



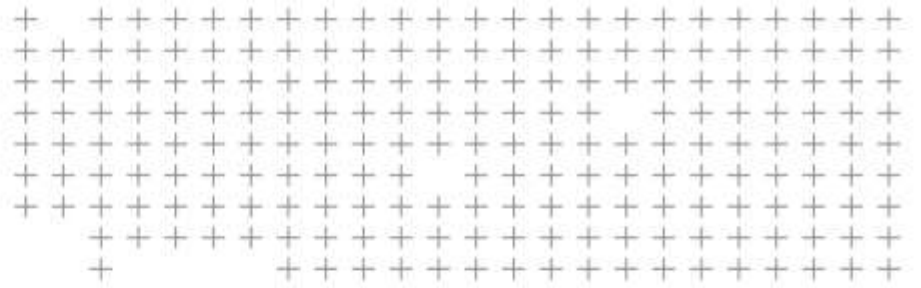
Christian Hoffmann | Market Manager – Aerial, Photogrammetry and Remote Sensing

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MAY 2016



Urban Development for Smart Cities: Looking at Cities through the Lens of Geospatial Data Analytics



- ◆ 1. Urban Expansion
- ◆ 2. Pursuit for Resilience
- 3. Geospatial Big Data to Smart Data
- 4. City Projects



Discussion Agenda

Growing World Population & Urbanization

3 Billion



1960

6 Billion



1999

9 Billion



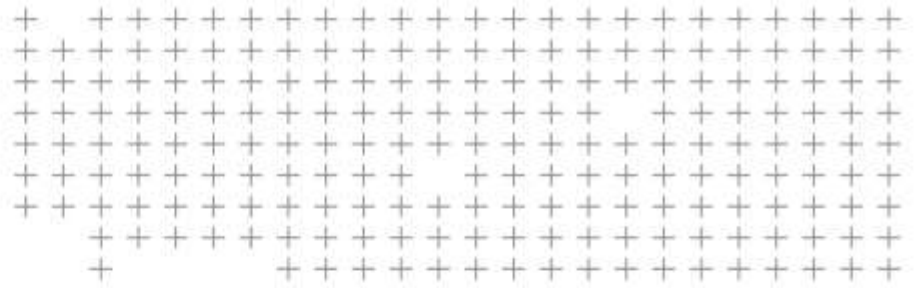
2040

Cities Under Pressure

- Climate Change
- Urbanization
- Aging Infrastructure
- Environmental Issues

World Population Reached	Year	Time to Add a Billion	Urban Population
1 Billion	1804		-
2 Billion	1927	123 years	-
3 Billion	1960	33 years	33%
4 Billion	1974	14 years	38%
5 Billion	1987	13 years	40%
6 Billion	1999	12 years	48%
7 Billion	2011	12 years	51%
8 Billion	2024	13 years	59%
9 Billion	2040	16 years	63%

Source: United Nations / worldometers.info



- 1. Urban Expansion
- 2. **Pursuit for Resilience**
- 3. Geospatial Big Data to Smart Data
- 4. City Projects



Pursuit for Resilience

What is Resilience?

- Returning to an original or improved quality of life

Shocks

- Severe, sudden events
- Threaten a city



Credit: NY Post

Stresses

- Temperate, day-to-day events
- Weaken a city



Credit: Marius Vieth

100 Resilient Cities Program

Mission Statement:

“Helping cities around the world become more resilient to the **physical**, **social**, and **economic** challenges that are a growing part of the 21st century”

PIONEERED BY THE
ROCKEFELLER FOUNDATION

100

RESILIENT

CITIES

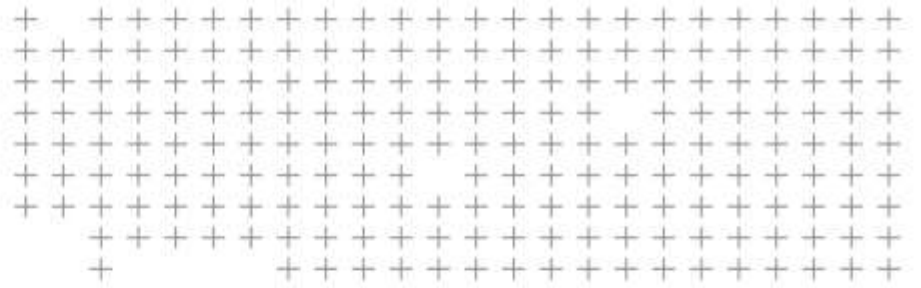


www.100resilientcities.org

Trimble as a Platform Partner

- Focused on “**physical**” challenges
- Geospatial imagery analytics
- eCognition software





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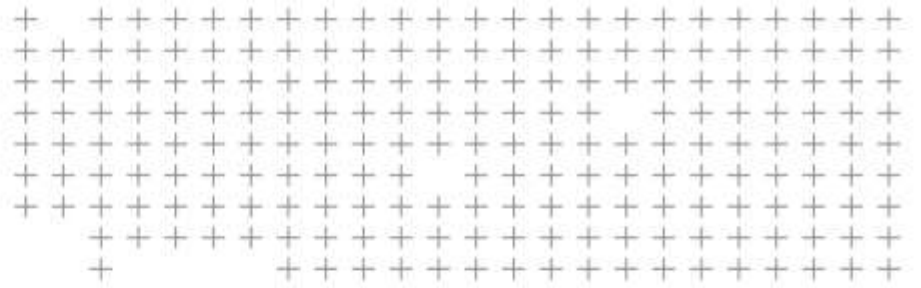


Geospatial Big Data to Smart Data

Geospatial Technology Disruption

- Increased data accessibility
- Innovative imagery analysis software
- Cloud-computing infrastructure





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Engaged Cities



Boulder, Colorado



Melbourne, Australia

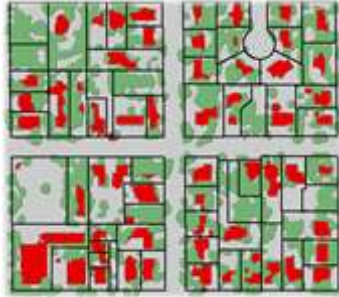


Los Angeles, California

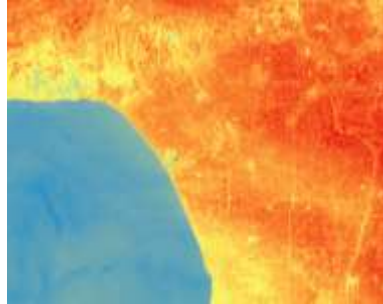


New Orleans, Louisiana

Analysis Applications



Urban Tree Canopy



Urban Heat Island



Impervious Surface

- Common to resilience challenges around the world
 - Urban environment
 - City climate
 - Water management
- Direct involvement with city councils

Project #1 – Urban Tree Canopy

Why trees?

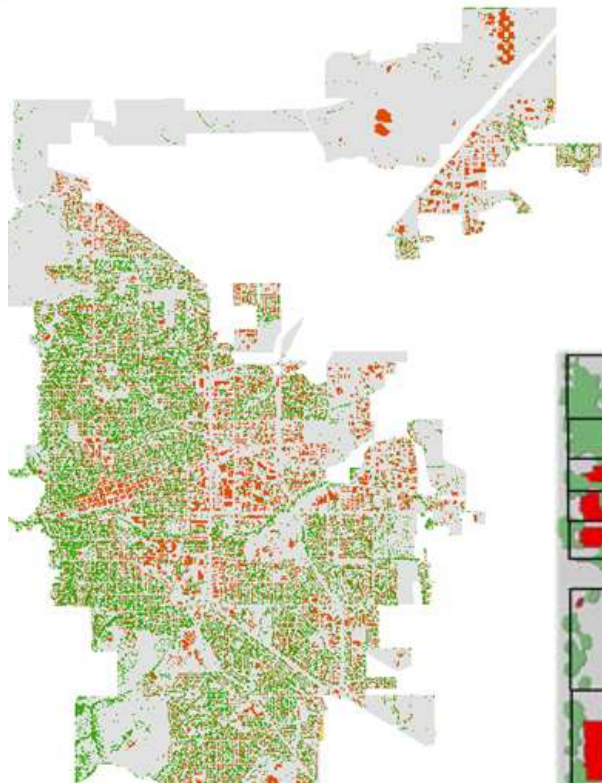
- Micro climate
- Air quality
- Shade
- Runoff
- Property Value
- Quality of living



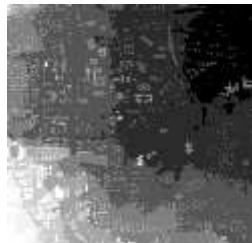
Objective

- Establish a baseline
- Monitor

Solution



DTM




DSM



4-band Imagery



	Tree Canopy: 2,639 acres	16%
	Buildings: 1766 acres	11%
	Unclassified: 12,027 acres	73%

Project #2 – Heat Island Analysis

Why?

- Quality of life
- Health effects [pos. / neg.]

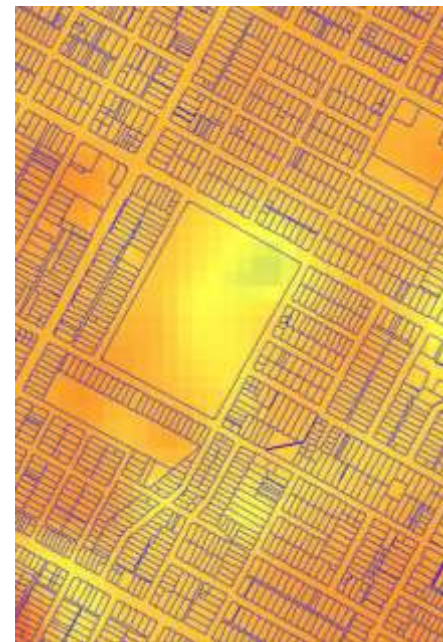


Objective

- Better understanding of dynamics
- Monitor



Solution



Temperature derived from Landsat 8, Band 11, Units: °F

Project #3 – Impervious Surface Analysis

Why?

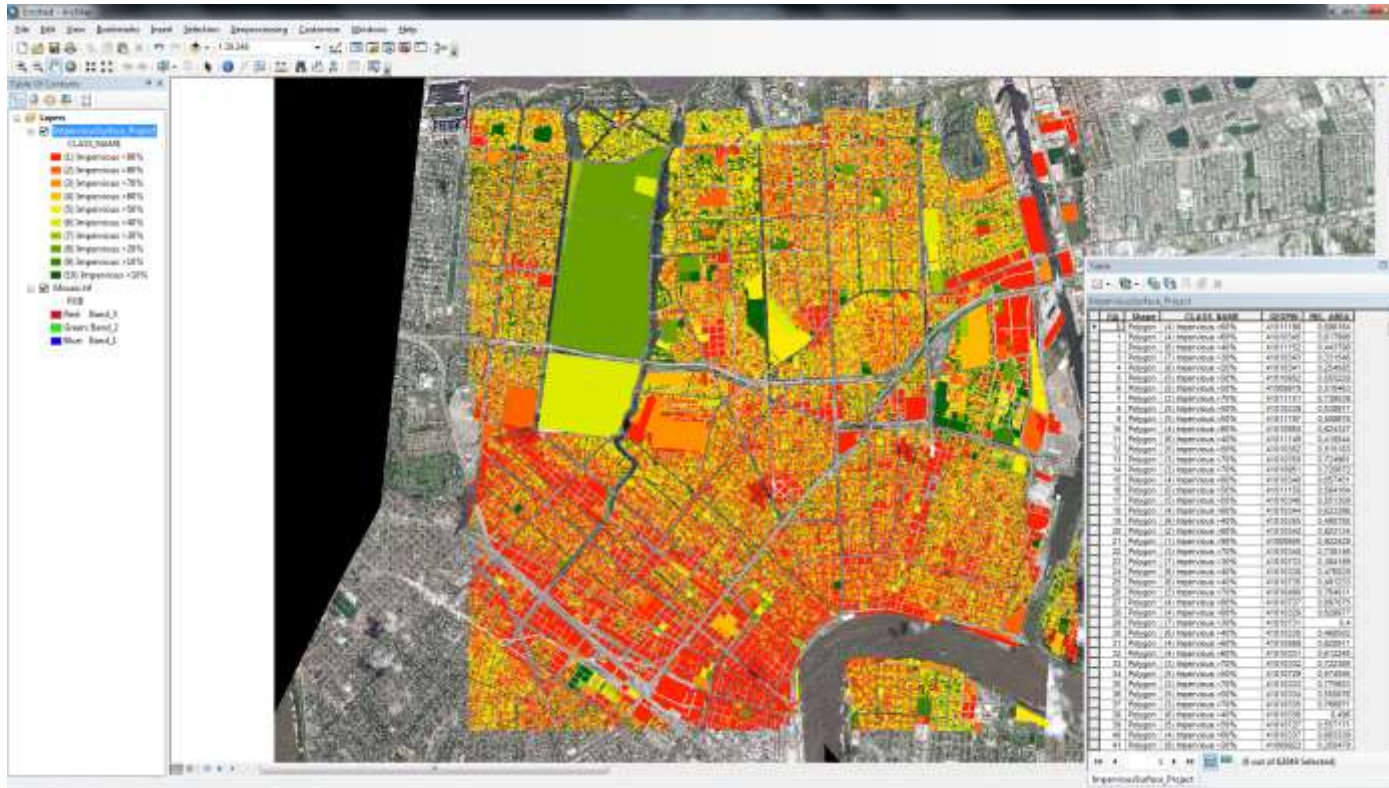
- Runoff modeling
- Flood prevention
- Taxation



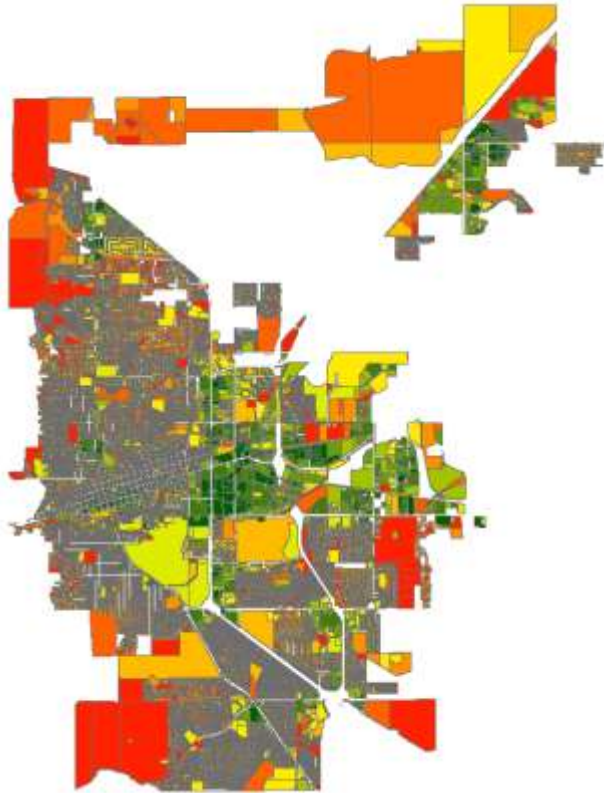
Objective

- Impervious surface at parcel level

Solution – New Orleans



Solution - Boulder



4-band Imagery



1. (01) Impervious >90%
- (02) Impervious >80%
- (03) Impervious >70%
2. (04) Impervious >60%
- (05) Impervious >50%
- (06) Impervious >40%
- (07) Impervious >30%
3. (08) Impervious >20%
- (09) Impervious >10%
- (10) Impervious <10%



Discussion

- Population growth and urbanization makes resiliency an essential part of urban planning in the future
- Geospatial big data needs to become smart data
- Focus on end user is key to deploy suitable geospatial technologies
 - Technology adoption
 - Workflow integration