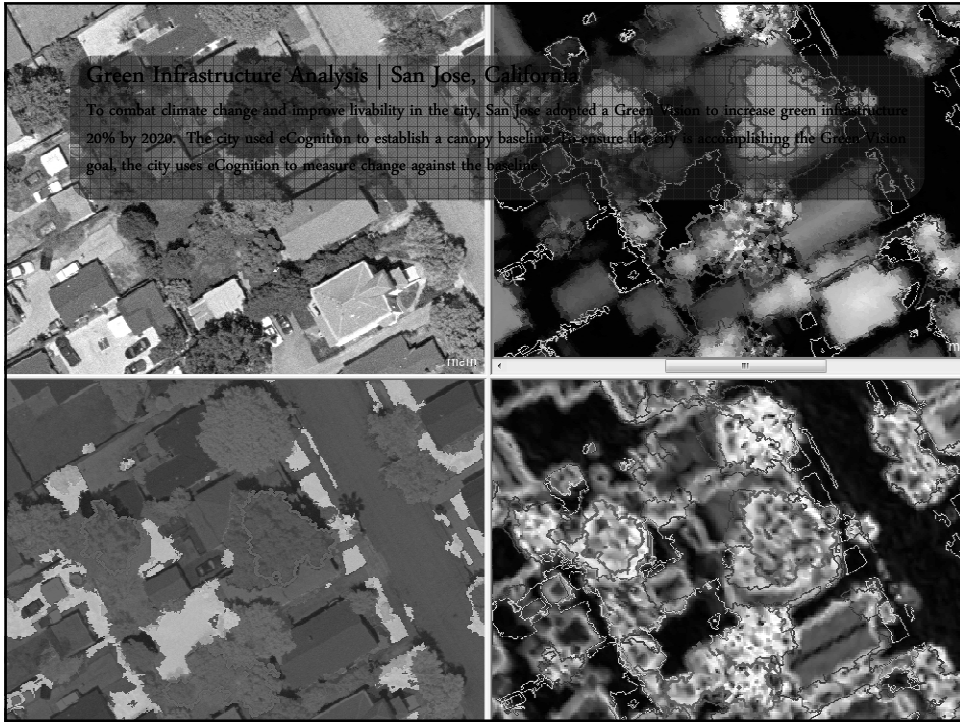


- Resulted in mass analysis for rapid infraction detection of illegal vertical builds
- Information offered to adjacent departments to
 - Action inspections
 - Amend safety issues
 - Reclaim revenues

Additional Use Cases

VARIOUS CITY APPLICATIONS





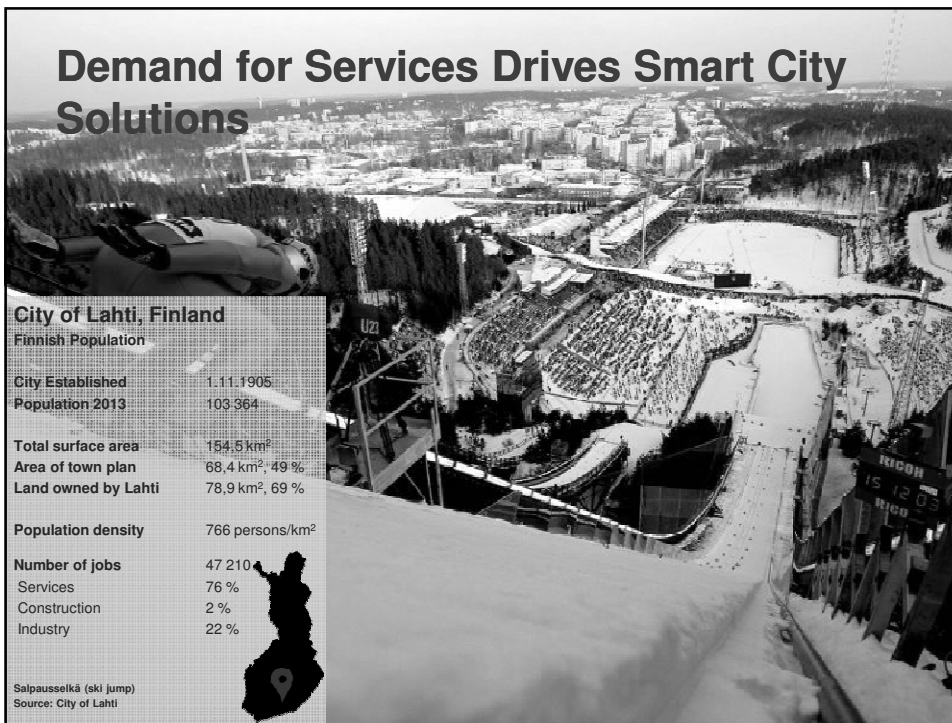
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OBRIGARDO

Use Case 3 – eGovernment Solutions

CENTRALIZING GEOSPATIAL DATA MANAGEMENT TO IMPROVE LEVELS OF SERVICE

Demand for Services Drives Smart City Solutions

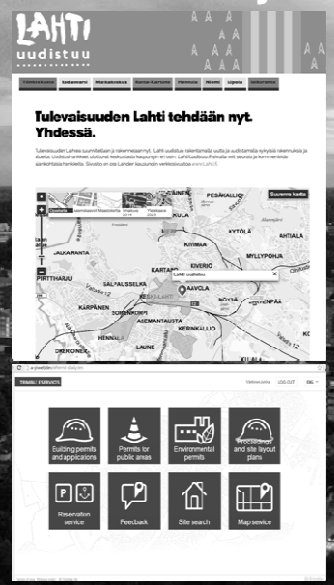


Lahti Finland Uses eServices to Connect Community to Data and Better Service



Lahti Finland Uses Integrated Trimble Geospatial Solutions for a Smarter City

- Trimble eGovernment eServices deployed
- Approx. 450 eService city users
- 4 other munis use the same Trimble eService system and database (Lahti acts as Service Center)
- Connected - eFeedback goes beyond the City; in regional use (libraries, public transport)
- Manage population register for 13 adjacent munis
- Single sign-on accross eServices
- 43% YOY citizen eService adoption



Structural Monitoring System | Christchurch, New Zealand

Trimble 4D Control and DiNi digital levels earthquake monitoring systems provide government and property owners the flexibility to reduce business interruption and the amount of time to prioritize repairs in the case of a major event. Cities use data to improve models, codes, and future designs.

Signal	Alert	Alert Type	Alert	Alert Type	Alert	Alert Type	Alert	Alert Type	Alert	Alert Type	Alert	Alert Type
1	Shore	Acceleration	None	Specific	General	Alert of 5%	Relative	Measurement	Relative	Measurement	Relative	Measurement
2	Q	Acceleration	None	Specific	General	Alert of 5%	Relative	Measurement	Relative	Measurement	Relative	Measurement
3	Q	Acceleration	None	Specific	General	Alert of 5%	Relative	Measurement	Relative	Measurement	Relative	Measurement
4	Q	Acceleration	None	Specific	General	Alert of 5%	Relative	Measurement	Relative	Measurement	Relative	Measurement
5	Q	Acceleration	None	Specific	General	Alert of 5%	Relative	Measurement	Relative	Measurement	Relative	Measurement

More than just data
Information to drive decisions

Slide Deck Outline

- **Purpose:**
 - Illustrate use cases where Trimble solutions are enabling smarter cities
- **Audience:**
 - EU Geospatial leaders; including local government leaders
- **Content:**
 - **Use case 1:** City of Padua, Italy – *Tech and More*
 - **Use case 2:** City of Hong Kong, China – *John Whitehead*
(Please keep city confidential and describe as Asian City)
 - **Use case 3:** City of Lahti, Finland – *Mike Wehrt*
 - Additional 1 slide use cases
- **Questions:**
 - Contact Rick with questions or suggestions:
 - rick_gosalvez@trimble.com
 - (408) 992 5881

Customer Story Outline

3 to 4 slides telling -

- **Customer Info & Drivers:**
 - Customer info (could be anonymous)
 - Universal City Issues/Drivers
- **Solution – Concept & Challenge**
 - Common City Geospatial Challenge
- **Solution – Trimble to the rescue**
 - Trimble Products
 - Num. of Resources involved / Time to Resolve problem / Num. of Data Sources (i.e. GIS, Imagery, Survey, etc) / Num. of Systems
 - Before and After Results (quantifiable – time saved, number of systems connected, number of steps eliminated, man hours freed up, cost saved, etc)
 - Images/photos available

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START 3 SMART CITY USE CASES

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END 3 SMART CITY USE CASES