

A satellite image of the Florida Keys, Florida, showing the coastline and the surrounding ocean. The land is brownish-orange, and the water is blue. The image is taken from a high angle, showing the curvature of the Earth.

Seconds to Anywhere

N.S. SHANKARANARAYANA (SHANKAR)
SENIOR DIRECTOR, GOVERNMENT

DIGITALGLOBE®

Leading with Technology in Space

QuickBird

Launched Oct.
2001

First sub-meter
commercial
imaging satellite



WorldView-1

Launched Sept.
2007

First agile
commercial
imaging satellite,
5X QB capacity



WorldView-2

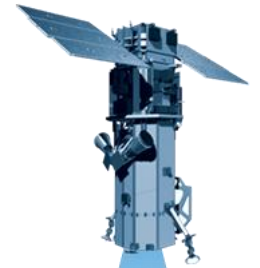
Launched Oct.
2009

First 8-band
commercial
imaging satellite



WorldView-3

Expect Ready for
Launch Late 2014



Collecting 3X world land
mass annually...1.5M km²
per day

A History of Innovation and Leadership

- ▶ **First** company to receive a high-resolution commercial remote sensing license from the U.S. Government
- ▶ **First** company to offer online, subscription-based access to imagery with web services (GlobeXplorer acquisition)
- ▶ **First (and only)** company to provide high-resolution 8-Band Imagery (WorldView-2 satellite)
- ▶ **First** company to launch sub-meter highest-resolution commercial satellite (QuickBird satellite)
- ▶ **Largest** commercial imagery library in the world

Advancing Our Industry One Milestone at a Time

1993

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



2001

Quickbird, the world's
**highest-resolution
commercial satellite, launches**

2008-2011

Major agreements expand high-
resolution imagery availability

2007

DigitalGlobe acquires
GlobeXplorer, a leading
online imagery provider

WorldView-1 launches

1992

DigitalGlobe founded



2003

DigitalGlobe wins contract
to **build WorldView-1 and WorldView-2**

DIGITALGLOBE®

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

2014

Estimated launch of **WorldView-3**

2009

WorldView-2 successfully launches

FirstLook launches

to provide the industry's first information product

2011

New products launched, including **Global Basemap, Precision Aerial, Elevation, and Analysis Center**

Leading the Evolution of Analytics

The Commercial Geospatial Intelligence industry has experienced four eras:

1st Era: Resolution

Customer needs evolve beyond aerial



DigitalGlobe drives “one meter” standard

2nd Era: Accuracy

Emergence of map making industry and greater accuracy drives growth



DigitalGlobe drives the 5.0 meter CE90 spec

3rd Era: Speed

Reliance on imagery at an all-time high and customer priority becomes speed and relevancy



DigitalGlobe drives on-demand standard

4th Era: Analytics

New valuable problem-solving uses emerging and priority becomes measuring on surface and below water



DigitalGlobe drives 8-band standard and custom analysis

World's Largest Commercial ImageLibrary

+ 1 billion square kilometers – grows 1.5 million square kilometers each day

2002 2003 2004 2005 2006 2007 2008 2009 2010

•24 Million
km²

•43 Million
km²

•43 Million
km²

•45 Million
km²

•57 Million
km²

•87 Million
km²

•267 Million
km²

•241 Million
km²

•500 Million
km²

Objectives : GeoInt-Infra

- Establish a Robust GeoInt Data Centre with Command Control Center (CCC) to monitor the Area of Interest with an integrated Decision Support System for Surveillance, Security and Intelligence Collection, Archival and Analysis
- Provide with a- state-of- art Visual Information Technology on-line Monitoring with 3-D GIS full flythrough capability
- Resources Integration with Field Sensors, Real-Time Communication, Event Management with 3-D Viz Software Engine to visualize the field events and link with Decision and Executing Authority
- Provide 24X7, 365 based Automated user Interactive system to safe guard the Area of Interest with Spot Action Tools

CCC Overview

Command and Control Center (CCC)

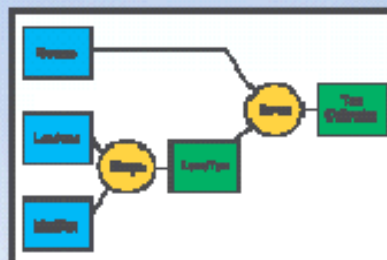
- CCC streamlines day-to-day activities and overall emergency preparedness by physically bring departments together with technology
- Allows for accurate and effective information gathering, dissemination, analysis, display, planning, and review inside one large secure location with all decision makers participating addressing the same information
- CCC combines
 - E999 (US 911) call taking and dispatch
 - Emergency Planning and Operations
 - Integrated and localized IMS and 2D/3D GIS applications
 - Automated Vehicle Location (AVL); foot, car, boat, and air patrol
 - Integrated CCTV Video Monitoring, inside building and outside



Typical CCC

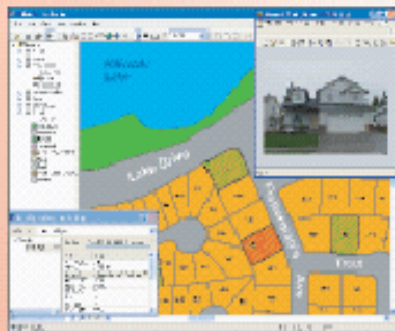
Three Views of GIS

Geoprocessing



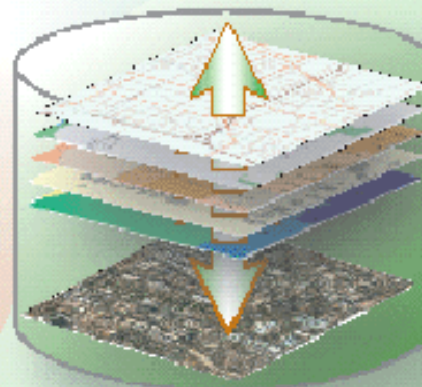
Models

Geovisualization



Maps

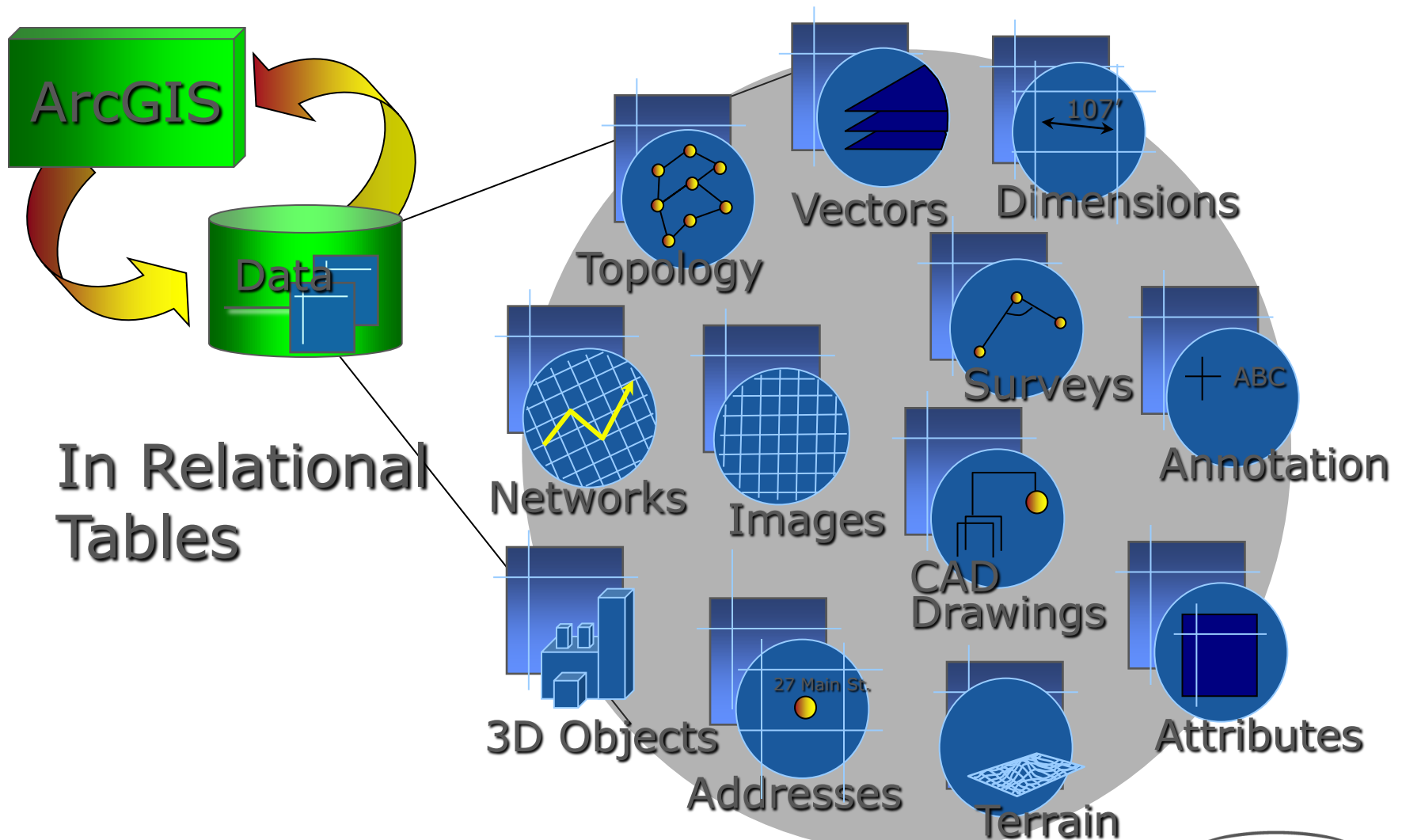
Geodatabase



Databases

Geoint needs it all

Supporting Multiple Data Types

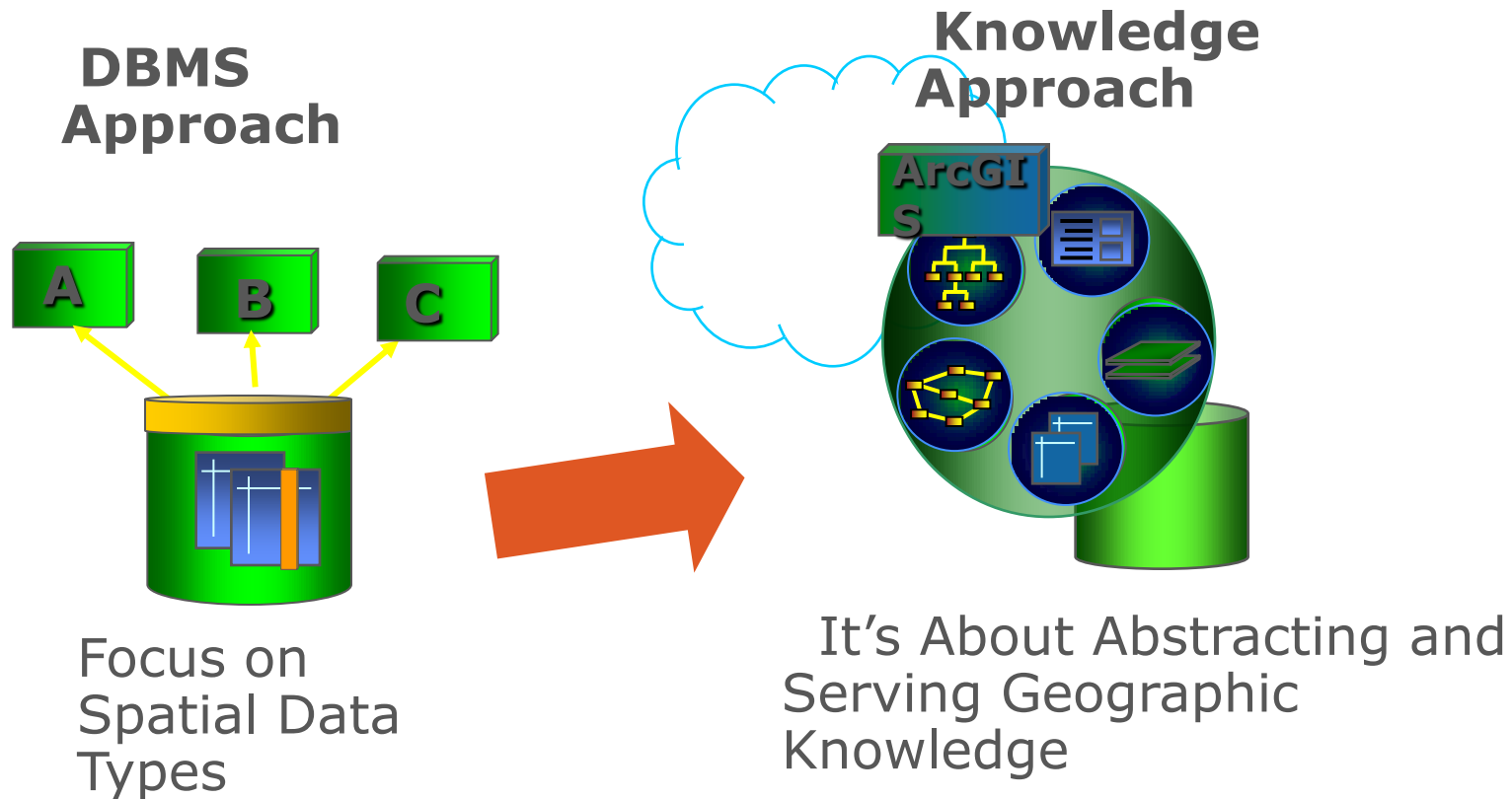


In Relational
Tables

... With Rules That Define Relationships and Behavior

Application-Centric Approach

It's more than just data and tools ...



... focus is on managing geographic knowledge!

System Overview

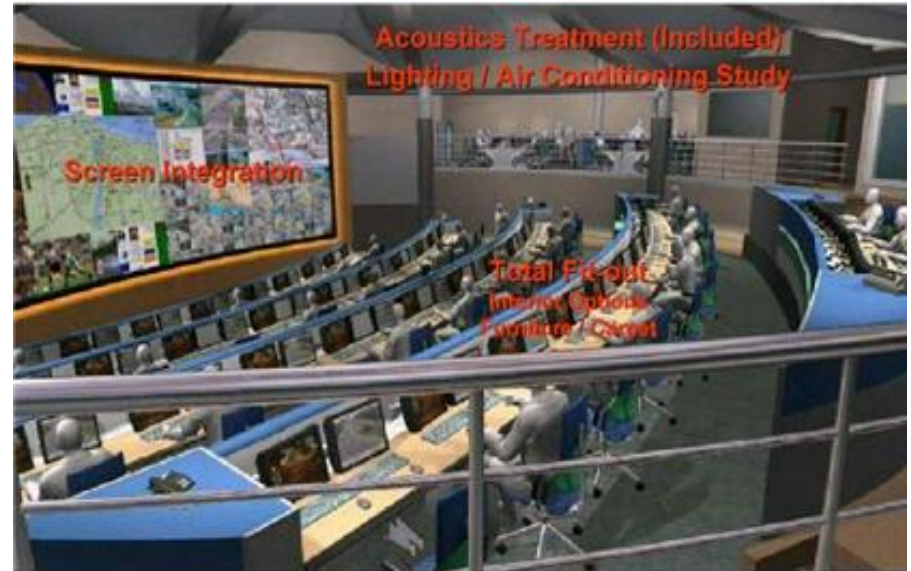
- CCC Visualization System with Geo Spatial-Communications Systems with Scalable Open Architecture
- 2-D and 3-D Online map and data base to see the Digital True Ortho Photos of the AOI in large scale 1:1000 or better
- Ready Road Maps, Railway Network, Airport, Sea Port details with Attributes and Vector overlay
- Online Communication Network
- Real-time CCTV and Field Sensors interface to Command Center
- Planning, Prevention and Spot Action Tools
- 24X7X365 fool proof System operations

Video Connector Service

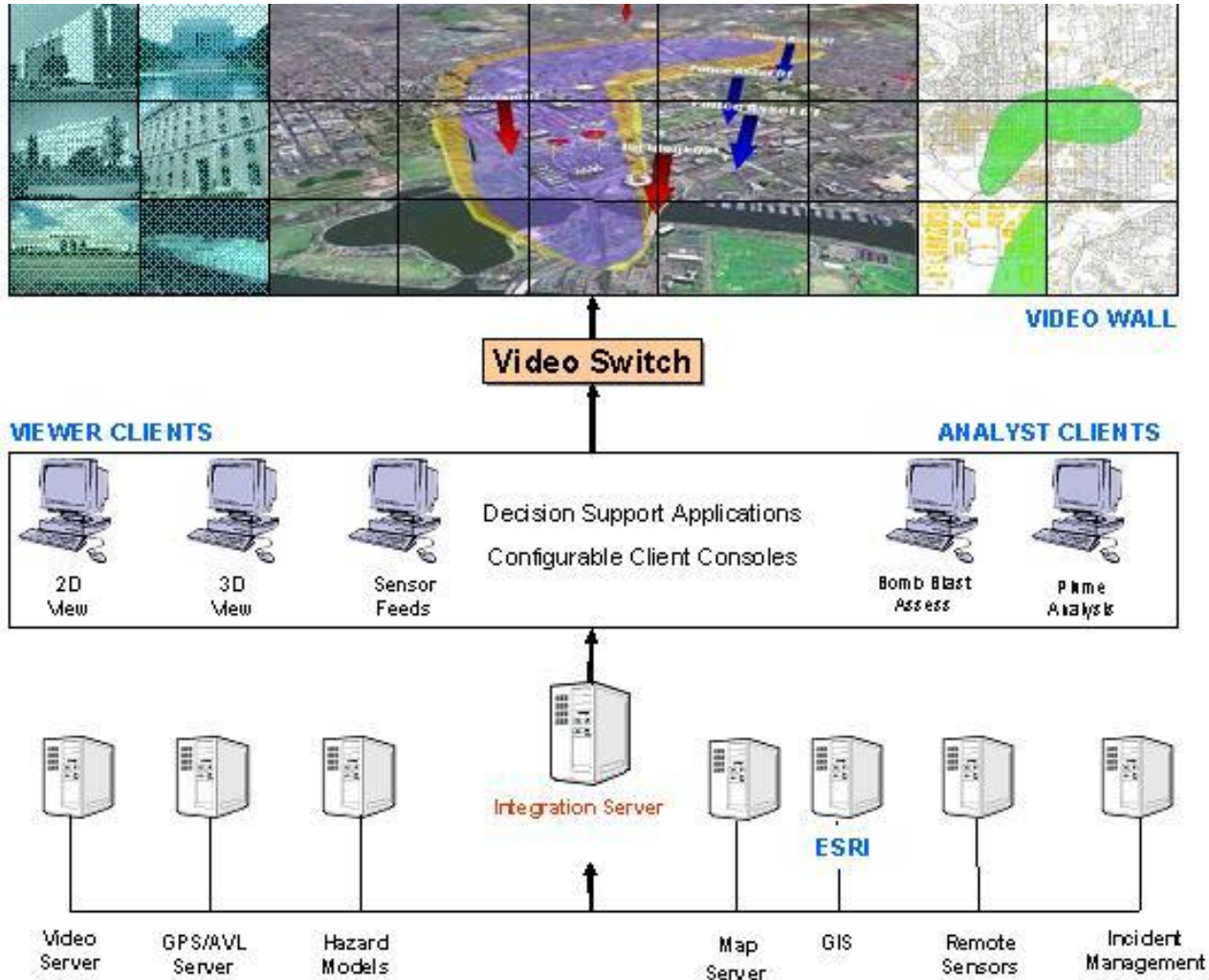
- Allows operational maps to show camera locations and fields of view
 - Connects to external Video server
 - Accesses camera locations, fields of view
 - Use mapping interface to select or control camera video feeds



System Capabilities Summary and Demonstration



Command Control System



TRACKING/PLANNING EXAMPLE

Asset Manager

- Unit_22
- Unit_34
- Unit_43
- Unit_66
- Unit_cmdr
- Suspect
 - Robbery
 - Suspect
- VIP
 - Shk Matourm
- Symbology classes
 - Bus
 - Helicopter
 - VIP
 - Snyper
 - Suspect



Display reference system is not set.

- Resource Coordination and Response
- Integrated Forward/ Reverse 911
- Threat analysis
- Route Planning
- Rule-based Scenario Models

- Scenario Simulation
- Integrated Field Communications
- Event Playback
- Auto Vehicle Location and Incident Management System with 3D Visualization
- Local and English GUI



DIGITALGLOBE Roles

- Provide large scale maps derived from Satellite 50-cm GSD and 2-M Color Stereo imagery. Supplemented with Aerial , LIDAR/ RADAR/ and Field Sensors data with Photo Realistic Texture
- Provide Precision Digital Elevation Models (DEMS) and Digital Surface Models (DSMs)
- Provide Satellite Subscription Services: GBM: FirstLook, FirstWatch: Event Monitoring, Change detection, Decision Support
- Provide the decision makers with Scenario Models and Secured Communication links
- Secure the Country/ Region with a world class VIT Solution

Advanced Elevation Series Product Options – DSM or DTM

Mapping Level

Precision Level

Very High Precision

**8M Resolution
8M Absolute
Accuracy
4M Relative
Accuracy**

**4M Resolution
4M Absolute
Accuracy
2M Relative
Accuracy**

**2M Resolution
2M Absolute
Accuracy
1M Relative
Accuracy**

Product Accuracy

Product Accuracy	Mapping Level Elevation Product	Precision Level Elevation Product	Very High Precision Level Elevation Product
Accuracy Overview	Accuracies from DG input product	Accuracies from DG input product augmented by GCPs	Accuracies from DG input product augmented by GCPs
HRE Description	HRE80	HRE40	HRE20
Resolution	8m	4m	2m
Rel Vert LE90 ¹	5m	2m	1m
Abs Vert LE90 ¹	8m	4m	2m
Rel Hor CE90	8m	4m	2m
Abs Hor CE90	10m	5m	3m

> 30% - LE90 scaled by 1.5x

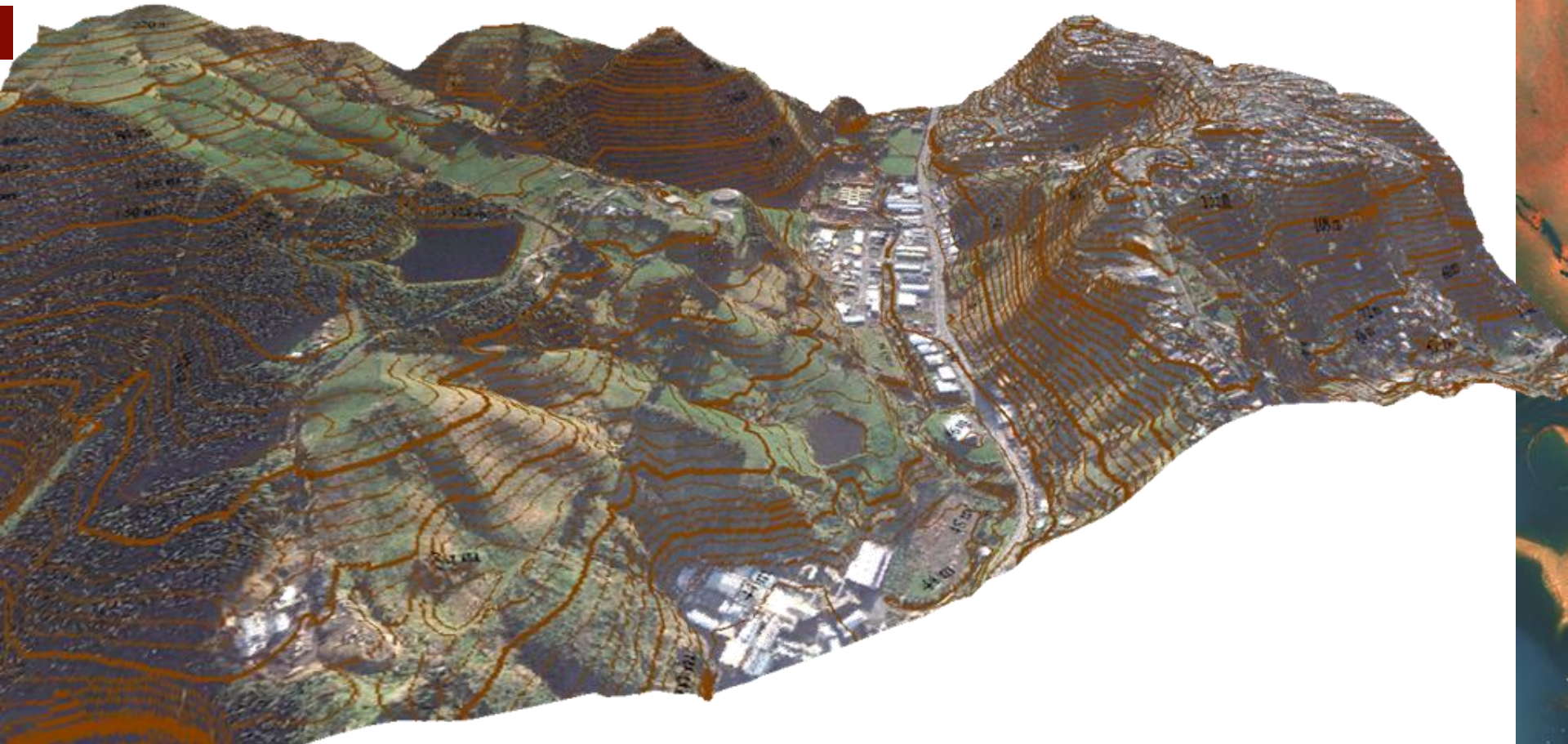
Use Case – Contour Generation

- ✓ Very High Precision
- ✓ Precision
- ✓ Mapping



Use Case – Contour Generation

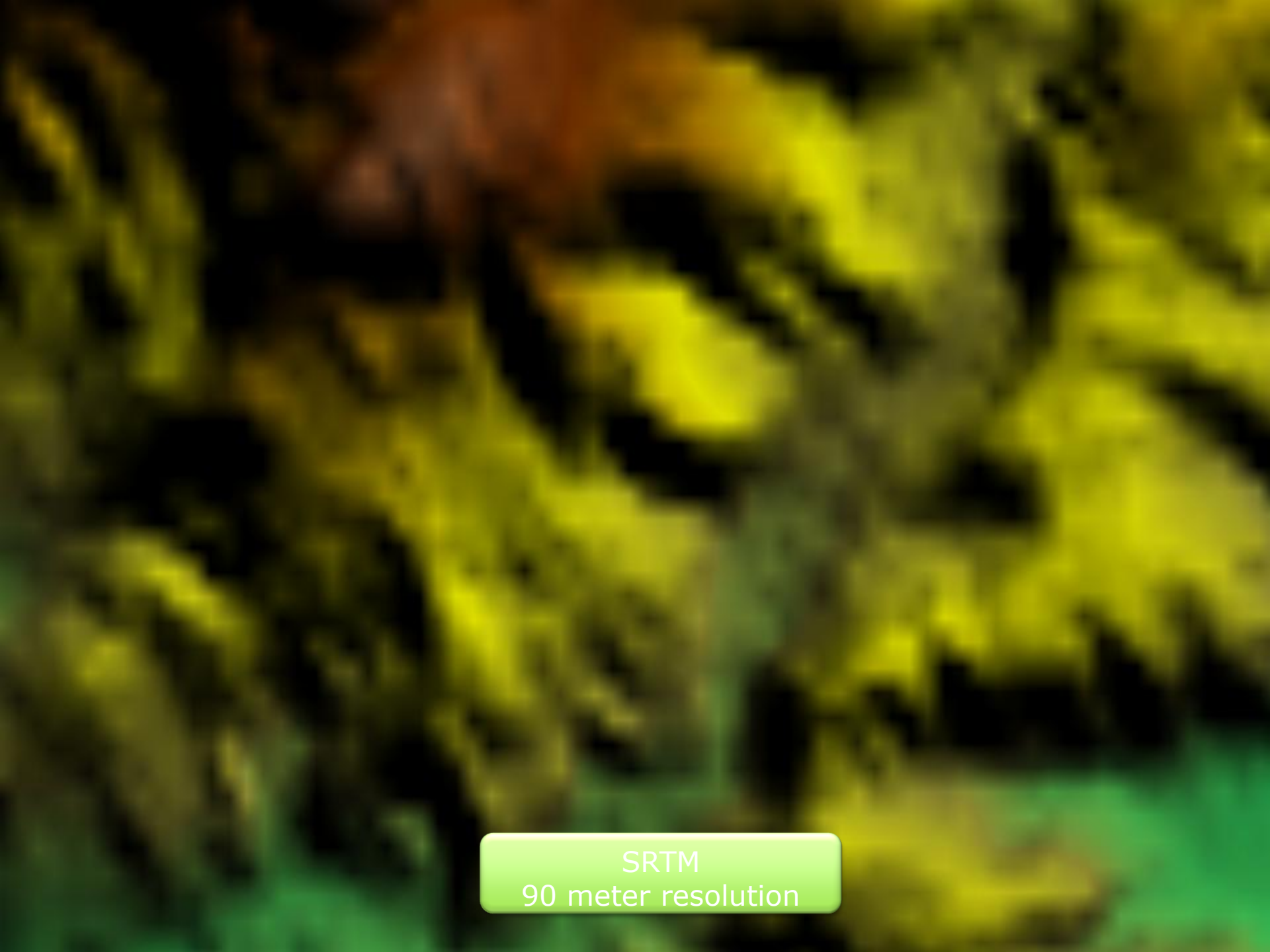
- ✓ Very High Precision
- ✓ Precision
- ✓ Mapping



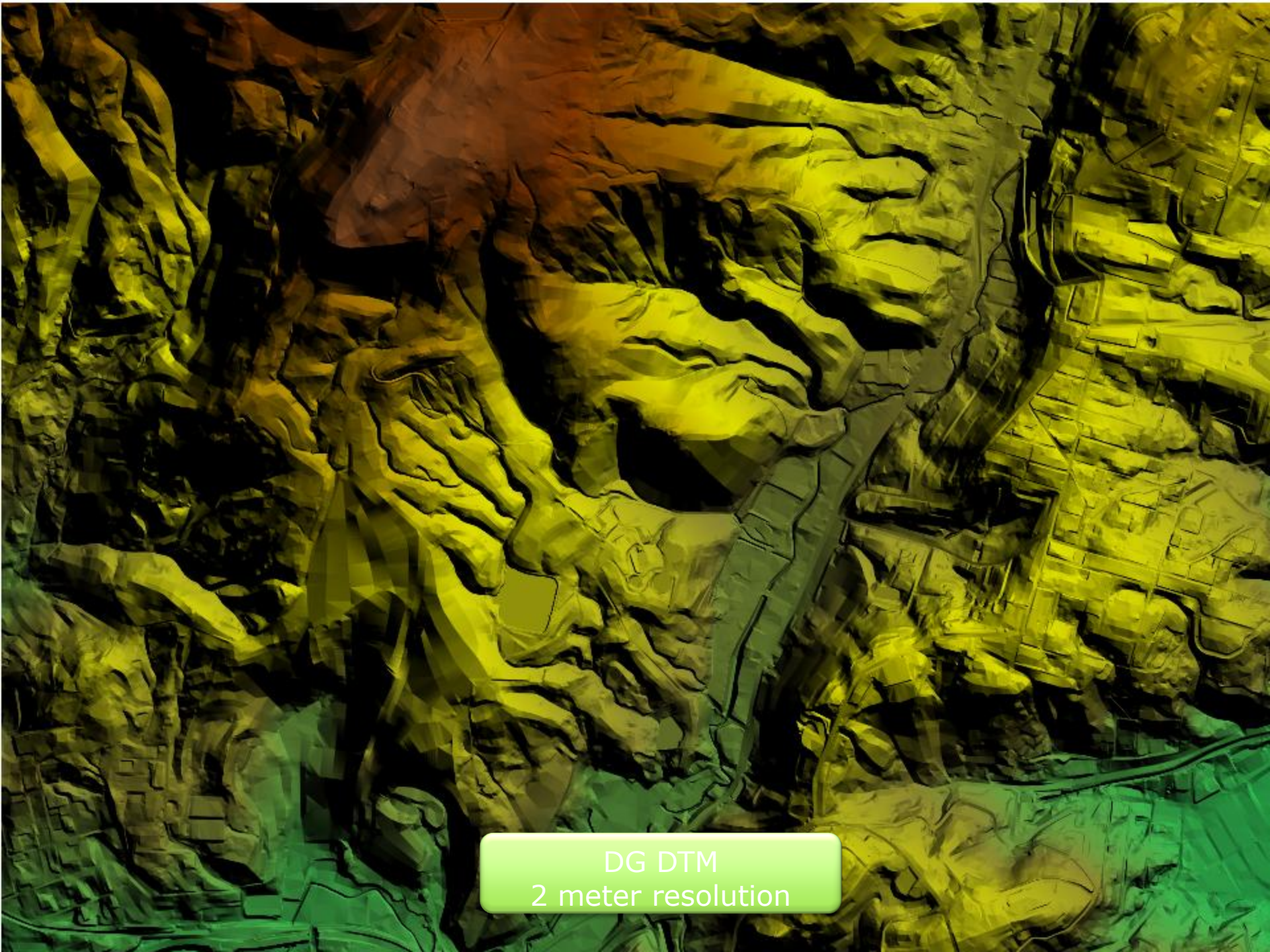
AES and SRTM

	AES	SRTM
Accuracy	2m – 8m	~16-20m
Resolution	2m – 8m posting	90m posting
Availability	Anywhere we can take imagery	Between 60°N – 56°S

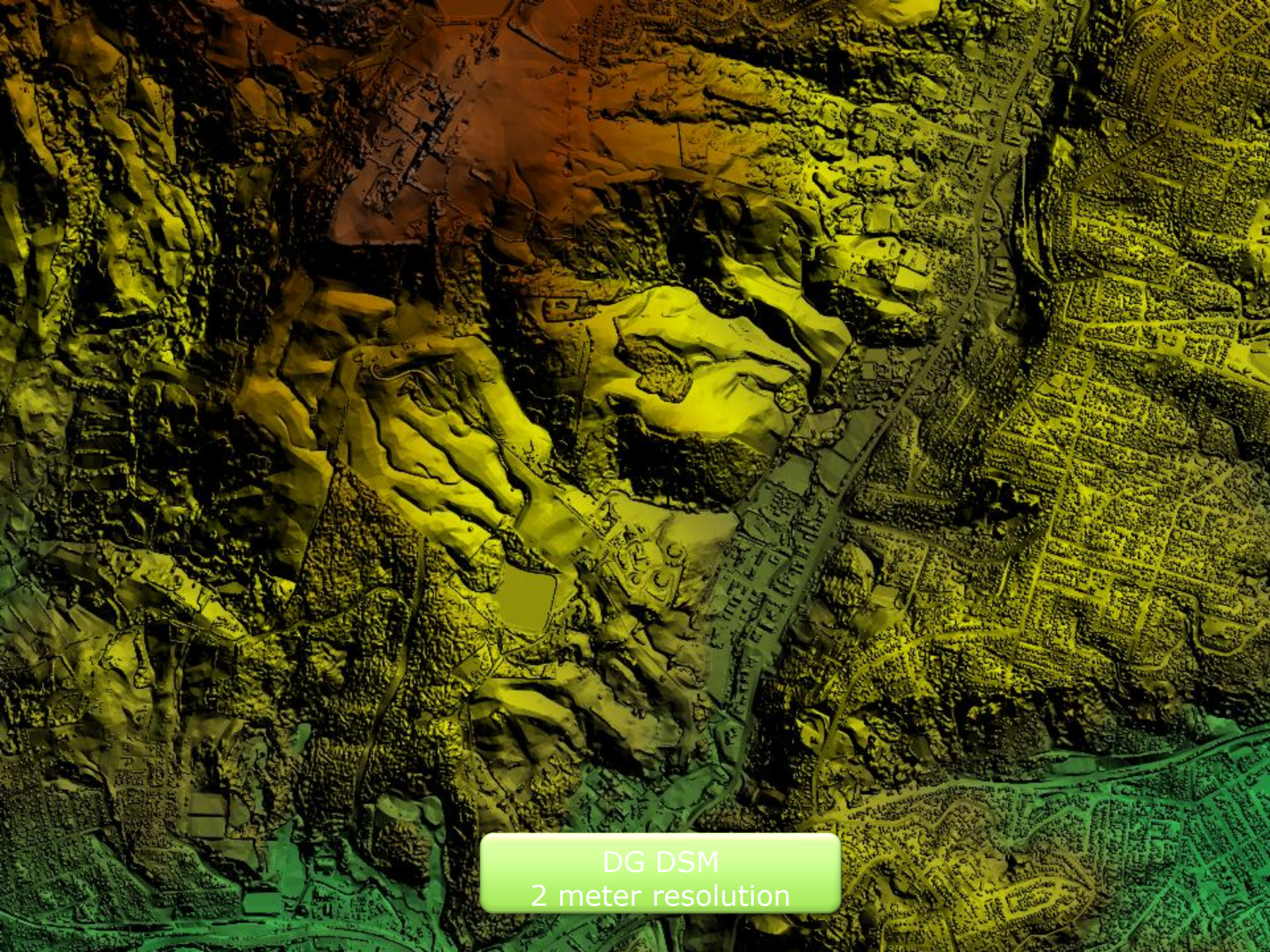
While SRTM data is freely available, it has limitations



SRTM
90 meter resolution

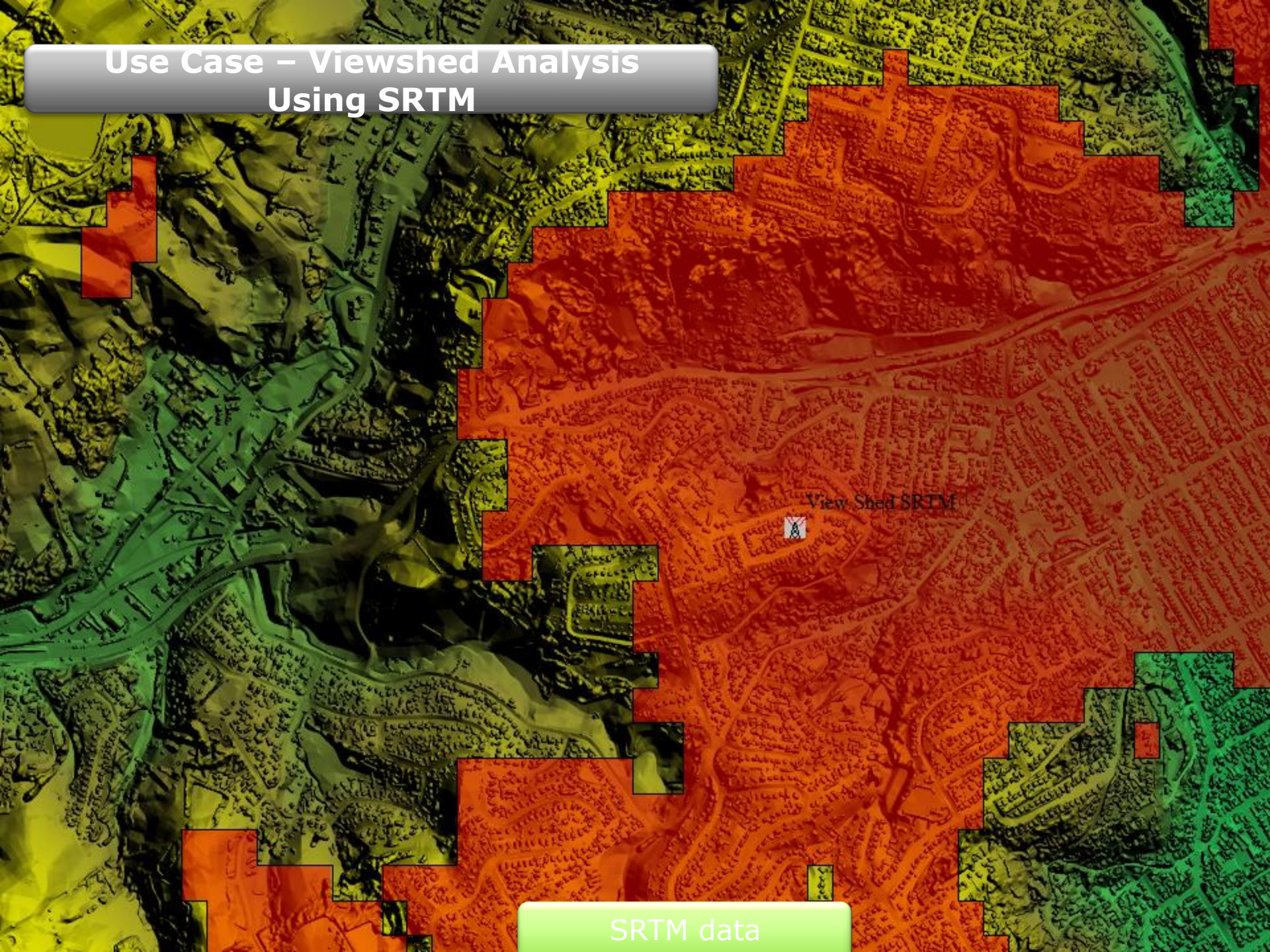


DG DTM
2 meter resolution



DG DSM
2 meter resolution

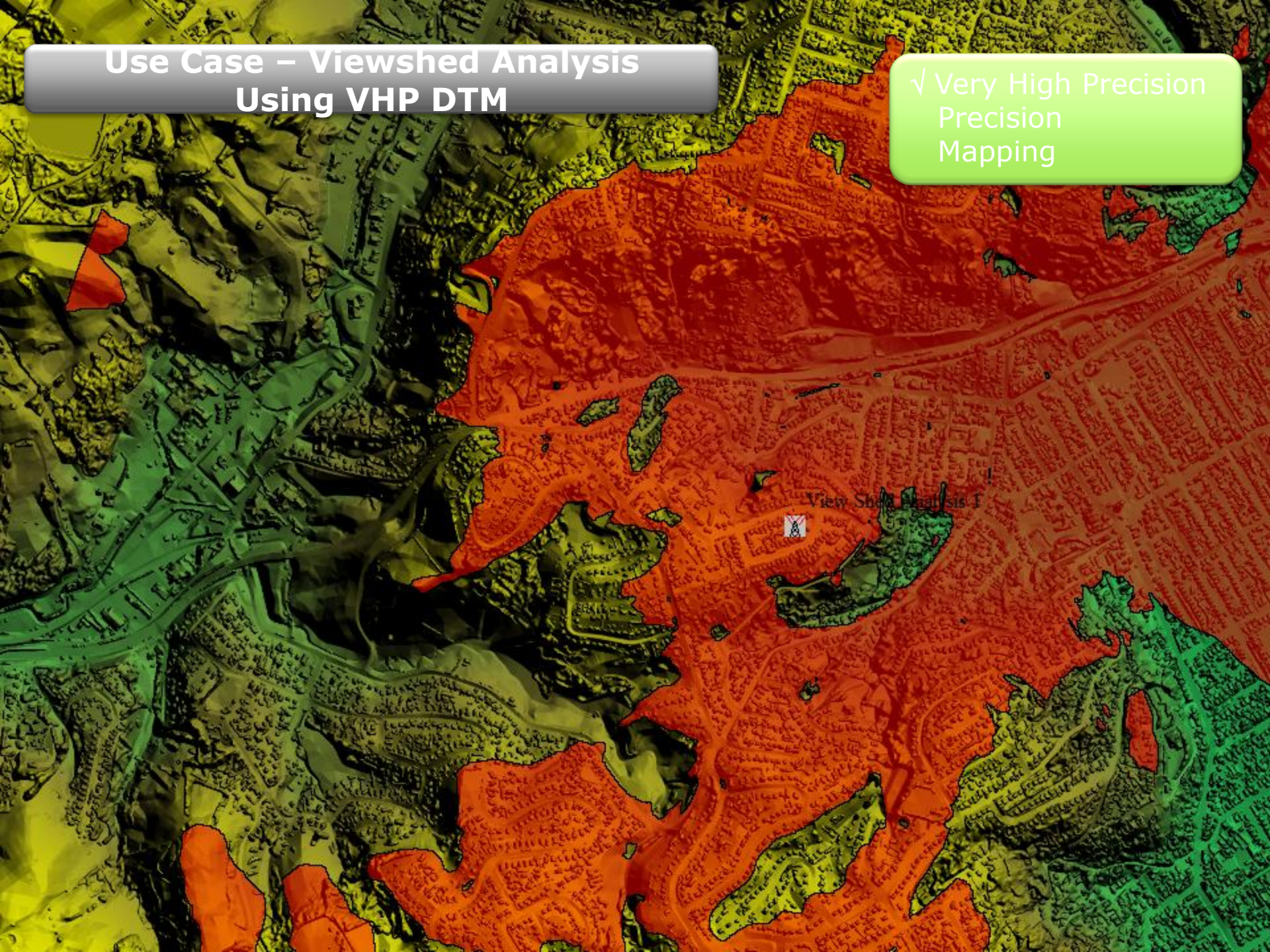
Use Case – Viewshed Analysis Using SRTM



SRTM data

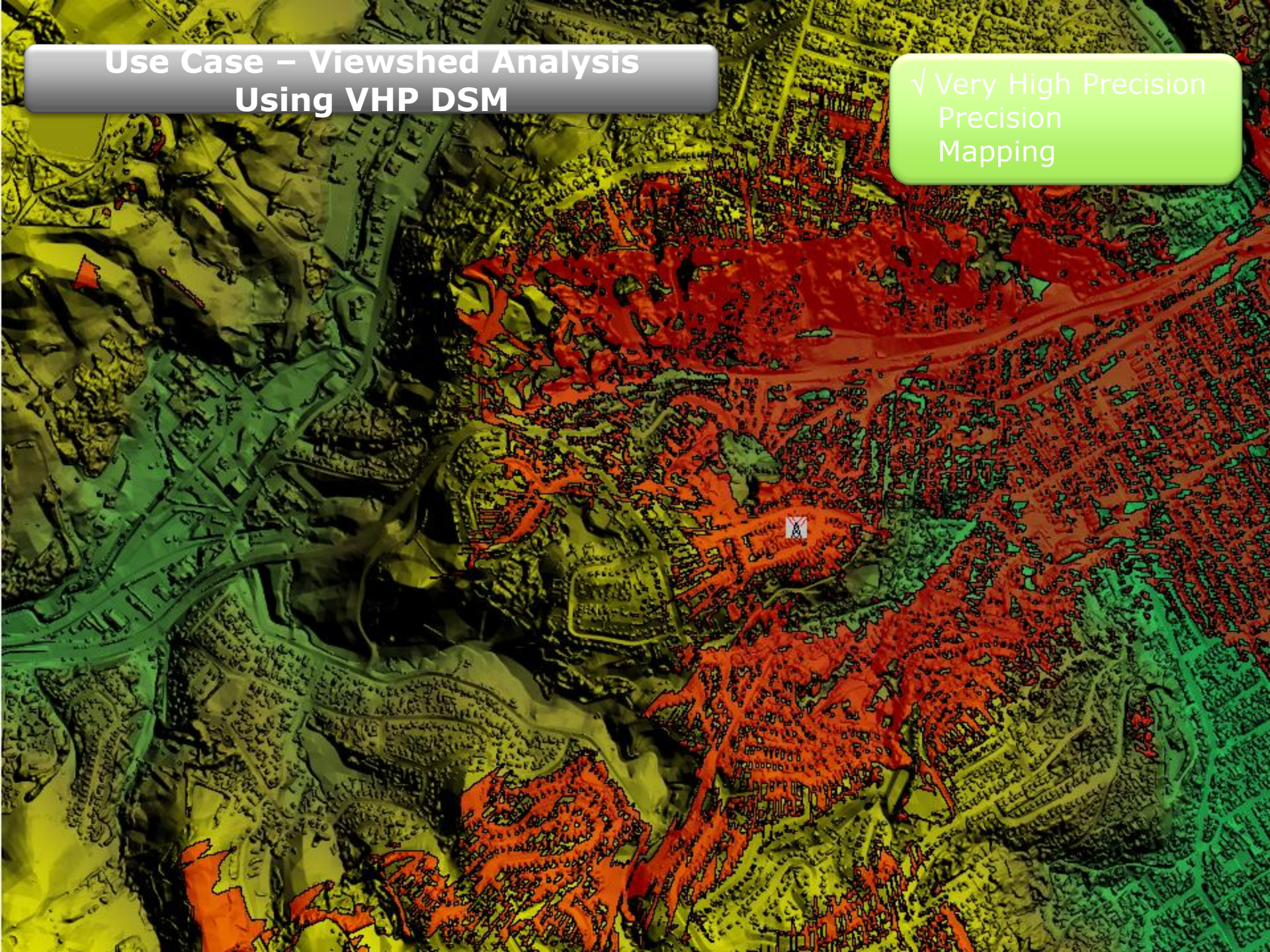
Use Case – Viewshed Analysis Using VHP DTM

✓ Very High Precision
Precision
Mapping

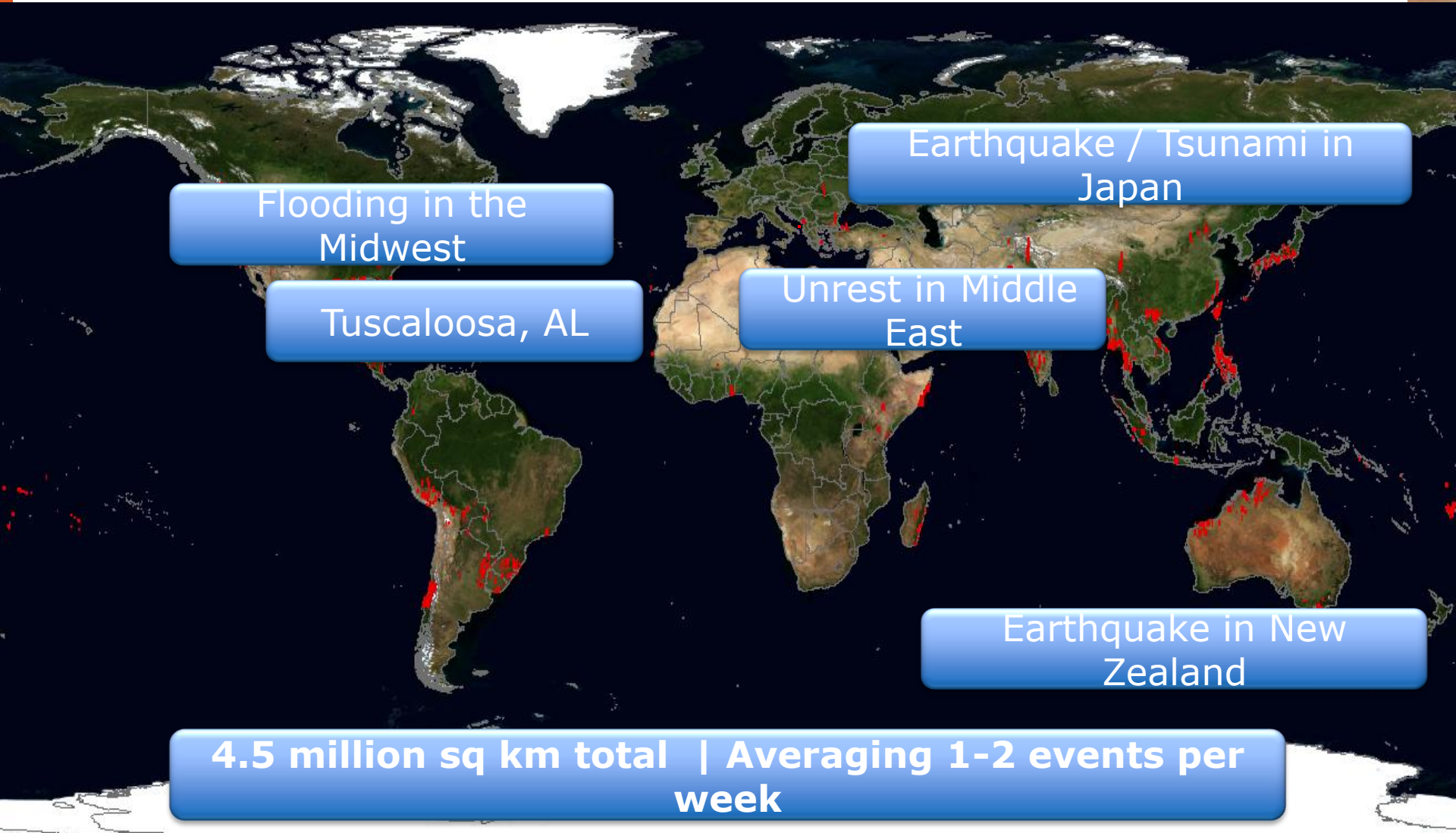


Use Case – Viewshed Analysis Using VHP DSM

✓ Very High Precision
Precision
Mapping

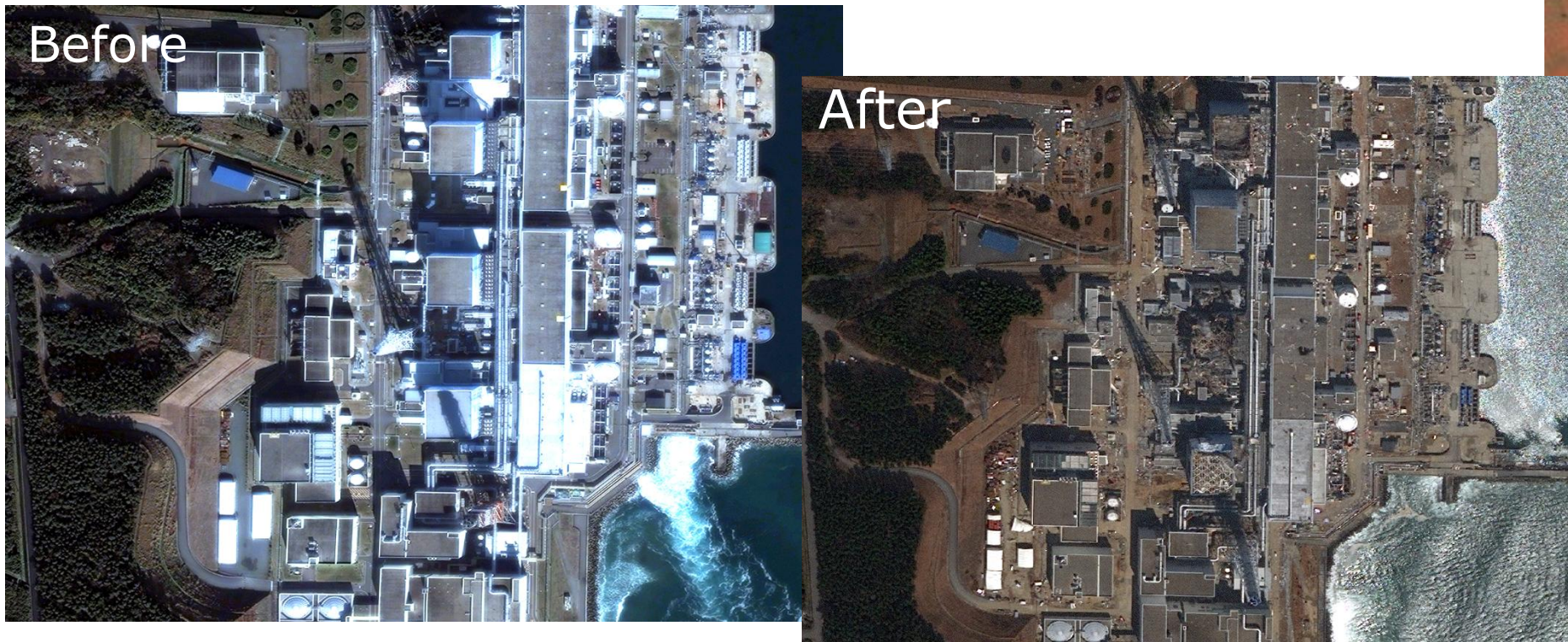


Examples of FirstLook Coverage



Natural Disaster: Tsunami in Japan

- FirstLook provides wide, overhead perspective of events.



Japan – Fukushima
Nuclear Plan



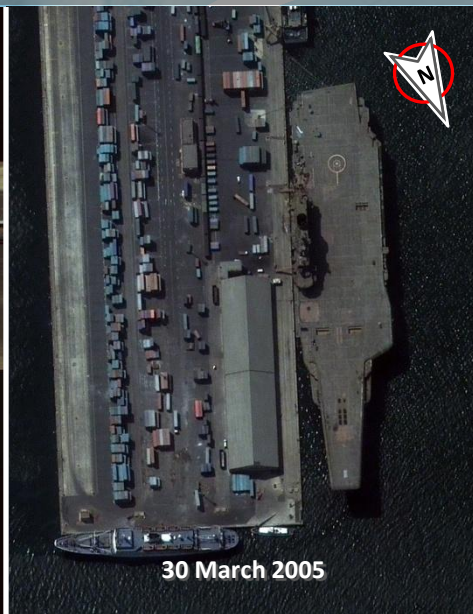
Varyag (Shi Lang) Aircraft Carrier

Dalian Shipyard, China

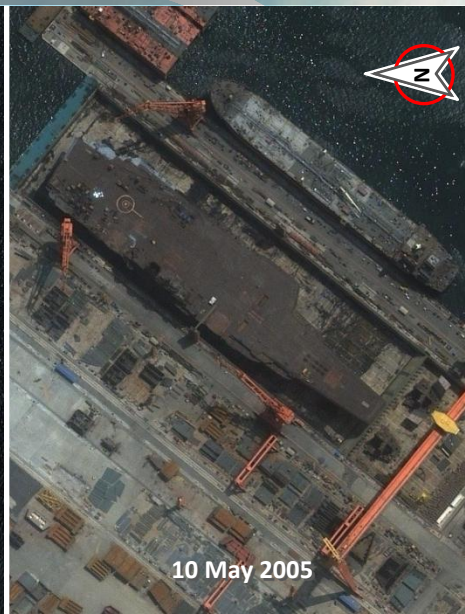
38 56 05N 121 36 57E



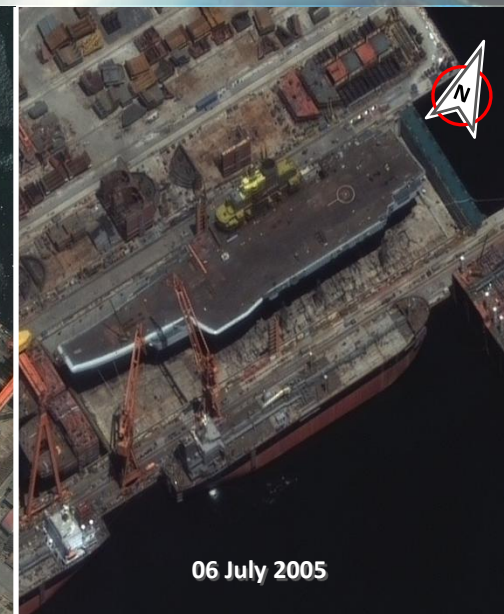
11 September 2003



30 March 2005



10 May 2005



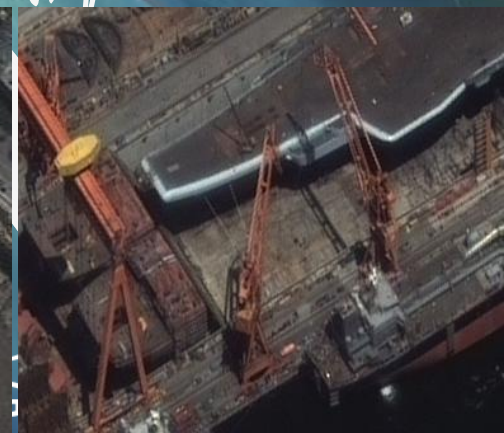
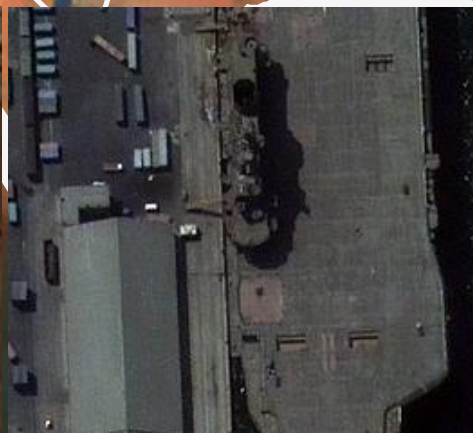
06 July 2005

When the original Chinese buyers abandoned plans to transform the *Varyag* into a casino, it sat for three years.

All three blast deflectors were missing upon purchase of the *Varyag* and remain off.

Between March and May 2005, the *Varyag* entered the Dalian dry dock where it remained for four months.

Two rail-mounted jib cranes were observed working over the bow of the vessel. Between May and July 2005, the vessel's hull was sandblasted and painted PLAN gray.



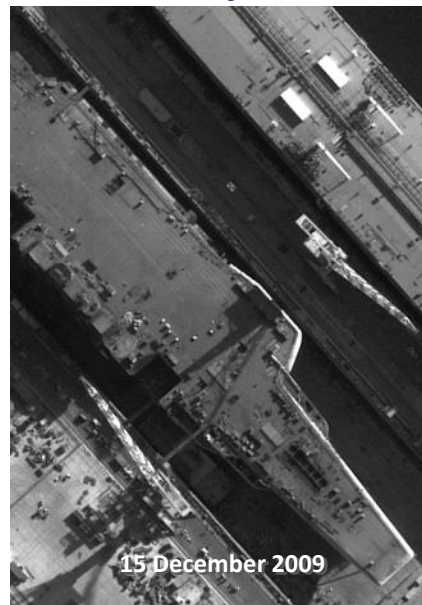
Varyag (Shi Lang) Aircraft Carrier - Maintenance Activity



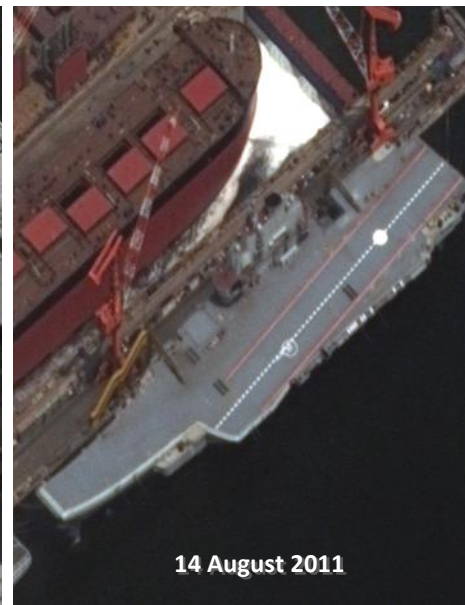
15 July 2009



17 October 2009



15 December 2009



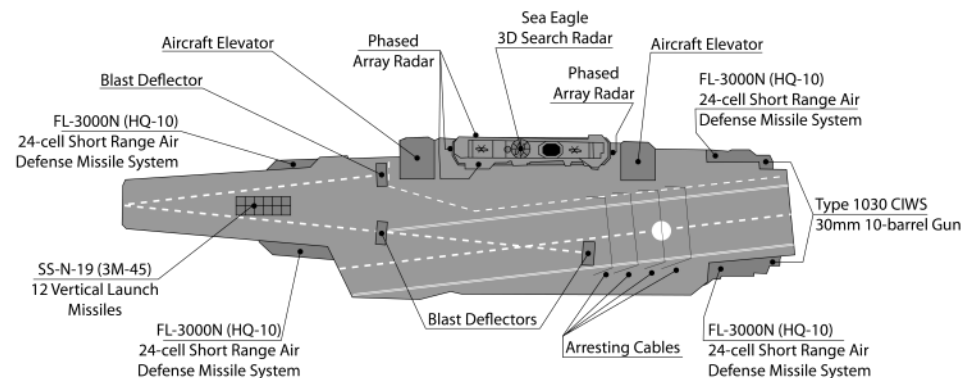
14 August 2011

Vertical launch missile bay hatches have been canvas covered during probable hatch maintenance & refurbishment. Forward aircraft elevator moved to down position

Vertical launch missile bays remain canvas covered during probable hatch maintenance & refurbishment. Rail-mounted gantry crane working over bow.

Canvas covers removed from SS-N-19 vertical launch missile bays. 6 of 12 SS-N-19 missile bay hatch covers open for maintenance.

Red and white runway lines have been assigned to the flight deck in preparation for flight operations. Helicopter landing areas designated as well



23 August 2011



23 September 2011

To date, the Varyag has been outfitted with various communications, tracking and weapons systems. Additionally, arresting cables, non-skid surface and runway lines have been installed and applied to the flight deck.

Placed in drydock after initial sea trials. Additional yellow flight lines applied to the flight deck. Jib cranes observed working over the bow.

Non-skid surface being re-applied to flight deck. Rail-mounted jib cranes observed working over the bow.



Marsa al Brega Crude Oil Storage Facility

Marsa al Brega, Libya

30 24 06N 19 35 51E



Each of the 16 tanks within the crude oil storage area has a capacity of 268,000 Barrels. As of August 21, 2011, the current volume of the measurable tanks was 25% of capacity.

Three of the floating lid tanks were damaged by fire and one tank was obscured by smoke, thus hindering measurement.

Tank Burned

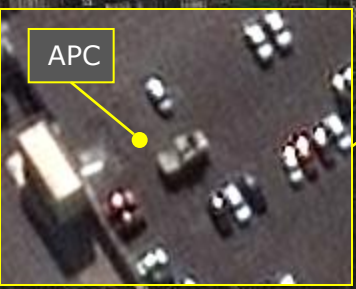
Tank Failed to Retain its Load. Oil Caught by Spill Containment Area. Oil Burning.

Tank Burning



Military Presence at Dumyat Oil Refinery and Port Facility

Dumyat, Egypt
31 27 02 N 31 45 05 E





Tahrir Square Protests

Cairo, Egypt

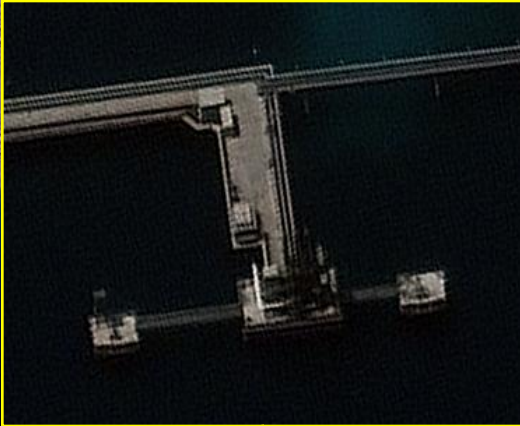
30 02 51 N 31 14 04 E



Large Crowd of Protesters



Port Facility
 Marsa al Brega, Libya
 30 24 57N 19 34 43E



1,758 sq m
 Warehouse
 (Destroyed)



8,162 sq m Warehouse (Destroyed)



Although Many of the Warehouses at Port Brega have been Destroyed , the Oil Loading Terminals and the Port facility Itself appear to be Intact.



Xingcheng Naval Training Airbase Construction

Liaoning Province

40 29 57N 120 39 25E



CAT ID: 103001000A7ED800

Markings and
Layout of the Shi
Lang (Varyag)

Ski-Jump
Take-Off
Ramp

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A satellite image of the Florida Keys, Florida, showing the coastline and surrounding waters. The land is depicted in shades of brown and green, while the water is a deep blue. The image is taken from a high angle, showing the intricate patterns of the coastline and the surrounding ocean.

Thank You

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