eSmart SYSTEMS

Realizing the Smart Grid with Big Data

Tina M. Skagen, director Business Development

8-PAGE SPECIAL POSTGRADUATE SURVIVAL GUIDE 8TH BIRTHDAY ISSUE!

COSMOS

THE SCIENCE OF EVERYTHING

THE END OF VIOLENCE
Steven Pinker on the new peace p36

DEFEATING POLIO
Will politics jeopardise a cure? p68

FRAUDS AND FAKES
Science's biggest scams p24

GENIUS OF DOGS
Inside the canine brain p41

IS data THE NEW GOD?

How tracking your digital trail could predetermine your future – and why you'll benefit from today's data deluge. p46

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COSMOSmagazine.com

GALAXIES AND NEBULAE ■ CANCER VACCINES ■ WHALES ■ FICTION ■ REVIEWS

significance

statistics making sense

BIG DATA

SPECIAL ISSUE

DATA AND THE CITY

WHO ARE YOUR FACEBOOK FRIENDS?

MEET THE DATA FAMILY
THEIR EVERY MOVE RECORDED.

The Economist

Obama the warrior
Misgoverning Argentina
The economic shift from West to East
Genetically modified crops blossom
The right to eat cats and dogs

The data deluge

AND HOW TO HANDLE IT: A 14-PAGE SPECIAL REPORT

nature

THE INTERNATIONAL WEEKLY JOURNAL OF SCIENCE

THE BITER BIT
Viral infections for viruses

TROPICAL CYCLONES
The strong get stronger

BLACK HOLE PHYSICS
A new window on the Galactic Centre

BIG DATA

NATUREJOBS
Minnesota musings

MIT Technology Review

"The mobile phone, the Net, and the spread of information—a deadly combination for dictators"

BIG DATA WILL SAVE POLITICS

BONO: DATA CAN FIGHT POVERTY AND CORRUPTION

SASHA ISSENBERG: DATA MAKES ELECTIONS SMARTER

JOE TRIPPI: DATA PUTS THE SOUL BACK INTO POLITICS

PLUS: OUR LETTER TO PRESIDENT OBAMA

POPULAR SCIENCE

THE FUTURE NOW

THE CONTROL CENTERS
Using Data to Feed the World, Solve Cold Cases, Battle Malware, Predict Our Fate

OFFICER ALGORITHM
Can a Crime Be Prevented Before It Begins?

NEW WAYS OF SEEING
A Gallery of Extraordinary Infographics

PLUS
Juan Enriquez Reprograms Life
James Gleick Unspools the Bit
AND Lawrence Weschler Questions the Cloud

SPECIAL ISSUE

DATA IS POWER

HOW INFORMATION IS DRIVING THE FUTURE

Harvard Business Review

The True Measures Of Success

10 Rules for Managing Global Innovation

What Ever Happened To Accountability?

GETTING CONTROL OF BIG DATA

How vast new streams of information are changing the art of management

Government Executive

GOVERNMENT'S BUSINESS MAGAZINE

MARCH/APRIL 2013

Does Government Ever Really Change?

Five Ways Women Get Ahead

BIG DATA

HOW IT'S MAKING AGENCIES SMARTER

The FOUR V's of Big Data

From traffic patterns and music downloads to web history and medical records, data is recorded, stored, and analyzed to enable the technology and services that the world relies on every day. But what exactly is big data, and how can these massive amounts of data be used?

As a leader in the sector, IBM data scientists break big data into four dimensions: **Volume, Velocity, Variety and Veracity**

Depending on the industry and organization, big data encompasses information from multiple internal and external sources such as transactions, social media, enterprise content, sensors and mobile devices. Companies can leverage data to adapt their products and services to better meet customer needs, optimize operations and infrastructure, and find new sources of revenue.

By 2015

4.4 MILLION IT JOBS

will be created globally to support big data, with 1.9 million in the United States

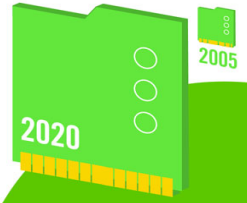
Volume

SCALE OF DATA

40 ZETTABYTES

[43 TRILLION GIGABYTES]

of data will be created by 2020, an increase of 300 times from 2005

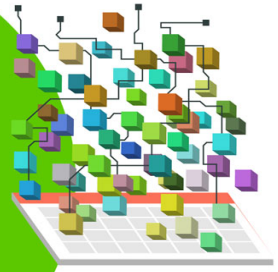


It's estimated that

2.5 QUINTILLION BYTES

[2.3 TRILLION GIGABYTES]

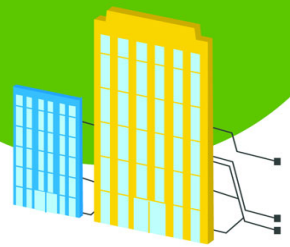
of data are created each day



6 BILLION PEOPLE

have cell phones

WORLD POPULATION: 7 BILLION



Most companies in the U.S. have at least

100 TERABYTES

[100,000 GIGABYTES]

of data stored

Variety

DIFFERENT FORMS OF DATA

As of 2011, the global size of data in healthcare was estimated to be

150 EXABYTES

[161 BILLION GIGABYTES]

30 BILLION PIECES OF CONTENT

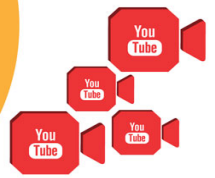
are shared on Facebook every month

By 2014, it's anticipated there will be

420 MILLION WEARABLE, WIRELESS HEALTH MONITORS

4 BILLION+ HOURS OF VIDEO

are watched on YouTube each month



400 MILLION TWEETS

are sent per day by about 200 million monthly active users

Velocity

ANALYSIS OF STREAMING DATA

The New York Stock Exchange captures

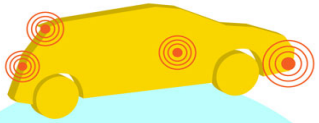
1 TB OF TRADE INFORMATION

during each trading session

Modern cars have close to

100 SENSORS

that monitor items such as fuel level and tire pressure



By 2016, it is projected there will be

18.9 BILLION NETWORK CONNECTIONS

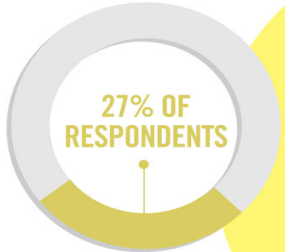
– almost 2.5 connections per person on earth

Veracity

UNCERTAINTY OF DATA

1 IN 3 BUSINESS LEADERS

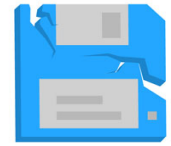
don't trust the information they use to make decisions



in one survey were unsure of how much of their data was inaccurate

Poor data quality costs the US economy around

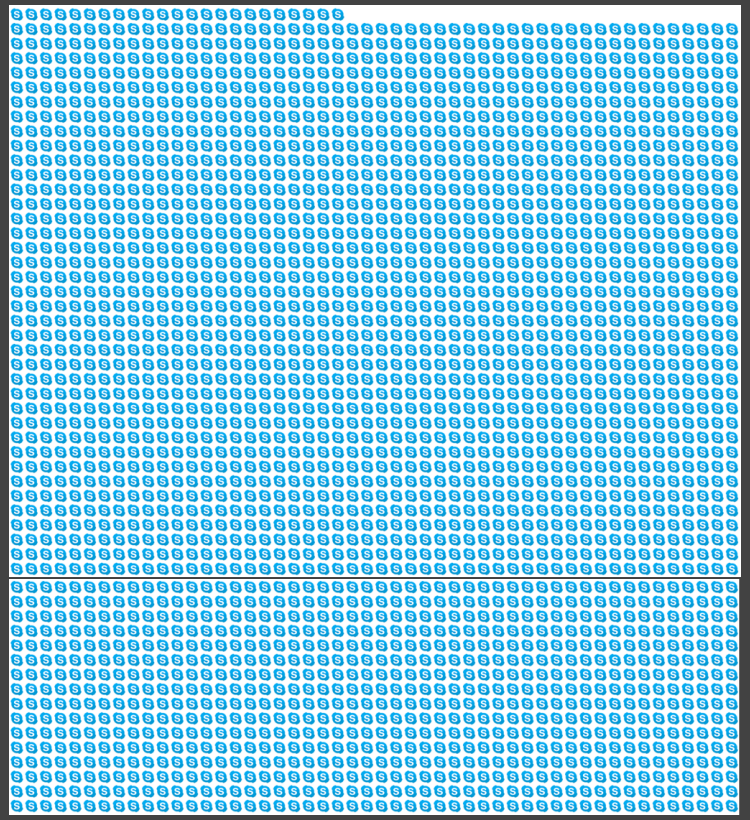
$3.1 TRILLION A YEAR



Sources: McKinsey Global Institute, Twitter, Cisco, Gartner, EMC, SAS, IBM, MEPTEC, QAS

IBM

2,373 Skype calls



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7,433 Tweets sent

POWERED BY VALUES

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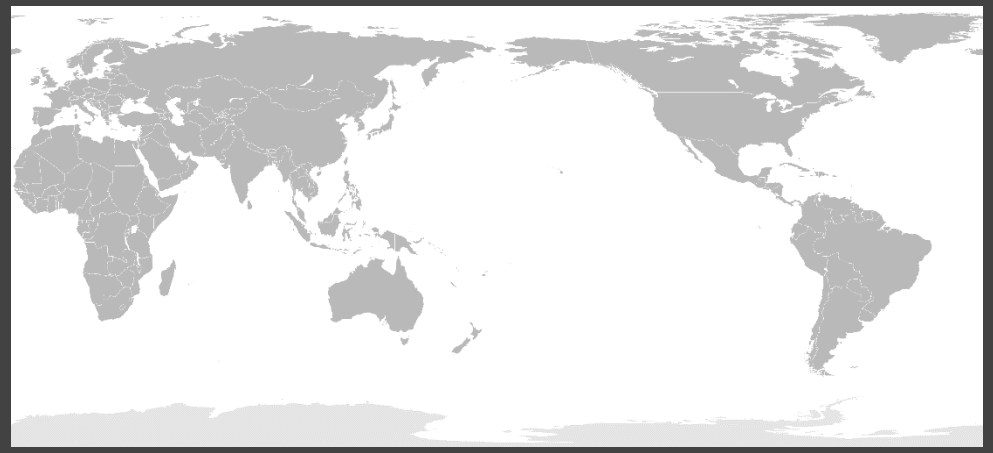
57,587 Google searches

eSmart SYSTEMS

67,319 YouTube videos viewed

= spam
2,545,417 Emails sent

1 byte	1 grain of rice
1 kilobyte	1 cup of rice
1 megabyte	8 bags of rice
1 gigabyte	3 container lorries
1 terabyte	2 container ships
1 petabyte	covers Manhattan
1 exabyte	Covers the UK – three times
1 zettabyte	Fills the Pacific Ocean



We will generate enough data by 2020 to fill the Pacific Ocean every day

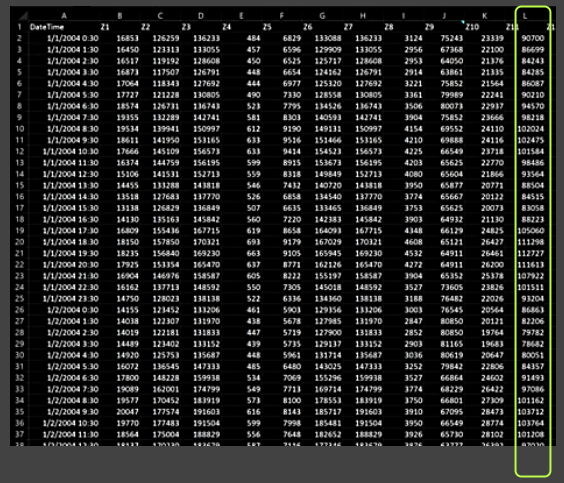
At the moment less than 0.5 % of all data is ever analyzed and used.

eSmart
SYSTEMS
Artificial intelligence and machine learning

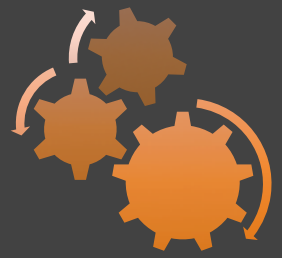
Simplified machine learning process

Question / objective

Data and examples



Learning algorithm



... containing answers to the question

Predictive model

... answers the question on new data

NVIDIA Titan X GPU
250W
26cm x 11cm x 4cm

NEC Earth Simulator

Worlds fastest supercomputer from 2002 to 2004

Used 6.4 MW of power (plus air conditioning)

Housed in a two-story building
65m x 50m x 17m

Trained machine learning models represent the digital intelligence in our solutions

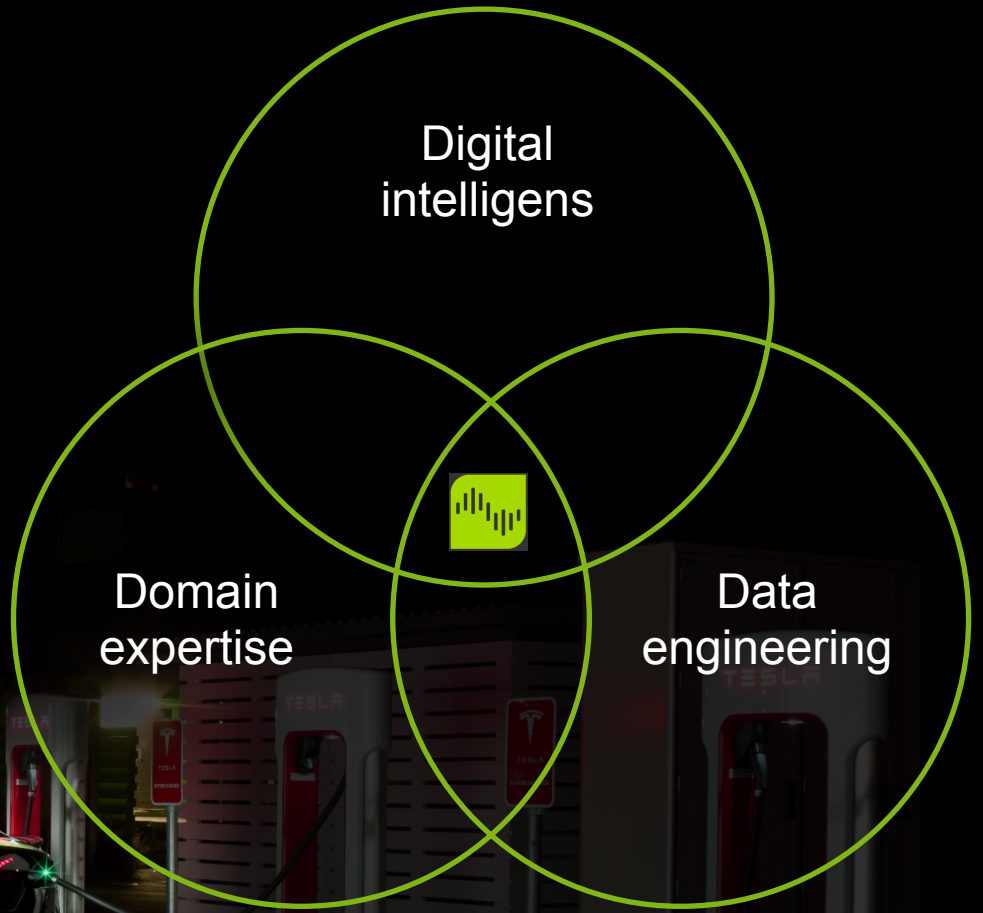
Digital intelligence

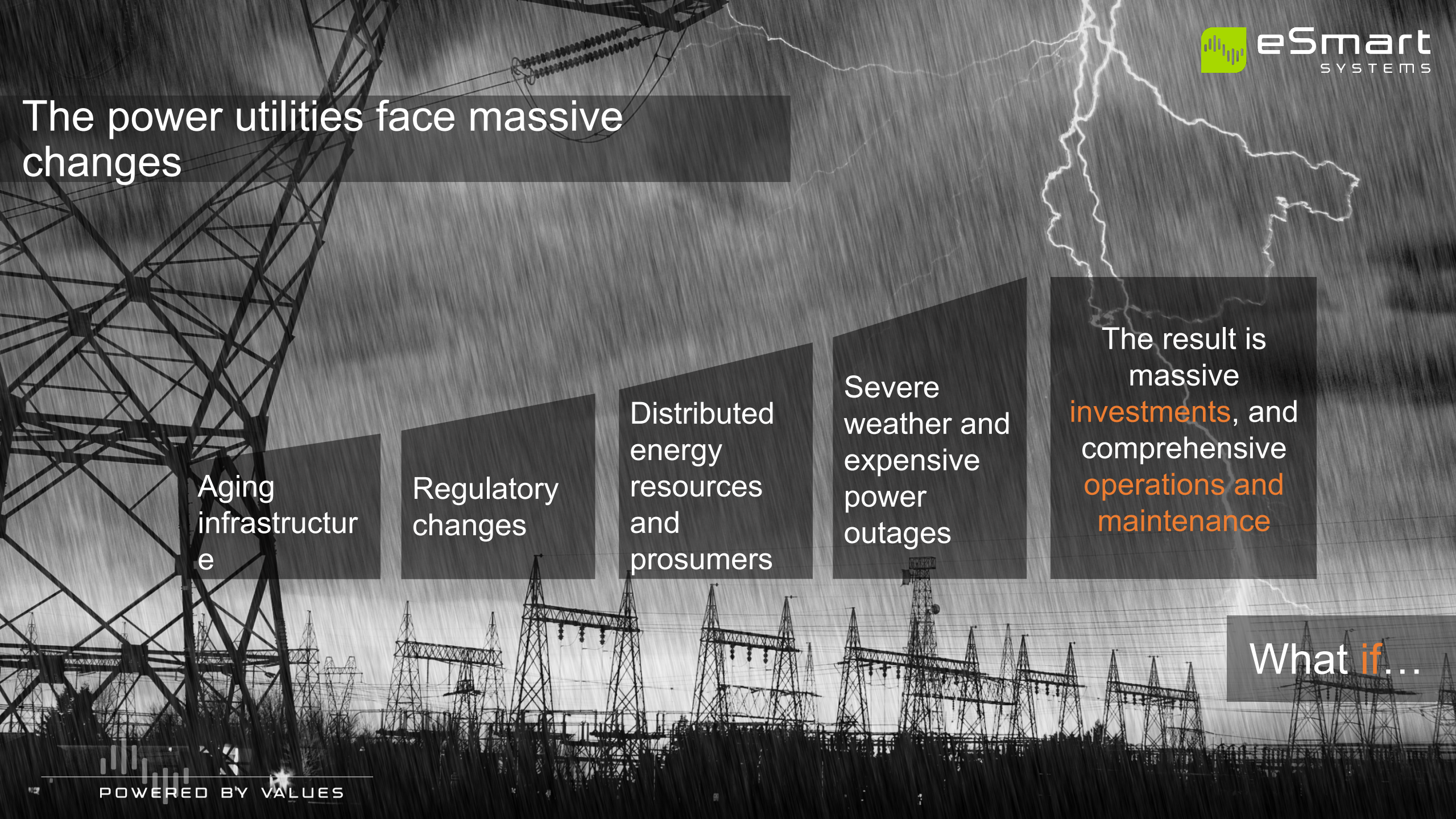
The models are implemented in our cloud based, digital platform

Digital intelligens

Data engineering

Innovative solutions to realize efficiency gains and savings for customers

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The power utilities face massive changes
Aging infrastructure
Regulatory changes
Distributed energy resources and prosumers
Severe weather and expensive power outages
The result is massive investments, and comprehensive operations and maintenance
What if…
POWERED BY VALUES

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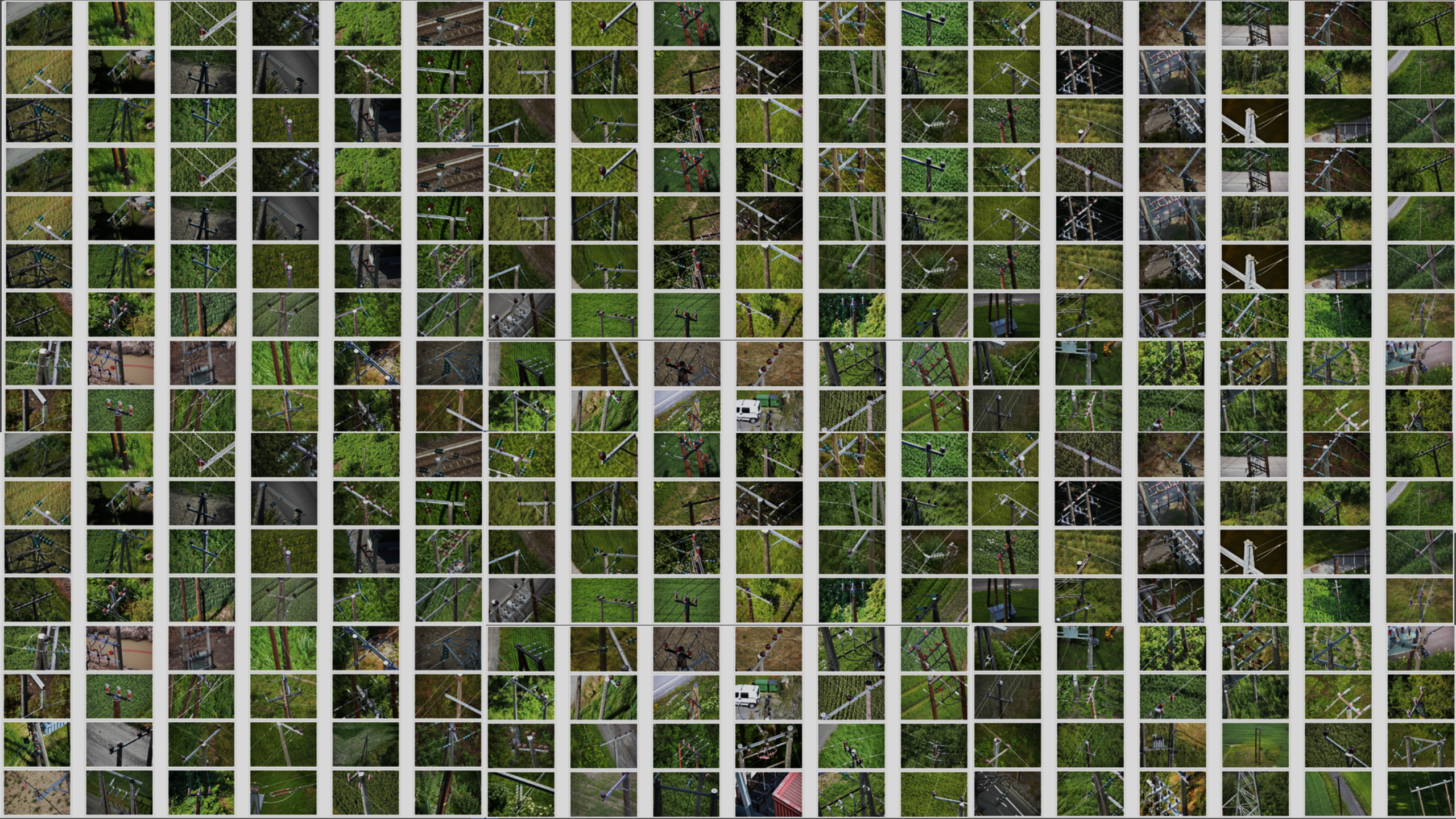
Intelligent asset management to ensure planning, operations, and maintenance of the power grid

- Jacksonville, Florida – 300 000 water meters and electricity meters
- 6000 truck rolls a year of which most are unnecessary
- AMI data and machine learning
- 87 % reduction in truck rolls
- Net value for JEA over three years is 1.6 million dollar

eSmart SYSTEMS

Leverage machine learning to predict broken water meters



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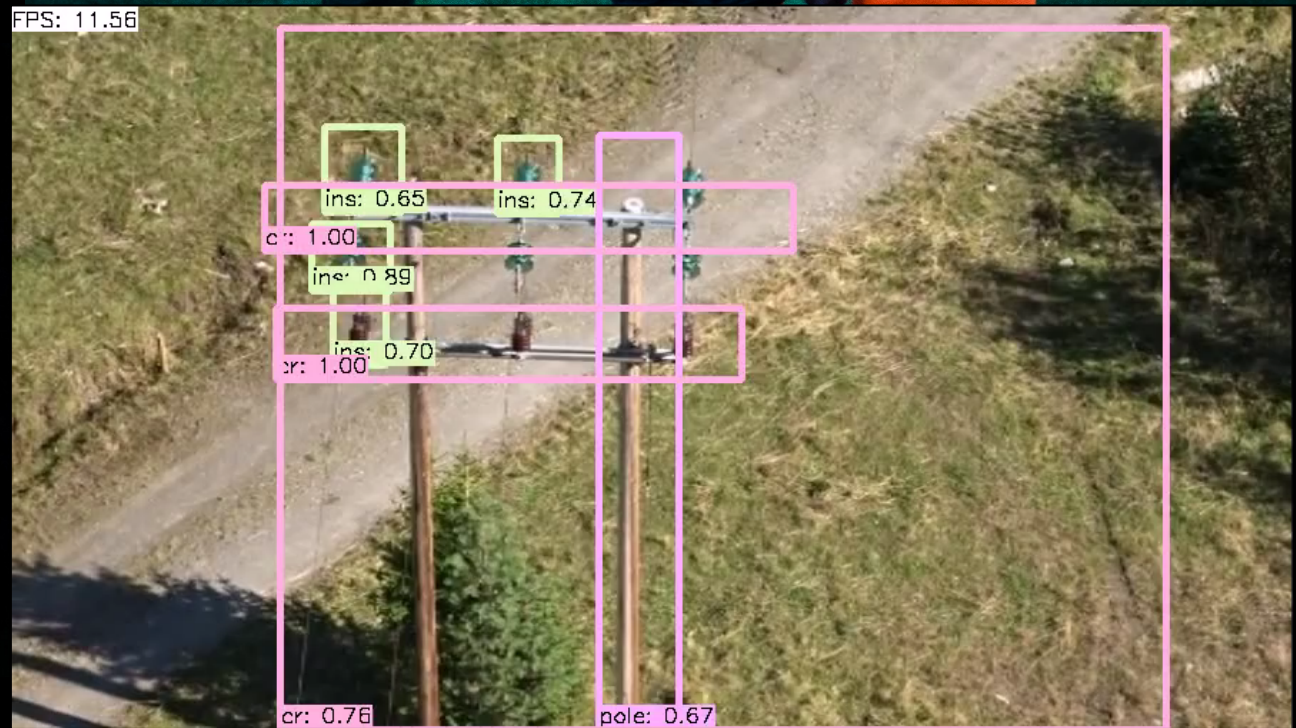
Today’s inspections are time-consuming, risky, and manual

Video
Images
IR
Infrared
Radio noise
Lidar/3D
eSmart
SYSTEMS

eSmart
SYSTEMS


FPS: 11.56
ins: 0.65
ins: 0.74
ins: 0.70
cr: 1.00
cr: 0.76
pole: 0.67

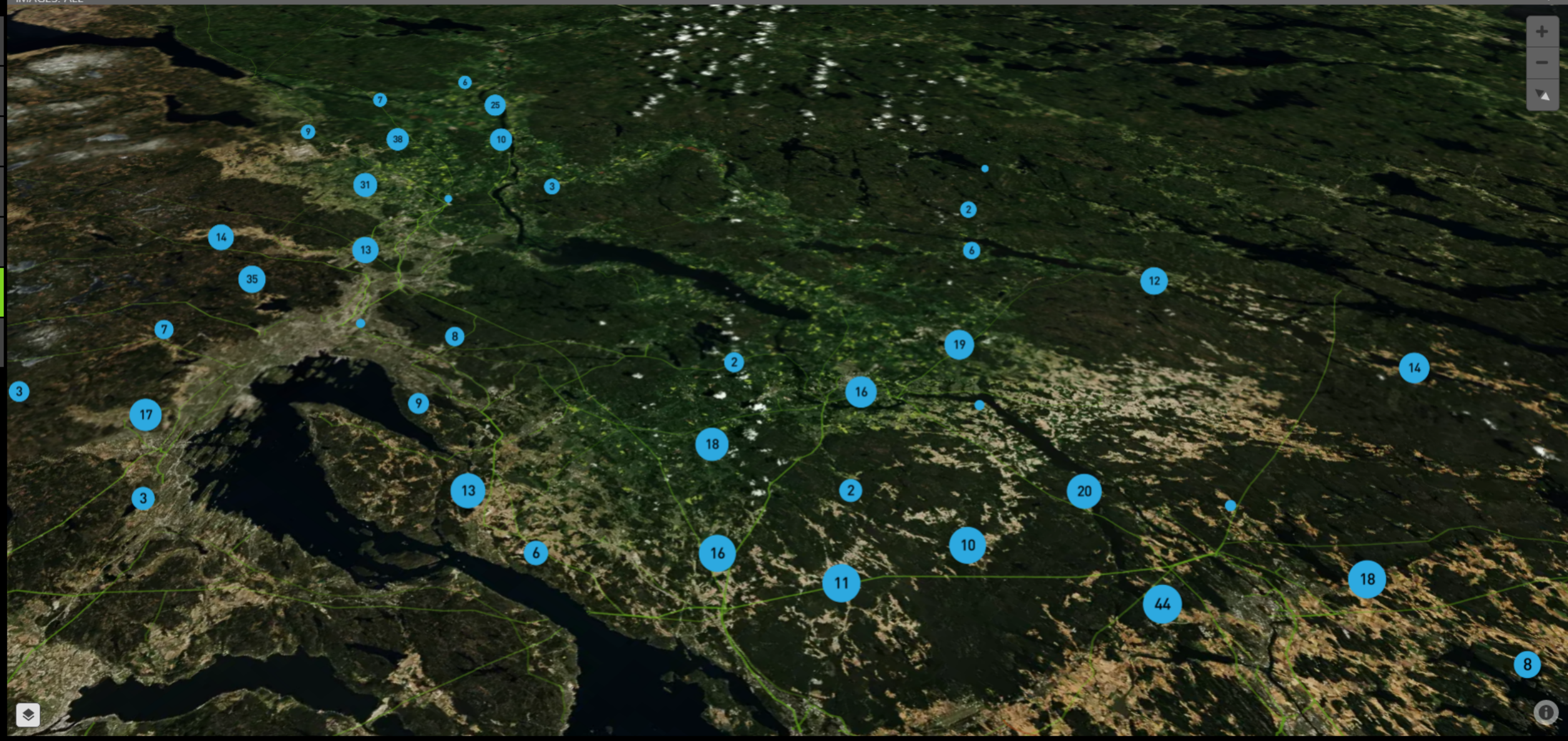
LOADED IMAGES

1890 images

FILTER BY COMPANY

HAFSLUND NETT AS

IMAGES: ALL



08.54

LOADED IMAGES

5714 images

FILTER BY COMPANY

TROMS KRAFT NETT AS

IMAGES: ALL

20160518164717_1.jpg
May 18th 2016

LNG: 18.457166666666666
LAT: 69.22126666666666

Killingholmen

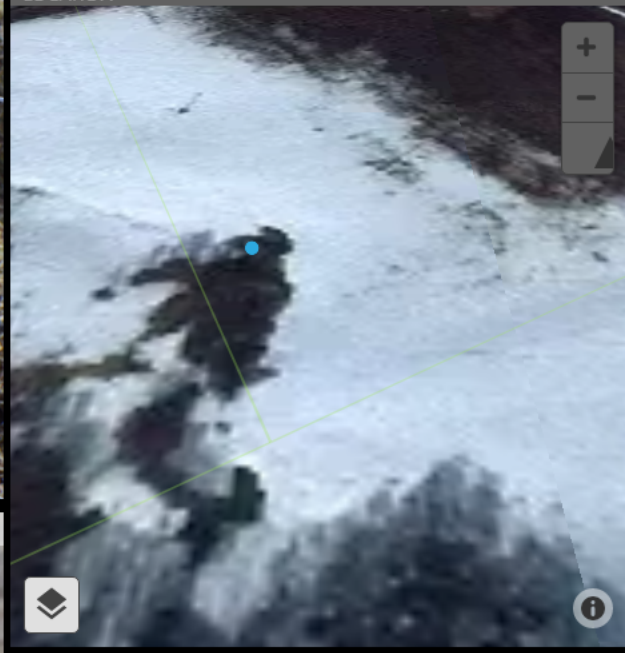
Kjerresnesveien

20160518143756.jpg

COMPONENTS

- Crossarm
- Brown 4-disc porcelain insulator - line through top track
- Pole
- Toppad
- Brown 4-disc porcelain insulator - line through top track
- Brown 4-disc porcelain insulator - line through top track

LOCATION

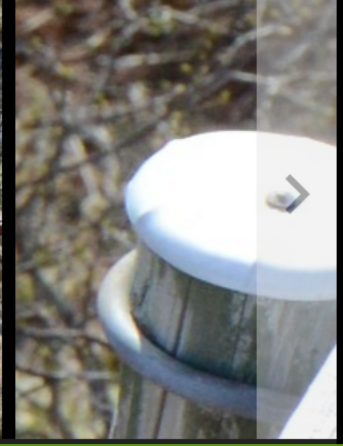


Crossarm

Brown 4-disc porcelain insulator - line through top track

Pole

Toppad



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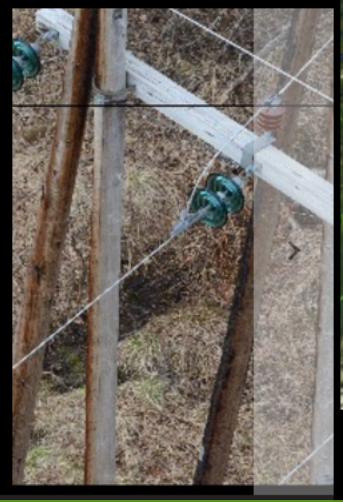
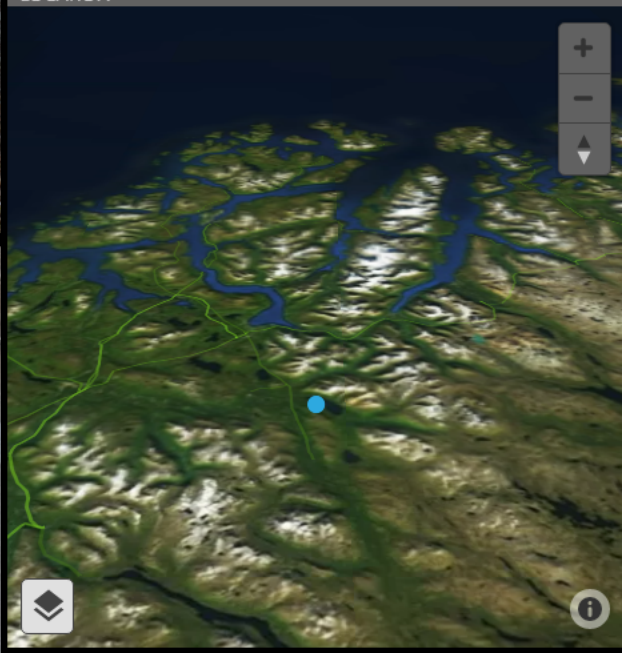


COMPONENTS

- Crossarm
- Pole
- Brown 4-disc porcelain insulator - line on side of top
- Crossarm
- Toppad
- Pole
- 2-disc glass insulator
- Pole
- Brown 4-disc porcelain insulator - line through top track
- Pole
- Toppad
- Toppad
- 2-disc glass insulator
- Brown 4-disc porcelain insulator - line through top track

LOCATION



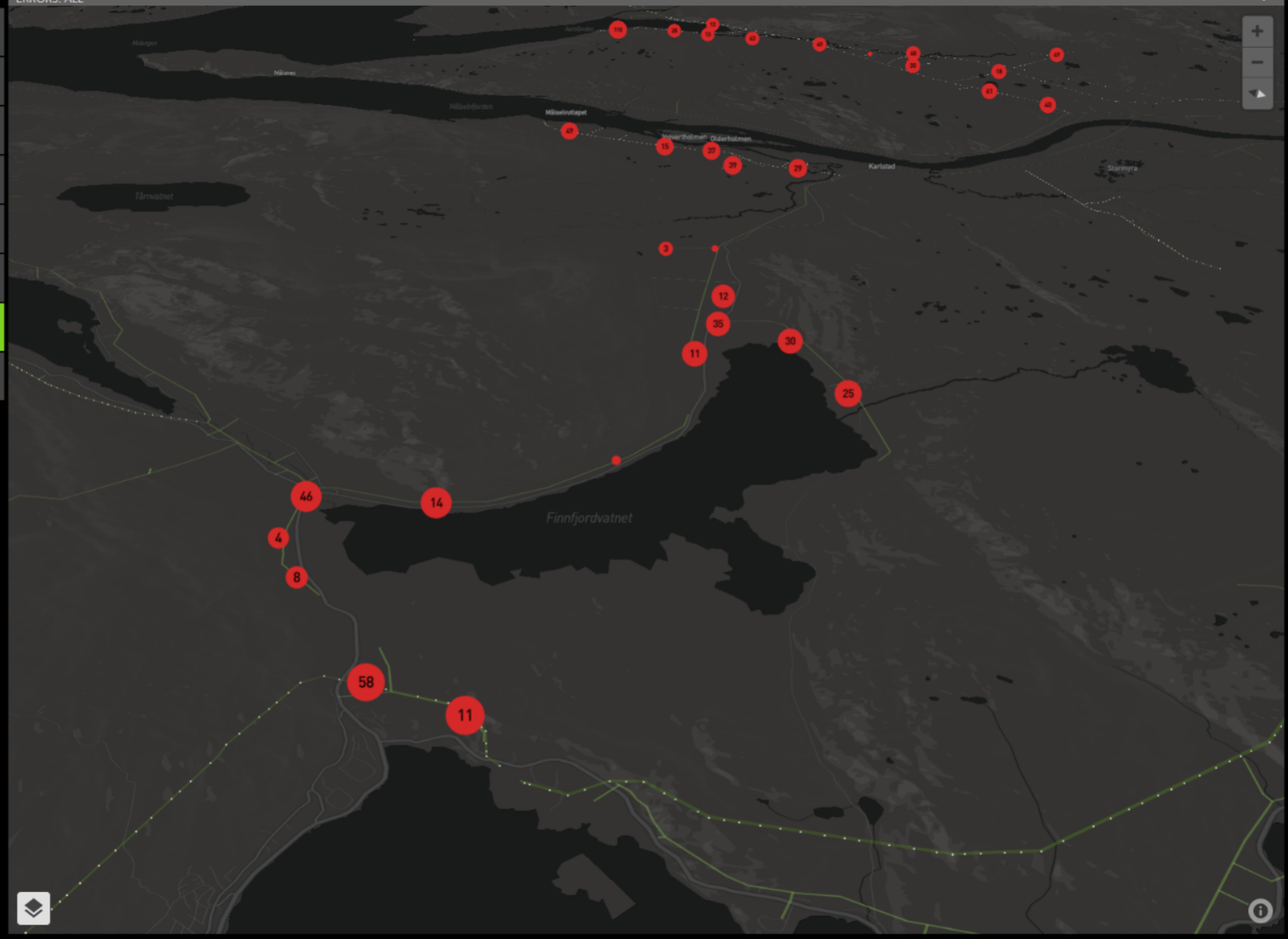
IMAGES ANALYZED

5715 images

COMPONENTS IDENTIFIED

37299 components

ERRORS: ALL



COMPONENT TYPES IDENTIFIED

Brown 4-disc porcelain insulator - line through top track
Counter: 9260

Pole
Counter: 7397

Crossarm
Counter: 4830

Toppad
Counter: 6101

Insulator - unclassified
Counter: 5024

Brown 4-disc porcelain insulator - other
Counter: 1065

Brown 4-disc porcelain insulator - line on side of top
Counter: 2127

2-disc glass insulator
Counter: 628

3-disc glass insulator
Counter: 746

9-disc white insulator
Counter: 105

9-disc orange insulator
Counter: 16

Connected Drone Line Inspection Client

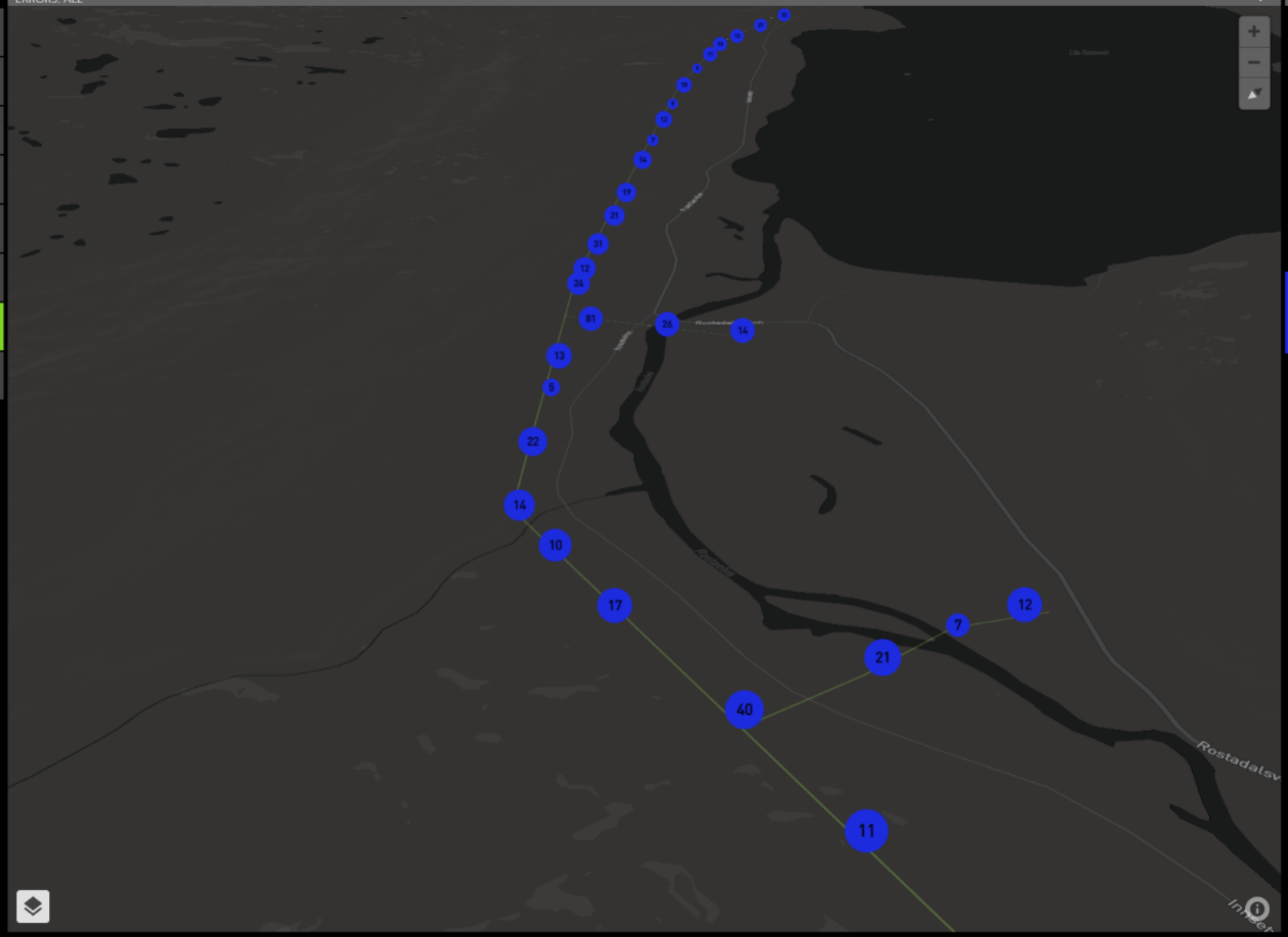
IMAGES ANALYZED

5715 images

COMPONENTS IDENTIFIED

37299 components

ERRORS: ALL



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Powered by eSmart Systems

Thank you

Tina M. Skagen
T: 995 89 577
E: tina.skagen@esmartsystems.com