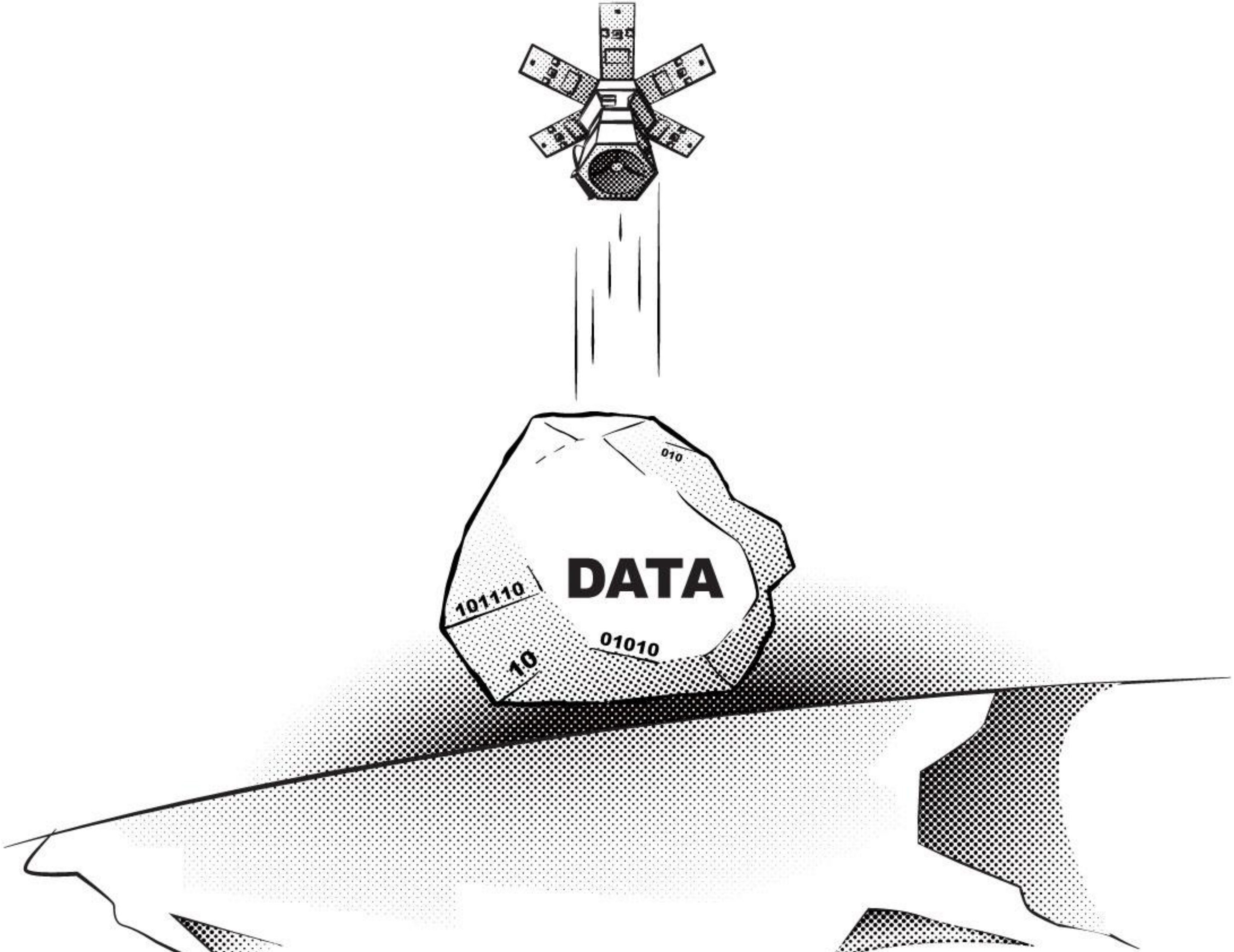
A Geospatial Revolution (Powered by AI) for Energy

DEBORAH HUMPHREVILLE -DIRECTOR OF ENERGY EMEAR | DIGITALGLOBE

See a better world.™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DATA
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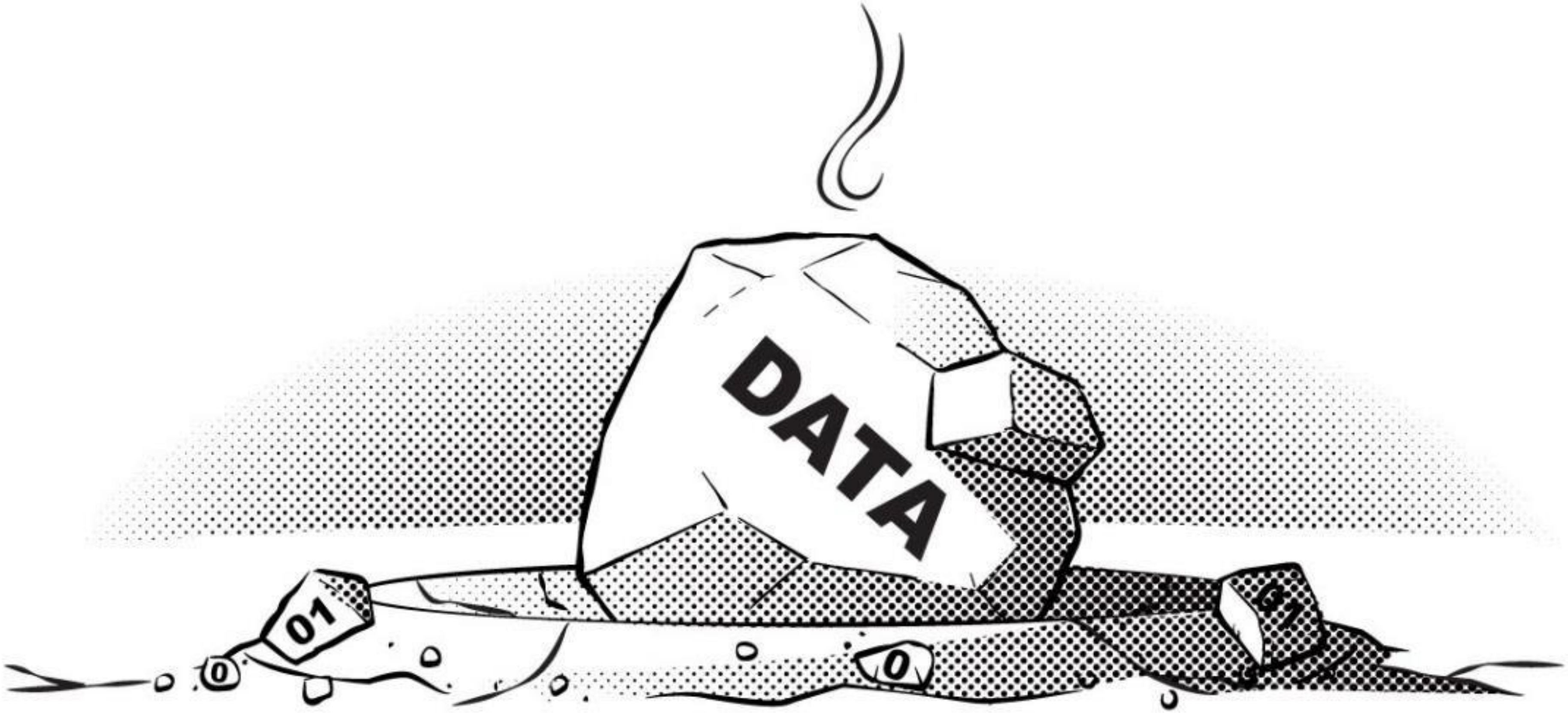
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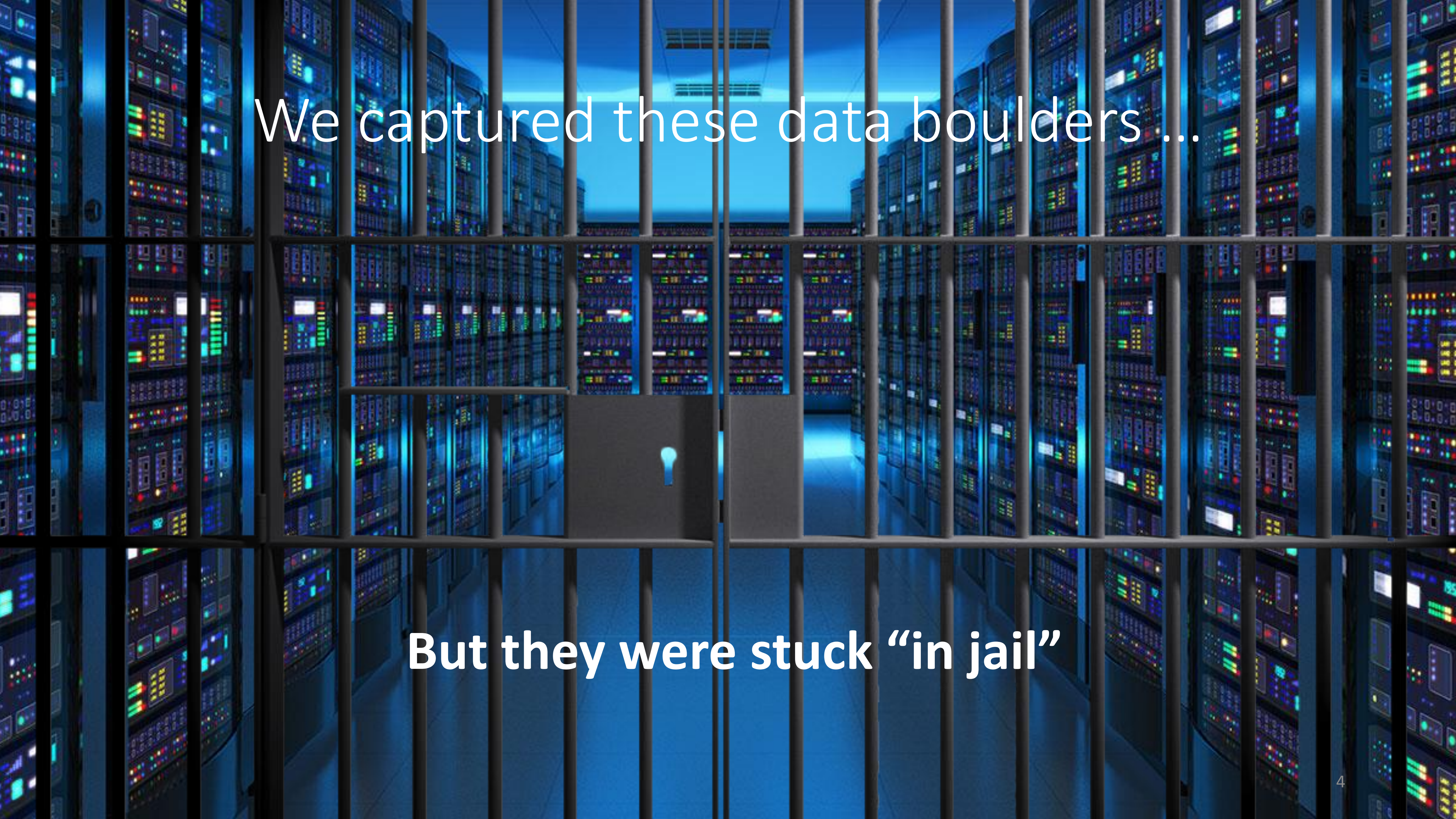
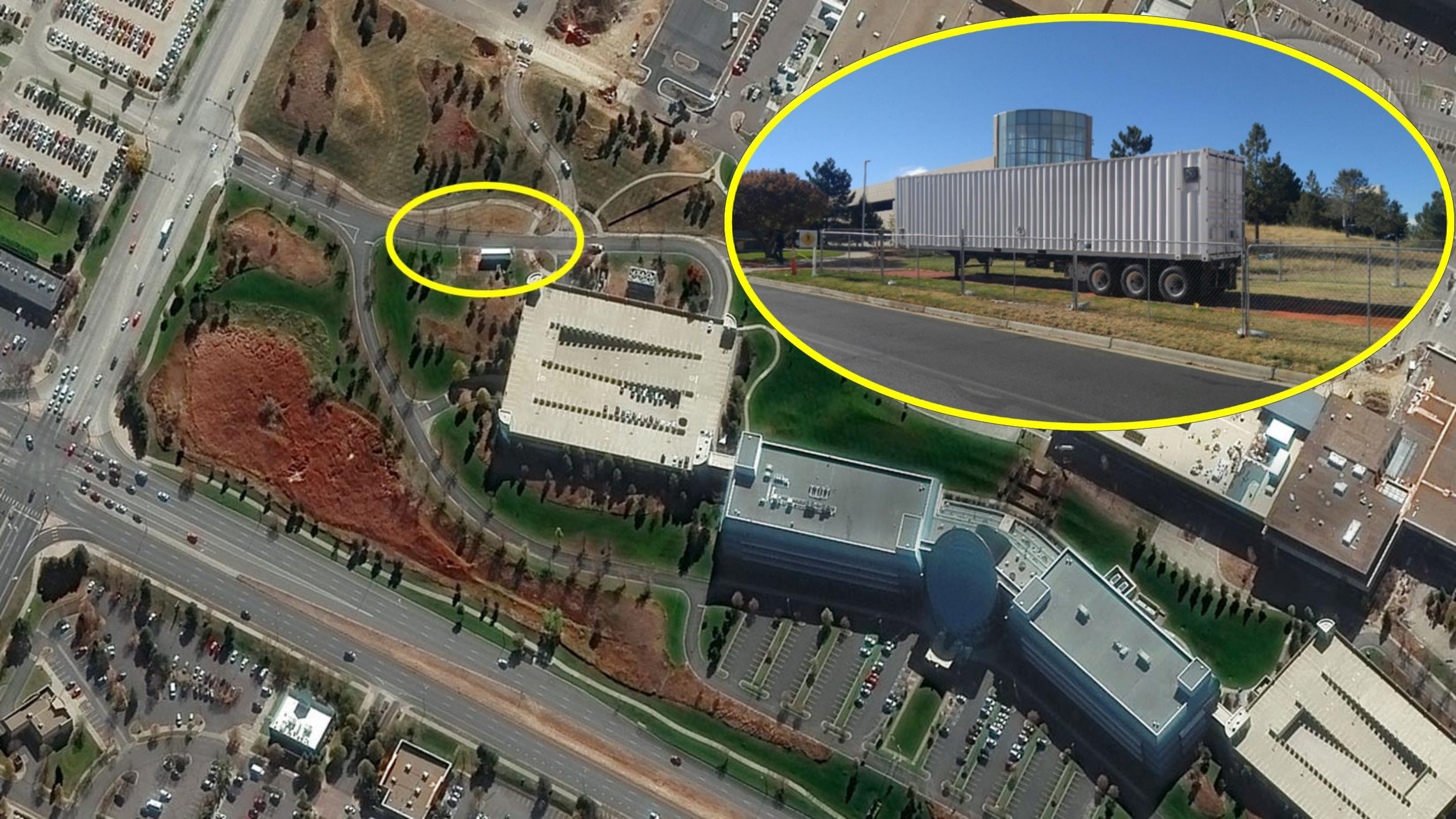
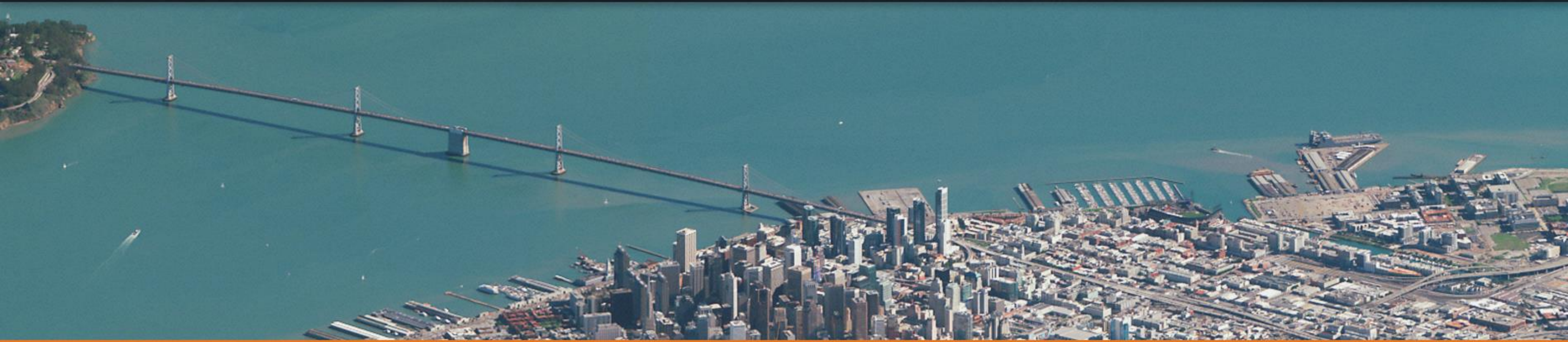


We captured these data boulders …

But they were stuck “in jail”





DeepCore Machine Learning Abstraction Framework

DeepCore is a utility toolkit, written in modern C++ (C++11) by DigitalGlobe

It allows a user to download, perform either image classification or object detection, and manipulate geospatial vector files. DeepCore is intended to be a machine learning framework agnostic toolkit, allowing for a simple, clean, consistent programmatic interface. It also provides easy access to the DigitalGlobe imagery archive. As new machine learning techniques and frameworks emerge, they can easily be integrated into DeepCore. This allows developers using DeepCore to easily extend their applications with the latest technology, without having to worry about the complexities of each framework or

DeepCore's machine learning features can also be accelerated by the use of Nvidia Graphics Processing Units (GPUs) using CUDA technology. By enabling GPU mode, the process of object detection becomes very quick, allowing for faster and more efficient processing of large geographic areas. The use of GPUs to accelerate machine learning and object detection processes is highly recommended.

THE CHALLENGE for FINDING OIL …..

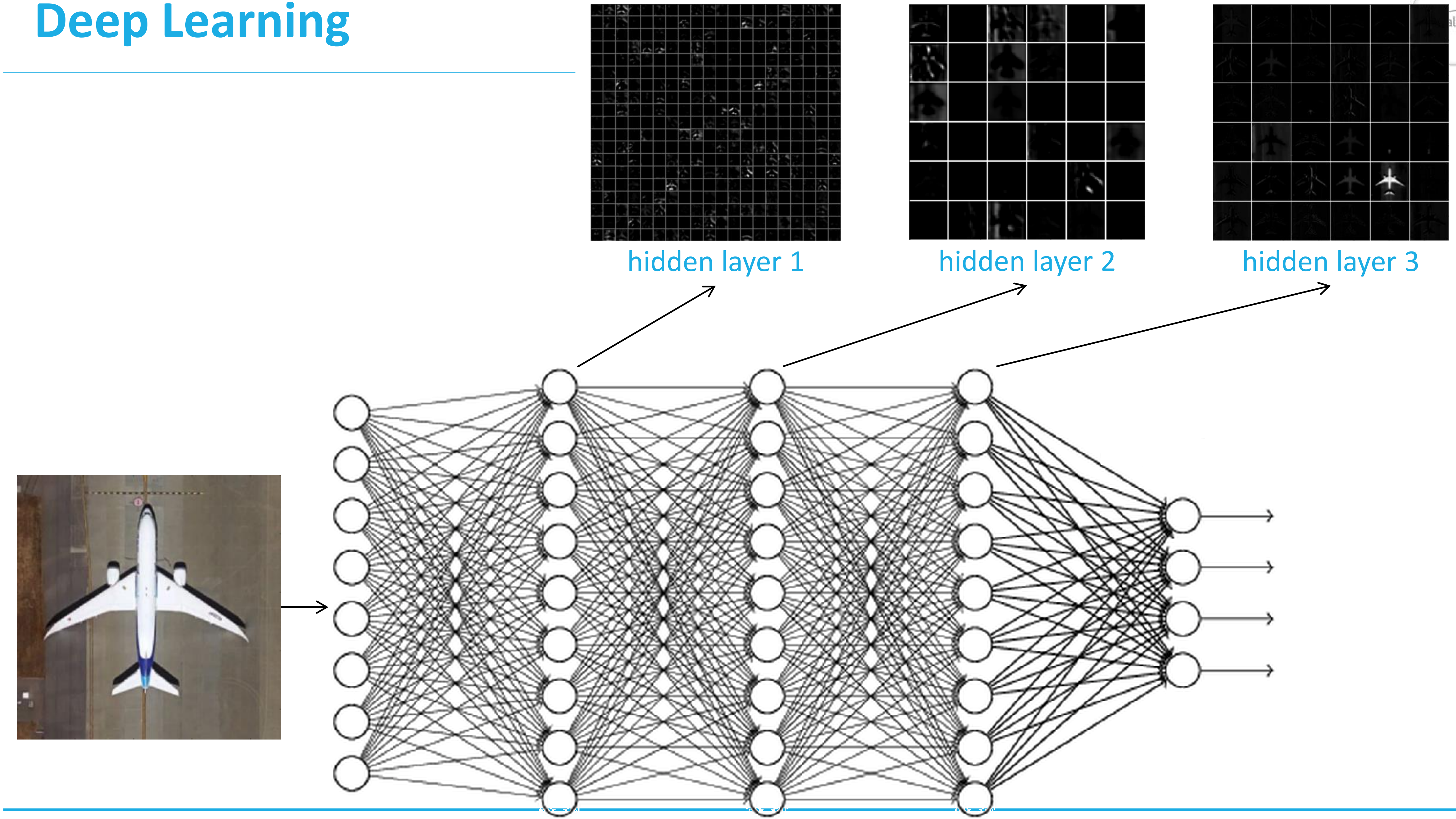
HOW DO WE ANALYSE ALL SENSOR DATA INTO SOMETHING RELEVANT ?

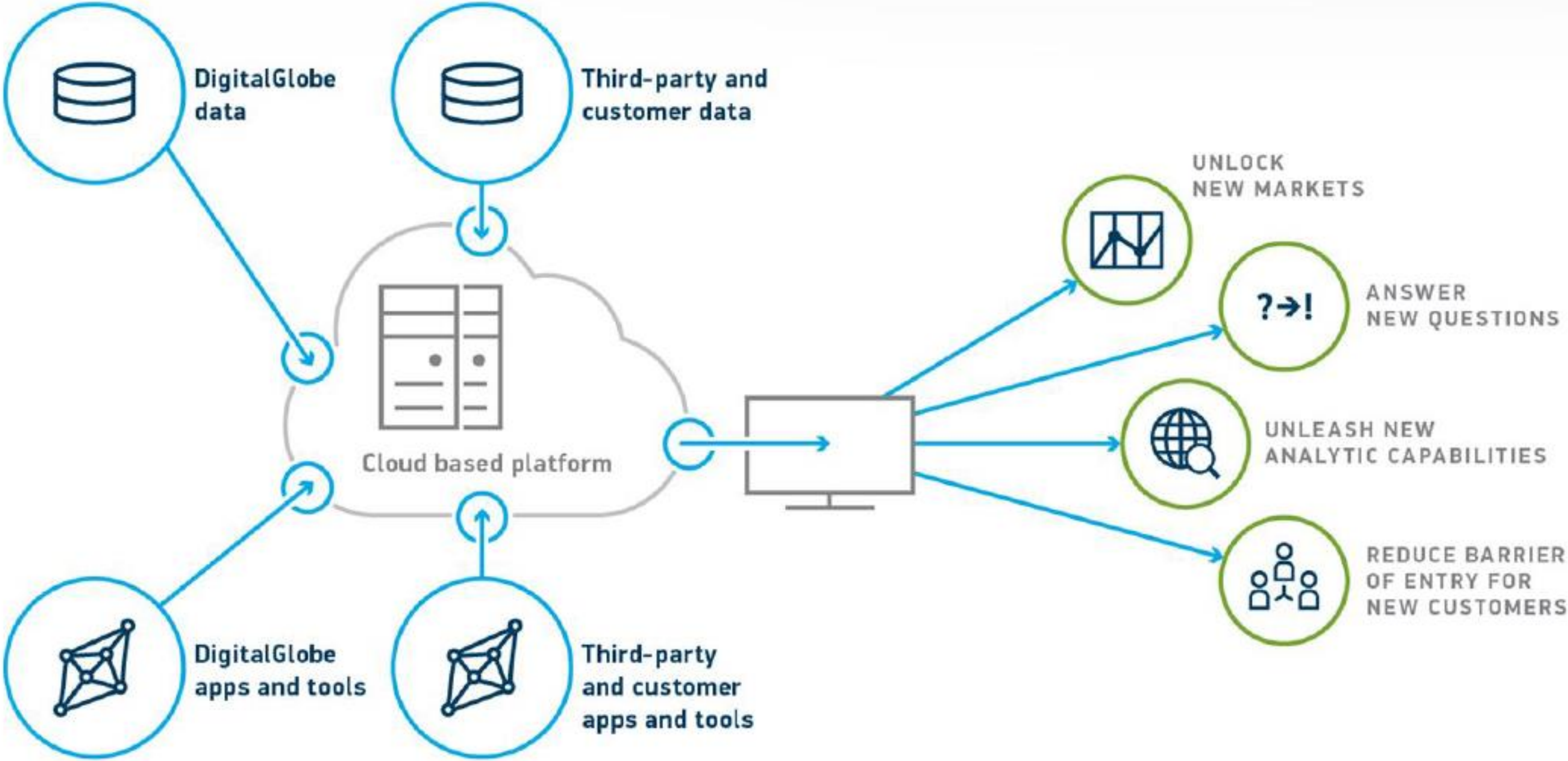
It’s all about the **information**

⛁ + ⚙ + 👥 + 📈 + 📖

Data	Customer data such as sensor data, your data and access to DigitalGlobe’s entire imagery archive, plus 3rd party data including RADAR
Compute	Highly scalable compute architecture for parallel processing of analytics
Ecosystem	Access to DigitalGlobe , partners and developer and proprietary ecosystem of algorithms
Analytics	ENVI, CrowdAI, ThinkTopic, Simularity, Exogenesis, SAP Hanna,
Information	Asset monitoring, Specialized Change Detection, Building Footprints, etc.

Deep Learning


hidden layer 1
hidden layer 2
hidden layer 3



DigitalGlobe data

Third-party and customer data

Cloud based platform

DigitalGlobe apps and tools

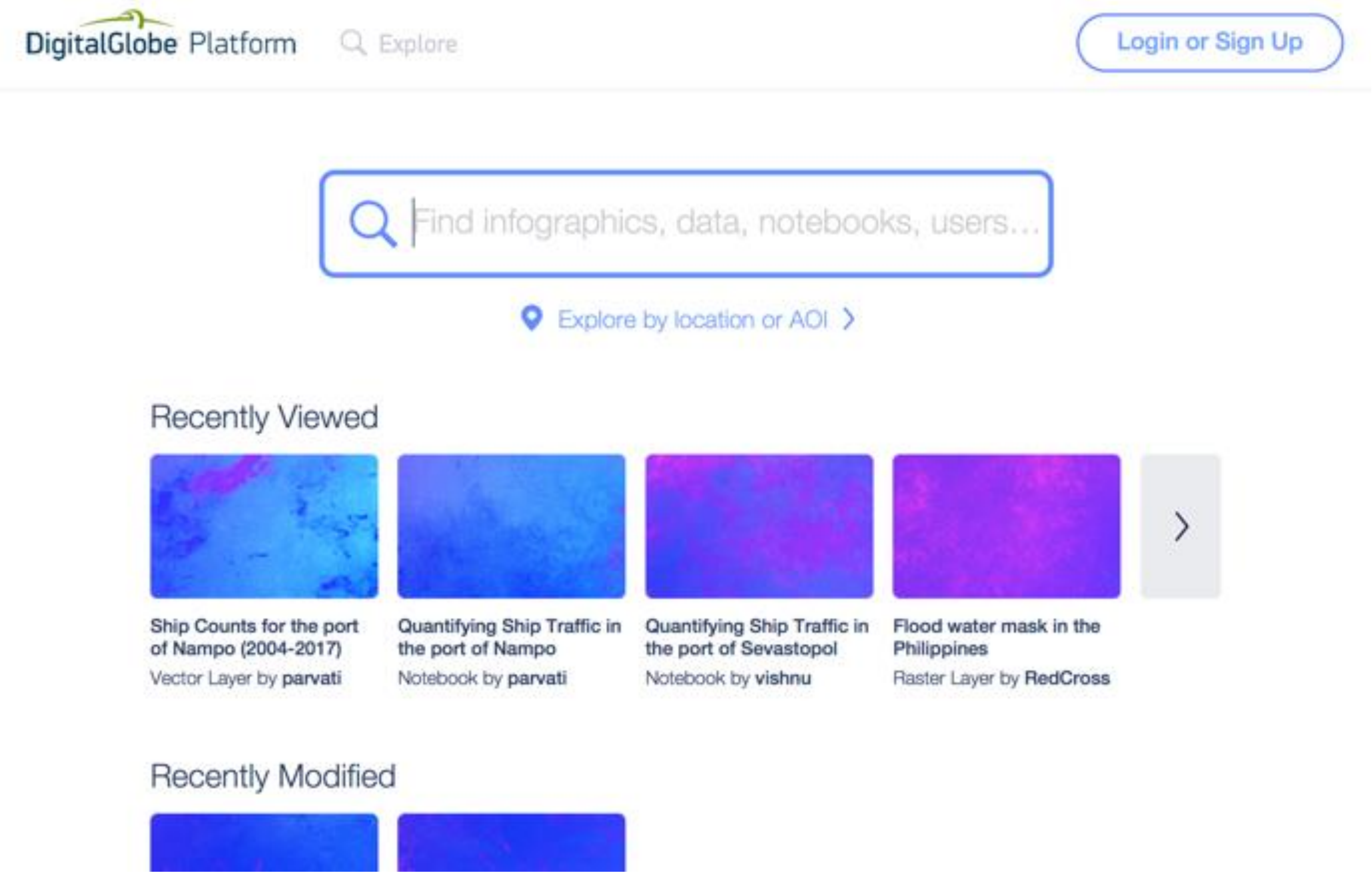
Third-party and customer apps and tools

UNLOCK NEW MARKETS

ANSWER NEW QUESTIONS

UNLEASH NEW ANALYTIC CAPABILITIES

REDUCE BARRIER OF ENTRY FOR NEW CUSTOMERS


DigitalGlobe Platform
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Find infographics, data, notebooks, users...
Explore by location or AOI

Recently Viewed

Ship Counts for the port of Nampo (2004-2017)
Vector Layer by **parvati**

Quantifying Ship Traffic in the port of Nampo
Notebook by **parvati**

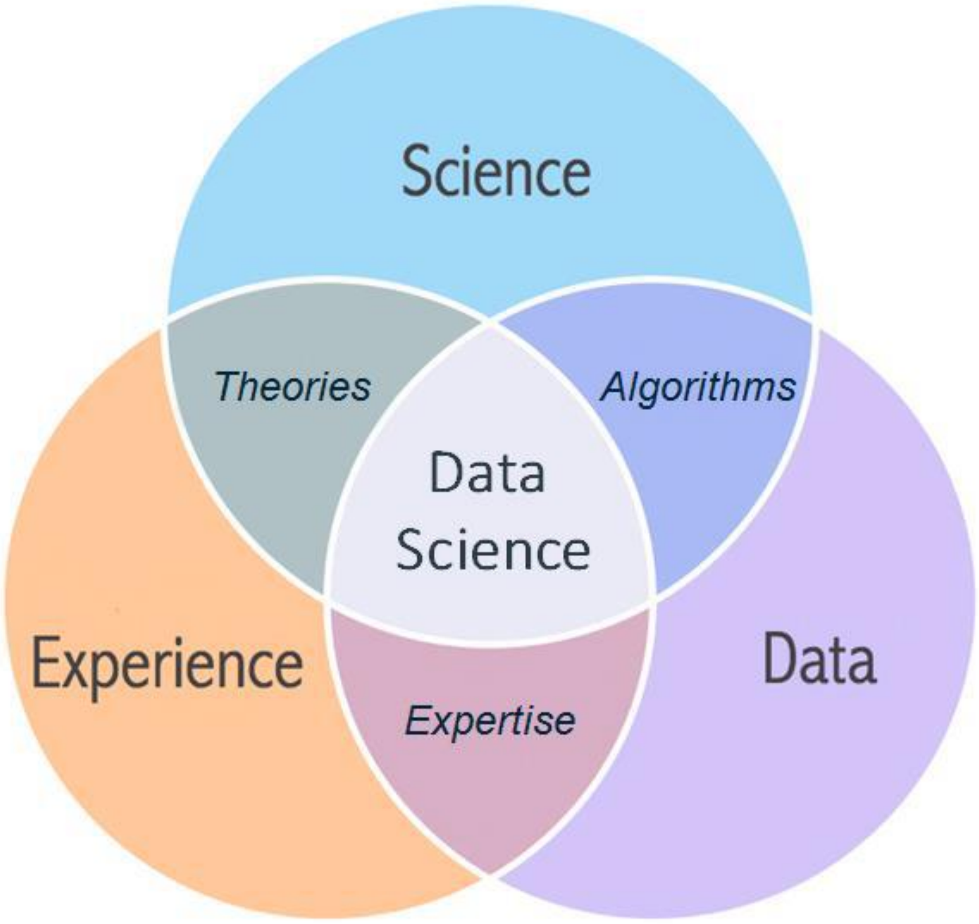
Quantifying Ship Traffic in the port of Sevastopol
Notebook by **vishnu**

Flood water mask in the Philippines
Raster Layer by **RedCross**

Recently Modified

Where Does Geospatial Data Provide Operational Efficiencies

Goal


Science
Theories
Algorithms
Data Science
Experience
Expertise
Data

Benefits

- Cost Savings
- Decrease downtime
- Higher efficiencies
- Better handle of Inventories
- Predict transport & travel logistics
- Optimize energy consumption
- Reduce carbon emission
- Detecting unusual Patterns through Analytics

7.6 million square km

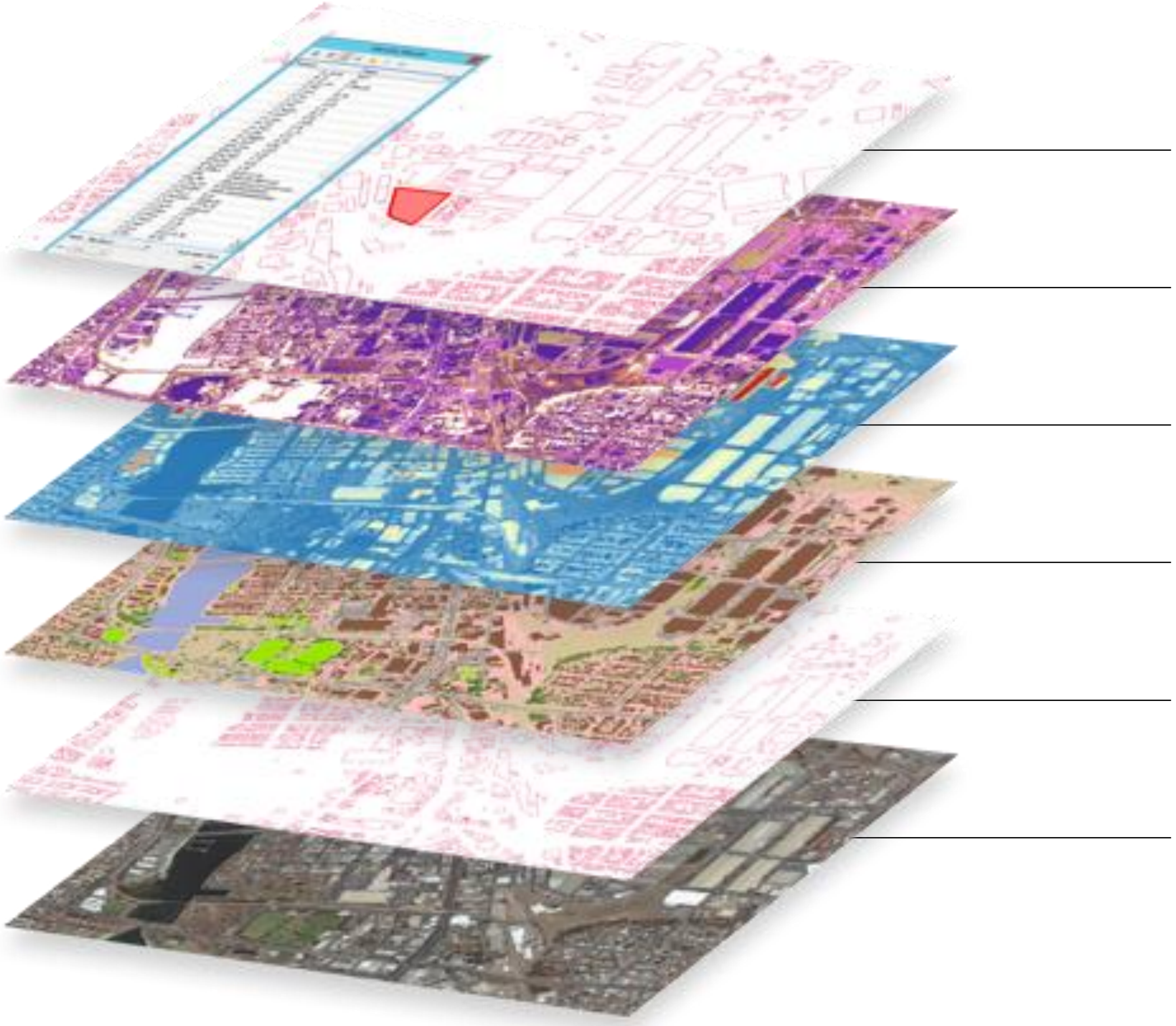
24 million people

13 million structures

spatial analysis at

CONTINENTAL SCALE

Geoscape - Turning data into information



Spatial database w/ building attributes

Roof material extraction

Digital Surface Model—Elevation map

High-resolution land cover map

Building footprint extraction

High-resolution satellite imagery

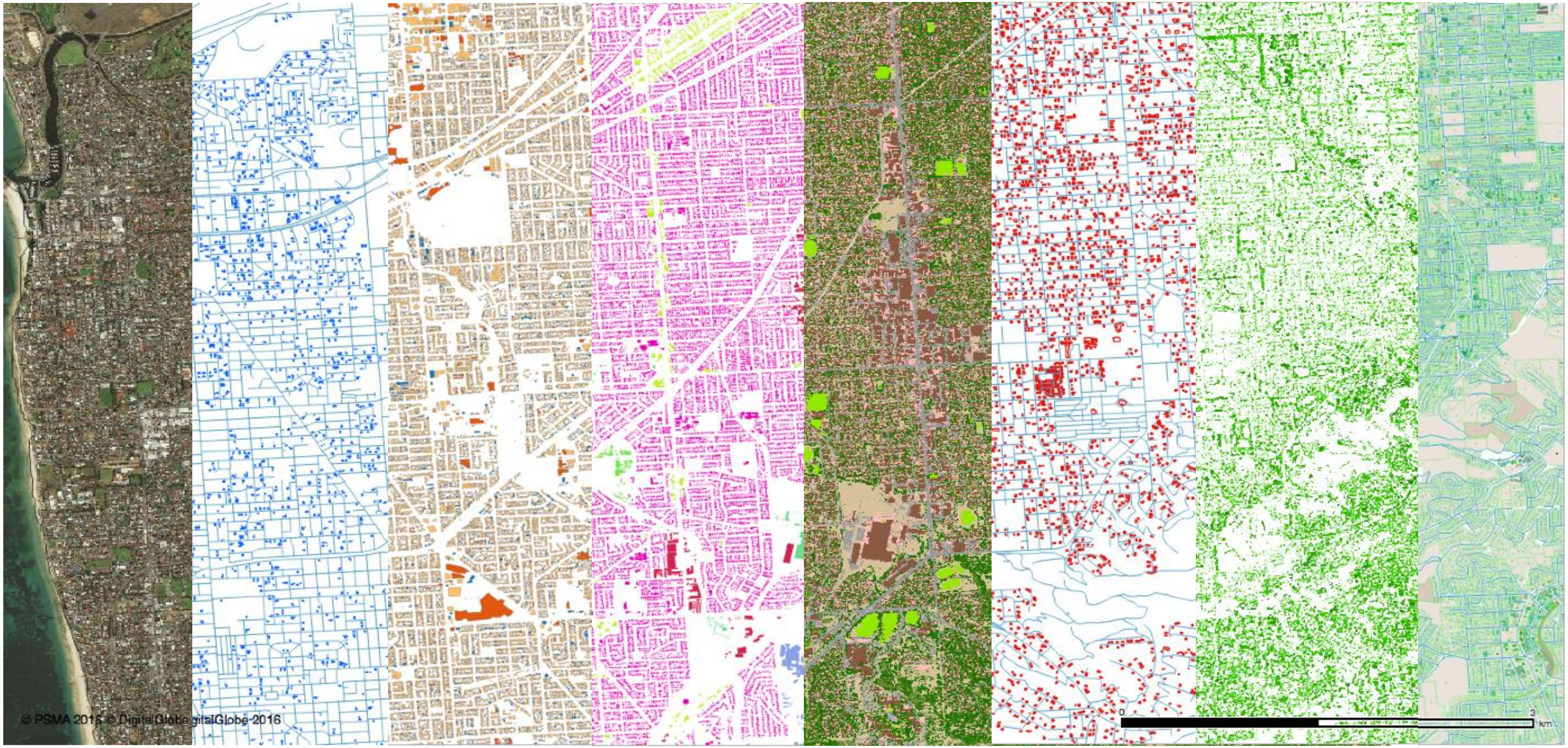
Analytics

- Machine Learning
    - Object Detection
    - Feature Extraction
- Generalized Change Detection
- Anomaly Detection
- In House Analytics
- ESRI Raster Analytics
- ENVI Algorithms

Key Drivers

- Explosion of new algorithms/methods not integrated with existing work streams
- Procurement activities protracted and complex
- All require large volumes of data access to be relevant
- Accelerate ecosystem growth to drive solutions for niche/unique demands

…enabling the creation of continental scale location intelligence products


© PSMA 2016 © DigitalGlobe gitalGlobe 2016
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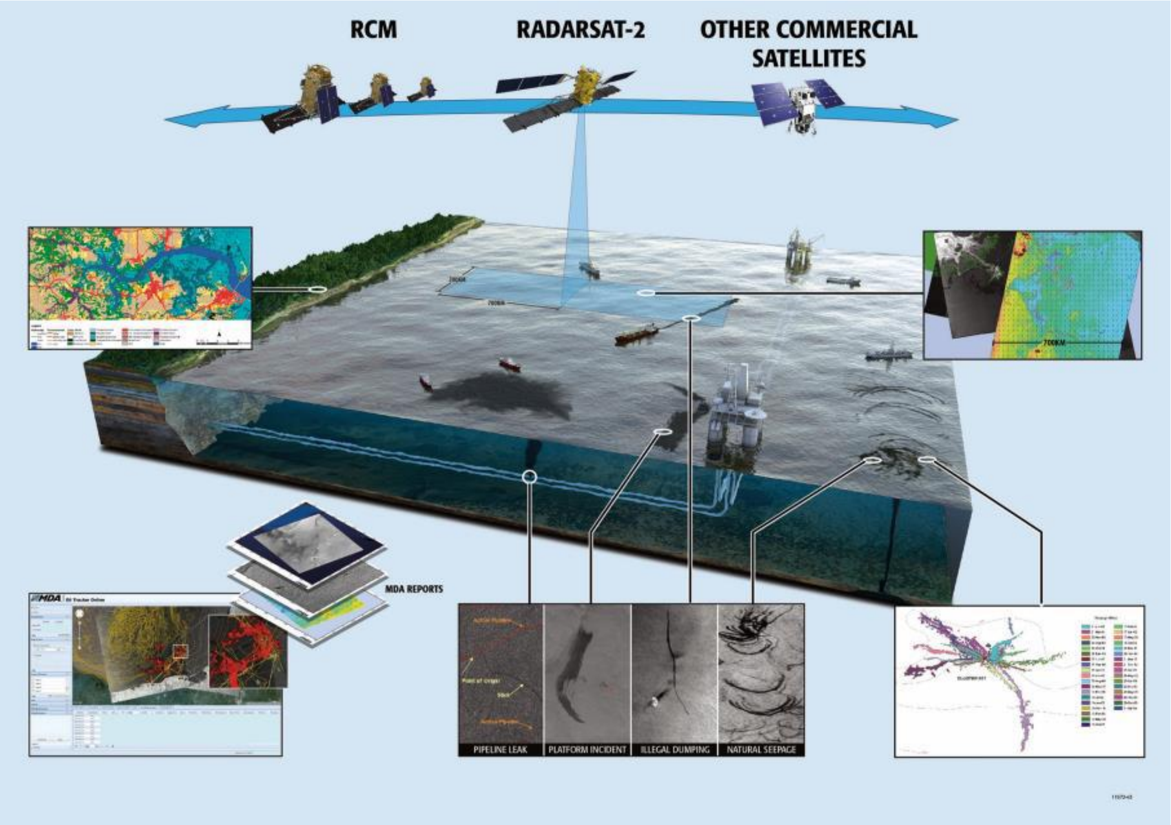
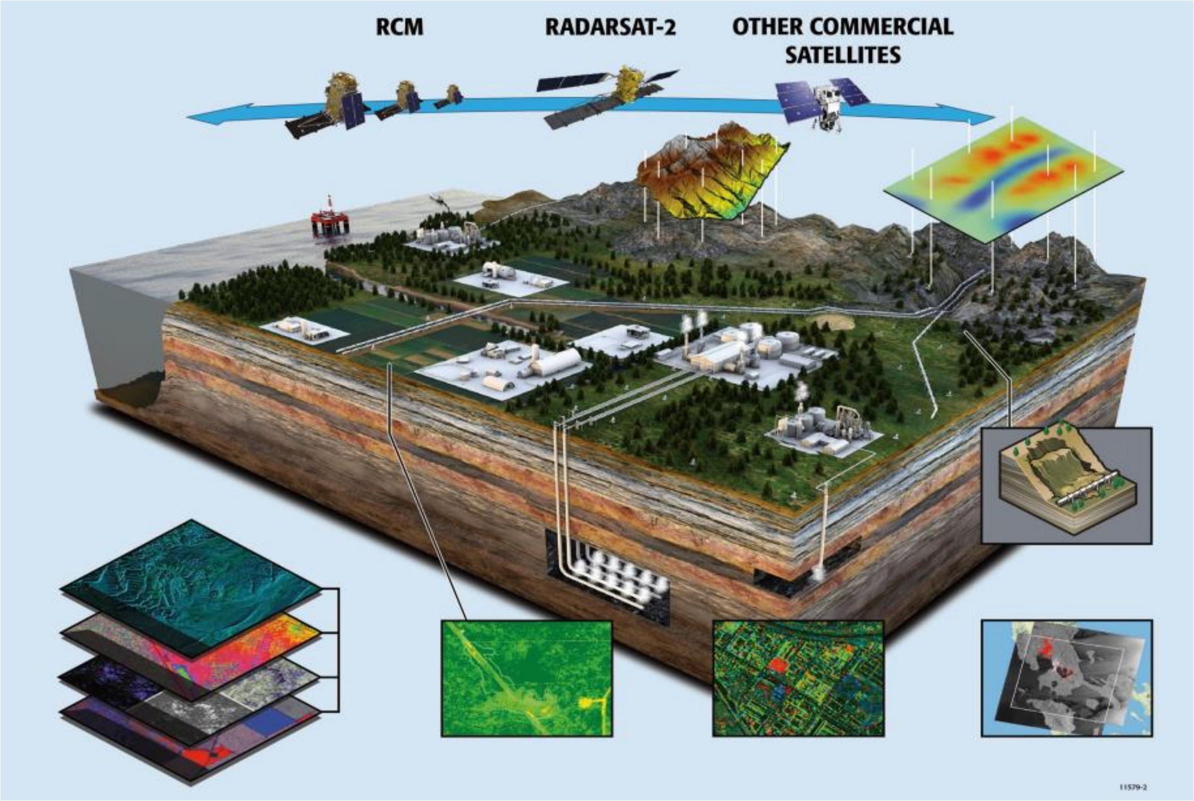
3
km

Operations Analytics


RCM
RADARSAT-2
OTHER COMMERCIAL SATELLITES
MDA REPORTS
PIPELINE LEAK
PLATFORM INCIDENT
ILLEGAL DUMPING
NATURAL SEEPAGE

- Oil on water detection from all source
- Natural Seep Studies
- Incident response support
- Vessel/platform monitoring
- Metocean information
- Shoreline sensitivity mapping


RCM
RADARSAT-2
OTHER COMMERCIAL SATELLITES

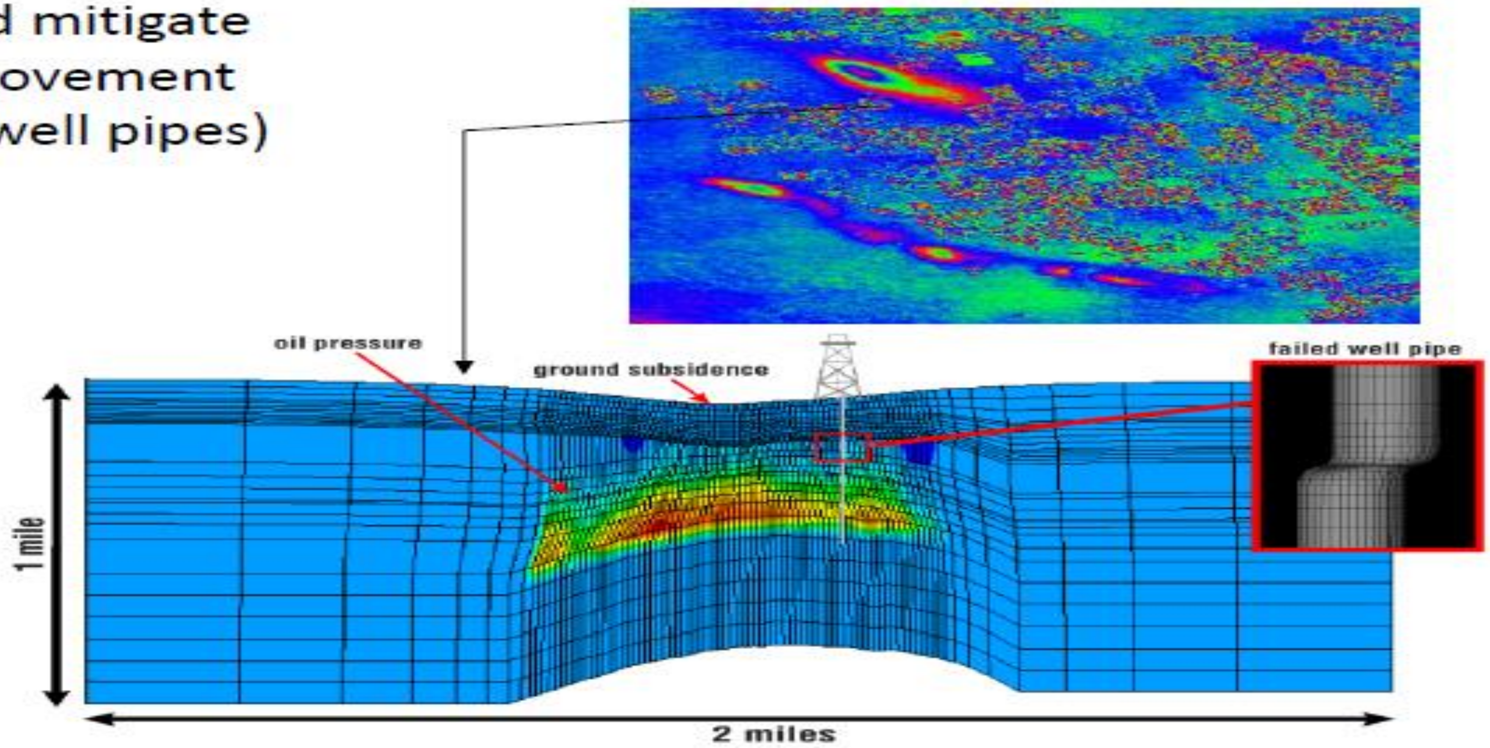
- Ground Movement and Geo-hazard Monitoring
- Enhanced Oil Recovery Monitoring
- Pipeline monitoring
- Change Detection
- Historical Movement Analysis
- Digital Elevation Models
- Map Products

MDA

What if you could predict damage to wells ?

Production Monitoring

- Ground movement data can be used to optimize operations and mitigate the impact of ground movement on infrastructure (e.g., well pipes)


oil pressure
ground subsidence
failed well pipe
1 mile
2 miles

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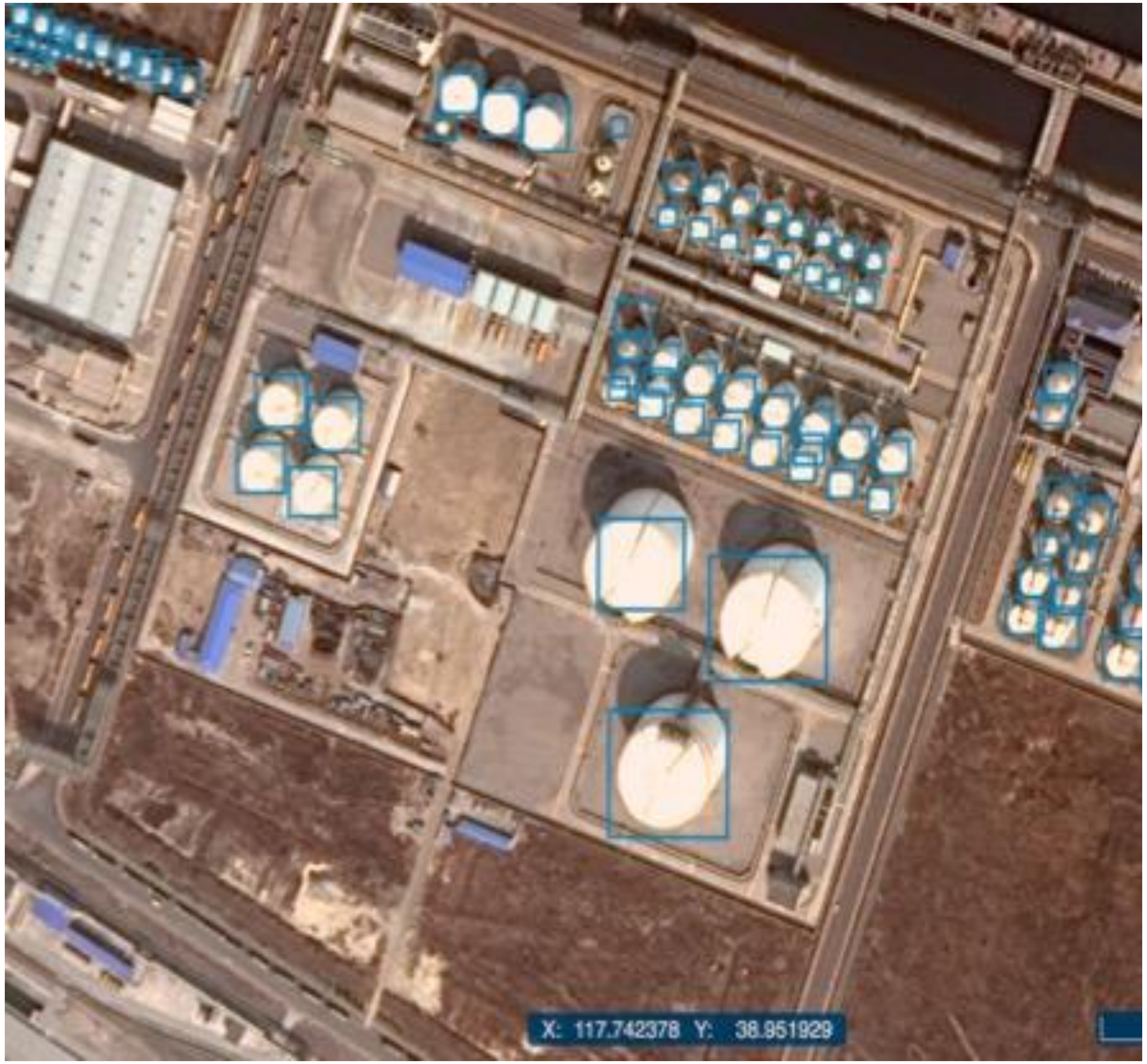
Information Layers

- Unconventional Asset Monitoring
- Pipeline Monitoring
- Land based Asset Monitoring
- Infrastructure Monitoring
- Building Extraction
- Oil Seep Mapping
- Road Extraction
- Competitive intelligence
- Refinery and Tank Farm Monitoring

Key Drivers

- “Best available” data sets derived from most current content
- Customers indicate they have analysis needs but don’t want to create every Information Layer themselves.
- Support a larger market

From Production to Storage


X: 117.742378 Y: 38.951929

Pipeline and Asset Detection

Customer Requirement

Rapid assessment pipeline locations , well pads and assets from space

Challenge

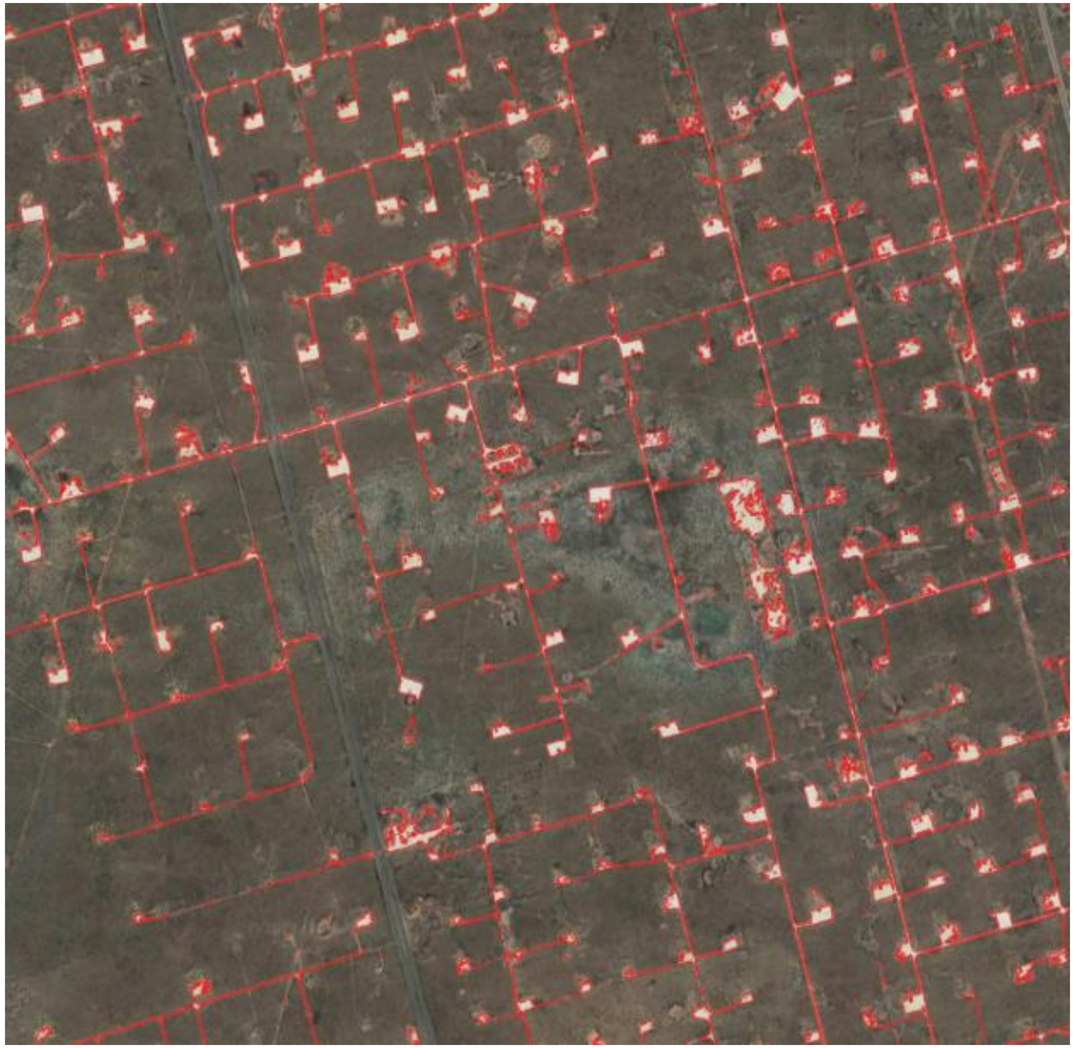
How to detect and monitor pipelines and assets in a cost efficient manner

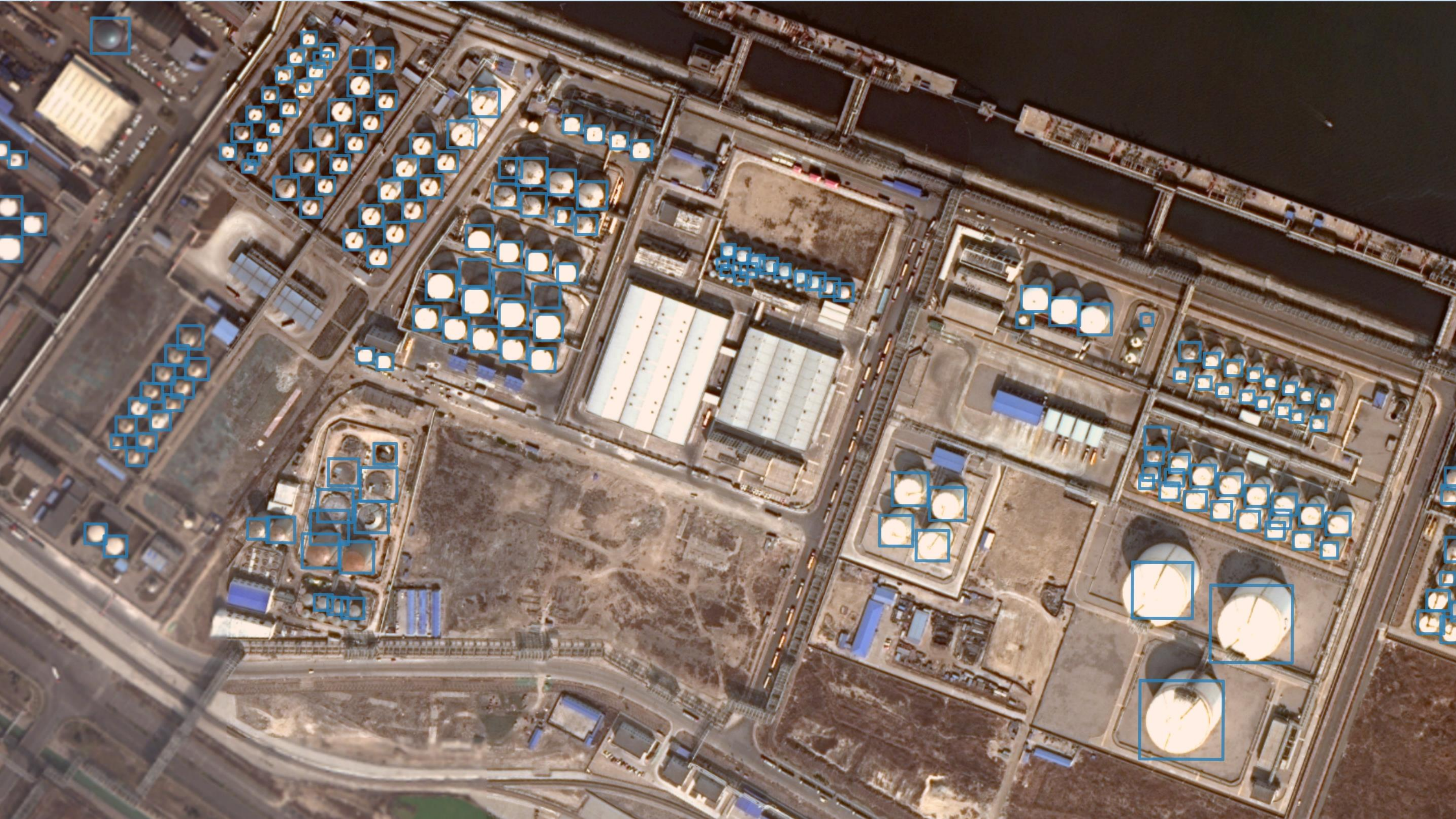
Solution

Large scale automated asset detection combined with optical, radar, and other source of surveillance

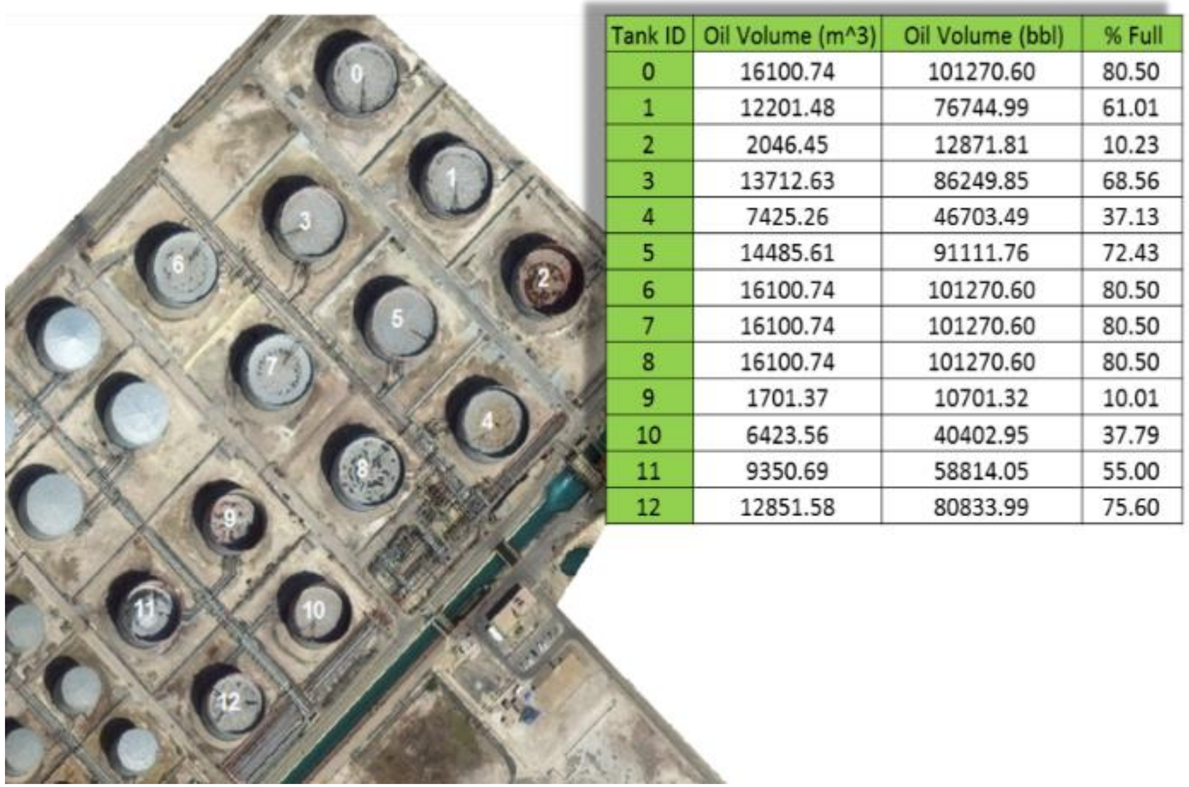
Benefit

Cost effective monitoring of assets in urban, and or remote locations





Floating Tank Lid Monitoring



Tank ID	Oil Volume (m^3)	Oil Volume (bbl)	% Full
0	16100.74	101270.60	80.50
1	12201.48	76744.99	61.01
2	2046.45	12871.81	10.23
3	13712.63	86249.85	68.56
4	7425.26	46703.49	37.13
5	14485.61	91111.76	72.43
6	16100.74	101270.60	80.50
7	16100.74	101270.60	80.50
8	16100.74	101270.60	80.50
9	1701.37	10701.32	10.01
10	6423.56	40402.95	37.79
11	9350.69	58814.05	55.00
12	12851.58	80833.99	75.60

Customer Requirement

Monitoring of floating tank lids to add critical information to trading algorithms

Challenge

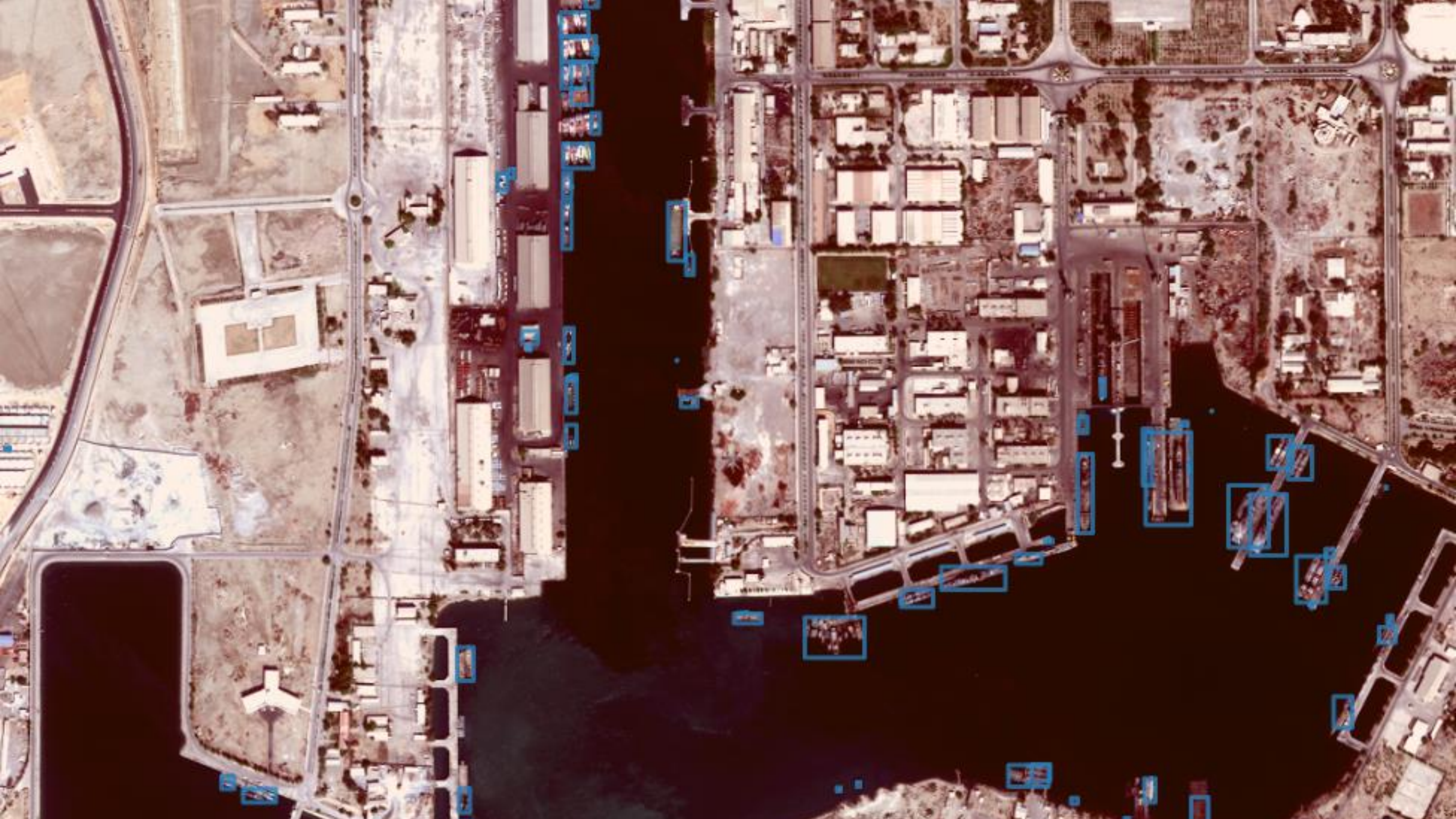
How to determine information on oil inventories that are not publically reported on a regular basis

Solution

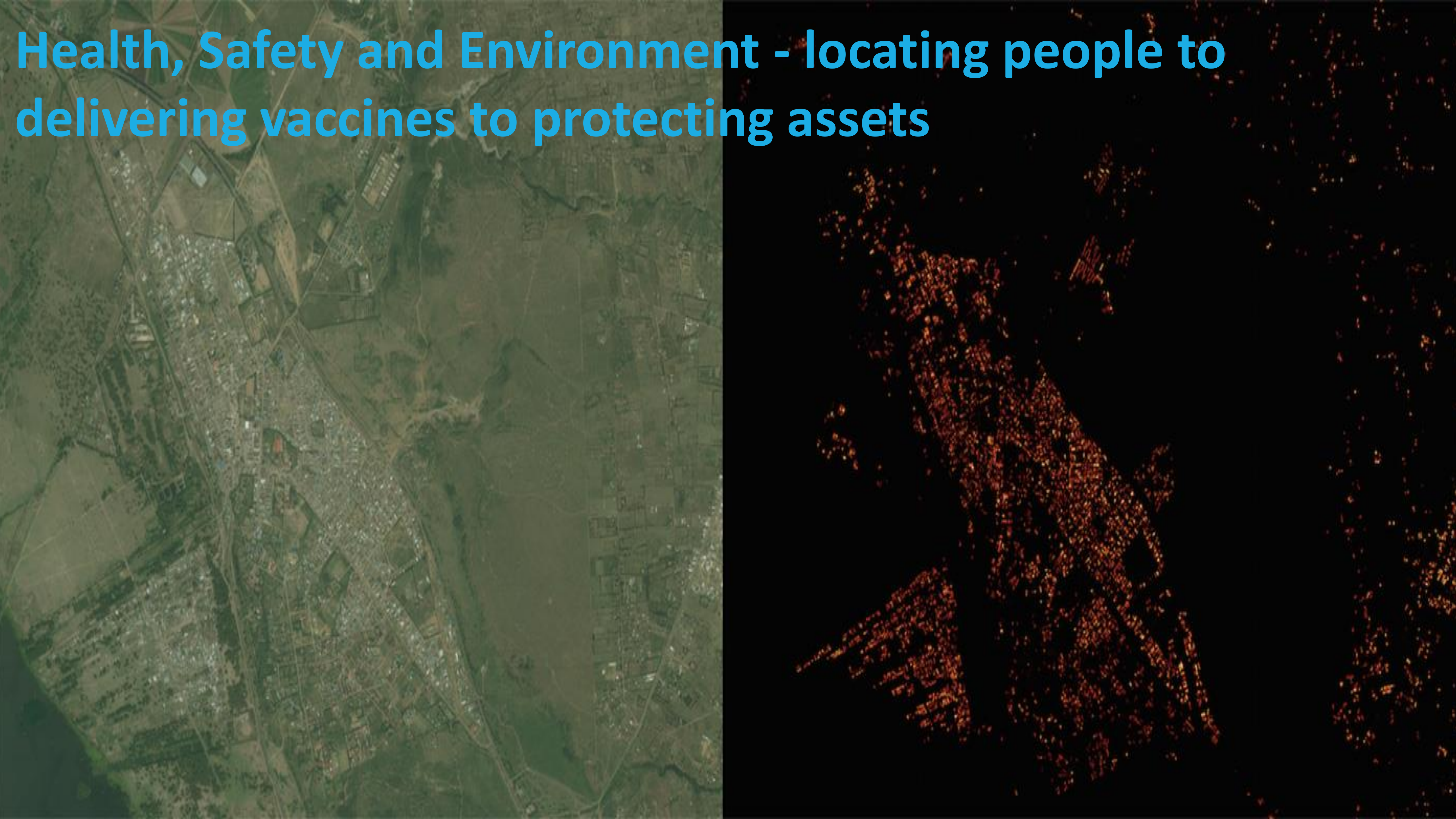
Two measurement methodologies to calculate oil tank volume levels from high resolution imagery. Calculations Include volume capacity, temporal monitoring, historical Trends

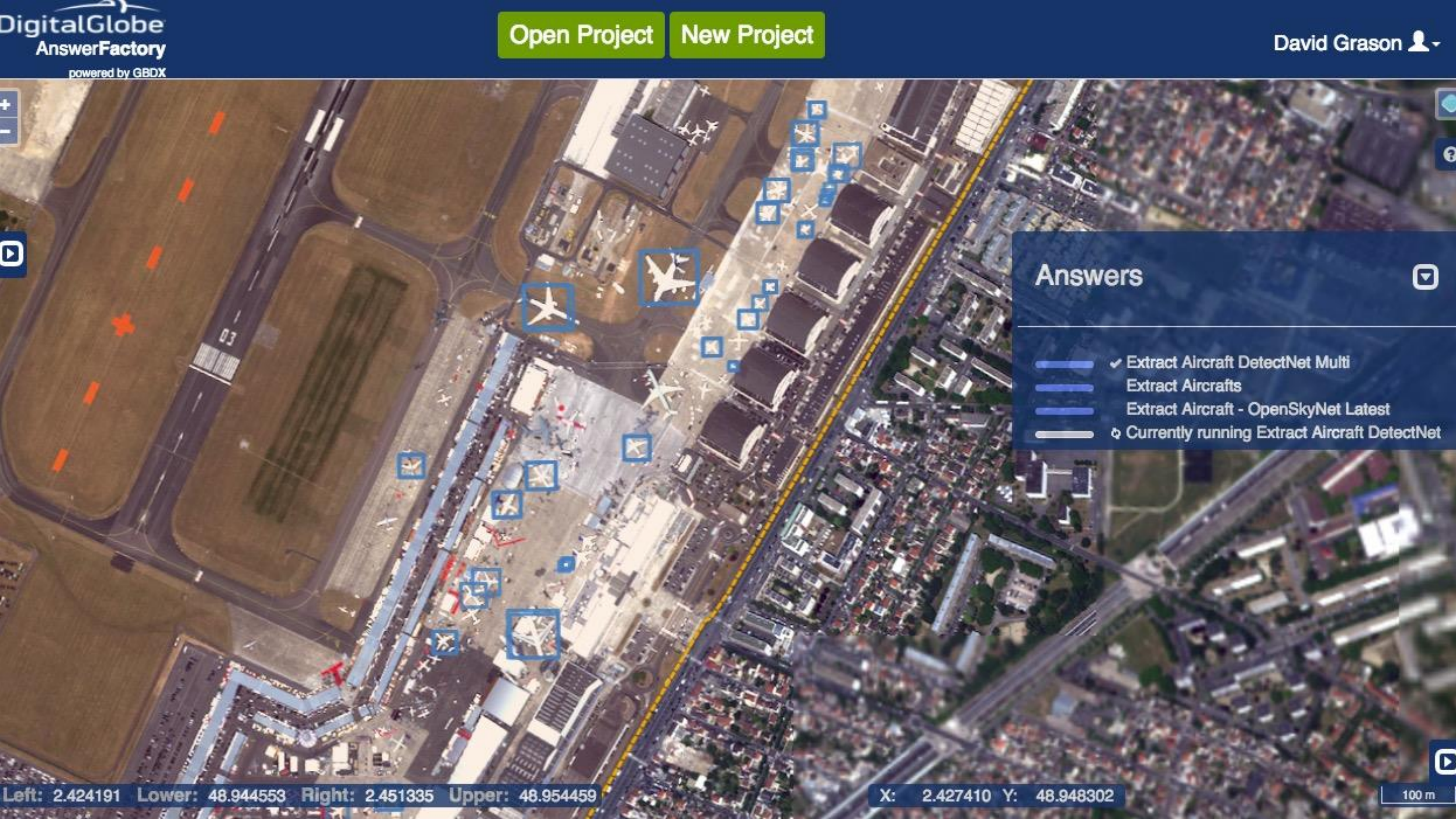
Benefit

Timely, accurate, reliable, measurements on a global basis to fit the customers needs



Health, Safety and Environment - locating people to delivering vaccines to protecting assets




DigitalGlobe
AnswerFactory
powered by GBDX
Open Project
New Project
David Grason
+
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03
100 m

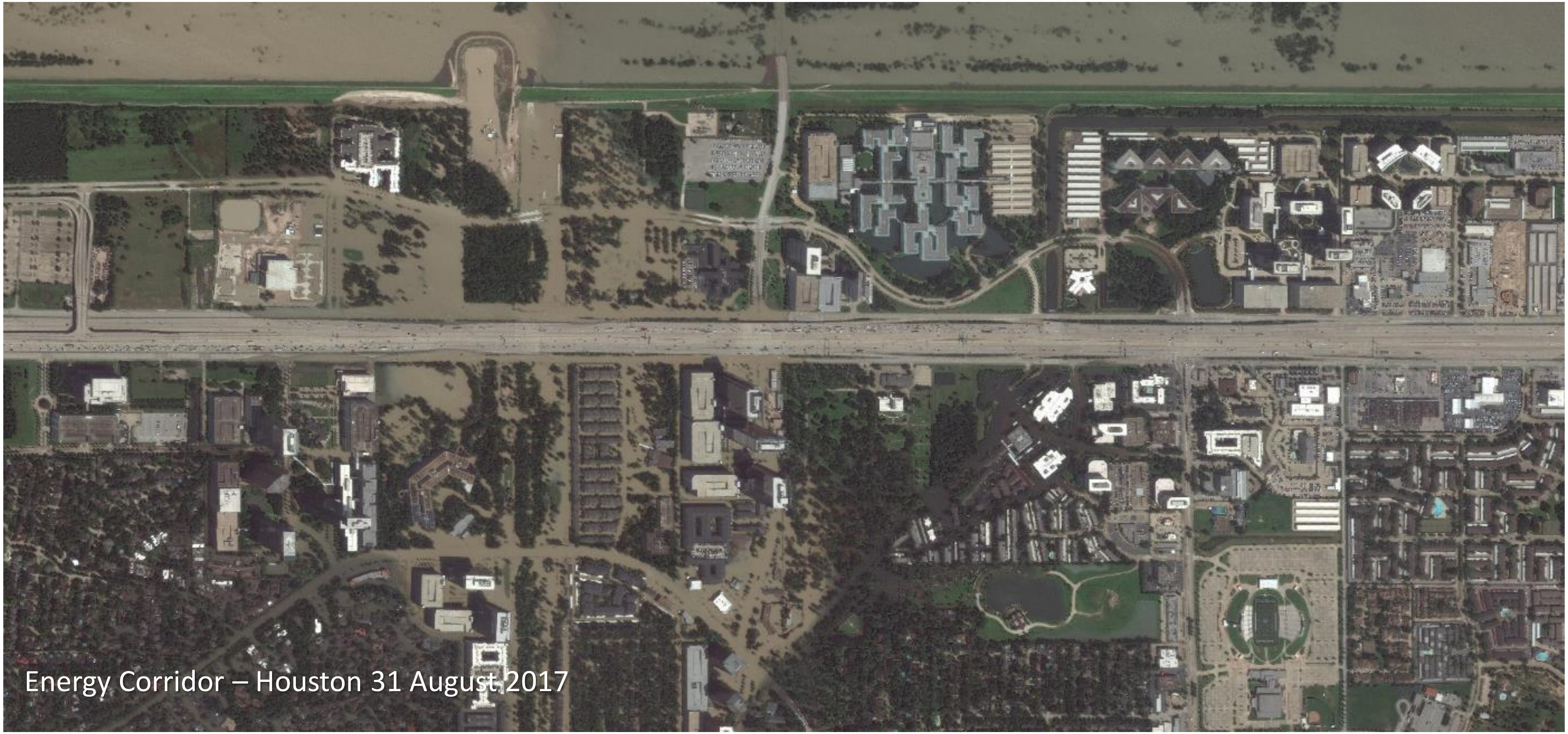
Answers

- ✓ Extract Aircraft DetectNet Multi
- Extract Aircrafts
- Extract Aircraft - OpenSkyNet Latest
- Currently running Extract Aircraft DetectNet

Left: 2.424191 Lower: 48.944553 Right: 2.451335 Upper: 48.954459

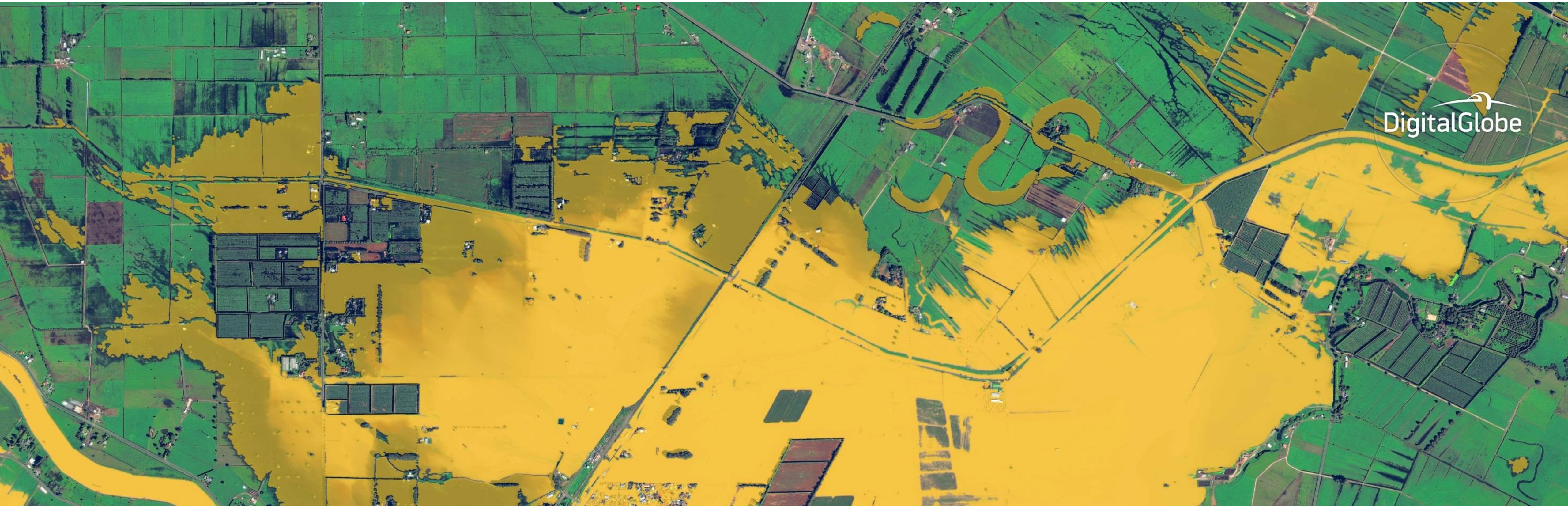
X: 2.427410 Y: 48.948302

…that can have a fundamental impact on business operations

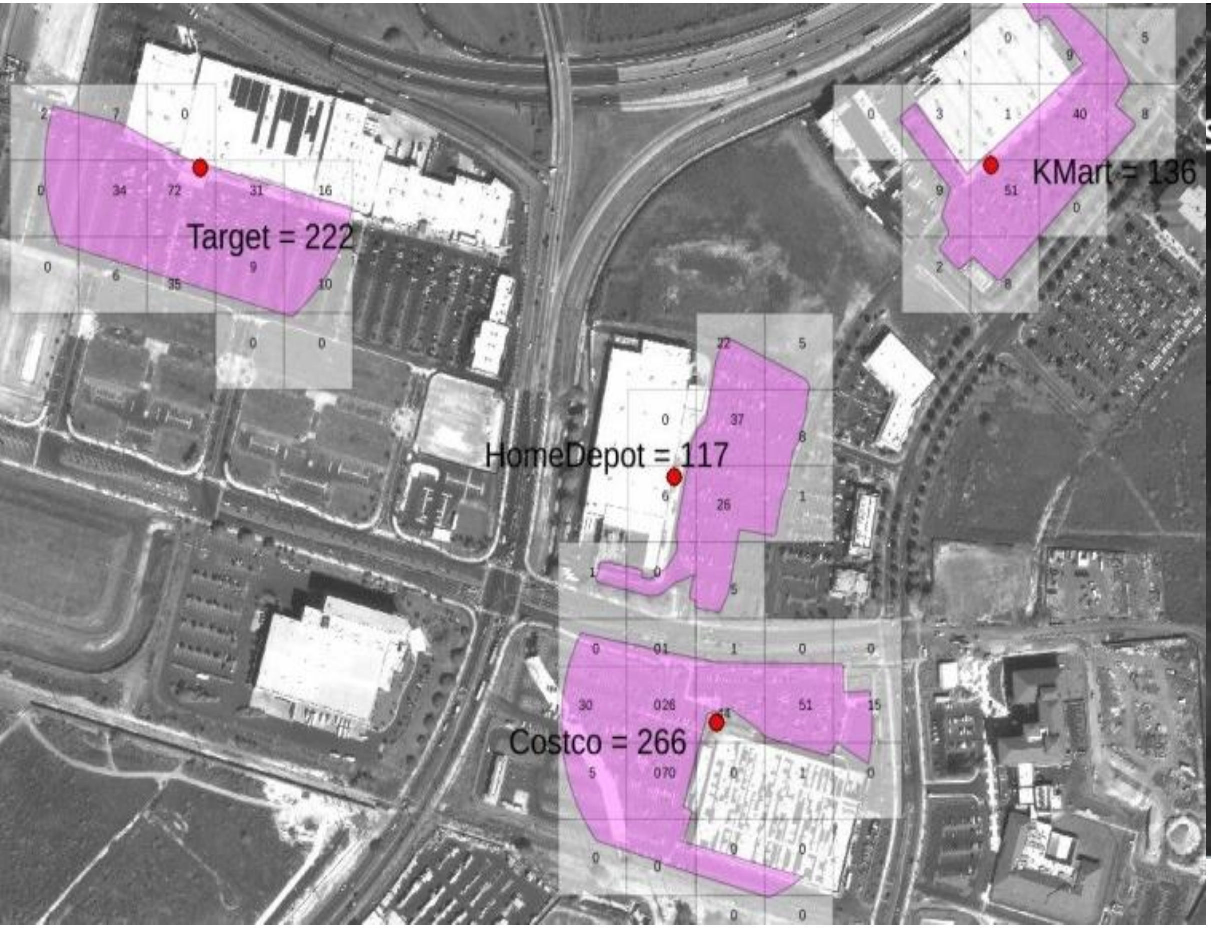


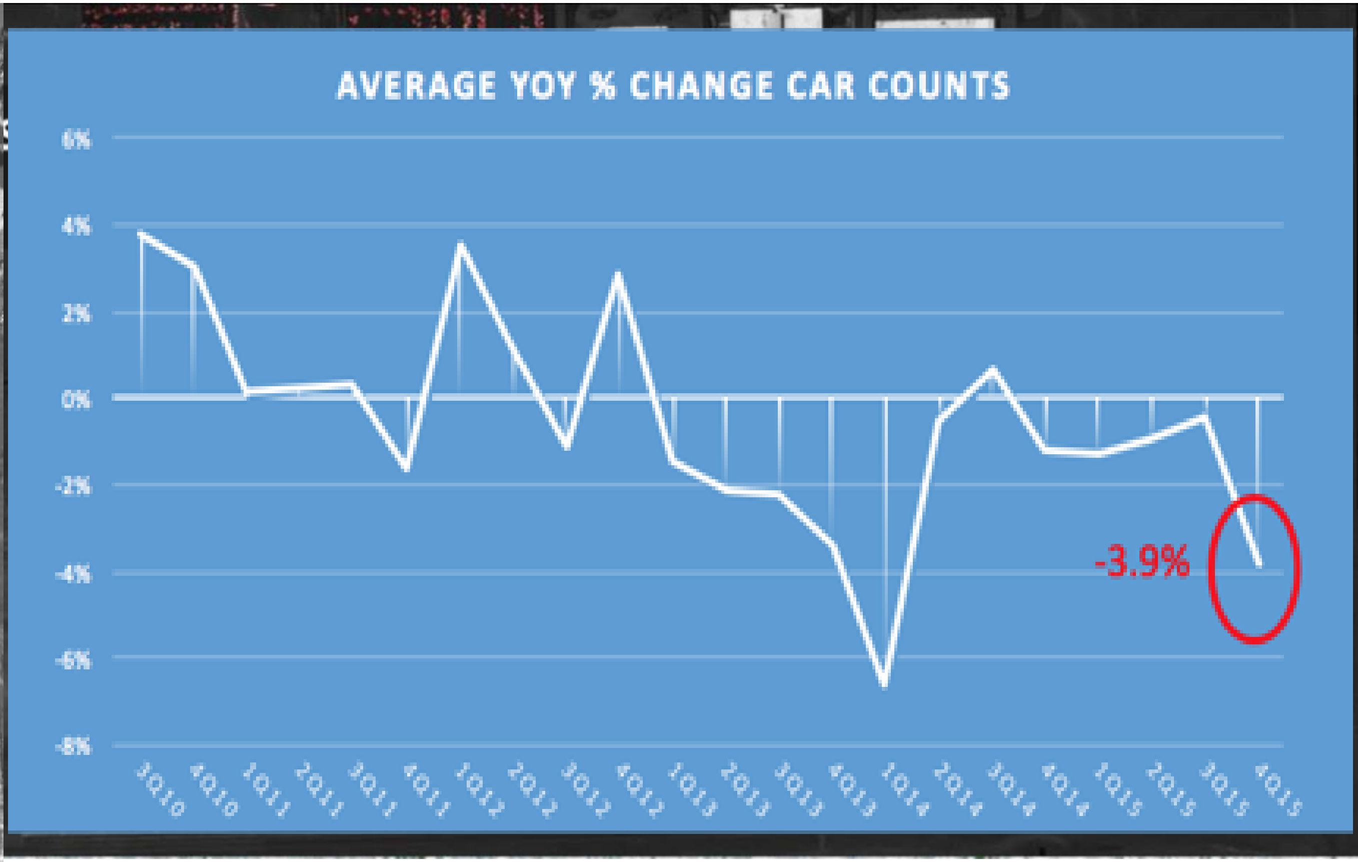
Energy Corridor – Houston 31 August 2017

Flood water classification


DigitalGlobe

Understanding Global Trends


Target = 222
KMart = 136
HomeDepot = 117
Costco = 266



- Amazon Web Services
- digitalglobe
- nvidia
- open data
- Artificial Intelligence

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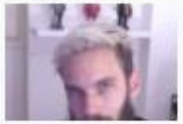
5 days ago

Why the iPhone X is the new iPhone you'll want now
5 days ago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5 days ago

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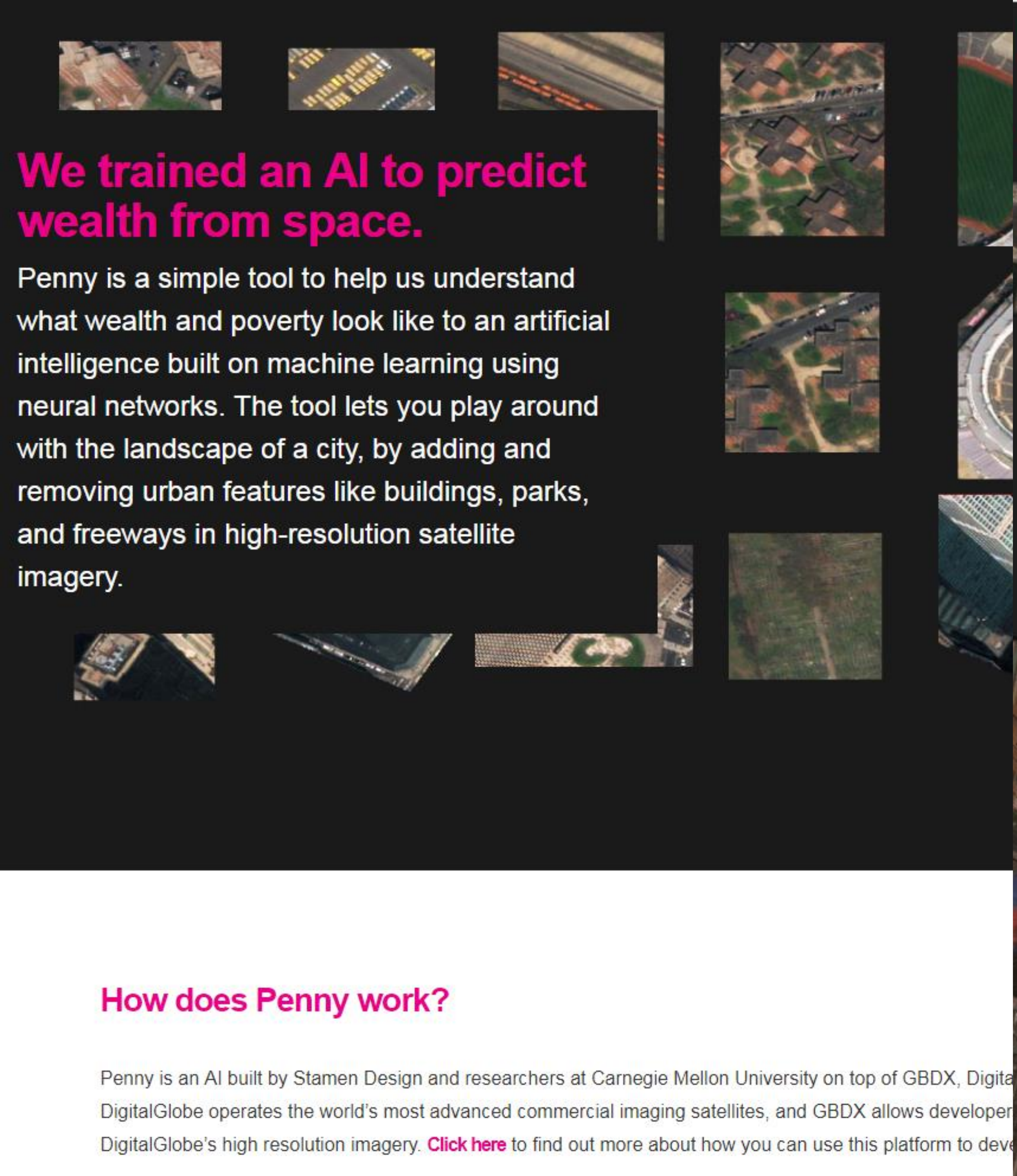
22 hours ago

SpaceNet satellite imagery repository launched by DigitalGlobe, CosmiQ Works and NVIDIA on AWS

Posted Aug 25, 2016 by John Mannes (@JohnMannes)

A consortium of companies, including DigitalGlobe, CosmiQ Works and NVIDIA, today launched SpaceNet, an open-data initiative aimed at improving image analysis tools.

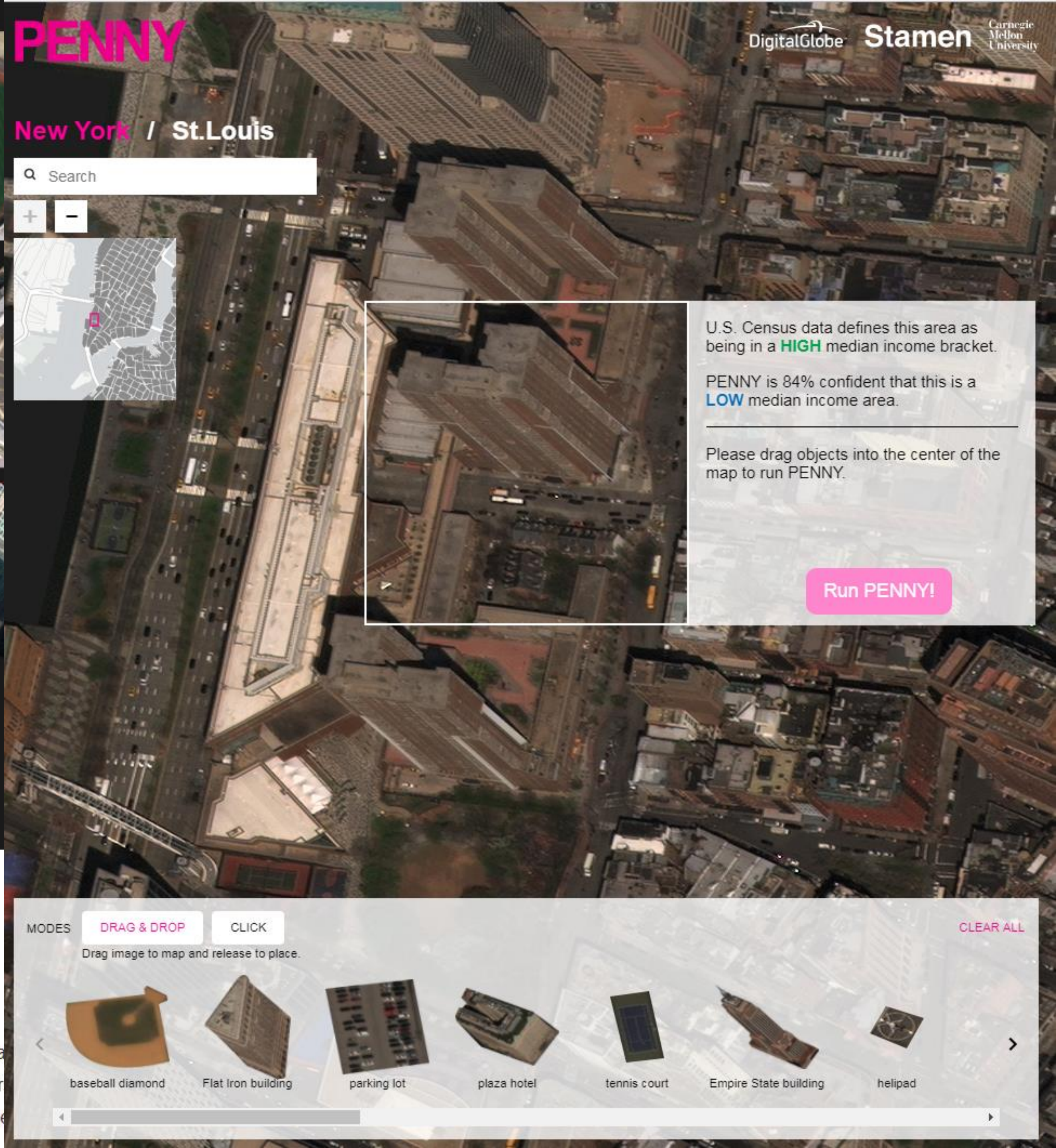


We trained an AI to predict wealth from space.

Penny is a simple tool to help us understand what wealth and poverty look like to an artificial intelligence built on machine learning using neural networks. The tool lets you play around with the landscape of a city, by adding and removing urban features like buildings, parks, and freeways in high-resolution satellite imagery.

How does Penny work?

Penny is an AI built by Stamen Design and researchers at Carnegie Mellon University on top of GBDX, Digita
DigitalGlobe operates the world's most advanced commercial imaging satellites, and GBDX allows developer
DigitalGlobe's high resolution imagery. **Click here** to find out more about how you can use this platform to deve



PENNY
DigitalGlobe
Stamen
Carnegie Mellon University
New York / St.Louis
Search
+
−

U.S. Census data defines this area as being in a **HIGH** median income bracket.

PENNY is 84% confident that this is a **LOW** median income area.

Please drag objects into the center of the map to run PENNY.

Run PENNY!
MODES
DRAG & DROP
CLICK

Drag image to map and release to place.

CLEAR ALL
baseball diamond
Flat Iron building
parking lot
plaza hotel
tennis court
Empire State building
helipad

DigitalGlobe