GEOSPATIAL WORLD FORUM

05-09 MAY 2014
Centre International Conferences Geneve
Switzerland

Theme - geoSMART Planet resources + infrastructure & You!

The Future of Geospatial Big Data ™

Giovanni Marchisio, Ph.D., Director Product Development

Nuclear Power Plant, Doel, Belgium| December 10, 2011 | WorldView-2

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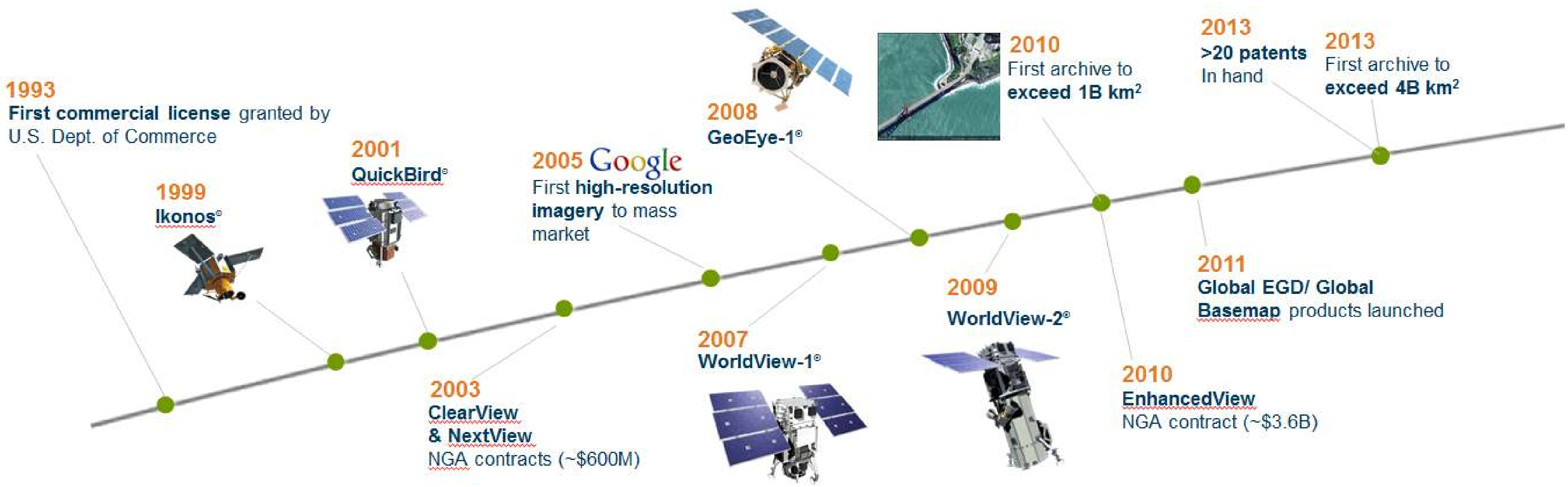
Why "Geospatial Big Data ™?

We Are the Innovators of Our Industry



Geospatial Big Data™ is the next Frontier!

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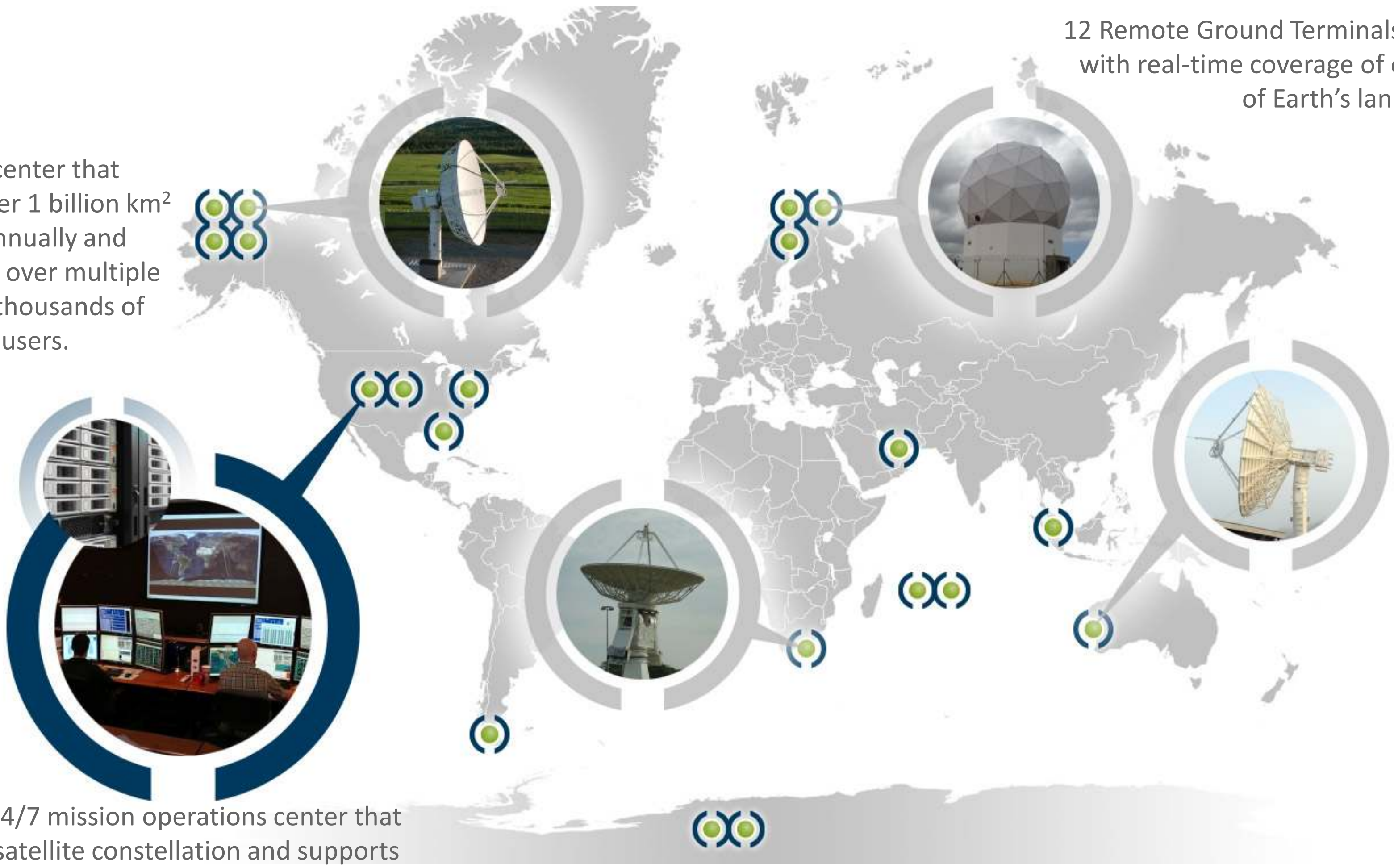
DigitalGlobe's global infrastructure provides real-time coverage of over 45% of Earth's land surface

12 Remote Ground Terminals globally with real-time coverage of over 45% of Earth's land surface

Secure data center that processes over 1 billion km^2 of imagery annually and disseminates over multiple networks to thousands of downstream users.



Secure, 24/7 mission operations center that flies a 6-satellite constellation and supports secure interfaces with US Government

DigitalGlobe high performance satellite capacity can address many global missions simultaneously

Target Areas			Recoverage Rate			Applied Capacity	
Global Land Use Group	Percent Land Area	Group Area (sqkm)	Group Percent	Image Ops	Image Window	Annual Area (sqkm)	Annual Capacity
Urban Areas	1.50%	2,224,500	100%	52	Year	115,674,000	7%
LOC Corridors	3.00%	4,449,000	100%	52	Year	231,348,000	15%
Arable Land	13.13%	19,471,790	50%	40	Season	778,871,600	48%
Permanent Crops	4.71%	6,984,930	50%	40	Season	279,397,200	17%
Permanent Pastures	26.00%	38,558,000	100%	2	Year	77,116,000	5%
Forests	32.00%	47,456,000	100%	2	Year	94,912,000	6%
Other (e.g., barren)	9.95%	14,755,850	100%	1	Year	14,755,850	1%
Antarctica	9.71%	14,399,930	100%	1	Summer	14,399,930	1%
Total Land Area >	100.00%	148,300,000				1,606,474,580	

What is "Geospatial Big Data ™"?

- It is a living digital inventory of the surface of the earth: every structure, vehicle, road, tree, rock, field and patch of dirt
- It is enabled by DigitalGlobe's ability to collect over 1 billion km2 of high resolution satellite imagery every year.
- It is possible because we can convert this imagery automatically and at scale into searchable, analytics ready information layers.
- It enables us to answer two kinds of questions:
  - "Show me there" — tell me everything we know about a particular place; and
  - "Show me where" — tell me where I need to pay attention.

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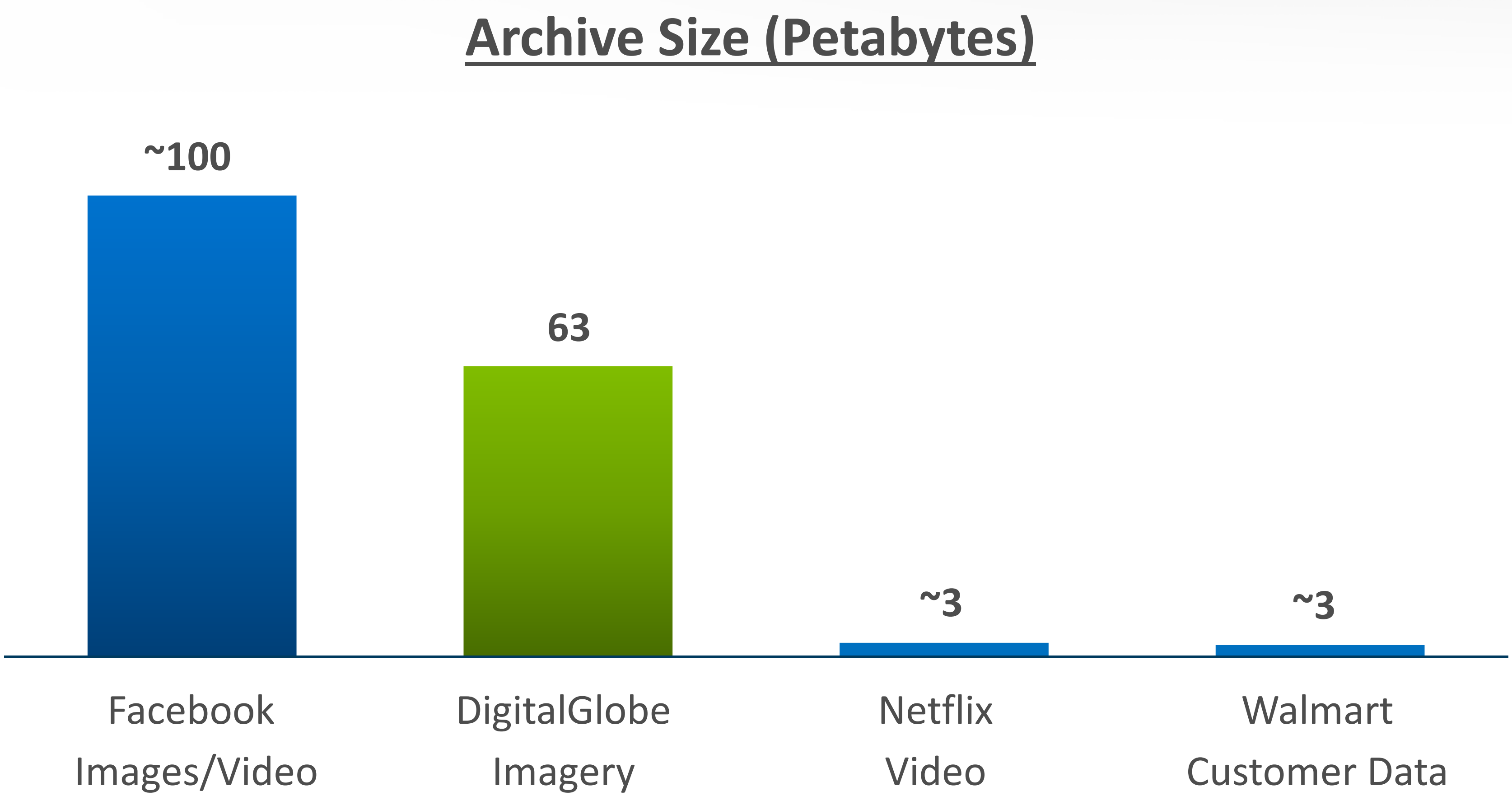
How do we compare with other Big Data silos?



Sources: Facebook IPO Prospectus, May 2012; Bloomberg, May 2013; SAS, 2012

Our Vision:

“to provide a living digital inventory of everything on the surface of the planet”

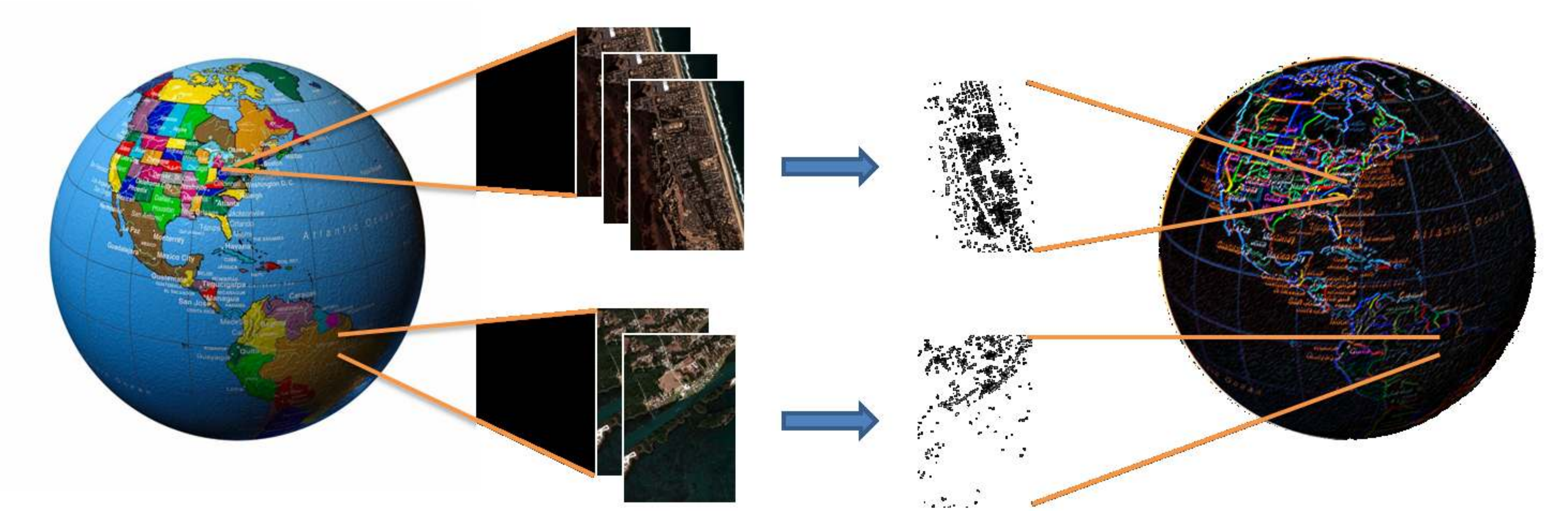
FUSION WITH NON-IMAGE DATA + MACHINE LEARNING & CROWDSOURCING + MODELS & KNOWLEDGE BASES

Global A Priory Knowledge

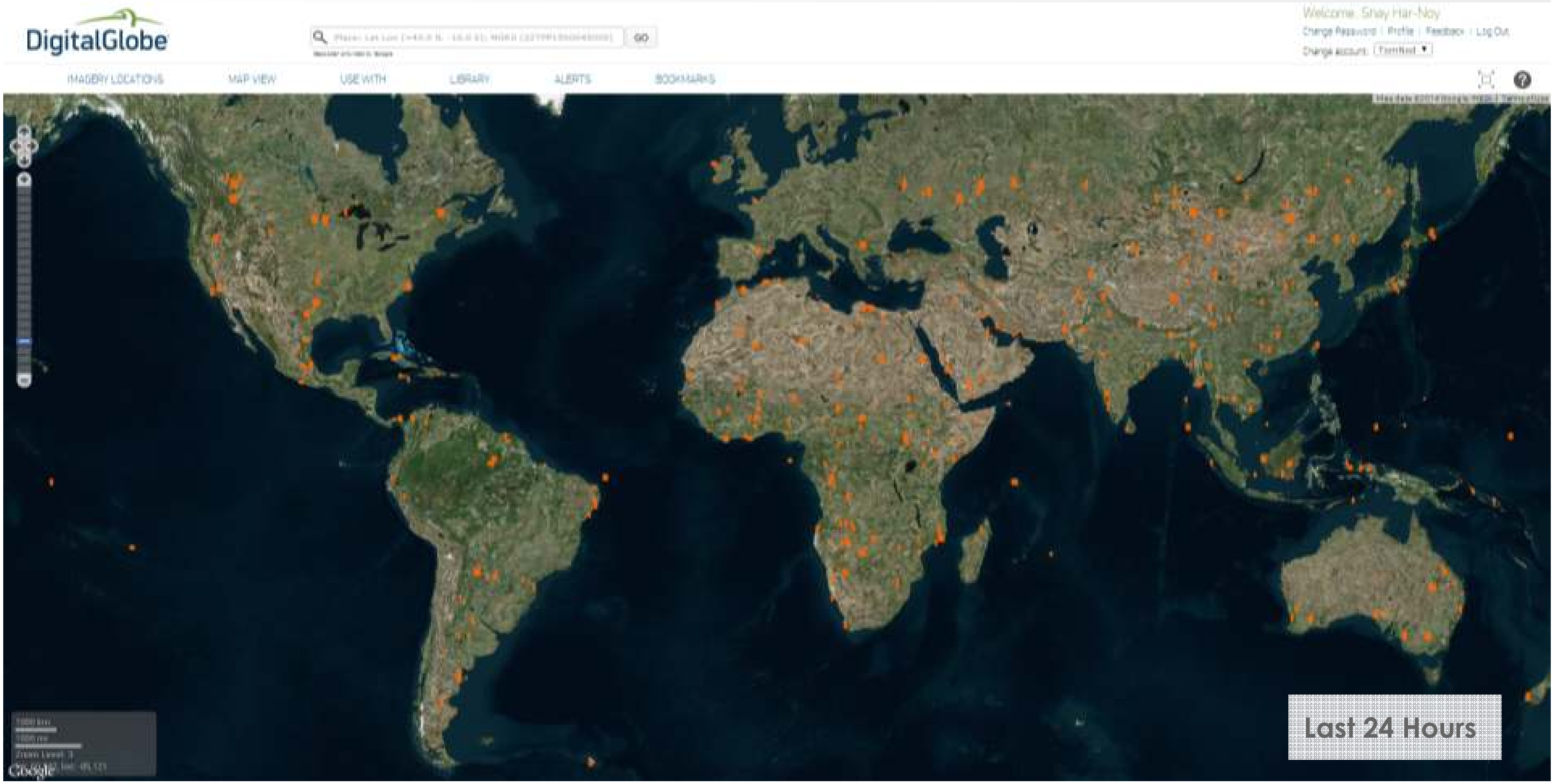
Local Hi-res Multi-temporal Measurements

Local Hi-res Knowledge

Global Augmented Knowledge



We can process and see the world every day



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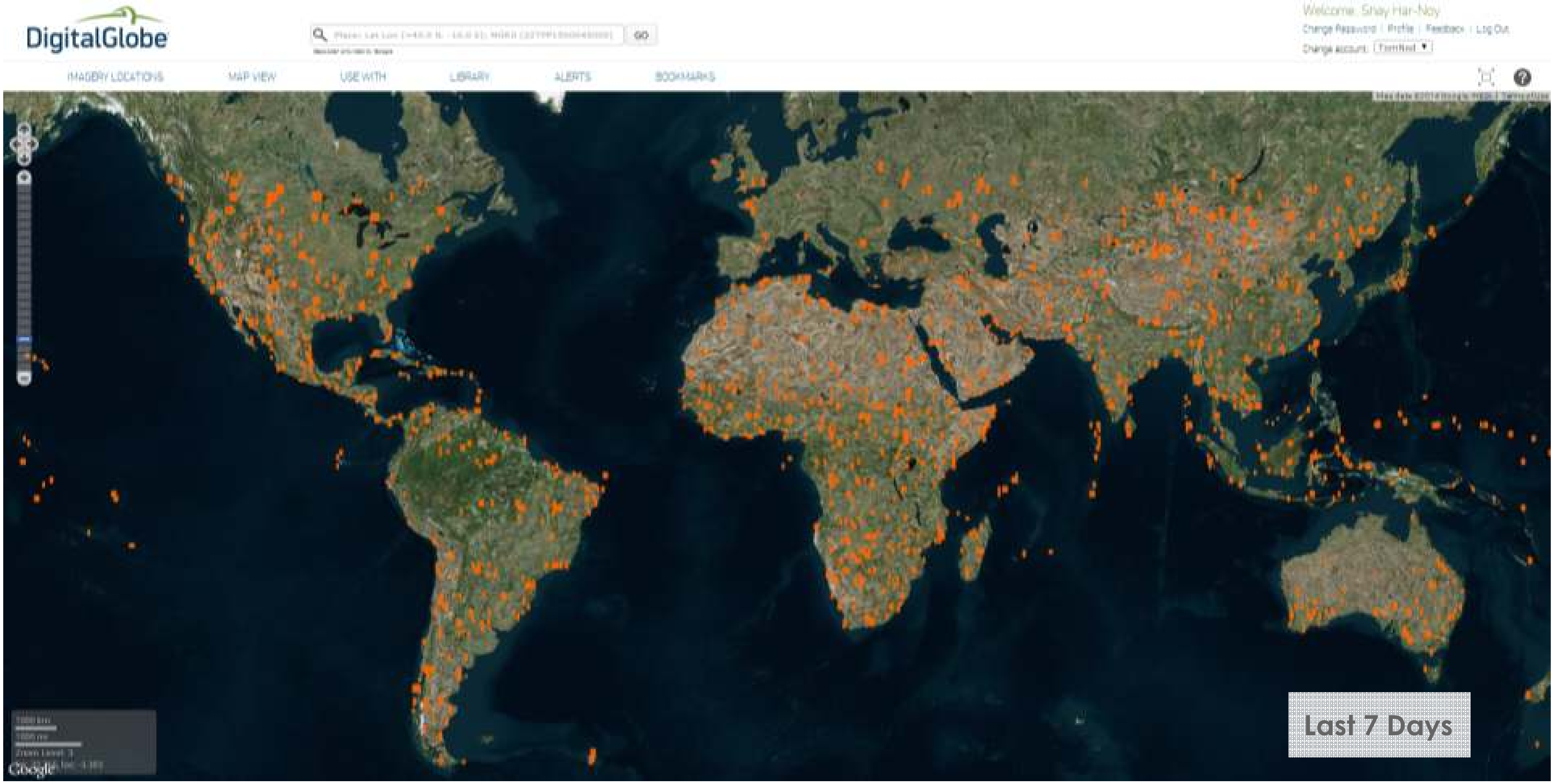

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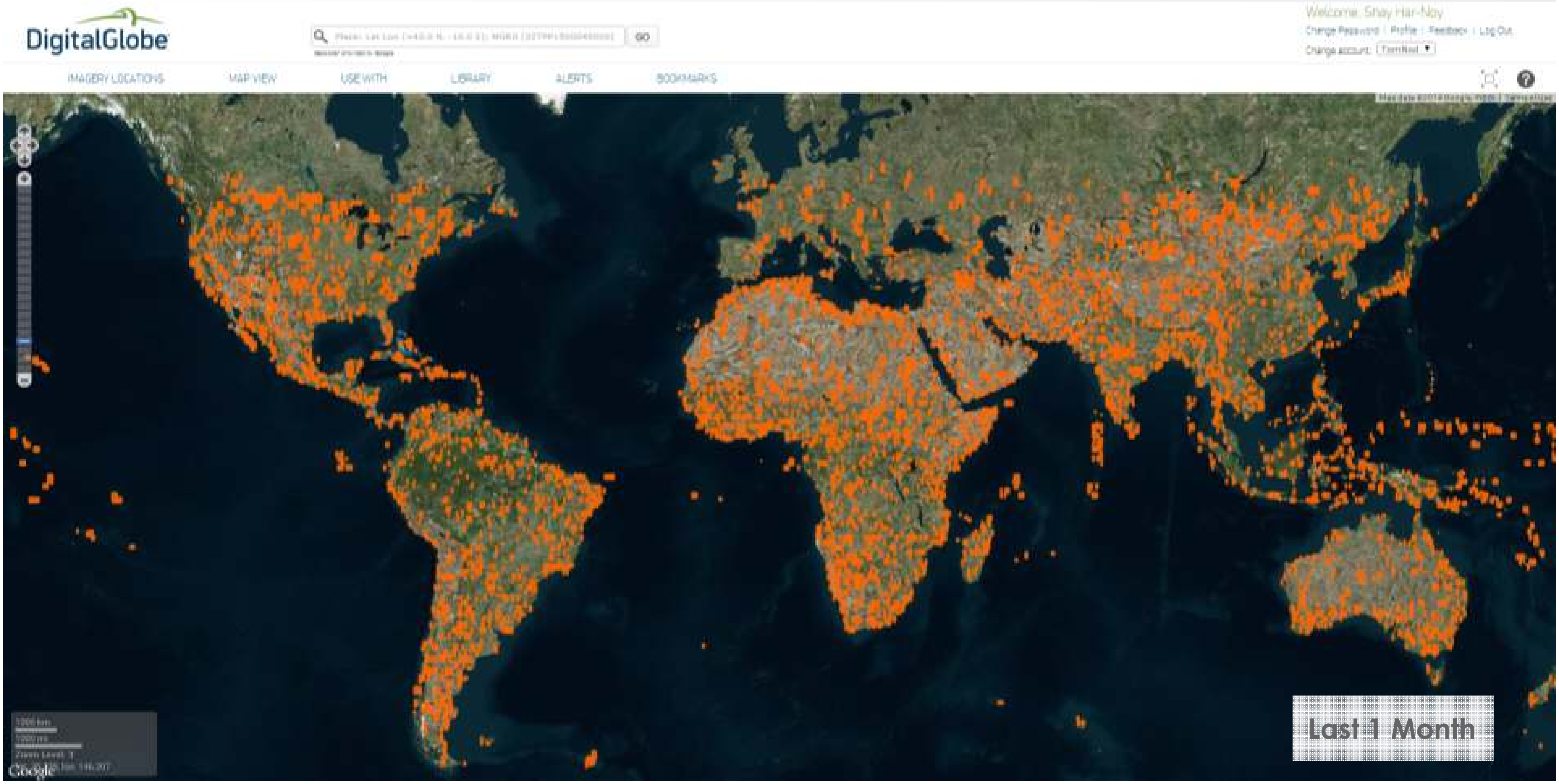

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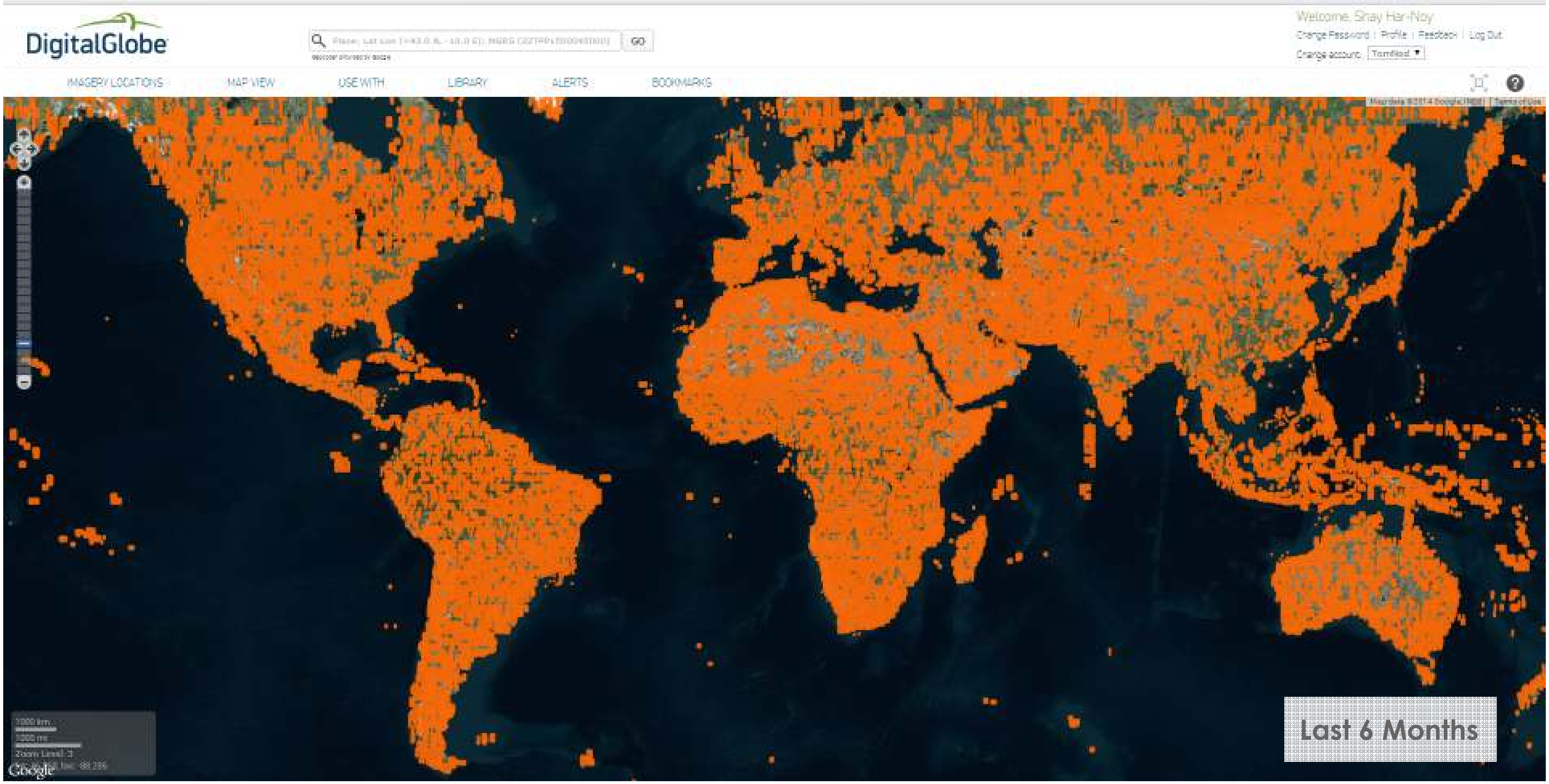

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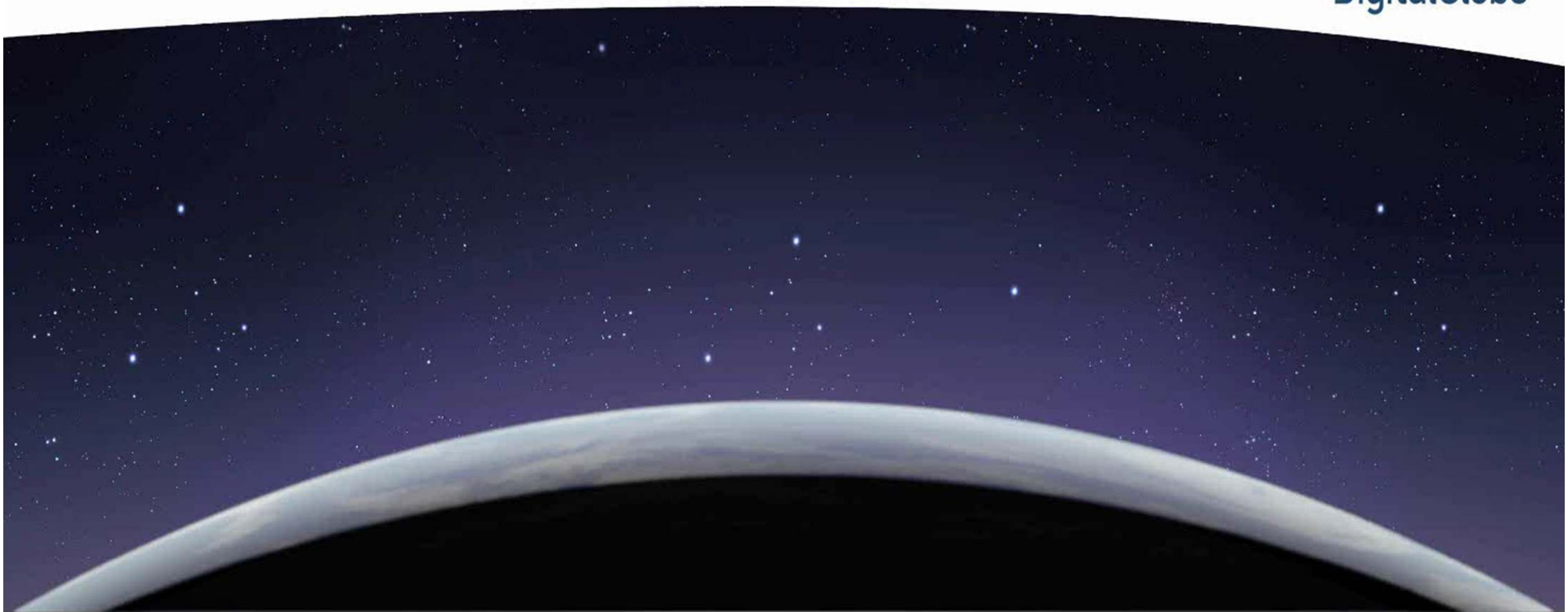


Examples of GBD™Layers

Base Layers
- Surface Reflectance
- Country Scale Orthomosaics
- 3D Terrain Data

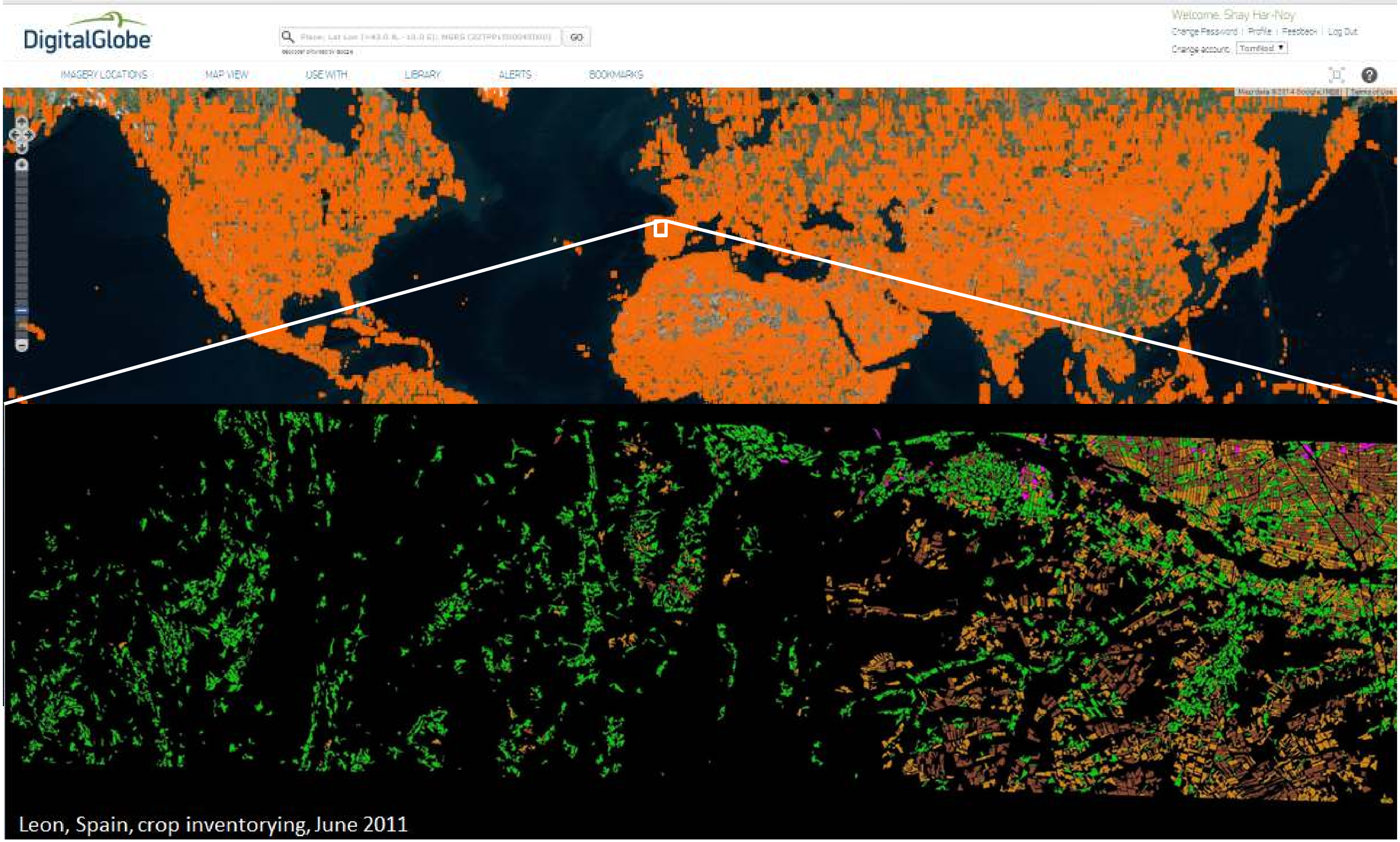
Very High Resolution LULC Maps
- Agricultural: field boundaries
- Agricultural: crop identification
- Agricultural: crop monitoring
- Agricultural: crop rotation
- Forestry: forest acreage determination
- Forestry: tree species differentiation
- Geology Maps

Objects and Facilities Detection
- Car, plane, containers counts
- Parking Lot identification
- Oil tank detection and measurements

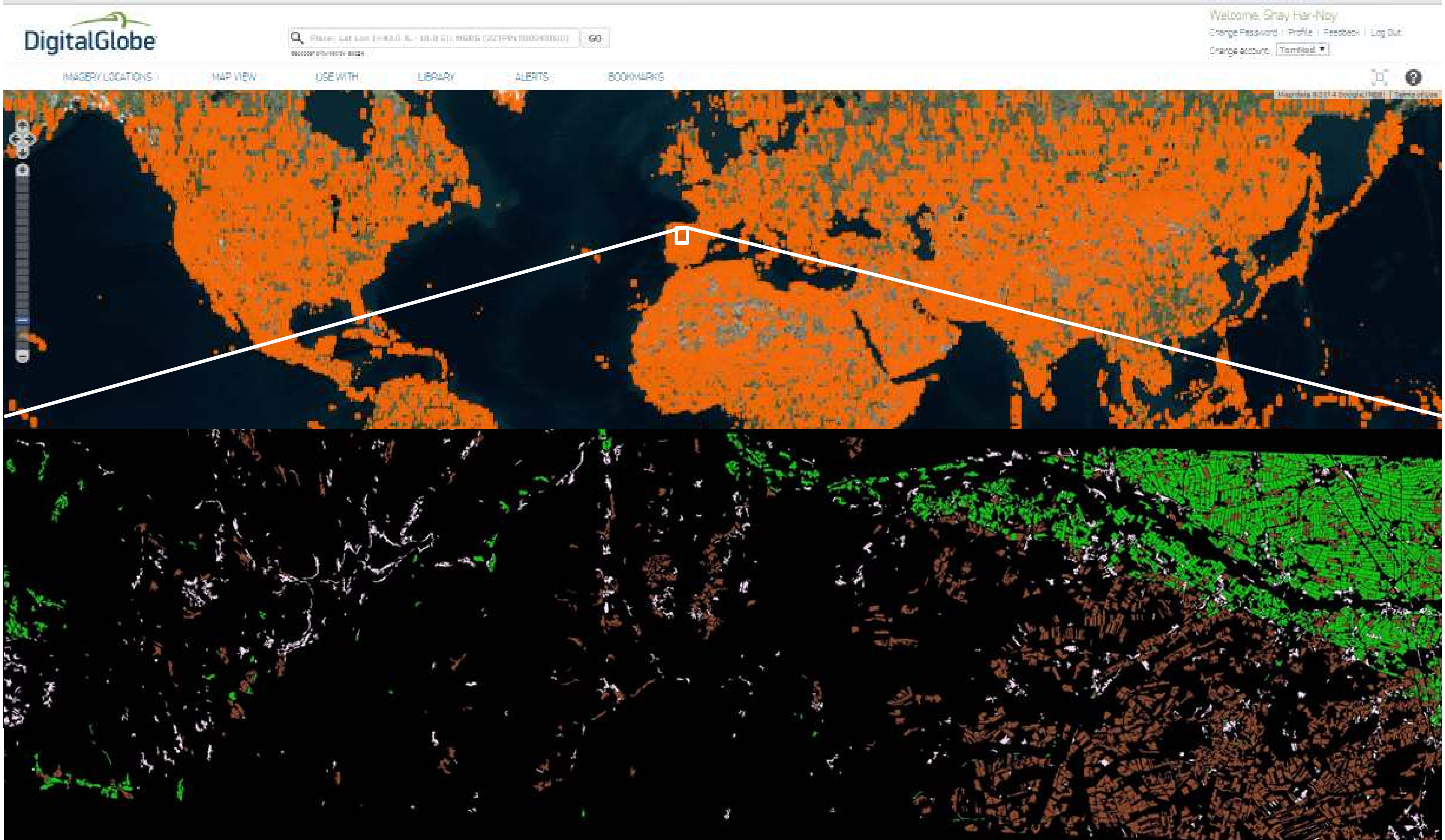
Quantifying Human Presence
- Built-up extent
- Building footprints
- Building centroids and areas
- Population density estimates
- Village boundaries with population counts
- Detection of building patterns: slums
- Detection of new construction
- Detection of building improvements

Disaster and Crisis Management
- Damaged houses
- Burned houses
- Flooded houses
- Debris fields
- Downed trees
- Plane wreckage

Monitor crop rotation



Monitor crop rotation



Leon, Spain, crop inventorying, August 2012

Monitor factory output

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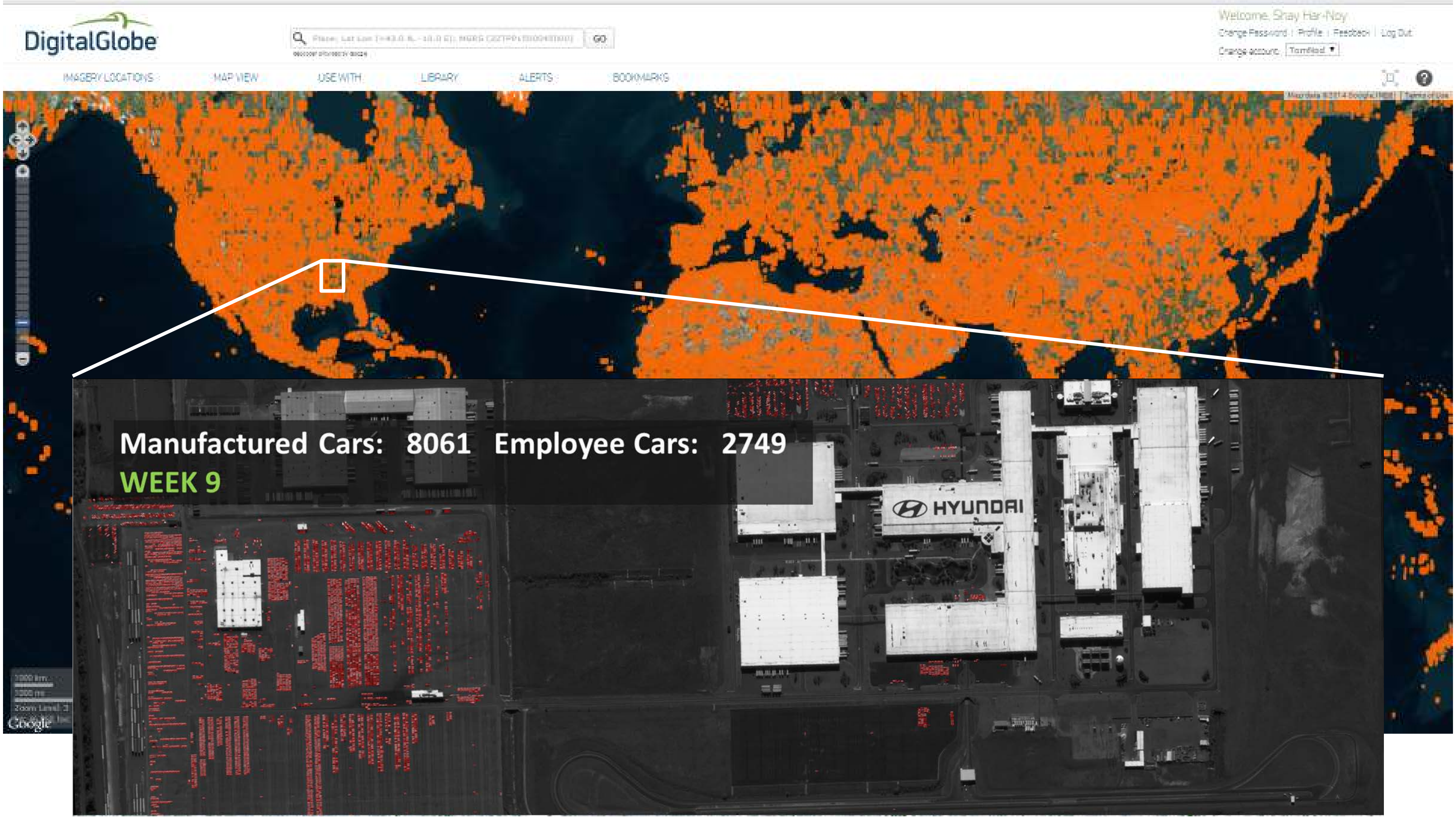
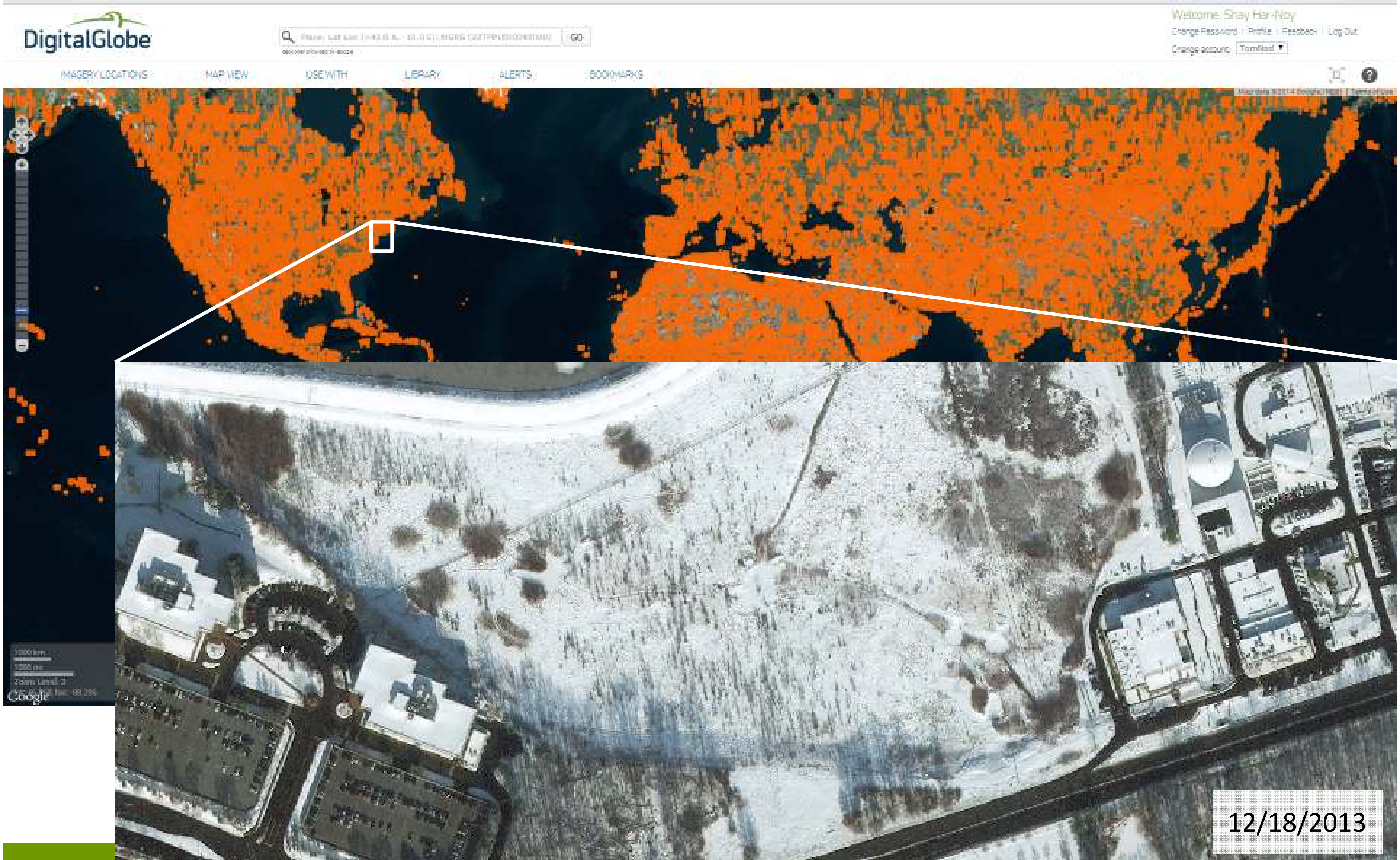


Identify new construction and new buildings



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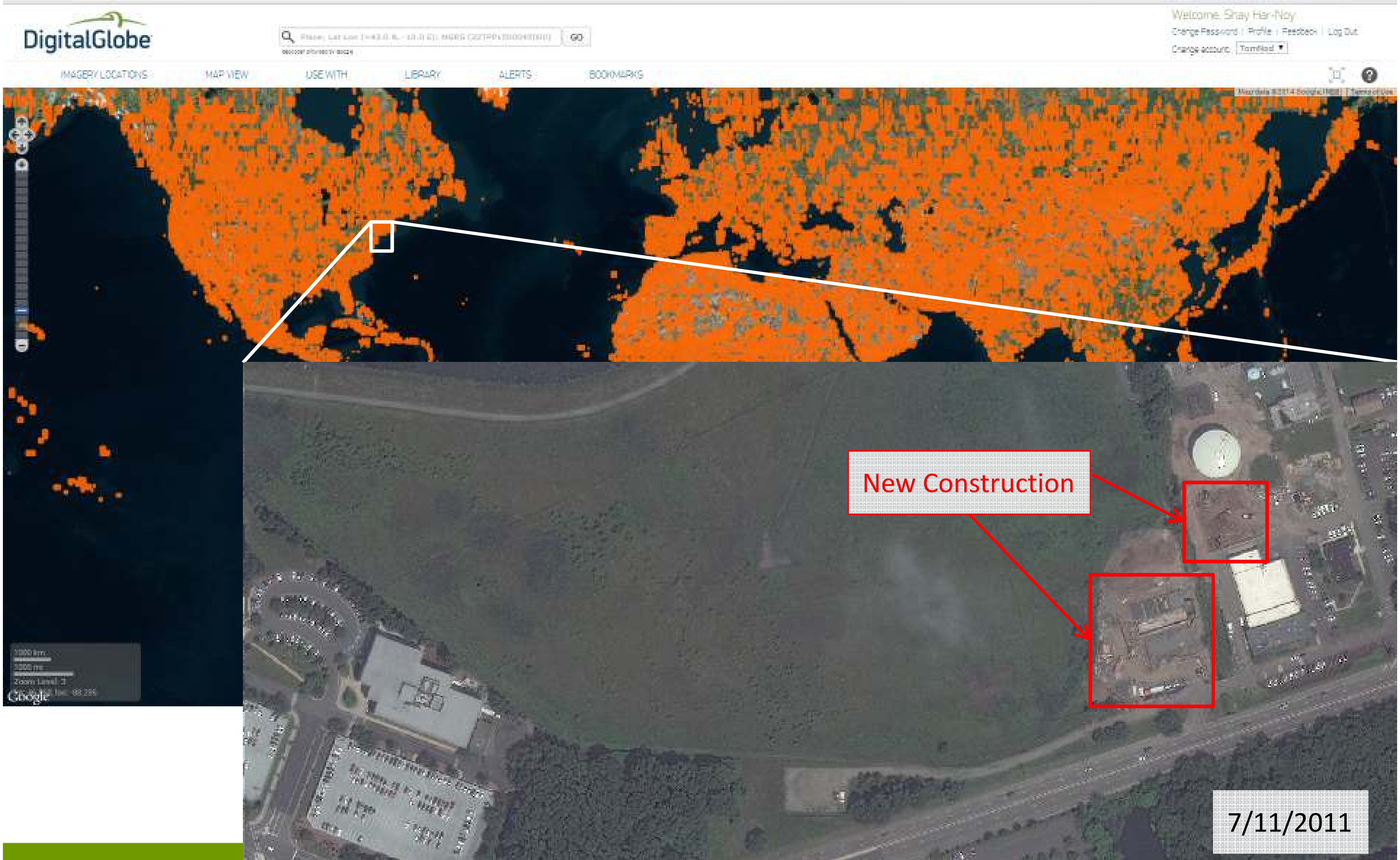

Identify man-made structures

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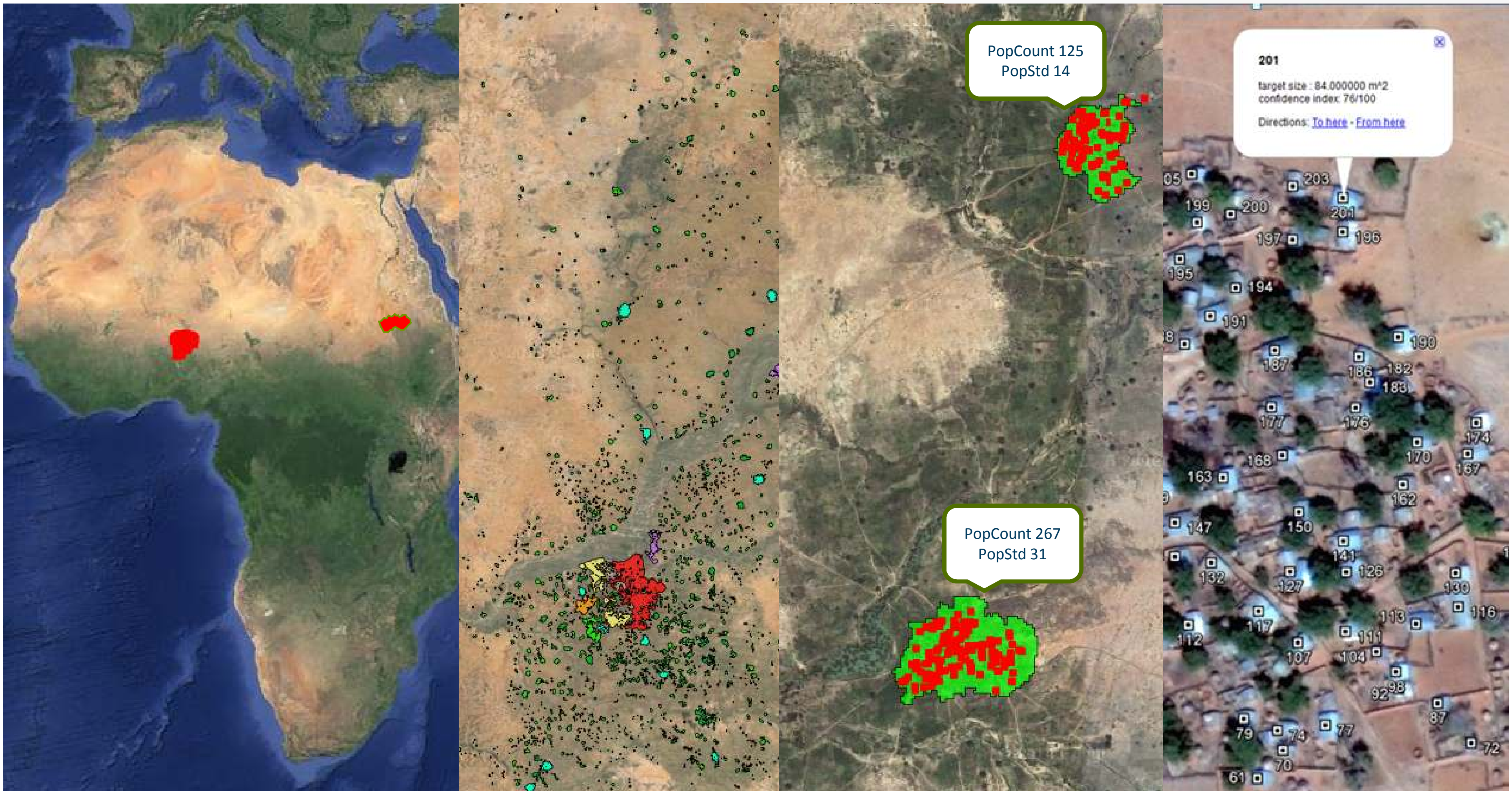
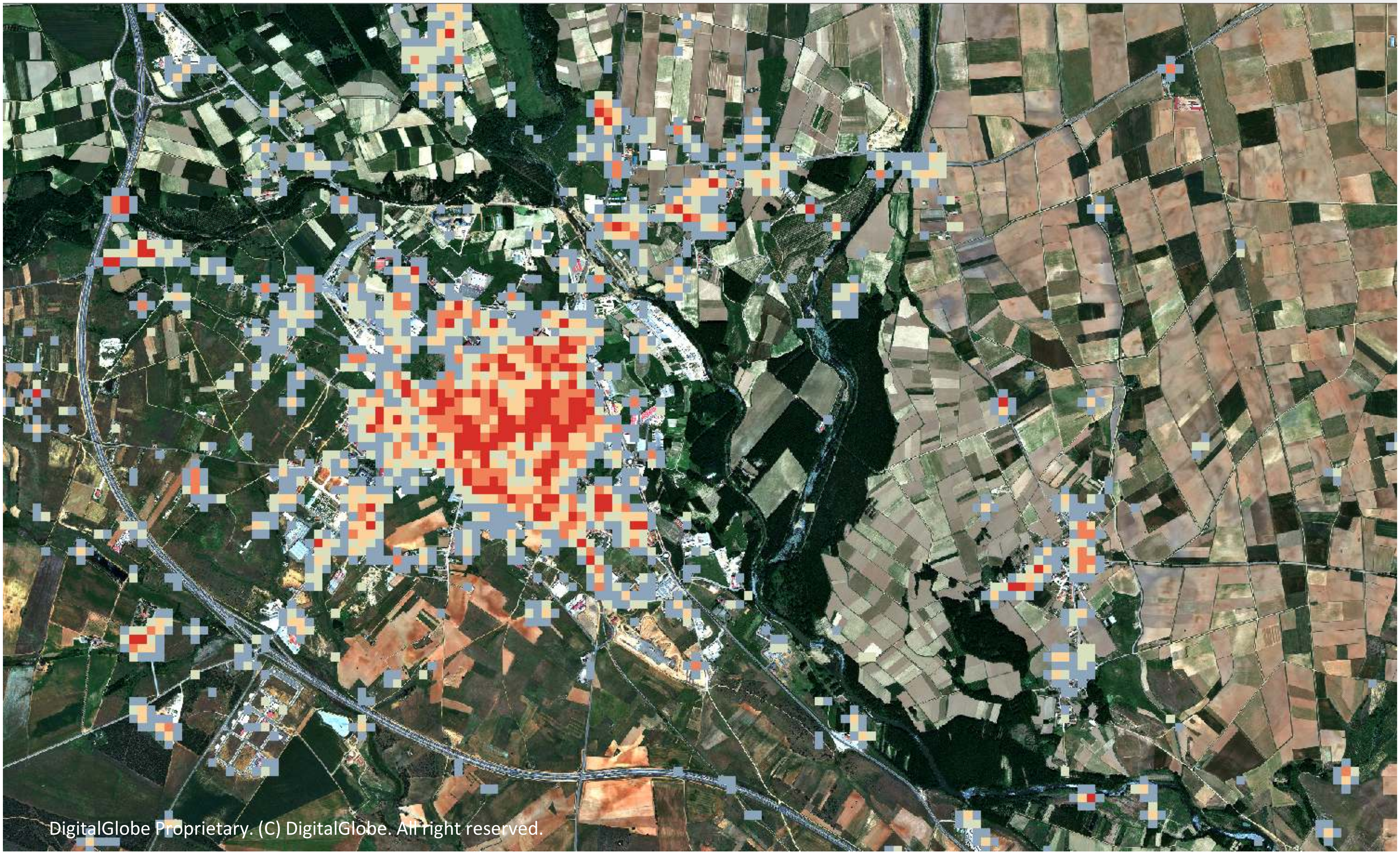
Mapping Unchartered Territory in Africa



Producing High-res Res Population Density Estimates

DigitalGlobe Population Density Estimates

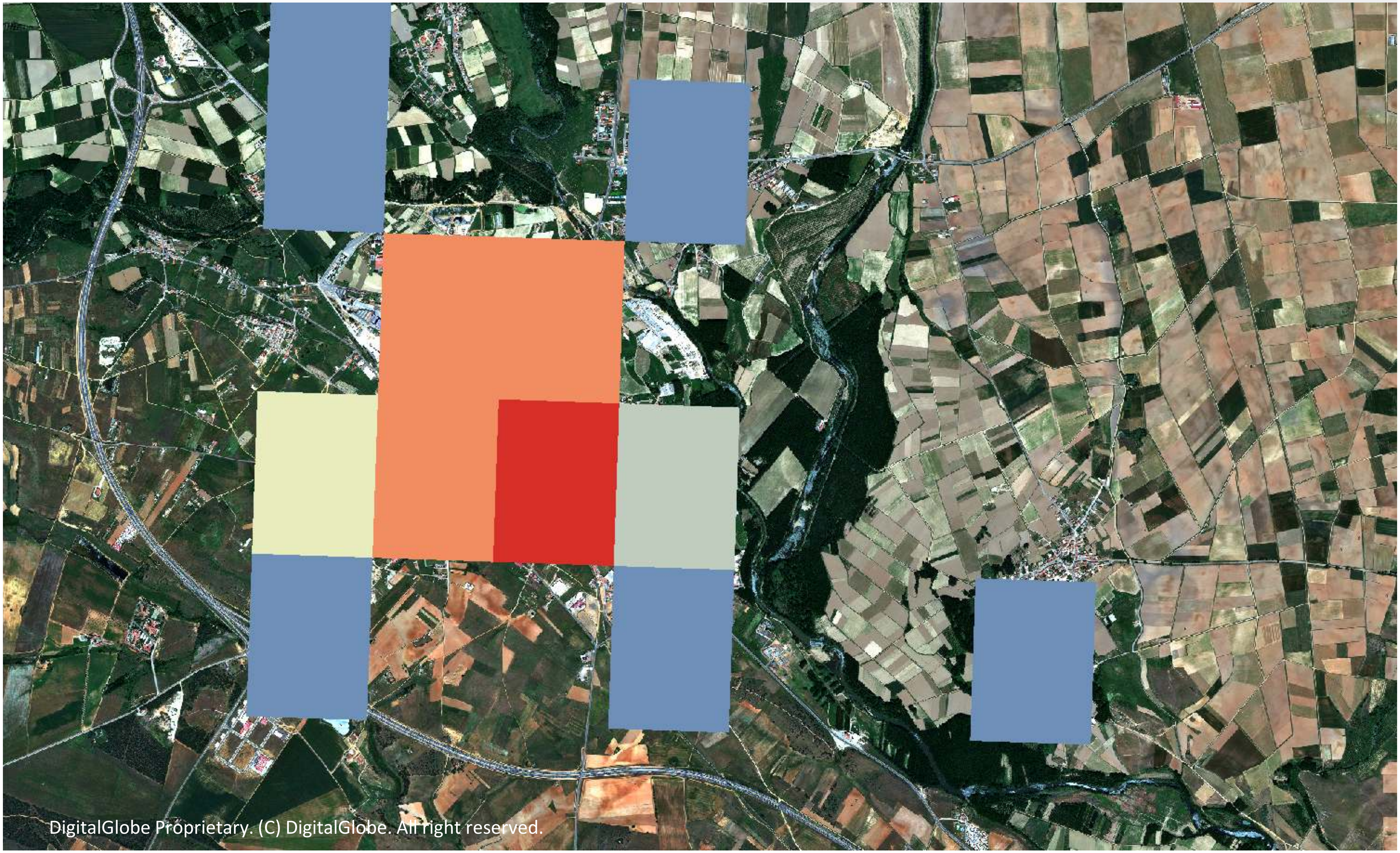
DigitalGlobe's WV2 (50m cells)



Producing High-res Res Population Density Estimates

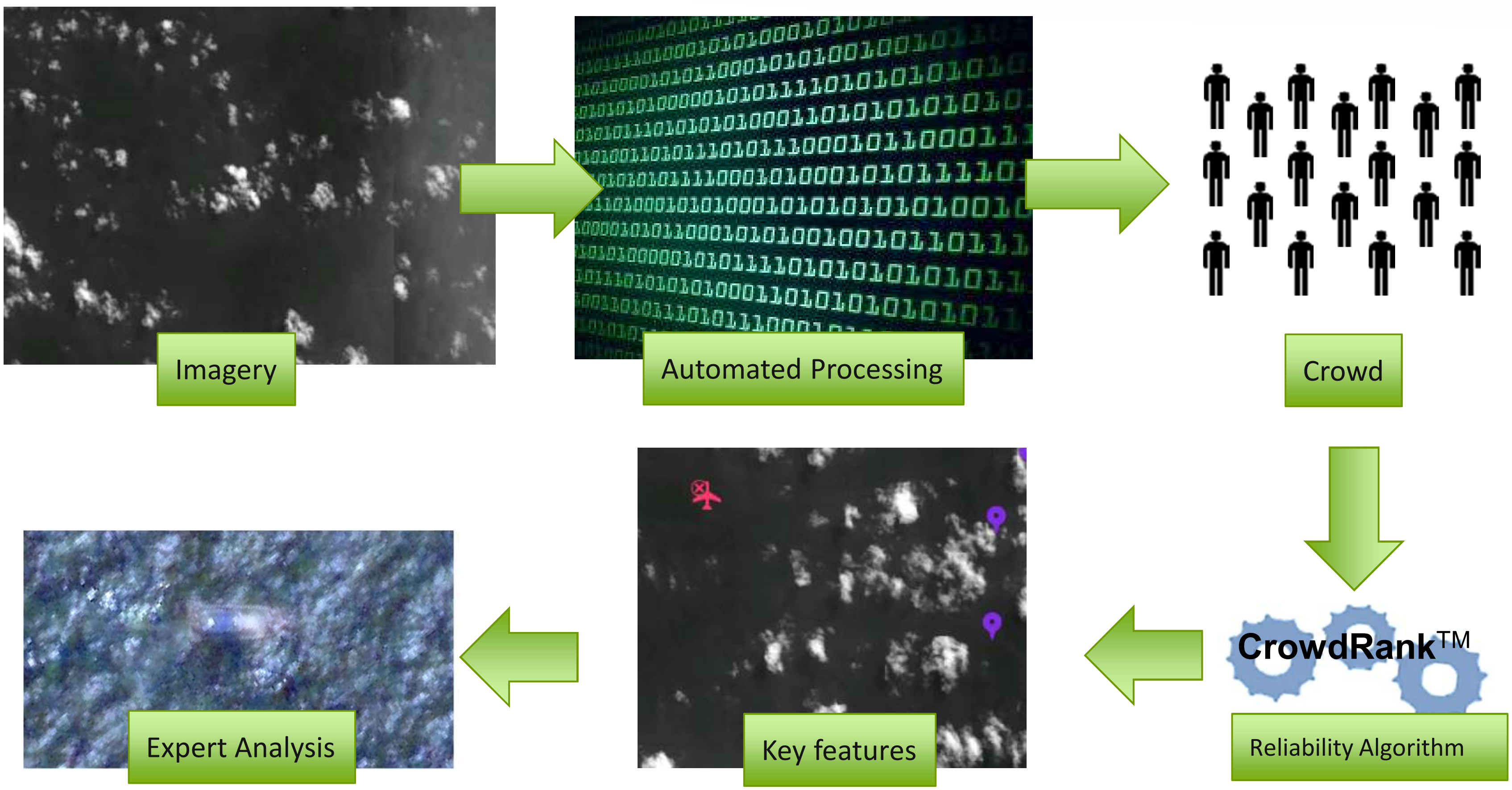
Population Density Estimates Available Today

LandScan (1Km cells)

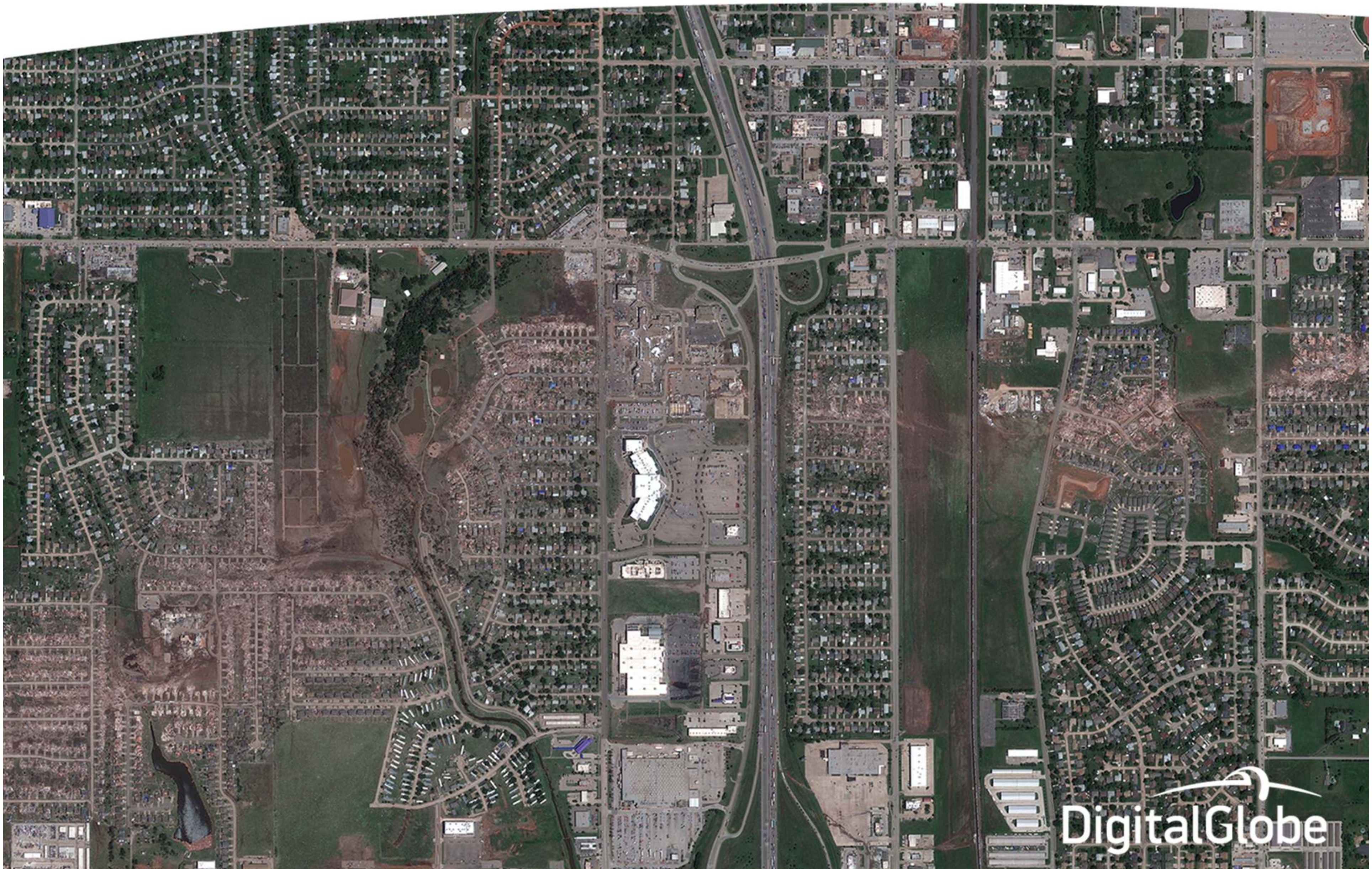


But….machine learning is hard

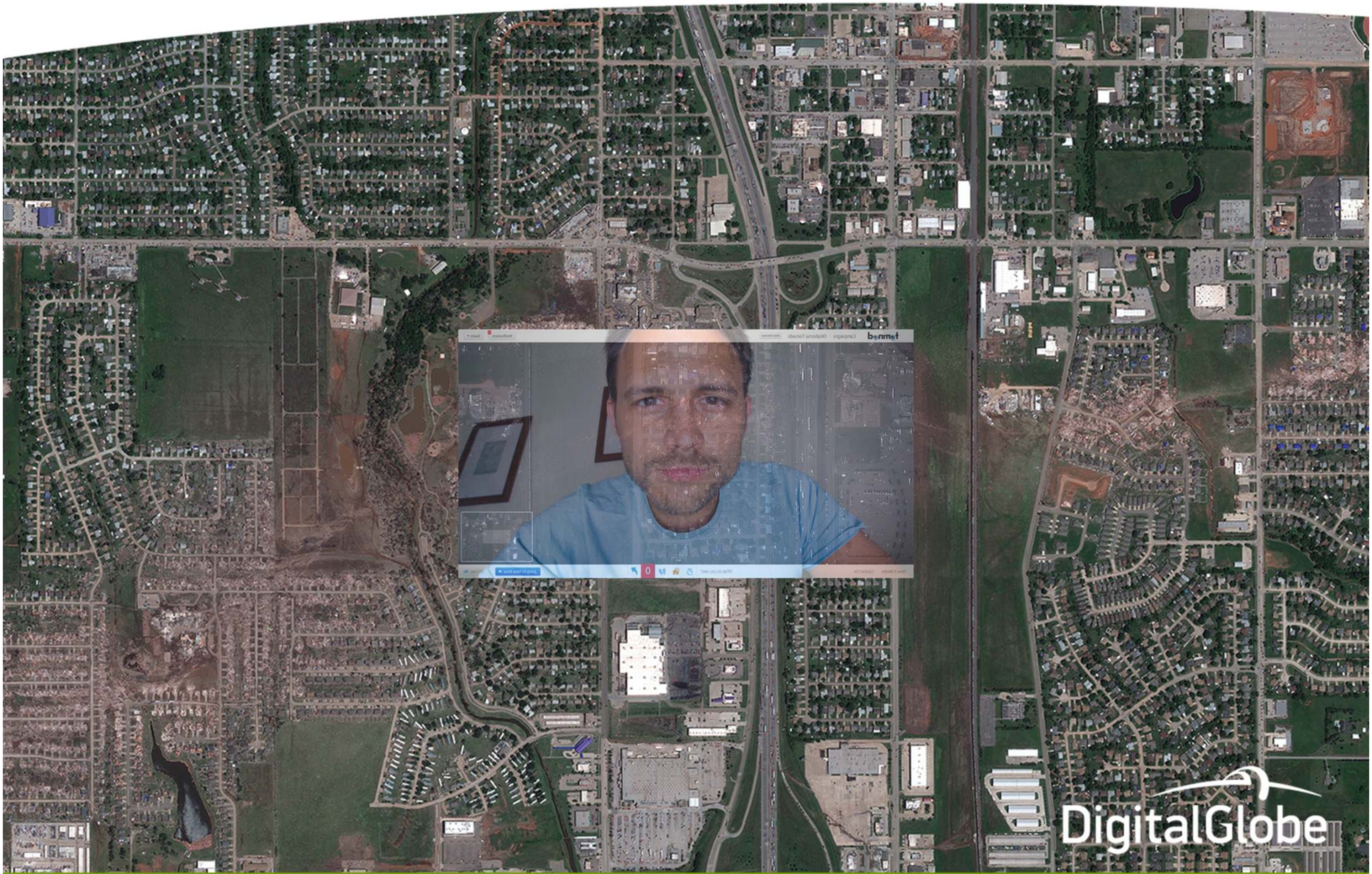
Use Humans and Machines!



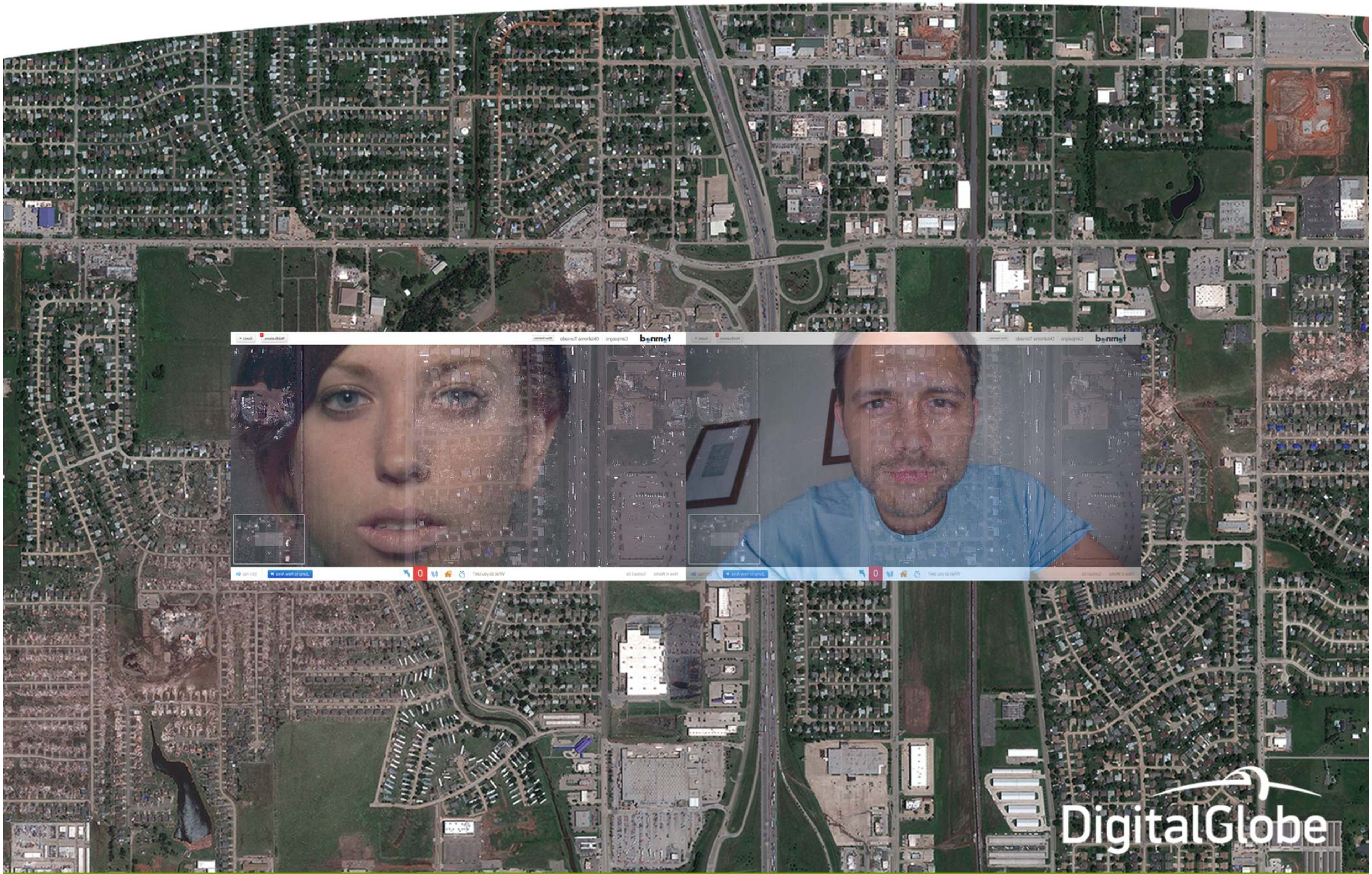
How might we quickly analyze this image?



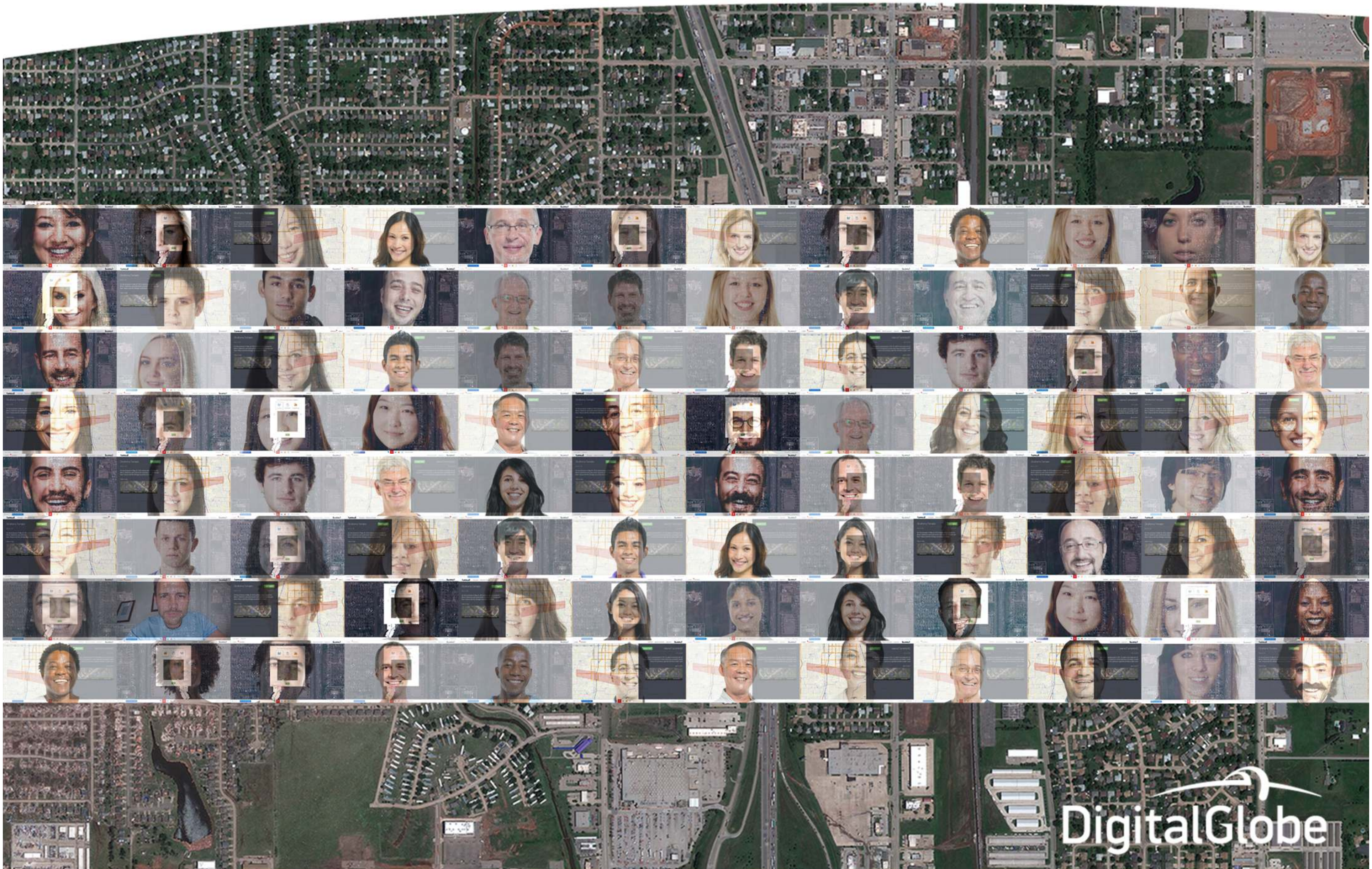
We could have a human analyst examine it



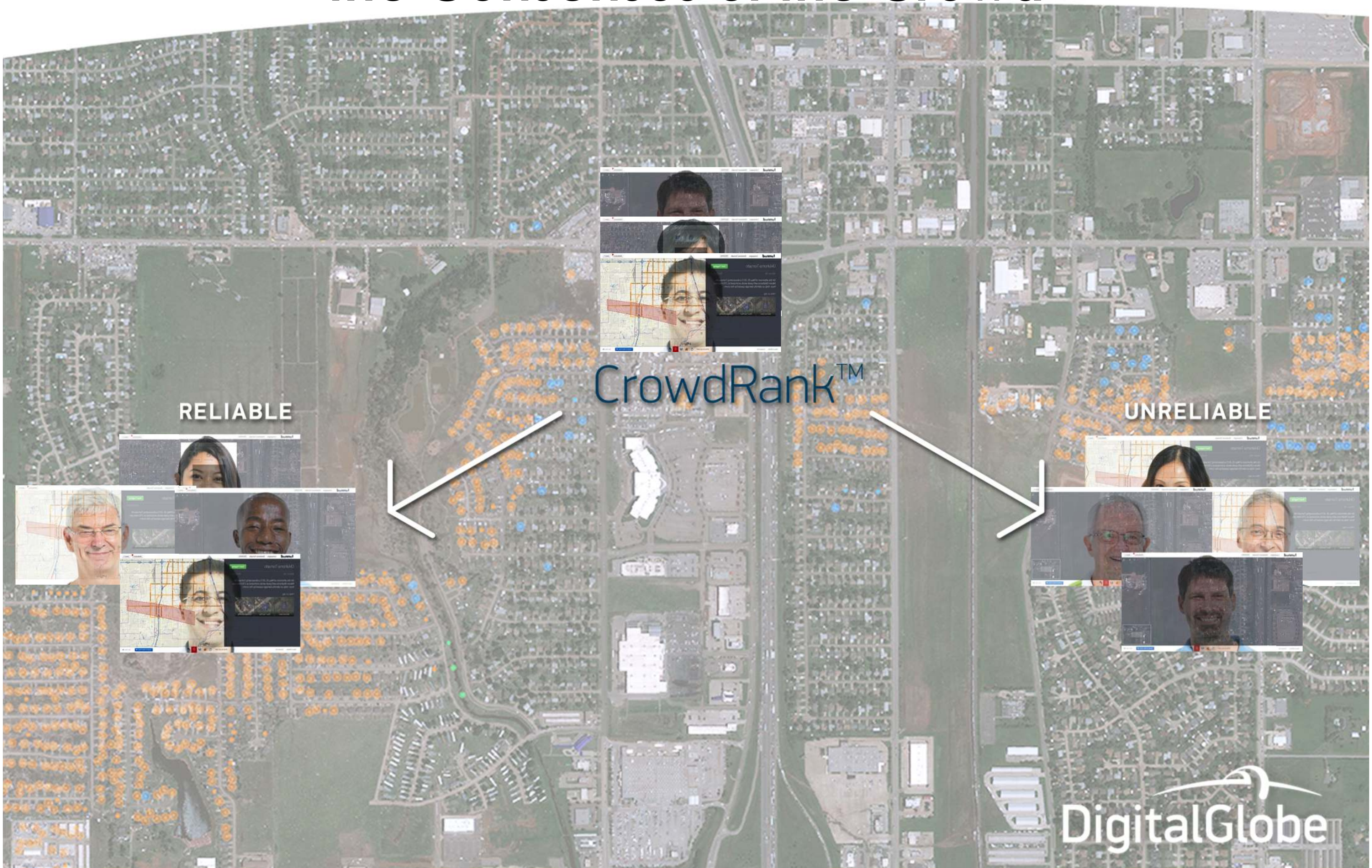
Two analysts would make the job go faster



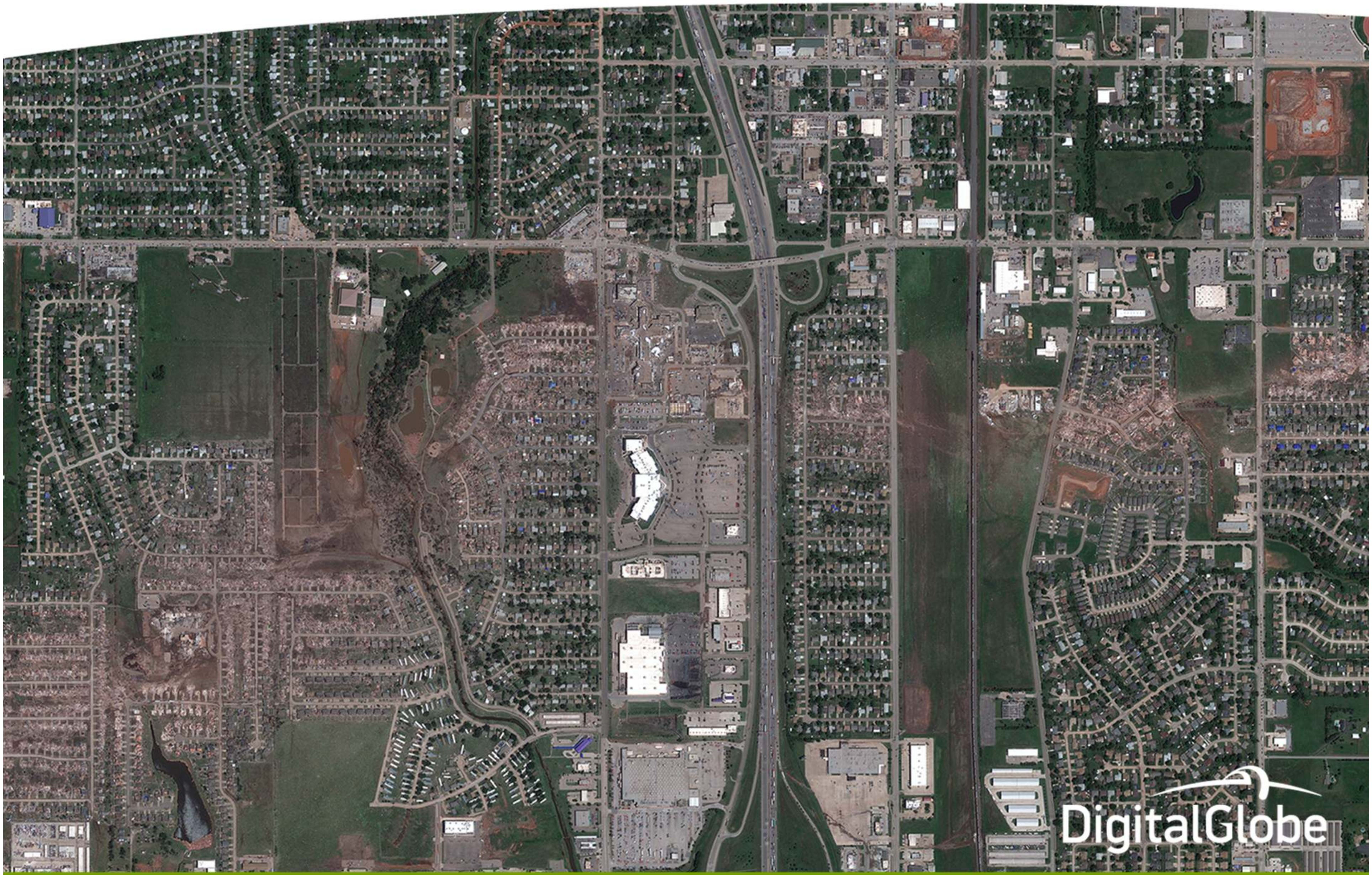
Many analysts would speed it even more



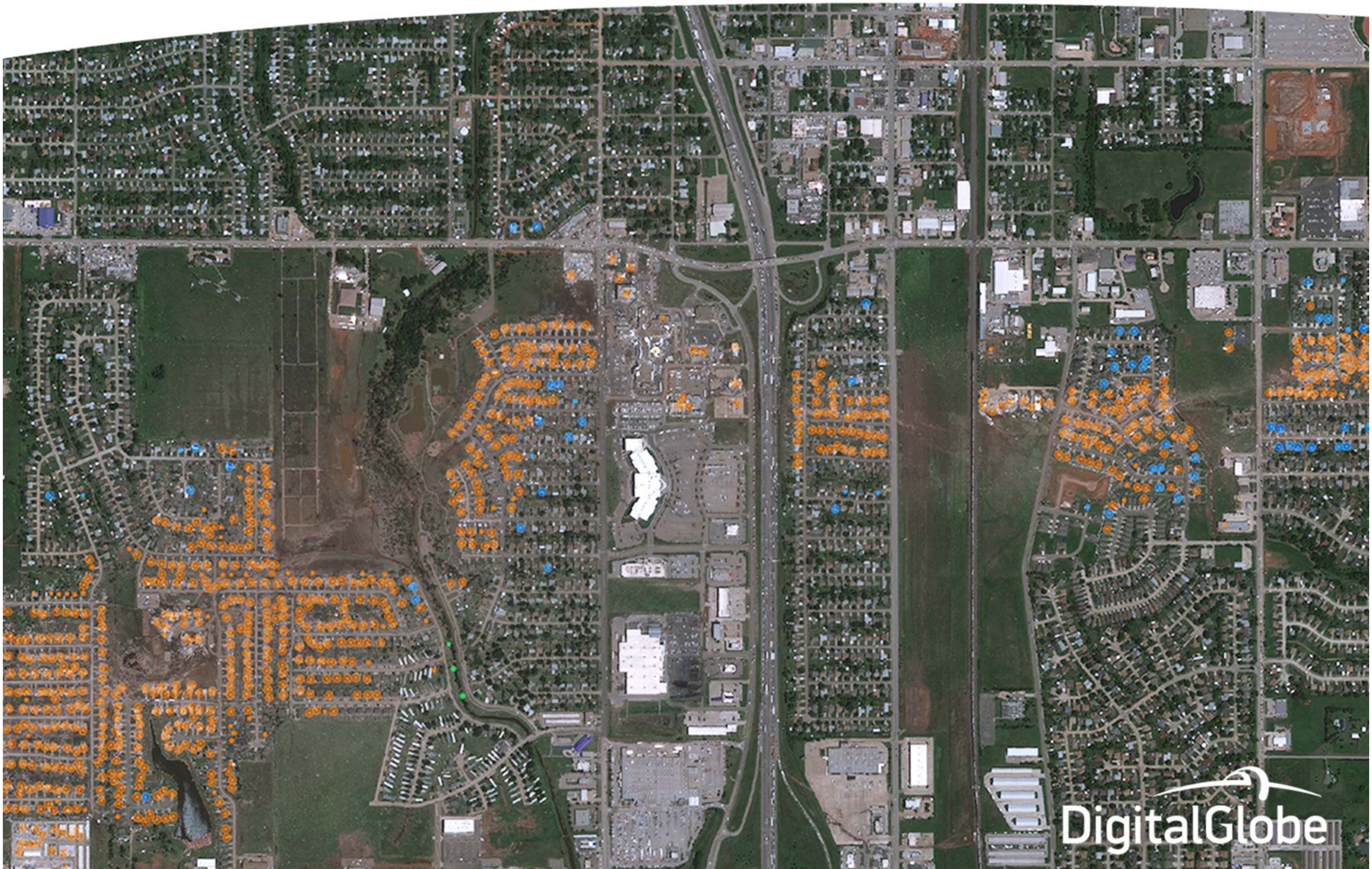
Our CrowdRank™ Technology Develops the Consensus of the Crowd



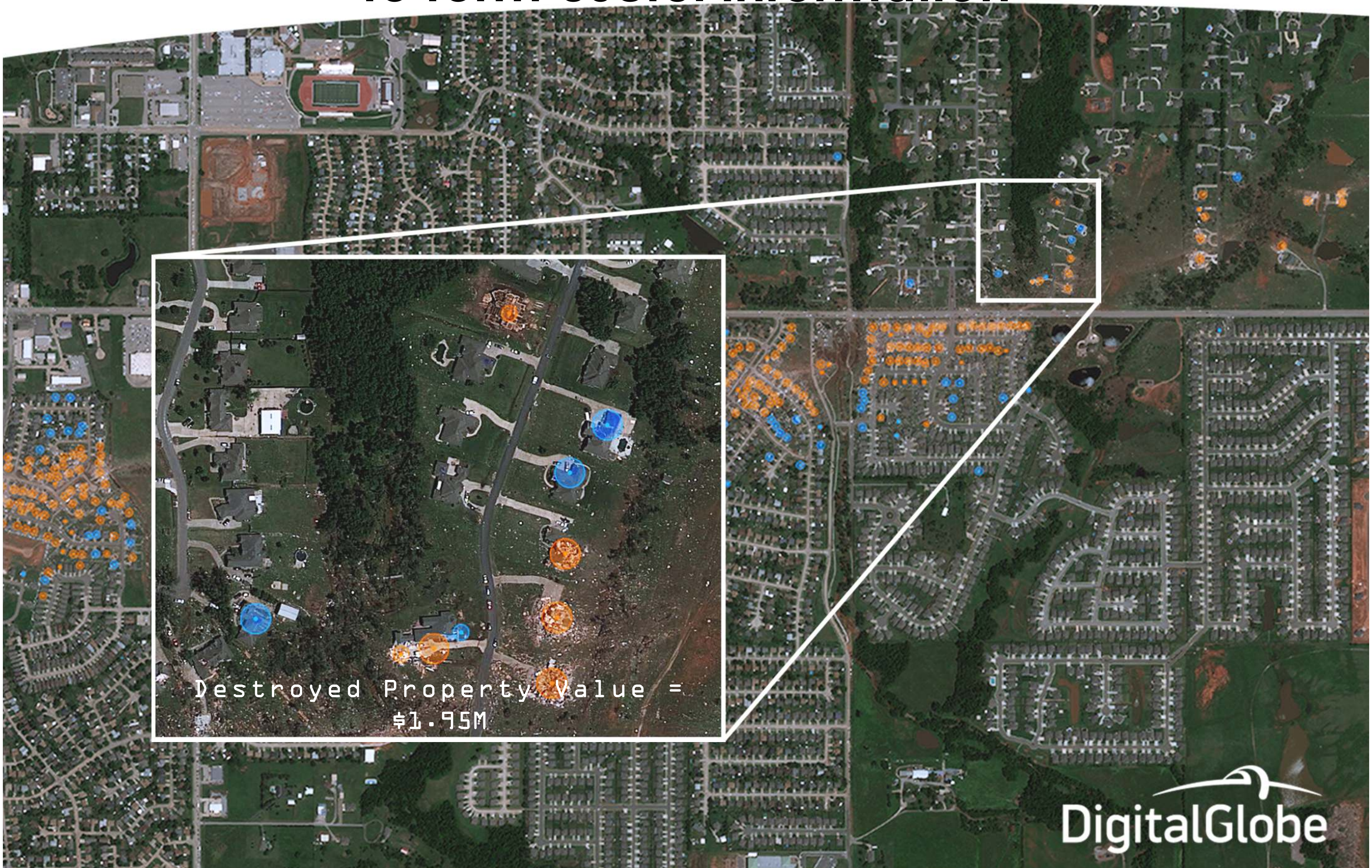
Turning This Image…



…Into This Damage Map, In an Hour

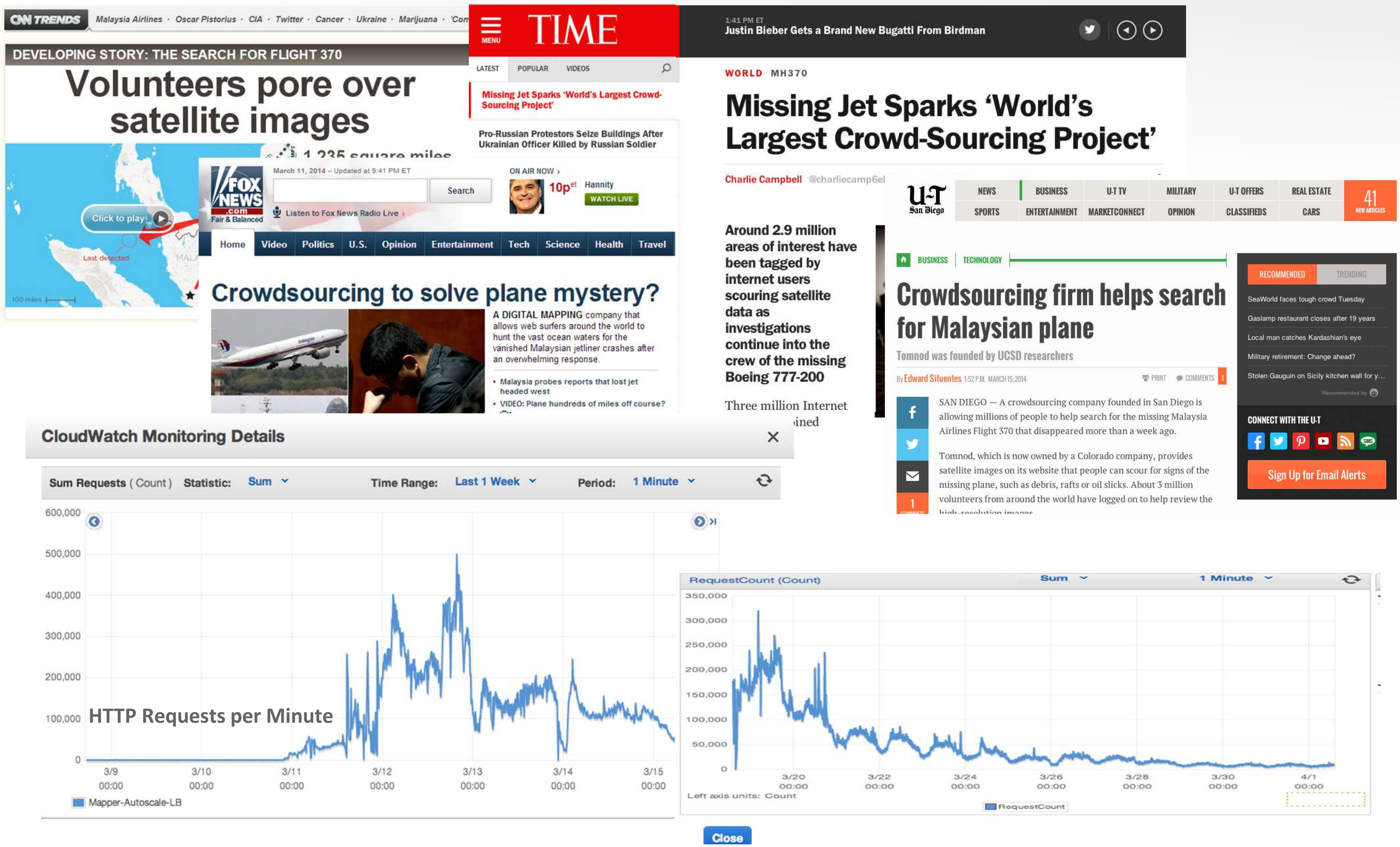


…which can be searched and analyzed to form useful information



MH 370: World's largest crowdsourcing project?

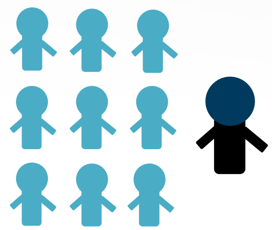
Media Frenzy Drives Traffic to DigitalGlobe



Some impressive statistics…

CROWD

8 MILLION
GUEST USER
ACCOUNTS



MAPS VIEWED

775 **MILLION**
MAP VIEWS

IMAGERY ANALYZED

250
IMAGE STRIPS
ANALYZED BY THE CROWD

NEW EMAIL ADDRESSES

911
THOUSAND

EMAILS CAPTURED

TAGS

14 MILLION
TAGS PLACED

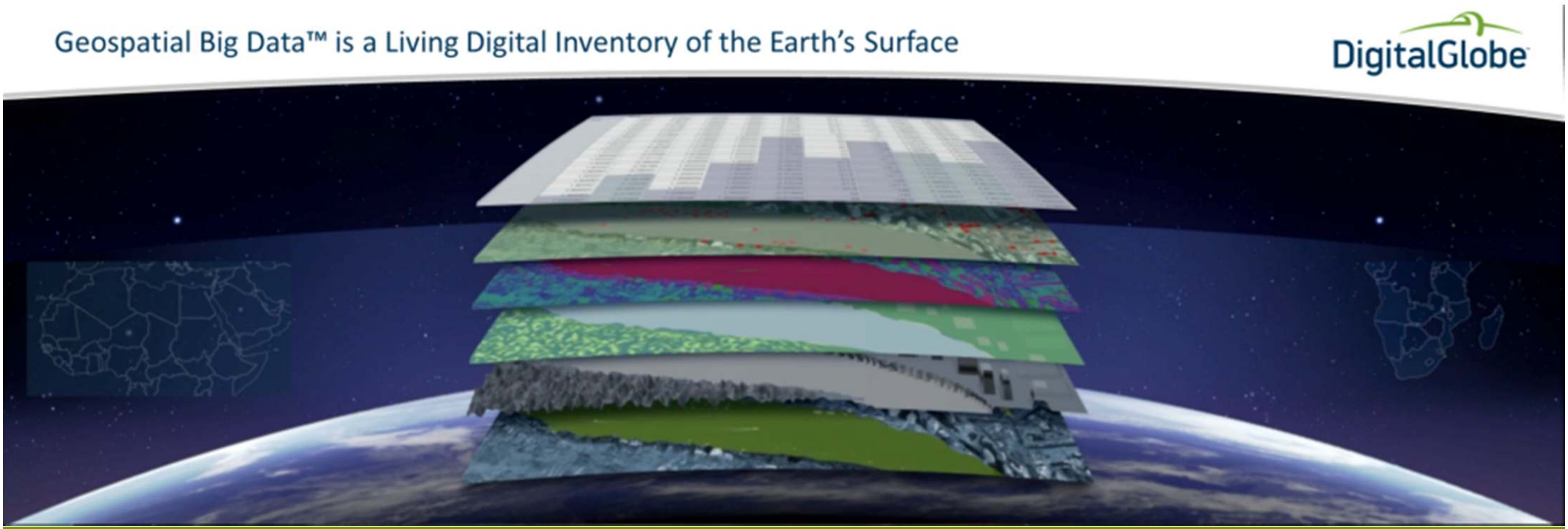
SERVER LOAD

500 **THOUSAND**
HTTP REQUESTS
PER SECOND

Conclusion

Through a combination of computer vision, machine learning, crowdsourcing, DigitalGlobe has begun turning large volumes of raw very high resolution imagery into actionable knowledge scaling to state and country sized regions.

These dynamically evolving Geospatial Big Data™ layers enable the information and insight applications that will make us, by 2020, the indispensable source of information about our changing planet.



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