Moore, Oklahoma | Crowdsourced damage map | WorldView-1 & GeoEye-1 imagery
Geospatial Analytics in a World of Big Data

• Current Paradigm
• Emerging Trends
• Starting the Journey
Our world is full of threats

» Military conflict

» Natural & manmade disasters

» Infrastructure risks & security

» Geopolitical instability
DigitalGlobe Analytics Surfaces Unseen Threats

Physical geography, human geography & spatial event data

Expertise, tradecraft & tools

Geospatial insight
Global awareness of government repression

Which villages are most at risk for attack from the Sudanese Army?
Global awareness of government repression

Solution: Determine which villages are at risk to focus attention and resources

**Suitability index**
- Highly suitable
- Suitable

**Legend**
- Maneuver
- Ground Attack
- Artillery Attack
- Aerial Attack
- Defense

**2013: SAF Encirclement**
Highest probability of future SAF attacks against local populations. Key factors include:
- Inhabited, agricultural areas (< 5% slope)
- Key military terrain (cart track/stream bed intersect)
Critical infrastructure protection

Where is infrastructure most vulnerable to theft or sabotage?
Critical infrastructure protection

Solution: Risk factors identify which facilities require increased security
Geospatial Big Data can help our analysts support broader missions
DigitalGlobe = Geospatial Big Data

**Volume:** Our ImageLibrary contains over 4 Billion square kilometers of high resolution imagery, which is enough to cover the Earth’s land mass 27 times.

**Velocity:** Our imagery can be collected, processed and hosted online in under 12 hours. Crowdsourced image mining can extract features in hours.

**Variety:** Our predictive models can typically analyze hundred of spatial factors to discover the most relevant signatures associated with events.
DigitalGlobe Constellation Coverage and Refresh

Content leader:

\[ \times 8 \] and counting

Archive contains the equivalent of over 8 times Earth’s surface

More access:

\[ \times 5 \] satellites + aerial

Faster refresh:

60% monthly

30 days collection (sample)
EnhancedView program allows anyone with a .gov or .mil email account to gain online access to current and precise satellite imagery from DigitalGlobe.

"The new My DigitalGlobe user interface large download capability will be greatly helpful to me in the field. Overall, I find it very easy to use."  Mike C. Government User in the field.
### DigitalGlobe = Geospatial Big Data

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Gathers Massive Amounts on Current Imagery

30 Days of “Daily Take” Collections on EnhancedView Web Hosting
Harness The Crowd to Extract Insights

CrowdRank Results After Moore, OK Tornado

Implications of Geospatial Big Data Strategy
DigitalGlobe = Geospatial Big Data

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Each country has its own set of circumstances calling for a unique approach. However, certain guidelines are always followed.

Guidelines:
- Data is collected at the lowest administrative level available
- Information collected can consist of either point, polyline, polygon, textual or raster data
- Data is cross-referenced with other sources to corroborate
Human Geography Example - Languages of Indonesia
Human Geography Example – Jakarta, Indonesia
Point of Interest (POI) Data
Human Geography Survey Coverage Map

As of July 15, 2013

Complete
Production
Future
Moving Geospatial Big Data
From the Desktop to the Cloud
What is MrGeo?

• MrGeo – MapReduce Geo

• A geospatial toolkit providing analytics that can be…
  - performed at scale
  - performed across the entire globe
  - performed reliably
  - efficiently parallelized across hundreds of machines

• For the analyst
  - Remove data logistics
  - Coupled data and analytics for “application services”
  - Result: Make geospatial analytics an interactive experience
Developing Open IT to Enable Global Analytics

MrGeo technology enables analytics against global cache of imagery and terrain

Initially developed at NGA Innovision and now being transitioned by Army INSCOM to bring geo-processing to the DCGS-A Cloud (IC ITE)
DigitalGlobe Cloud Analytics: COMMS
DigitalGlobe Cloud Analytics: SightLine
DigitalGlobe Cloud Analytics: CostDistance/LCP
DigitalGlobe Cloud Analytics: SiteScan
DigitalGlobe Cloud Analytics: Suitability
DigitalGlobe Cloud Analytics: ForeSight
Recap and Next Steps

• Geospatial Analytics Can Mitigate Global Threats

• Geospatial Big Data Can Help Great Analysts Scale
  - Global Imagery Collection and Processing via EnhancedView
  - Augment Collection with Near Real-Time Feature Extraction
  - Leverage Human Geography Data and Expand Coverage

• Geospatial Cloud Analytics Transforms GIS Workflows
  - Hadoop, NoSQL, and GPUs are Emerging Big Data Building Blocks
  - MrGeo and Legion extend these platforms to the world of geo-processing
  - NGA and Army INSCOM have funded development via a GOTS model
  - Government Services business model to deploy and customize

www.digitalglobe.com/geospatialbigdata