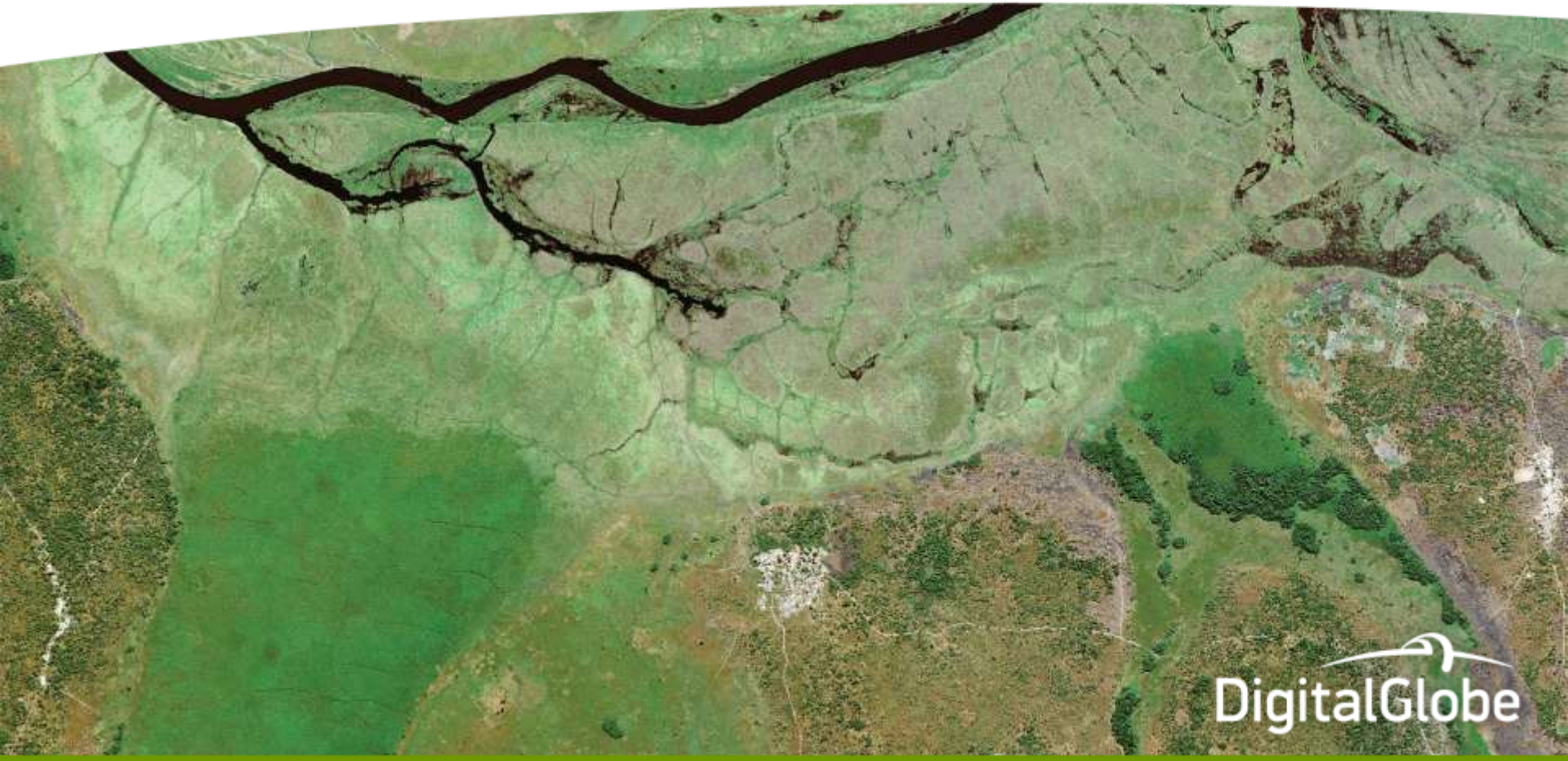
MundoGEO#Connect LatinAmerica 2013 | June 18 to 20 | São Paulo (SP) Brazil

Los Roques Archipelago, Venezuela | Mar 12, 2011 | WorldView-2

Dados de sensores óticos orbitais para qualquer aplicação que você imaginar

Tata Lacale – tata.lacale@digitalglobe.com



Los Roques Archipelago, Venezuela | Mar 12, 2011 | WorldView-2

Advancing our industry one milestone at a time

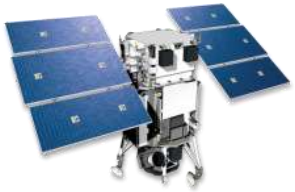
1993
U.S. Dept. of Commerce grants DigitalGlobe **first private enterprise license**

1992
DigitalGlobe founded

2001
QuickBird launches, The first commercial sub-meter resolution satellite

1999
IKONOS launches, The first commercial ~meter resolution satellite

2003
DigitalGlobe wins NextView contract to build and **deliver data on WorldView-1**



2007
DigitalGlobe acquires GlobeXplorer, a leading online imagery provider

WorldView-1 launches

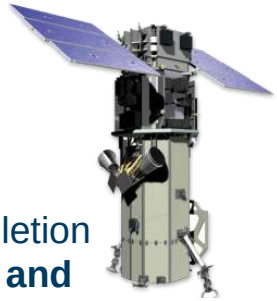
2008
GeoEye-1 launches

Advancing our industry one milestone at a time

2009
DigitalGlobe **opens London office** and expands Singapore office

DigitalGlobe begins trading as DGI on NYSE

2010
DigitalGlobe **surpasses one billion km² of earth imagery**



2013/2014
Estimated completion of **WorldView-3 and GeoEye-2**

2009
WorldView-2 launches

FirstLook launches
to provide the industry's first information product

2013
DigitalGlobe and GeoEye merge to make DigitalGlobe currently operating five satellites in low earth orbit

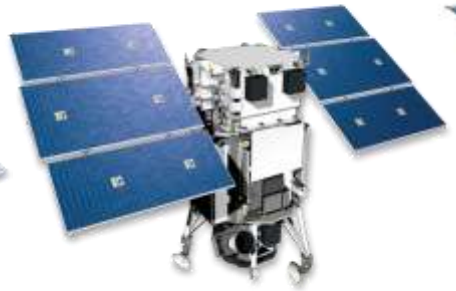
DigitalGlobe **current archive 3.8 Billion km² of earth imagery**

The Current DigitalGlobe Constellation

IKONOS
Launched September 1999
4 band multispectral
85 cm resolution

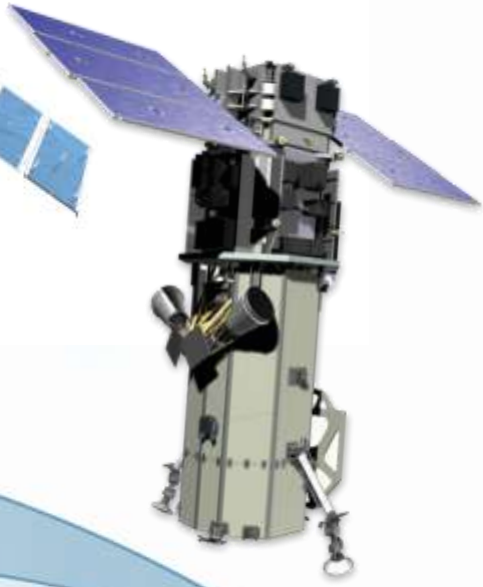
QuickBird
Launched October 2001
4 band multispectral
65 cm resolution

WorldView-1
Launched September 2007
Panchromatic
50 cm resolution



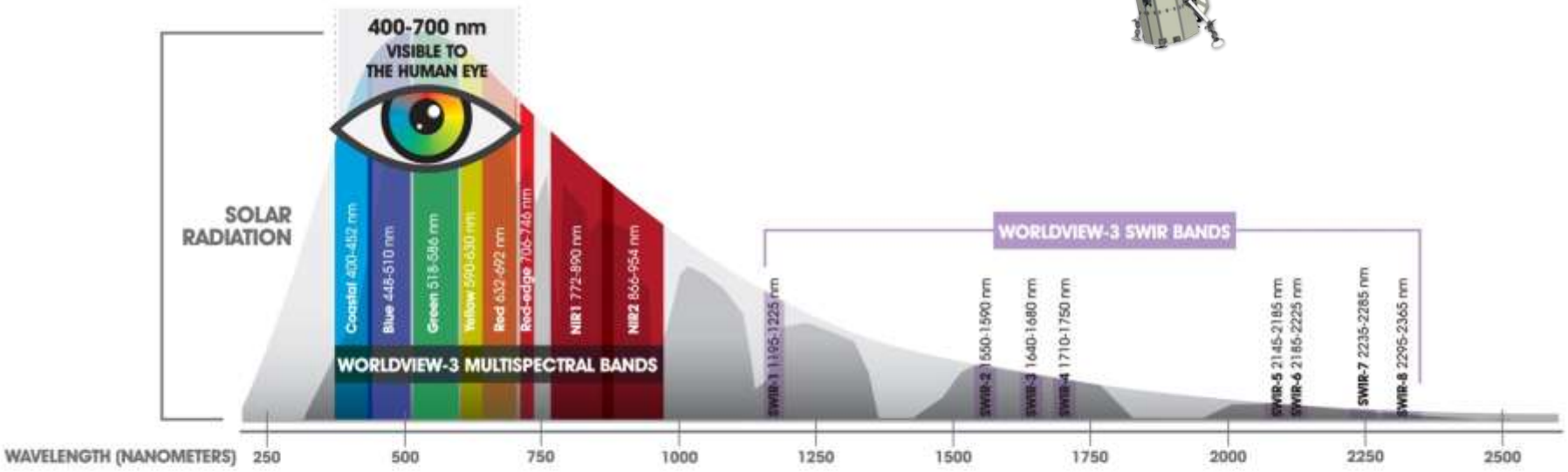
GeoEye-1
Launched September 2008
4 band multispectral
41 cm resolution(1)

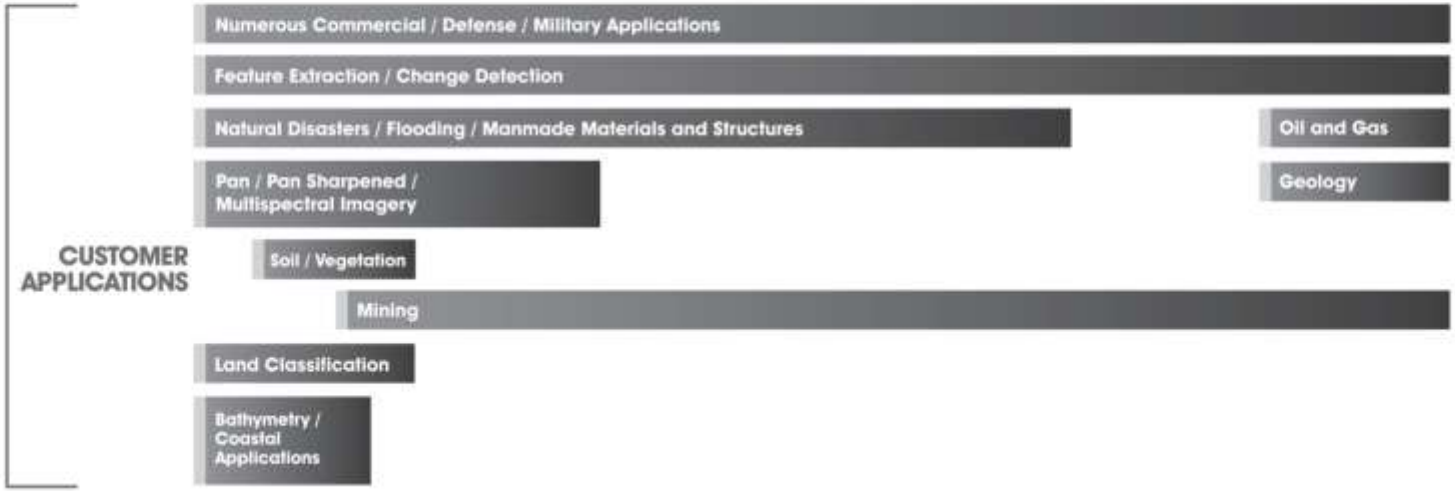
WorldView-2
Launched October 2009
8 band multispectral
46 cm resolution(1)

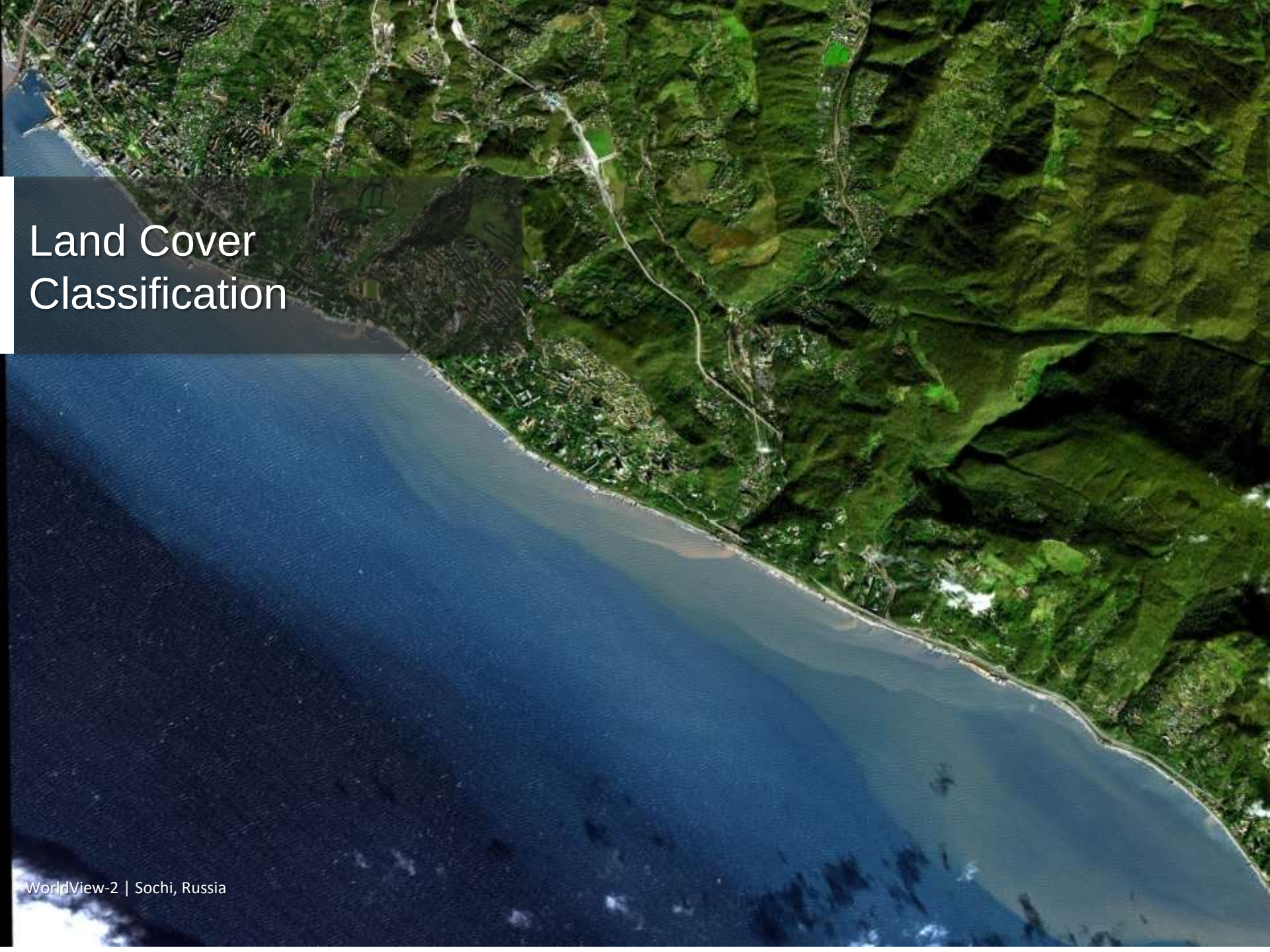


WorldView-3

DigitalGlobe

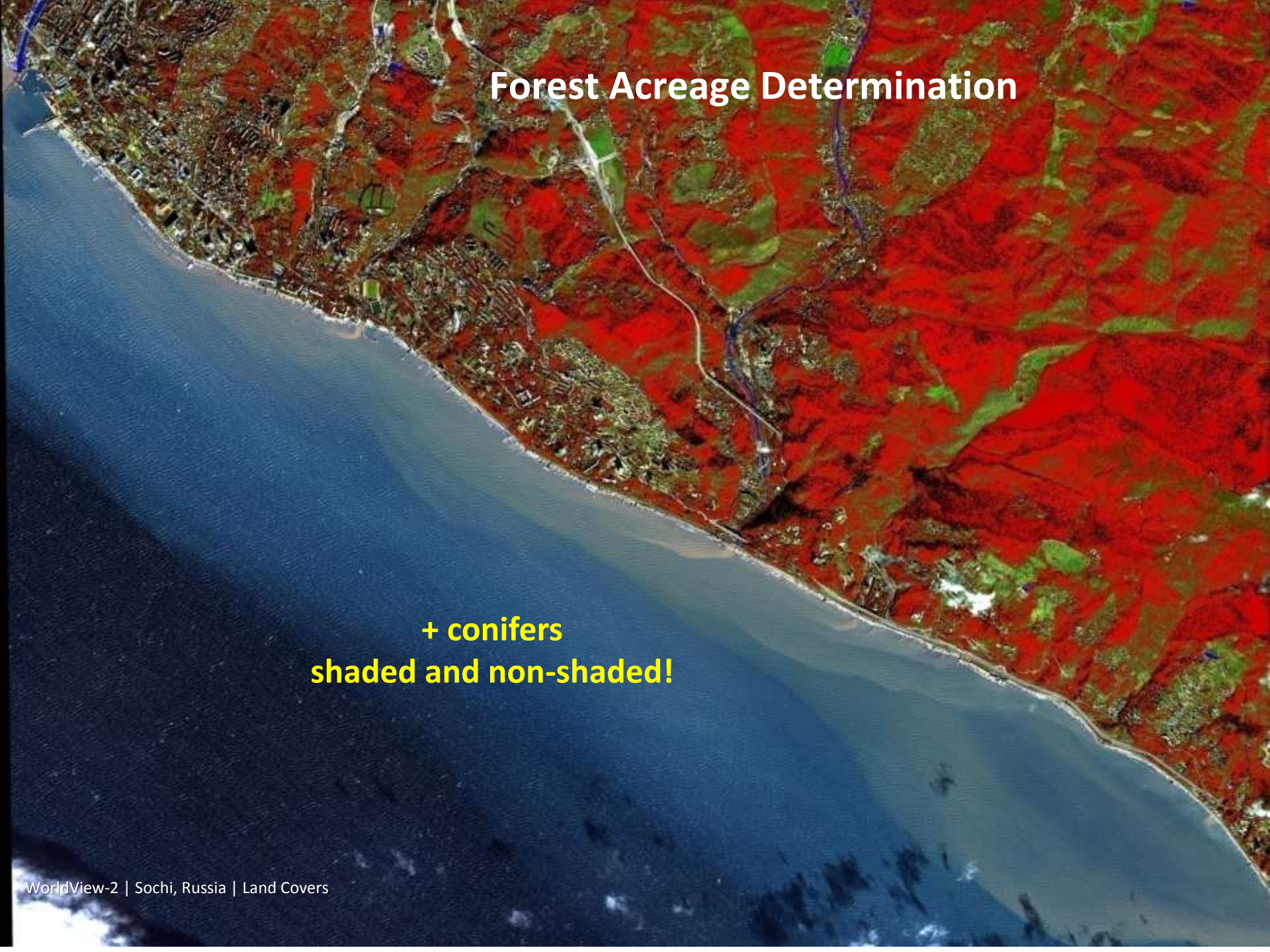


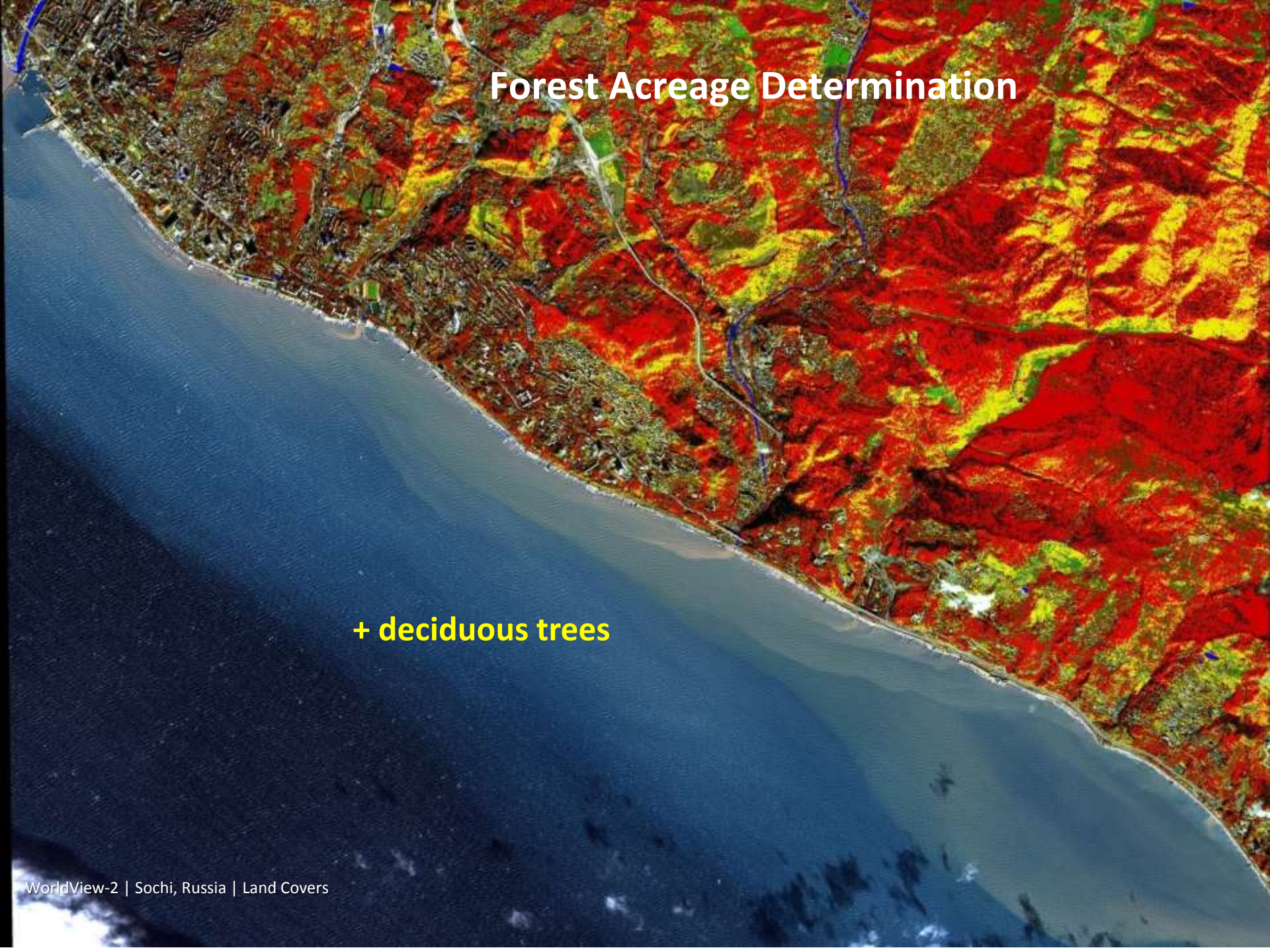



Land Cover
Classification
WorldView-2 | Sochi, Russia

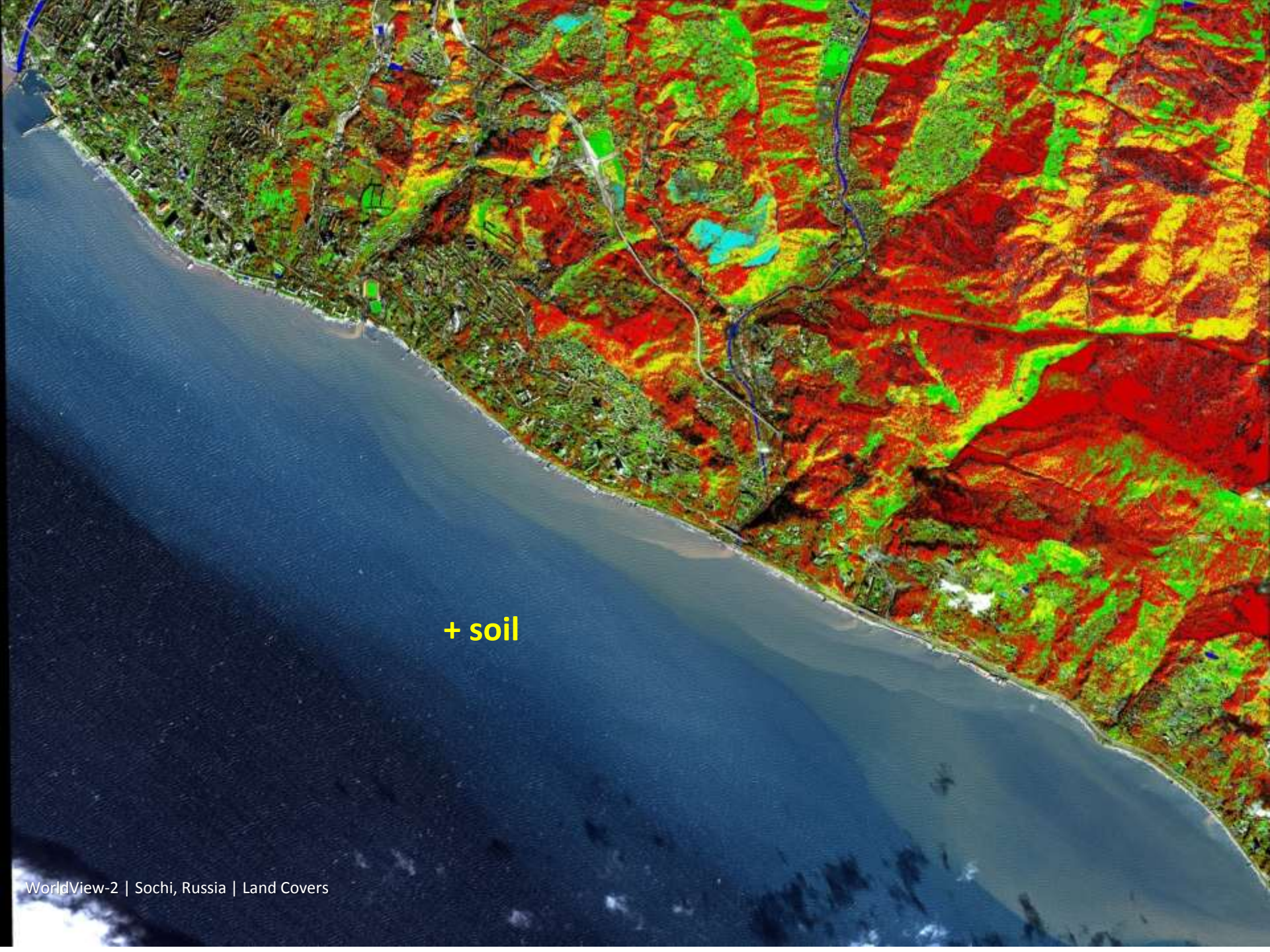
WorldView-2 | Sochi, Russia

WorldView-2 | Sochi, Russia | Land Covers


Forest Acreage Determination
+ conifers
shaded and non-shaded!
WorldView-2 | Sochi, Russia | Land Covers

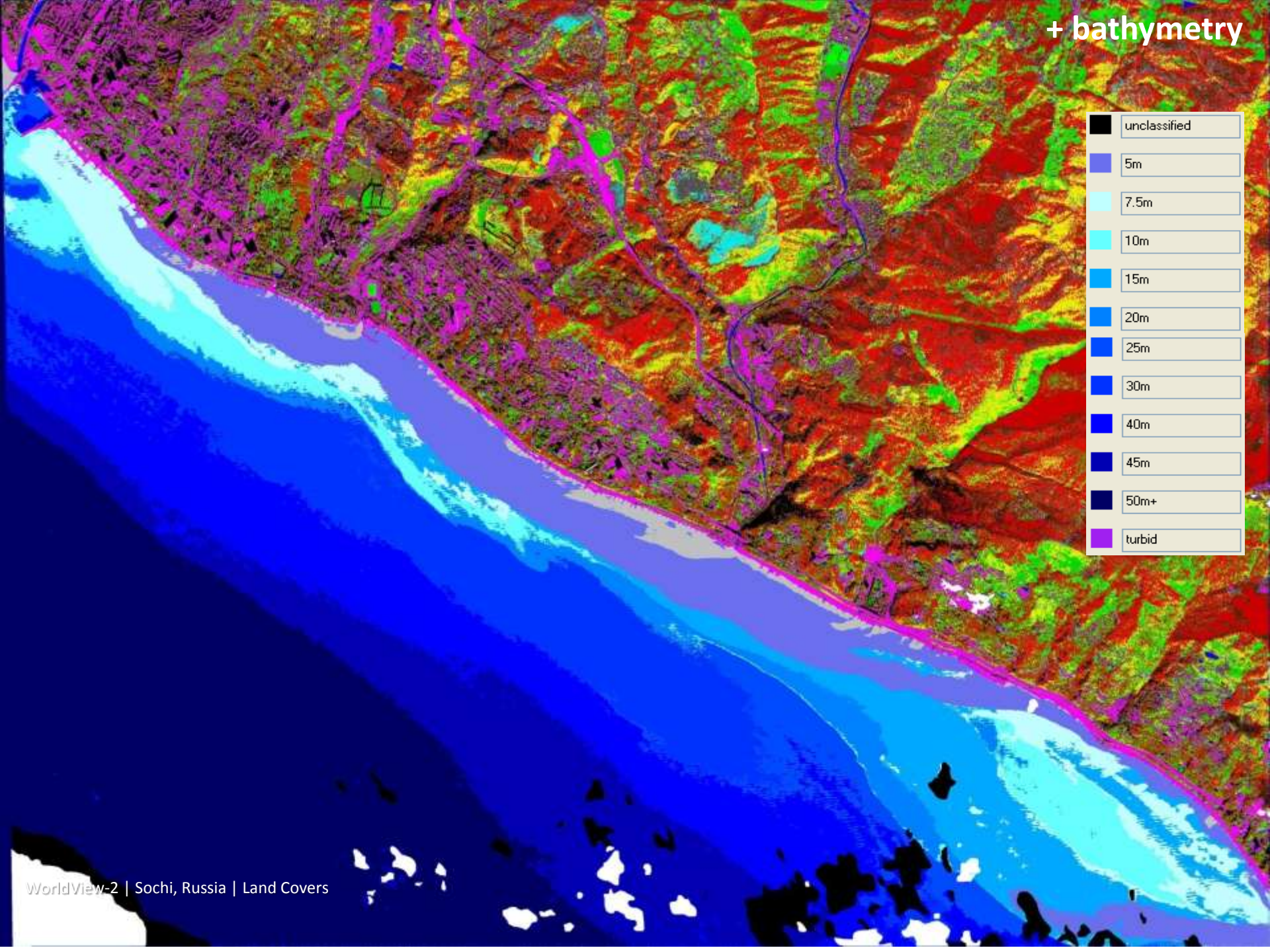

Forest Acreage Determination
+ deciduous trees
WorldView-2 | Sochi, Russia | Land Covers

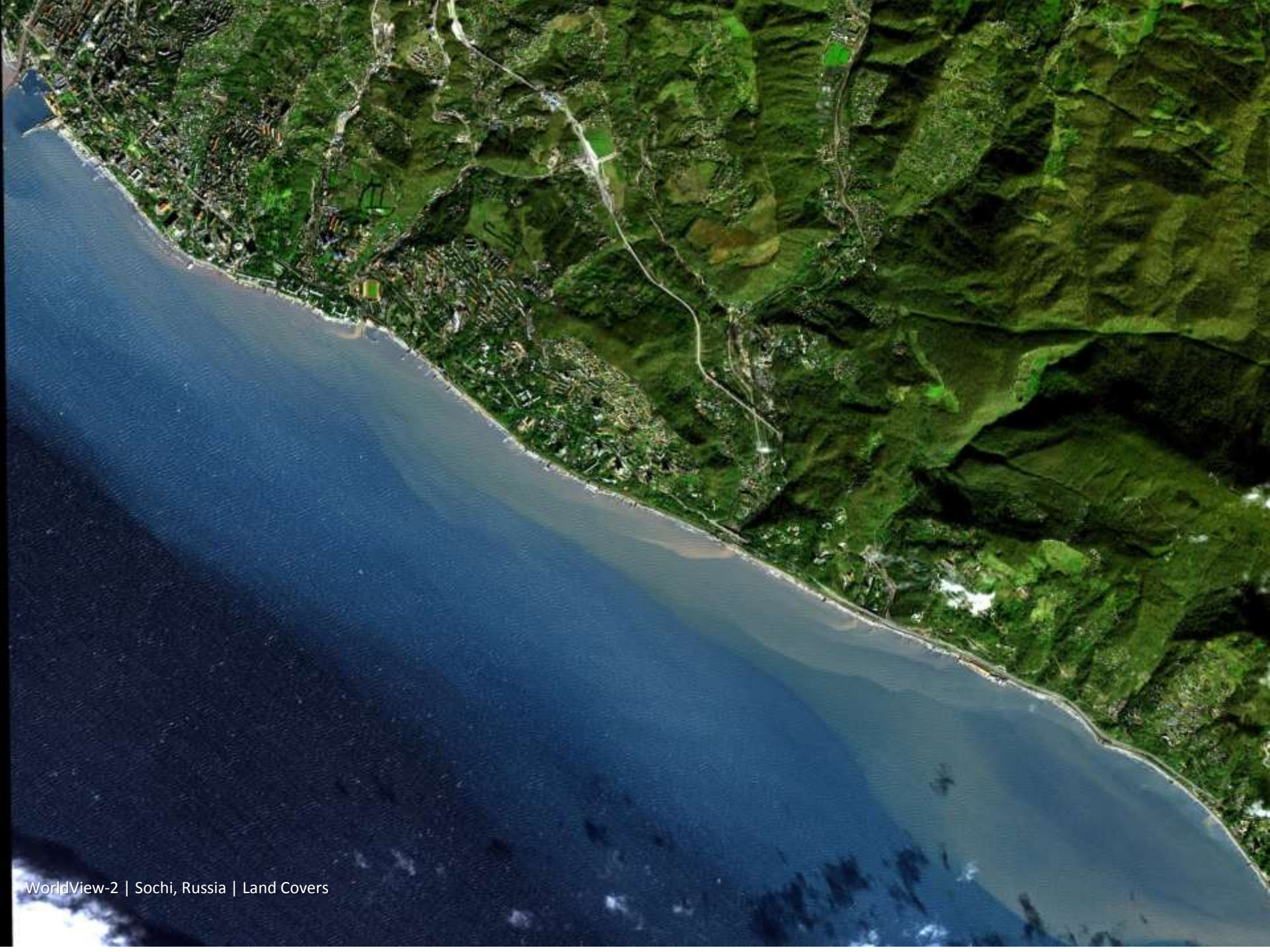
WorldView-2 | Sochi, Russia | Land Covers



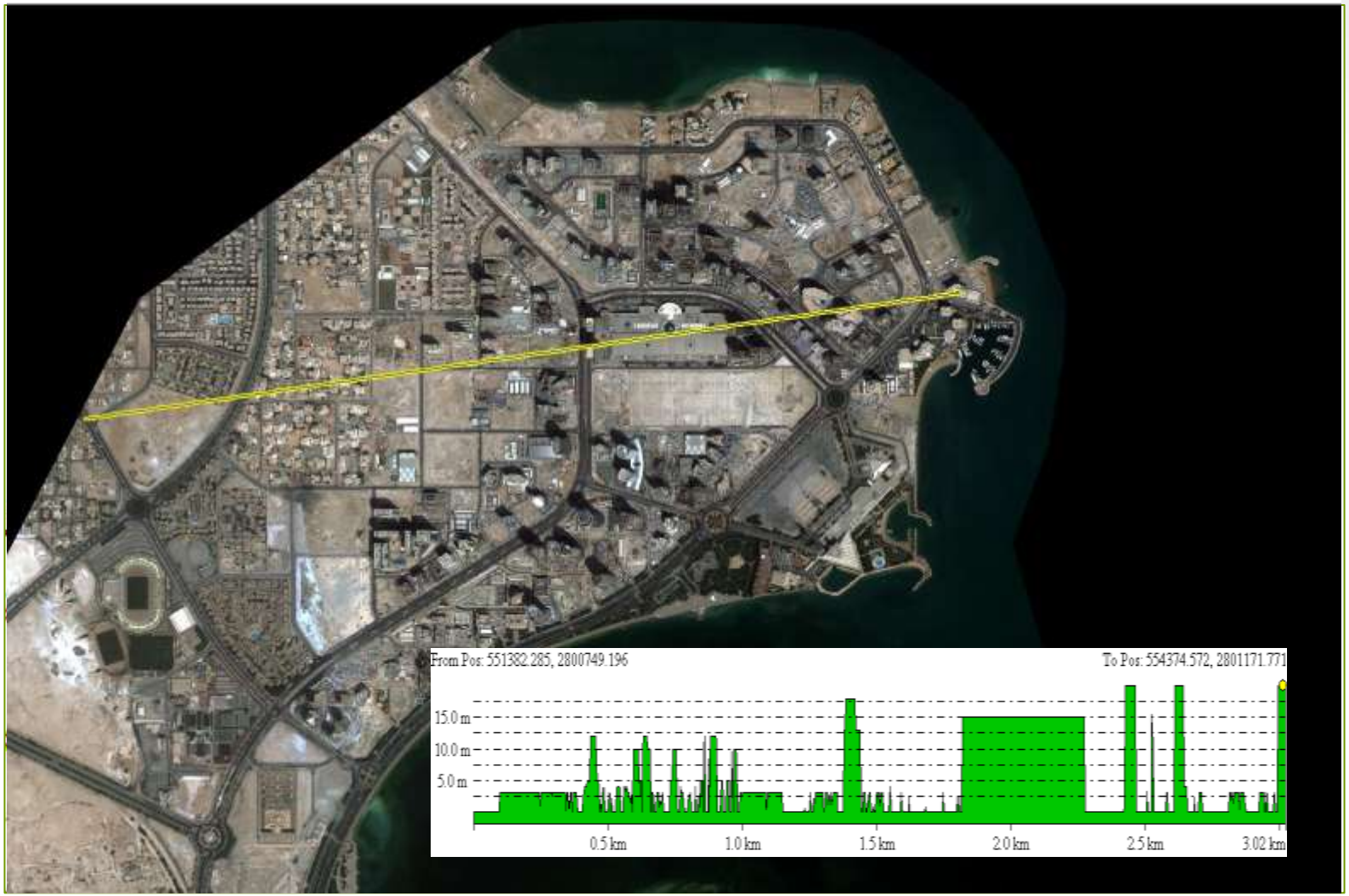
WorldView-2 | Sochi, Russia | Land Covers

WorldView-2 | Sochi, Russia | Land Covers


+ bathymetry
unclassified
5m
7.5m
10m
15m
20m
25m
30m
40m
45m
50m+
turbid
WorldView-2 | Sochi, Russia | Land Covers


WorldView-2 | Sochi, Russia | Land Covers

Land Cover Classification



WorldView-2 | Doha, Qatar| Clutter Data + Height Map + Ortho + Line of Sight

Change Detection – Visual Context

Change Detection Map

Unchanged

New

Demolished

The power to understand and take action

Analysis

- Imagery + Analysis = Insight
- Empower better decision making
- Custom solutions for customers

What do we mean by custom solutions?

Japan Crisis 2011

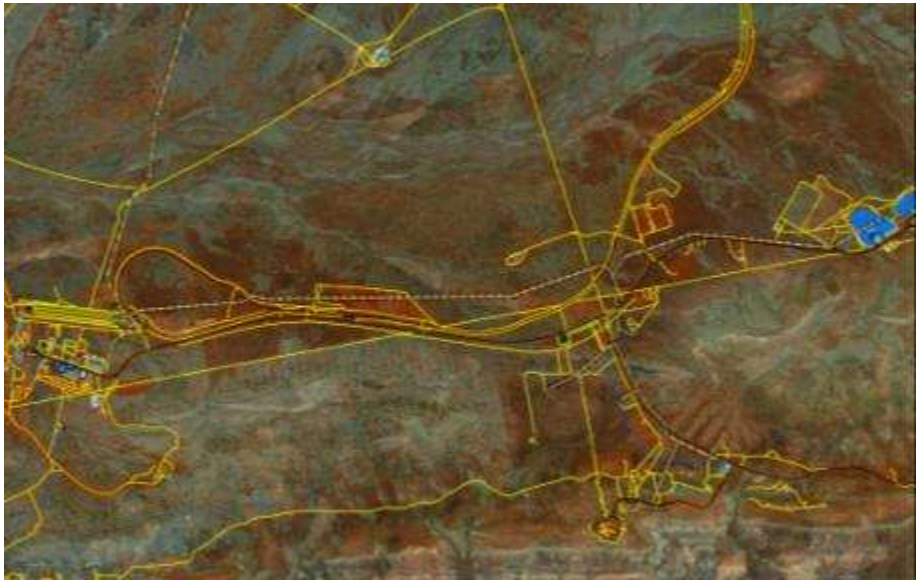
In the aftermath of the tsunami, more than 95,000 downloads of imagery and analysis details of the damaged Fukushima Daiichi nuclear power plant were downloaded from our website.

Vermont Floods 2011

This August 29, 2011,image of Pico Mountain Resort, Killington Township, Vermont, shows the damage caused by rainwater and mud runoff to the lodges and parking lots at the base of the ski slopes.

Mapping Base Features

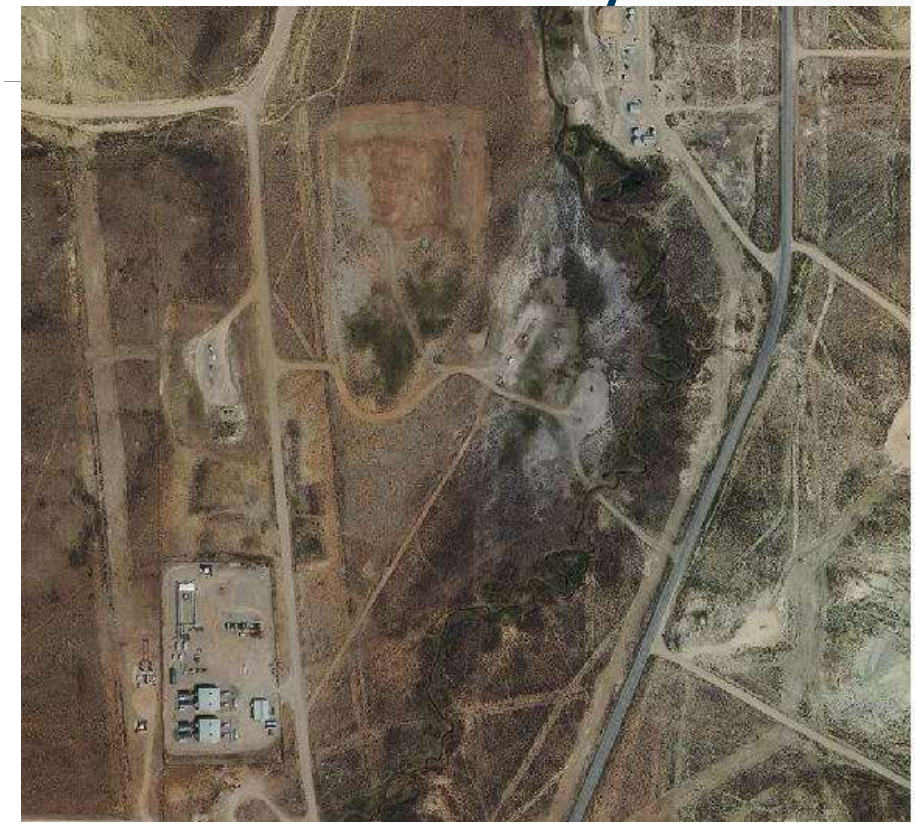
Infrastructure

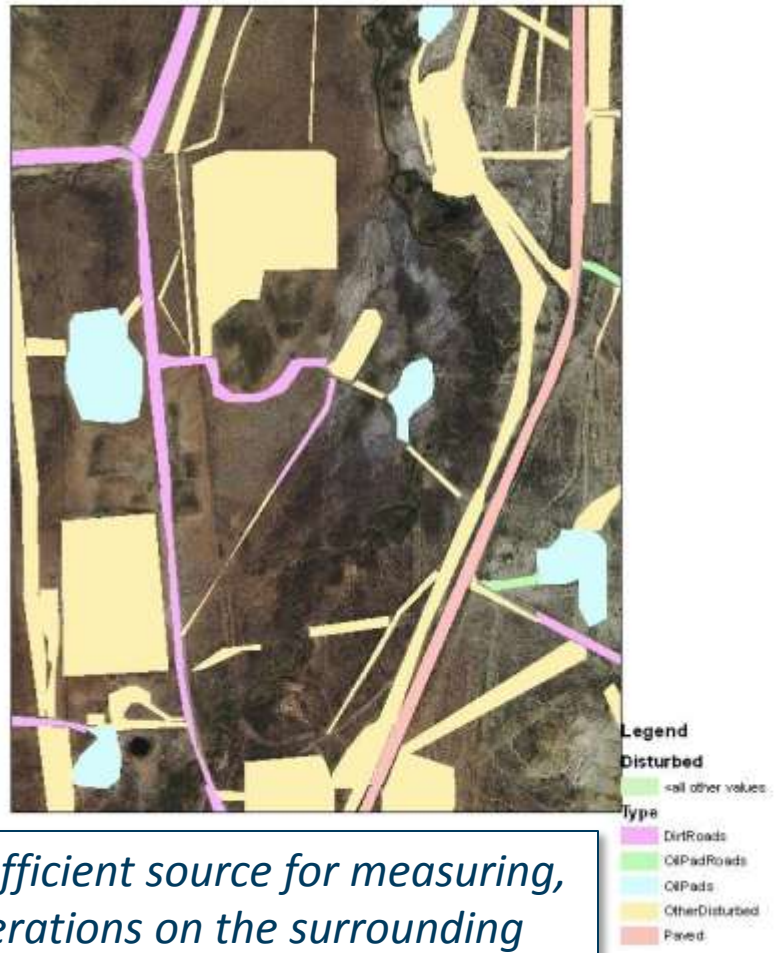


Facilities

Imagery and automated feature extraction offers an efficient method to plan, map, and update large scale development projects

Disturbance Analysis





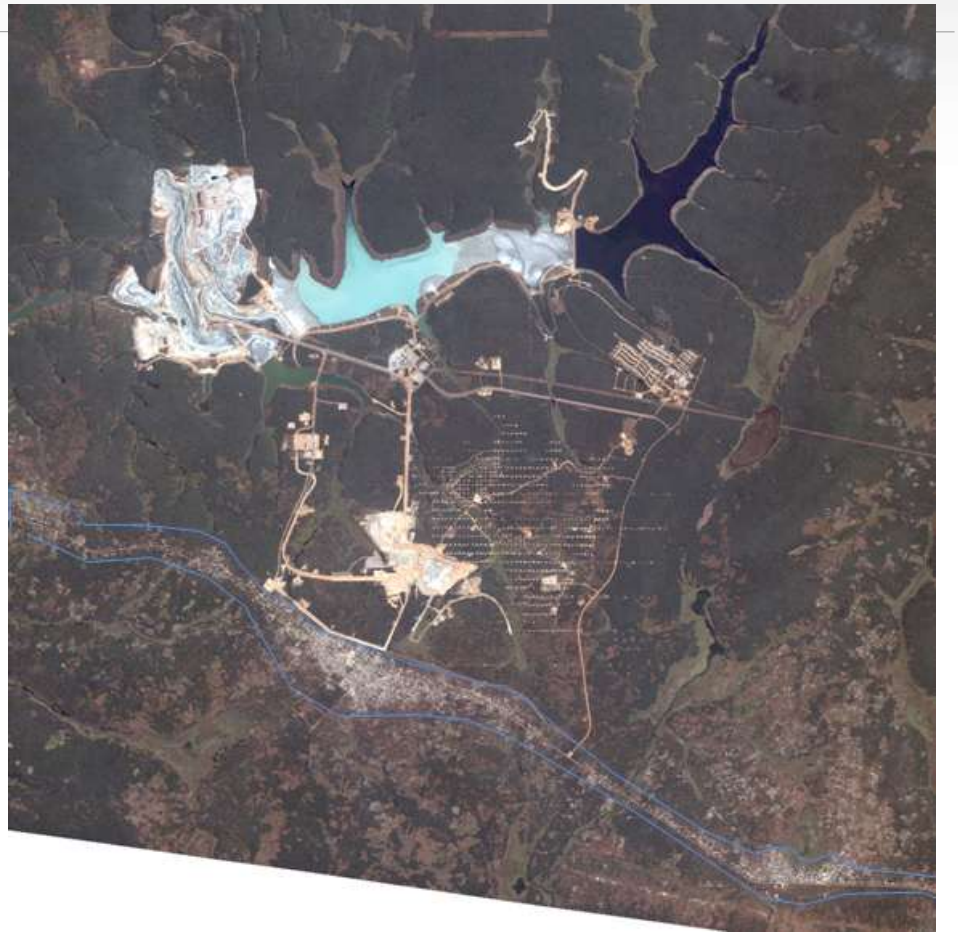
Imagery and land cover analysis provides an efficient source for measuring, mapping, and quantifying the impact of operations on the surrounding environment.

Population Impact Studies

Deliverables

Deliverable	Description
Rural building count	Building count of all structures in rural areas
Settlement building count	Complete building count of all structures in settlements around the mine
Land use/land cover classification	12-class land use/land cover classification
Wall map	Poster-sized (approximately 36” by 48”) image wall map at 1:50,000 scale for the entire AOI.
Map book	Image map book at 1:50,000 scale for the entire AOI. Approximately 16-25 pages.

Measuring *change* in populated areas surrounding large scale extractive operations



Population Impact Studies

Deliverable	Description
Population change report	Report consisting of imagery with annotations and text summarizing the findings. Based on any two images in with at least one year separating the images.
	Option of including change analysis for an additional image in the base report for the AOI
Rural building count	Complete building count of all structures in rural areas in the 110 km^2 AOI.
Settlement building count	Complete building count of all structures in settlements in the AOI.
Land use/land cover classification	12-class land use/land cover classification for the 110 km^2 AOI.
Wall map	A single poster-sized image wall map at 1:25,000 scale for the AOI. Priced per image. Customer can select from available image date(s).
Map book	A single image map book at 1:25,000 scale (approximately 10-20 pages) for the 110 km^2 AOI. Priced per image. Customer can select from available image date(s).

These services are being sold to some of the largest mining operators in the world.

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Decision Planning for Risk Management – Pipeline Planning

- Enterprise Need
- Quantify Public presence around pipelines
- Support allocation of funds for preventative maintenance
- Identify road centerlines and structure locations
- Accurately map facilities
- Identify high consequence areas in case of rupture

Stereo Imagery

Stereo Imagery products are designed for users with advanced image processing capabilities and photogrammetric tools. This product is ideal for Digital Elevation Model (DEM) generation, 3D visualization, and feature extraction applications. Stereo images are collected in-track, meaning on the same orbit, and are acquired at angles optimal for stereo viewing and manipulation.

Multi-shot over Longmont, CO

Digital Elevation Models Derived from Stereo

DSM

Digital Surface Model

Includes vegetation and buildings

DTM

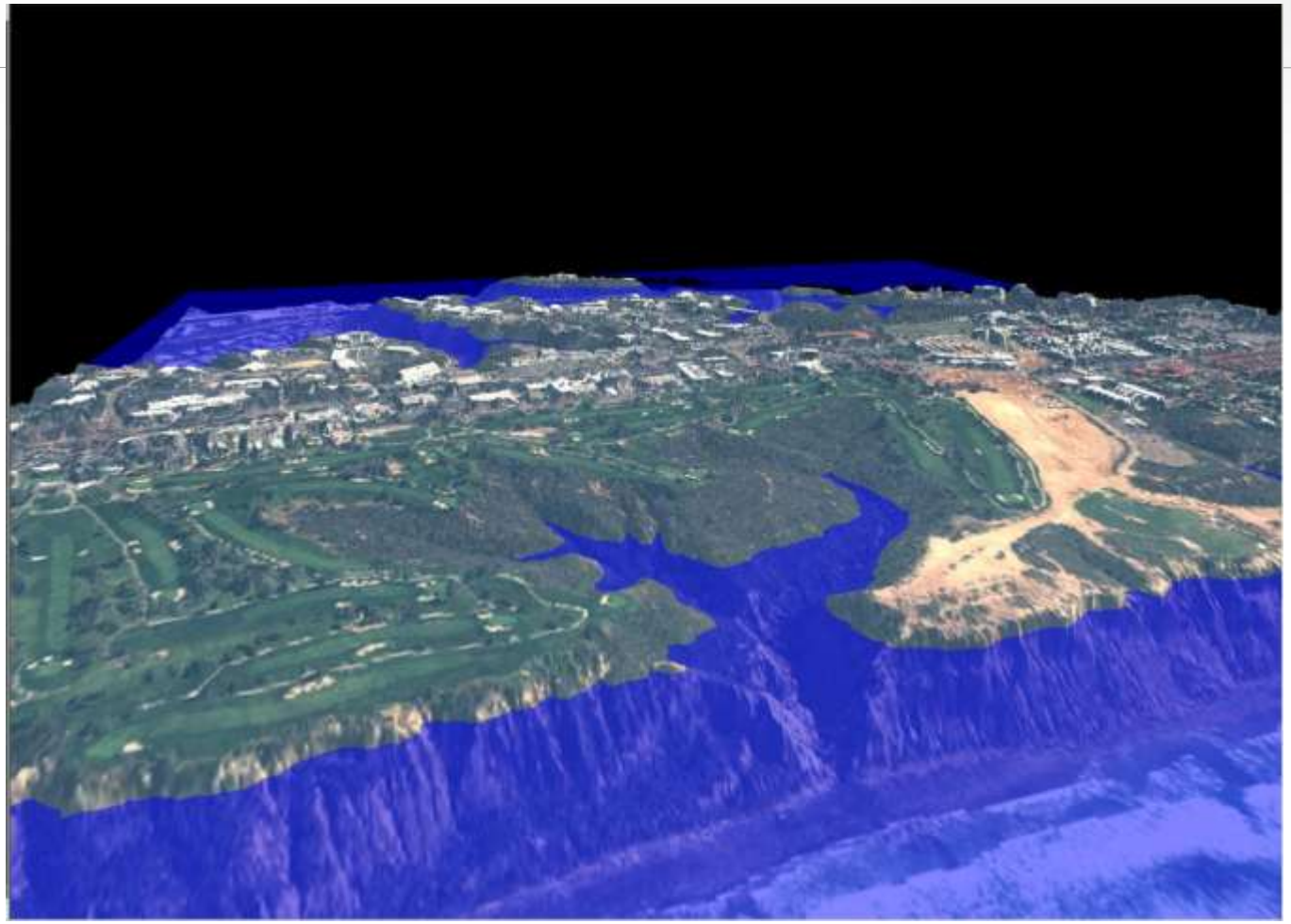
Digital Terrain Model

Bare earth

Storm Surge Modeling

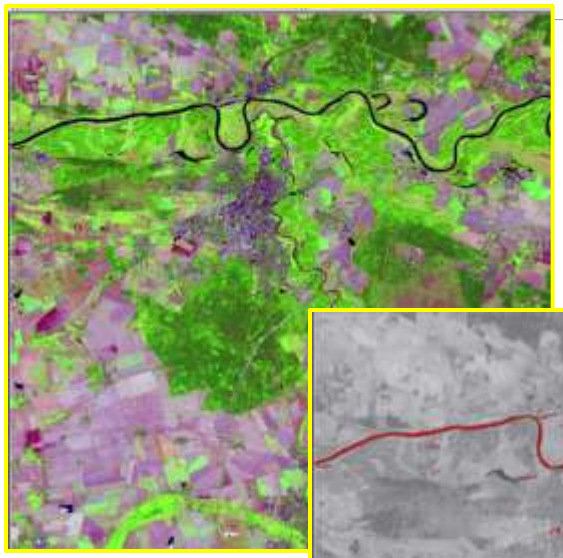
Using imagery based elevation models to project impact of flooding

Modeling Potential Inundated Areas



Potential Impact to San Diego because of Global Warming and Melting of Ice Caps

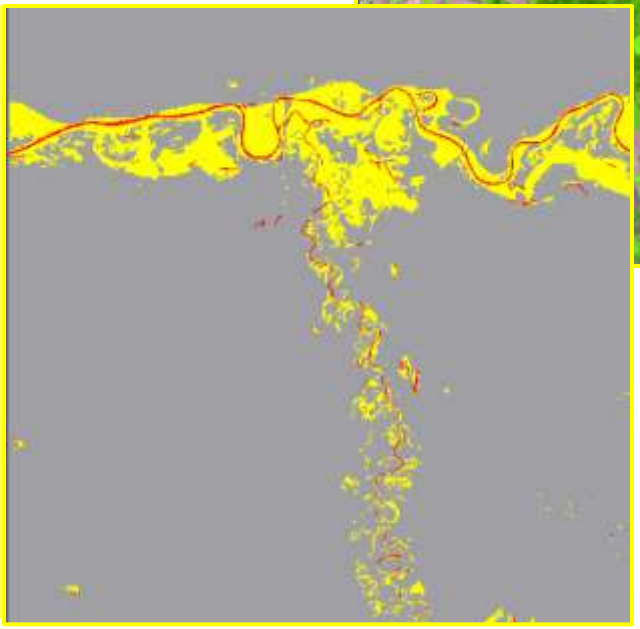
Flood Monitoring & Impact Assessment



Pre-Flood

Pre-Flood River Profile

River Bed



Flooded Areas

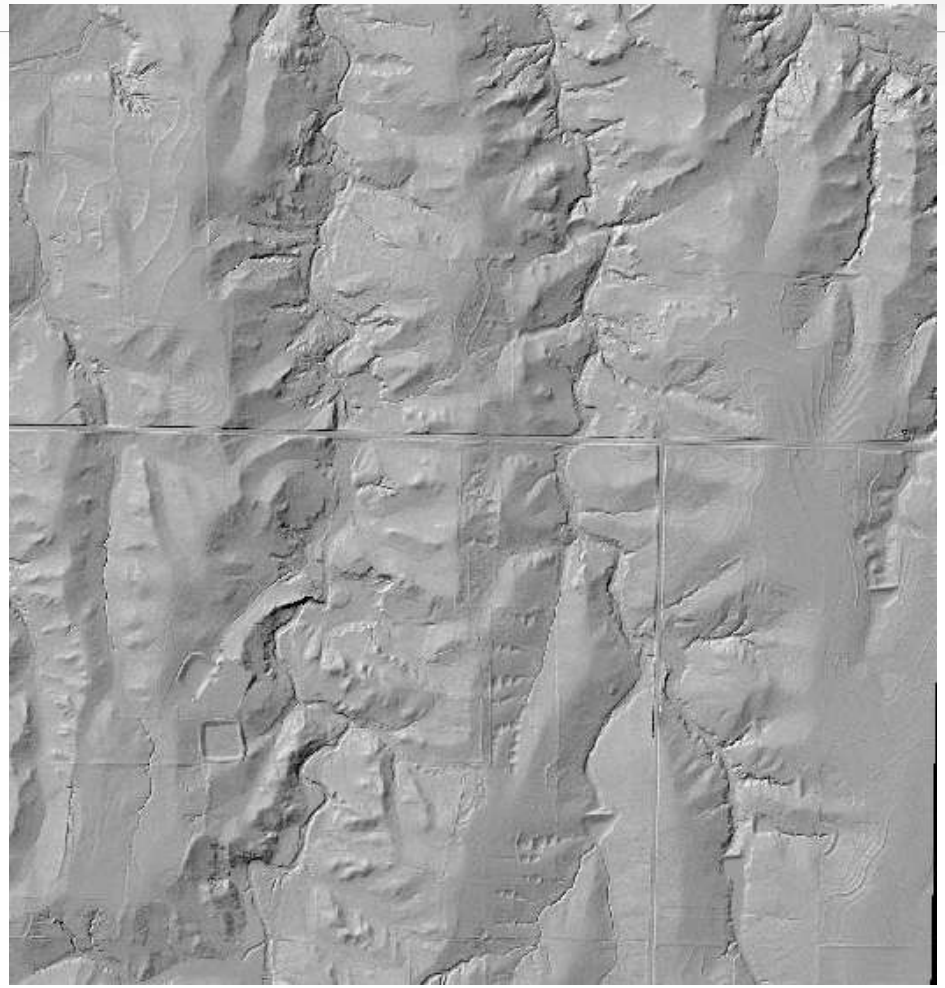
During-Flood

River Bed
Flooded Area

Stream Network & Storage Pond Mapping for Watershed Analyses

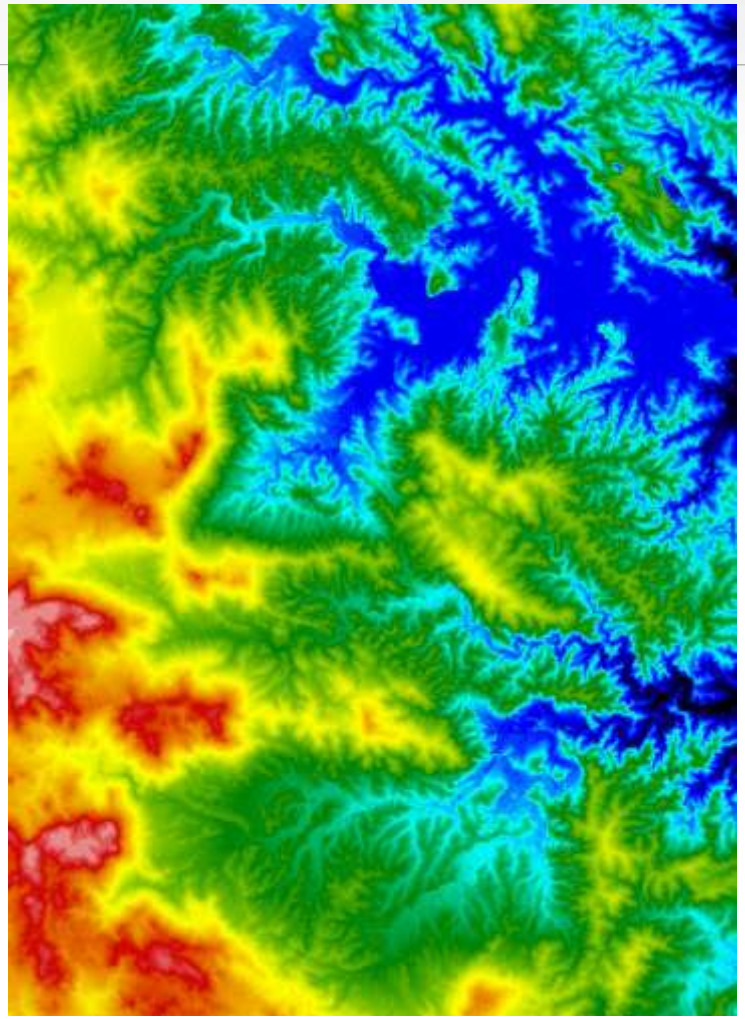
Identify, Map, and Quantify stream networks in support of watershed analysis projects

Watershed Boundary & Stream Network Identification using Elevation Models



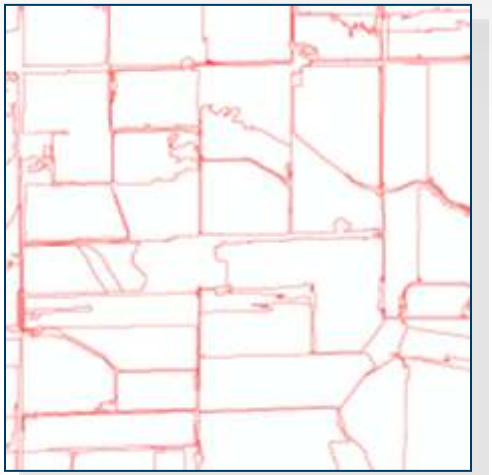
Imagery Based Elevation Model

Watershed Boundary & Stream Network Identification using Elevation Models



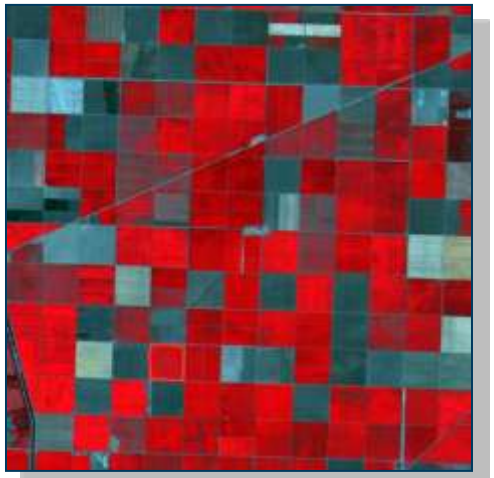
Crop Identification and Acreage Estimation

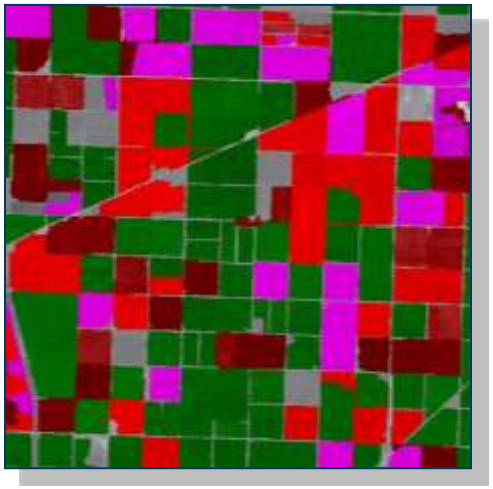
Field Boundary Extraction

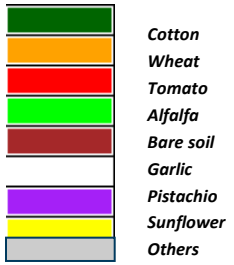


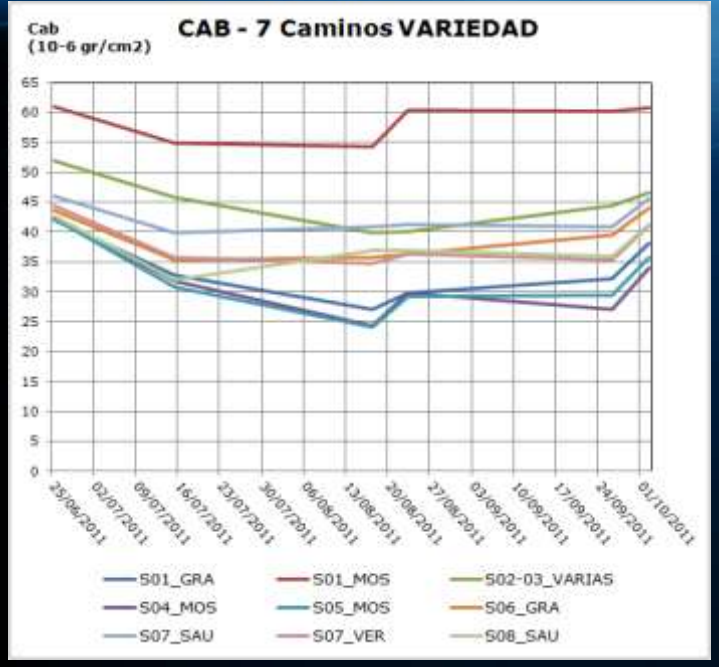
Field Boundaries

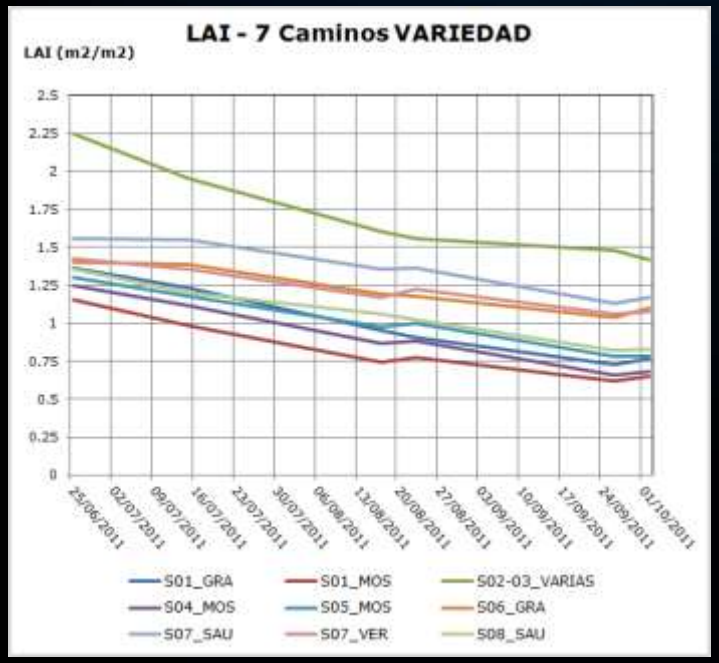
Crop Identification and Acreage Estimation







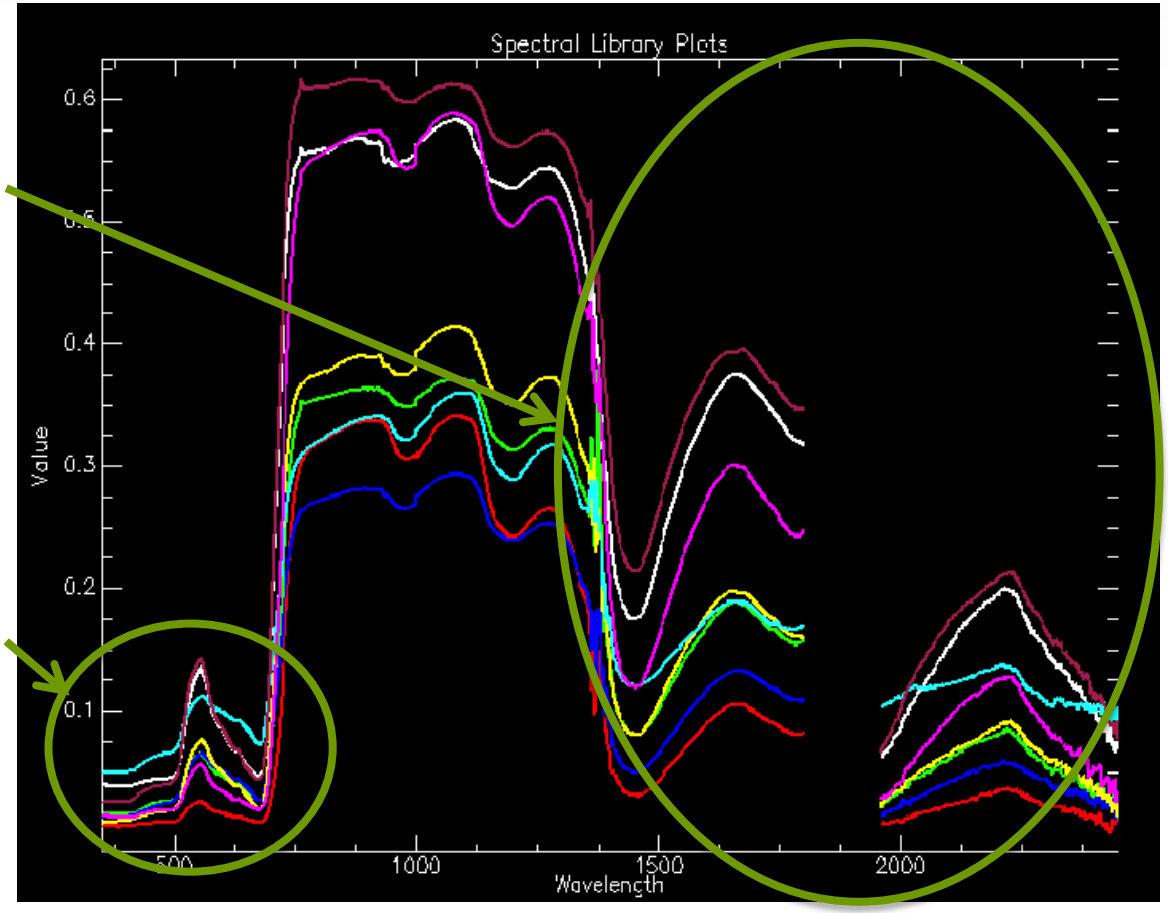

Cab
(10-6 gr/cm2)
CAB - 7 Caminos VARIEDAD
65
60
55
50
45
40
35
30
25
20
15
10
5
0
25/06/2011
02/07/2011
09/07/2011
16/07/2011
23/07/2011
30/07/2011
06/08/2011
13/08/2011
20/08/2011
27/08/2011
03/09/2011
10/09/2011
17/09/2011
24/09/2011
01/10/2011
S01_GRA
S01_MOS
S02-03_VARIAS
S04_MOS
S05_MOS
S06_GRA
S07_SAU
S07_VER
S08_SAU


LAI - 7 Caminos VARIEDAD
LAI (m2/m2)
2.5
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
25/06/2011
02/07/2011
09/07/2011
16/07/2011
23/07/2011
30/07/2011
06/08/2011
13/08/2011
20/08/2011
27/08/2011
03/09/2011
10/09/2011
17/09/2011
24/09/2011
01/10/2011
S01_GRA
S01_MOS
S02-03_VARIAS
S04_MOS
S05_MOS
S06_GRA
S07_SAU
S07_VER
S08_SAU

SWIR enhances forest species identification

Larger differences in spectral response when also looking in SWIR region

Smaller differences in spectral response in VNIR only



Green Ash
Crab Apple
White Ash
Hackberry
Honey Locust
Spruce
Norway Maple
Red Sunset Maple

Mining Life Cycle

Exploration and Navigation
- Determining existing infrastructure and accessibility to proposed sites
- Distribution of equipment and personnel to remote locations

Geological Mapping
- Identifying and mapping mineralogy

Feasibility Studies
- Determine the best development approach considering all aspects of the surrounding location

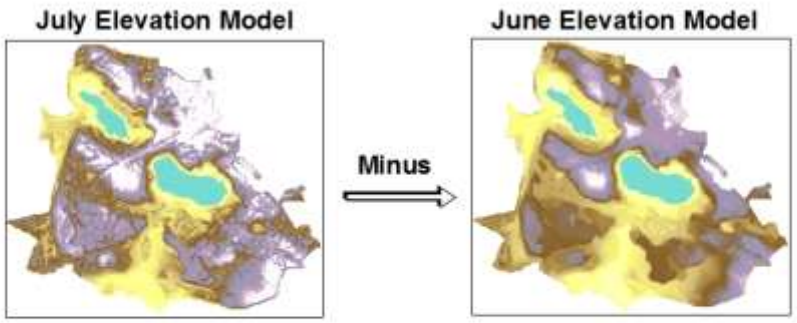
Resource/ Volume Calculations
- Determine how much of a given ore is present or has been removed

Geotechnical Assessment & Slope Stability Assessment
- Terrain and slope analysis
- Analyze 3D cut/fill scenarios

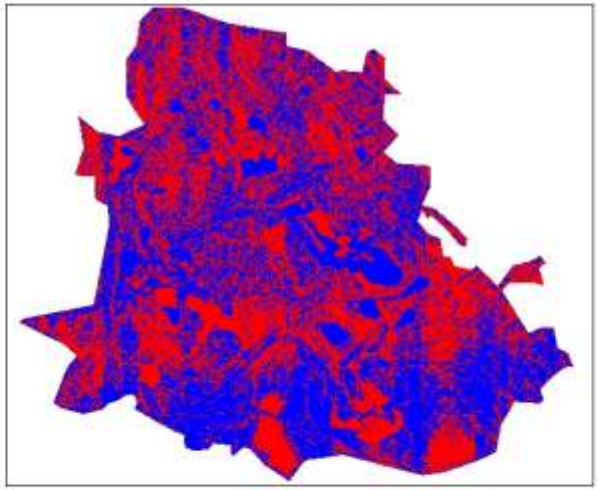
Reclamation Management
- imPlanning and monitoring reclamation
- Environmental pact assessment

Mining

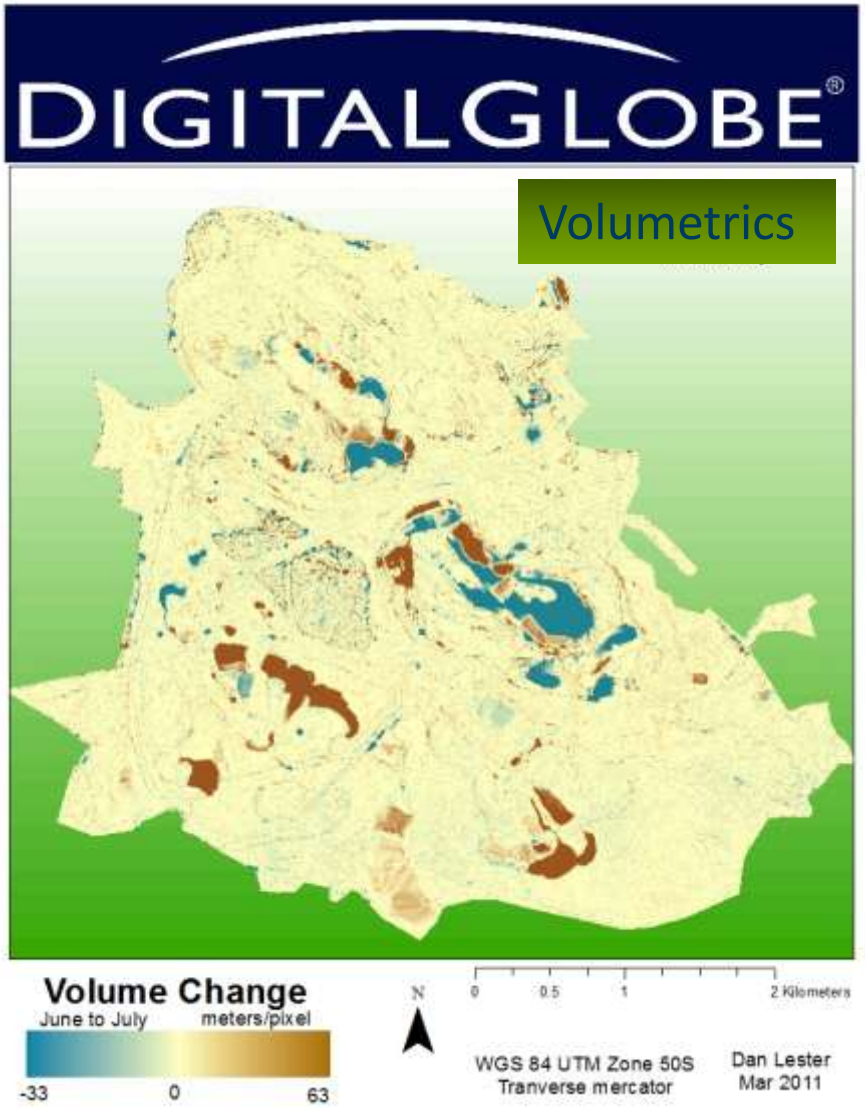
Mining



Subtracting one elevation model from another yeilds the change in elevation over time. Applying a change in elevation to a specific area produces the difference in volume.



Furthermore, volume displacement can be quantified and classified from a table format into a thematic map for geovisualization. An example is found on the following page.



Mining

Environmental Impact Assessment

False Color Composite

Damaged Forest

Digital Globe's 8-band multispectral capabilities enables in depth "Land Use/Land Cover" image classification

Projection: UTM, Zone 50S
Pixel Size: 2 Meters
Datum: WGS-84
Ellipsoid: WGS_1984

NDVI

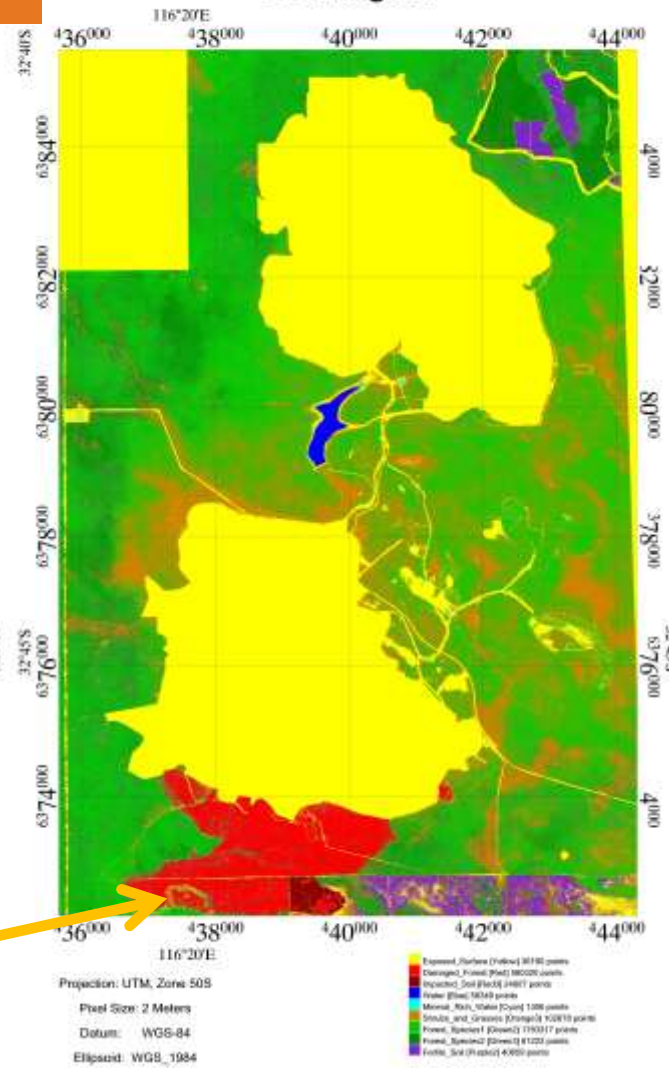
Normalized Difference Vegetation Index

Damaged Forest

NDVI is an index for measuring photosynthetic capacity, or plant presence and health

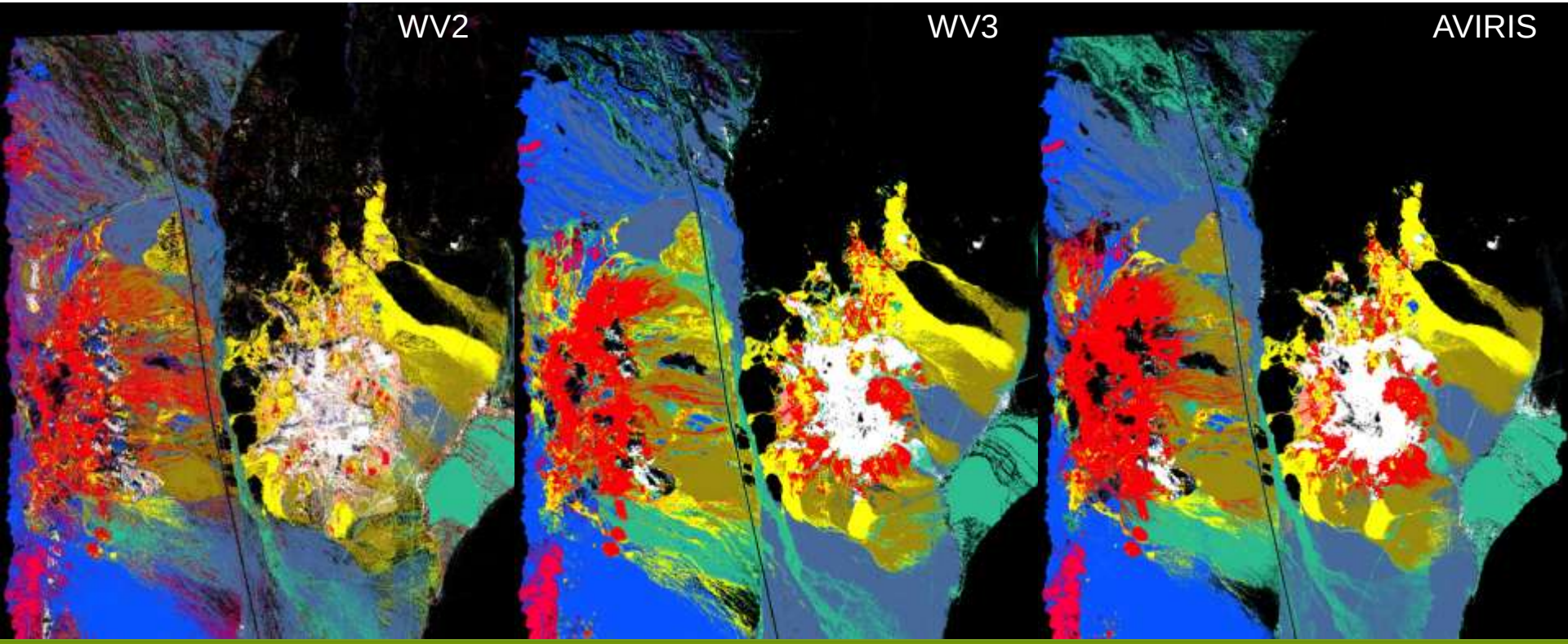
Projection: UTM, Zone 50S
Pixel Size: 2 Meters
Datum: WGS-84
Ellipsoid: WGS_1984

Land Use/Land Cover



Projection: UTM, Zone 50S
Pixel Size: 2 Meters
Datum: WGS-84
Ellipsoid: WGS_1984

SWIR enables accurate geological classification, within 2–5% of AVIRIS



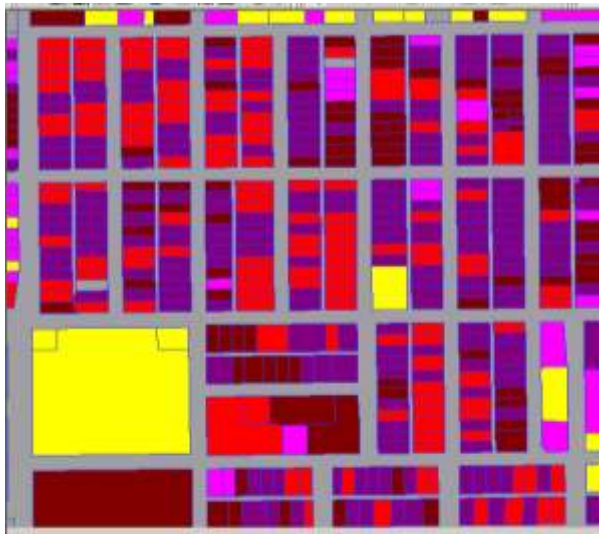
eGovernance Life Cycle

Monitoring
- Monitor federal, state, and city owned land, parks, and municipalities
- Natural disaster change detection and emergency relief

Zoning
- Regulate the development of residential, agricultural, commercial, and industrial land
- Mapping parcels or cadastre for federal, state, and city wide records

Planning
- Urban and rural infrastructure planning
- Using geospatial intelligence to understand how different land uses and land covers interact over large spaces and time

Taxation
- Maintaining land inventory for taxation and land transfer purposes
- Easy integration of digital cadastral maps



eGovernance

Accuracy

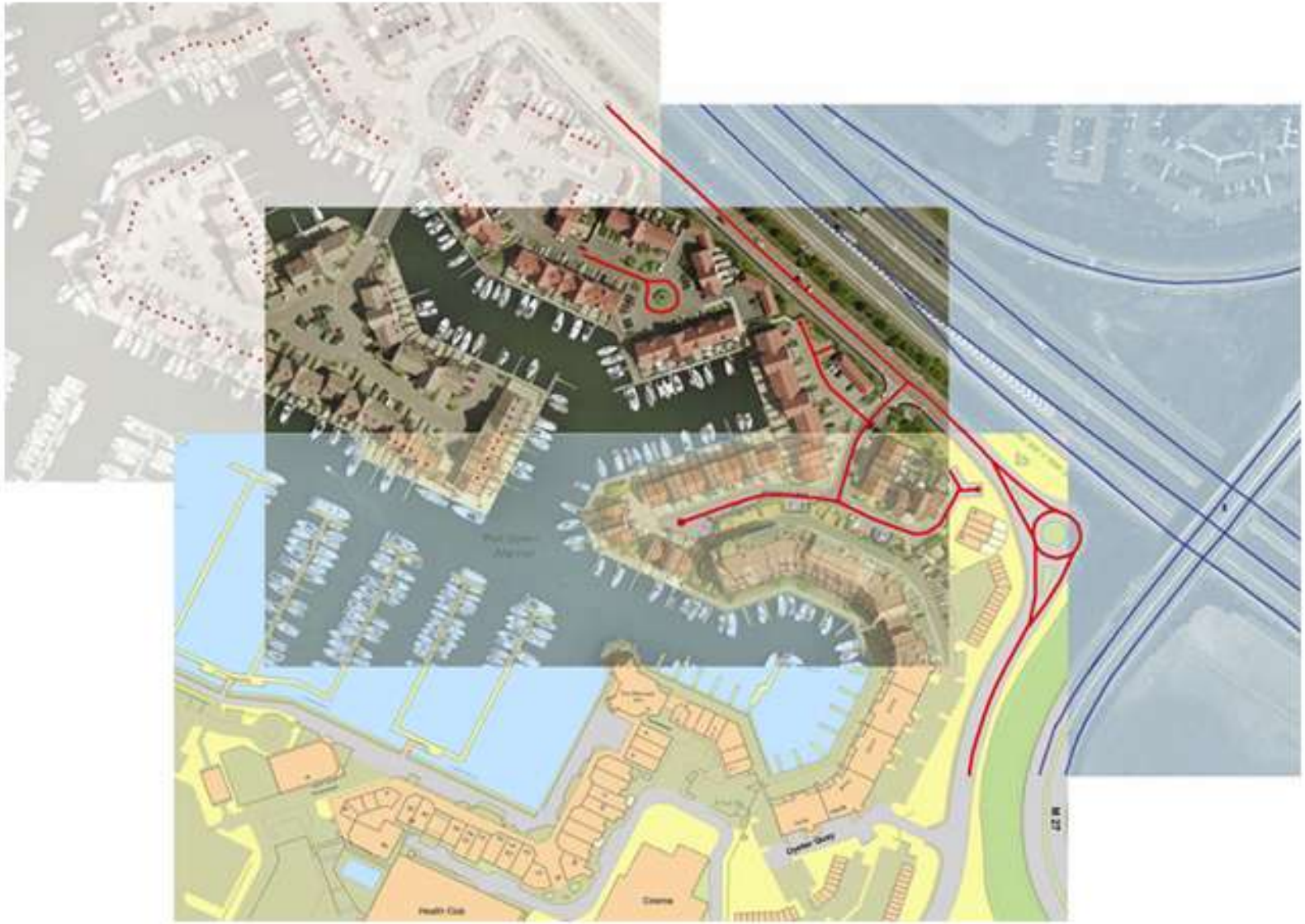
Coverage

Refresh

Quality

eGovernance

eGovernance



Telecommunications Life Cycle

Coverage
- Monitor potential sites for cell tower placement and telecommunications infrastructure
- Detect areas with high interference and plan accordingly

Clutter Maps
- Produce maps that portray the land use and land cover for potential sites
- Extract features and areas with high potential

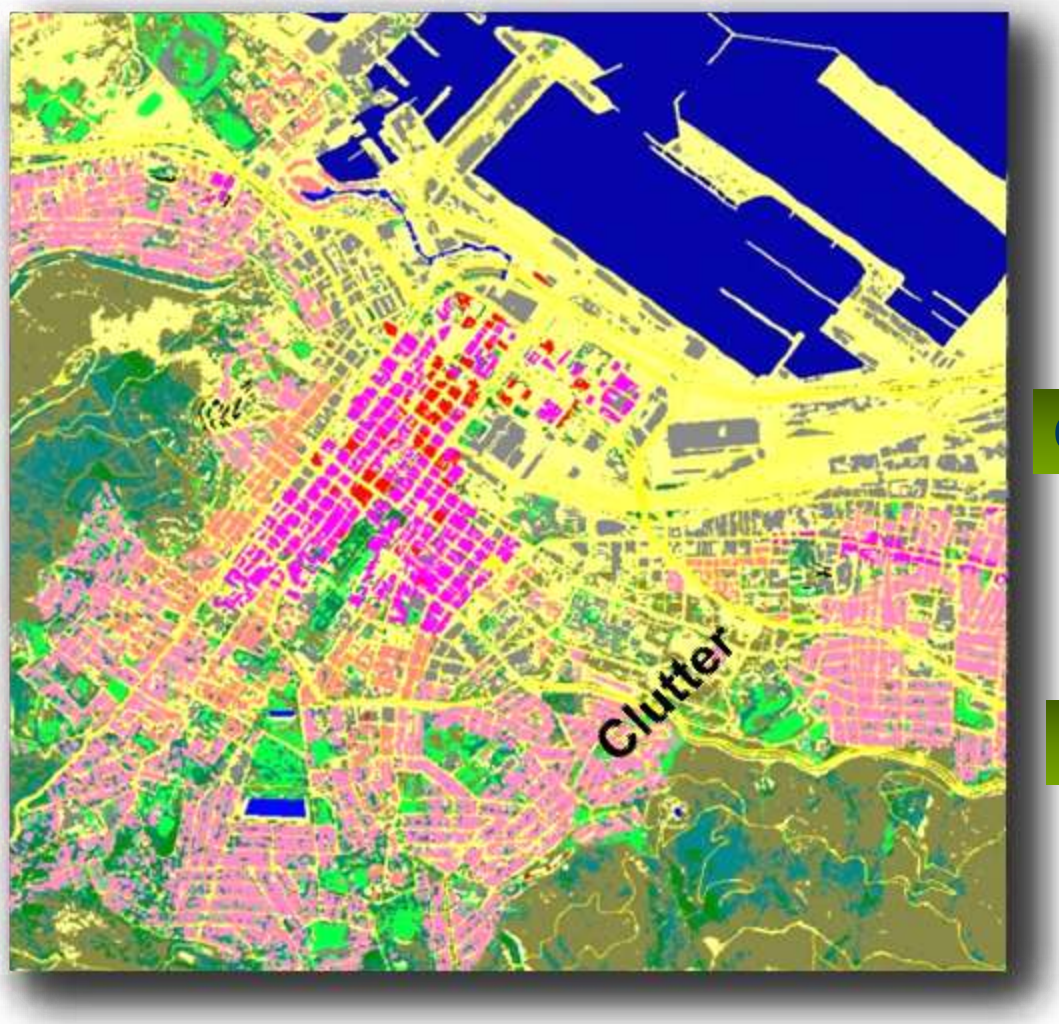
Radio Frequency Propagation
- Determining cell tower range before implementation
- Understanding complex propagation patterns and producing coverage maps

3D Models
- Derived for use in intricate 3D environments
- Line of Sight analysis and propagation mapping

Telecommunications

Digital Terrain

Digitized Vectors

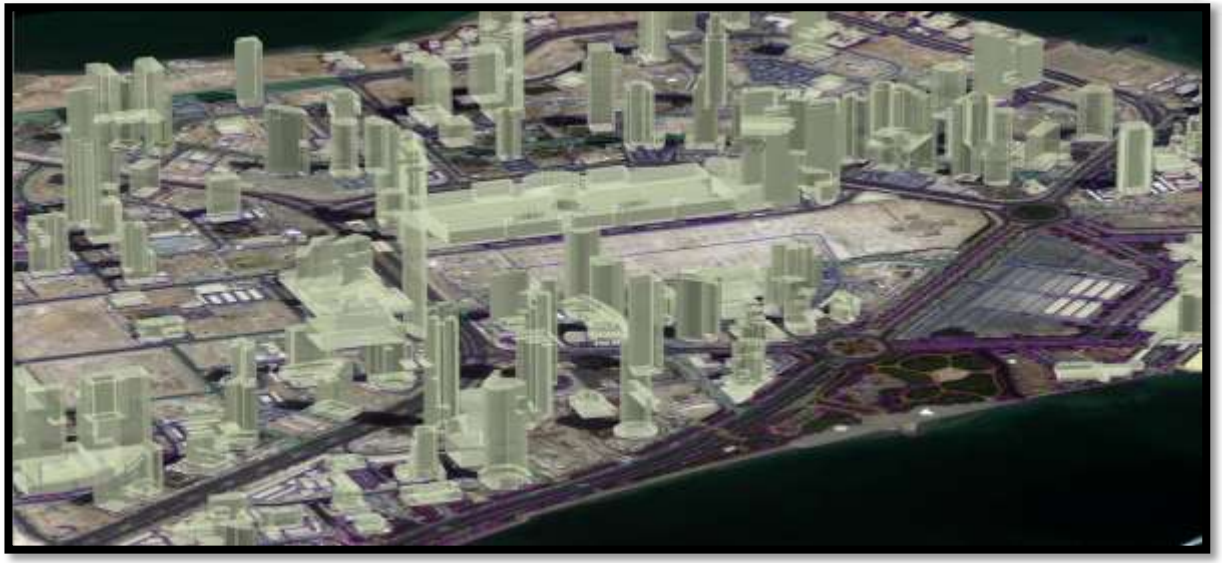


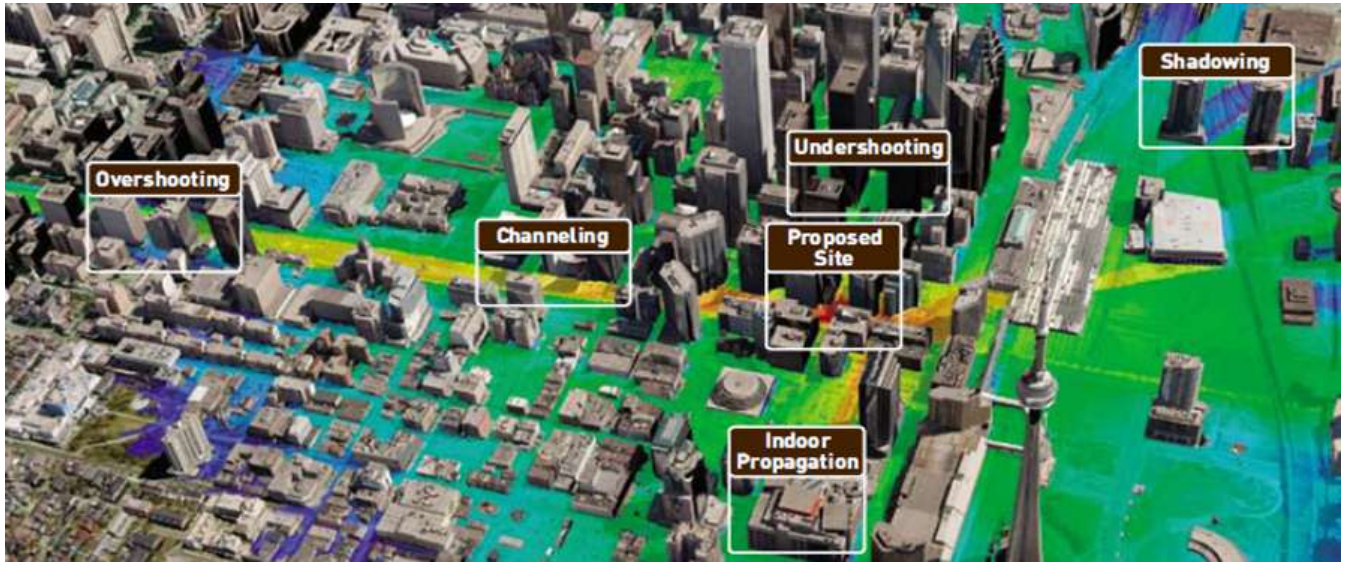
Ortho Imagery

Clutter Maps

Telecommunications

3D Modeling





Radio Frequency Propagation

Thank You!

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