



The Brain and the Nervous System in the New Energy Infrastructure

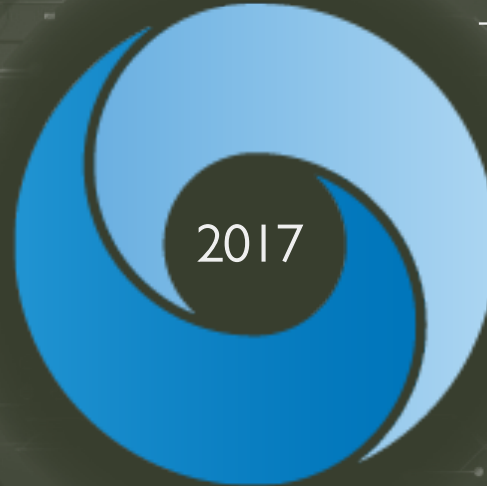
Knut H. H. Johansen CEO – eSmart systems
May 28 - 2019

Artificial Intelligence – example – Alfa Zero a chess-playing computer

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Alpha Zero a revolution



Tabula-rasa – No prior hard-coded knowledge

Learned by self-play alone ...

played 44 million games against itself

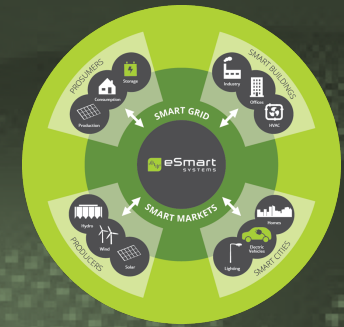
.... in 9 hours !!



If AI can create the worlds best chess player in 9 hours
what can AI then do for your business?



At eSmart our mission is to build digital intelligence to provide exceptional solutions to our customers and accelerate the transition to sustainable societies



Microsoft Partner of the Year 2018 Finalist

Machine Learning Blog

How Can Autonomous Drones Help the Energy and Utilities Industry?

October 23, 2018 by ML Blog Team

Welcome to *How AI Transform Business*, a new series featuring insights from conversations with Microsoft partners who are combining deep industry knowledge with AI in novel ways and, in doing so, creating leading-edge intelligent business solutions for our digital age.

Our first episode features eSmart Systems, which is in the business of creating solutions to accelerate global progress towards sustainable societies. Headquartered in the heart of Ostfold county, Norway, eSmart Systems develops digital intelligence for the energy industry and for smart communities. The company is strategically co-located with the NCE Smart Energy Markets cluster and the Østfold University College and thrives in a very innovative environment. When it comes to next-generation grid management systems, or efficiently running operations for the connected cities of the future or driving citizen engagement, the company is at the forefront of digital transformation.

We recently caught up with Davide Roviero, Chief Analytics Officer at eSmart Systems. Davide has many interesting things to share about where and how AI is being applied in the infrastructure industry. Among other things, he talks about how utilities companies are forced to fly manned helicopters missions over live electrical power lines today, just to perform routine inspections, and how – using AI – it is possible to have safer and more effective inspections that do not expose humans to this sort of risk.

Global attention

Microsoft Partner of the Year
2018 Finalist

Microsoft is proud to recognize
eSmart Systems AS
Artificial Intelligence Award
FINALIST

Gabriella Schuster
Gabriella Schuster
Corporate Vice President | One Commercial Partner
Microsoft Corporation

Microsoft
Microsoft Partner Network

Among top 4 Microsoft AI partners out of 2600 AI companies

Intelligence First – eSmart Systems #1 in Grid Analytics

Proven AI solutions in operation

Grid Analytics Competition by an international renowned research institute

- The institute launched a project for autonomous grid inspection in early 2018, funded by 15 of the largest utilities in the US, all utilities with 5 million+ customers and \$15-\$75 billion market cap.
- The project was divided into two: autonomous flights and autonomous data processing. The objective was to assess the maturity of these technologies and write a report on the findings.
- In total 12 companies had been sourced to participate in the project, based on an assumption that they were one of the leading companies within their field (including big names like IBM, Intel (that opted to withdraw), Harris (Large DDC contractor), Neurata, Opoteks & Sharper Shape).
- The project was structured in such a way that the vendor would select a minimum of 3-5 components and/or defects from a selection of 25 categories, provided by the institute. The 25 categories were included based on input from the 15 funding utilities on their highest priority items in their transmission grid.





- eSmart Systems chose all 25 and so did 4 other vendors. The participants were given 1000 images to train on and the test was performed on a dataset of 500 images. The test was supervised and conducted at institute's offices.
- eSmart Systems was ranked as the number 1 performing vendor.
- We are already experiencing the impact of being ranked on top in this project. We are invited to full day workshops with all 15 funding utilities later this year at the institute's offices.
- eSmart Systems is shortlisted (and front-runner) for this contract party based on the results from this competition.

#1 in Grid Analytics Competition in US



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SPEAKERS	INNOVATION AGORA	PARTNERSHIP	ABOUT
 <p>CERAWEEK Special Keynote Address</p> <p>Michael R. Pompeo, United States Secretary of State, presents a Special Keynote address on the role of energy in 21st Century global politics.</p> <p>WATCH VIDEO</p>		 <p>CERAWEEK in the News</p> <p>Timely articles written by IHS Markit researchers that address the current energy picture.</p> <p>GO TO ARTICLES</p>	
 <p>Jason Zander</p> <p>Jason Zander, Executive Vice President, Microsoft Corporation, discusses technology with Daniel Yergin, Vice Chairman, IHS Markit.</p> <p>Watch video</p>		 <p>Andrew Jassy</p> <p>Andrew R. Jassy, Chief Executive Officer, Amazon Web Services (AWS), talks with Daniel Yergin, Vice Chairman, IHS Markit.</p> <p>Watch video</p>	



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Who is speaking?



Synthesizing Obama: Learning Lip Sync from Audio

Supasorn Suwajanakorn
Steven M. Seitz
Ira Kemelmacher-Shlizerman

University of Washington

SIGGRAPH 2017

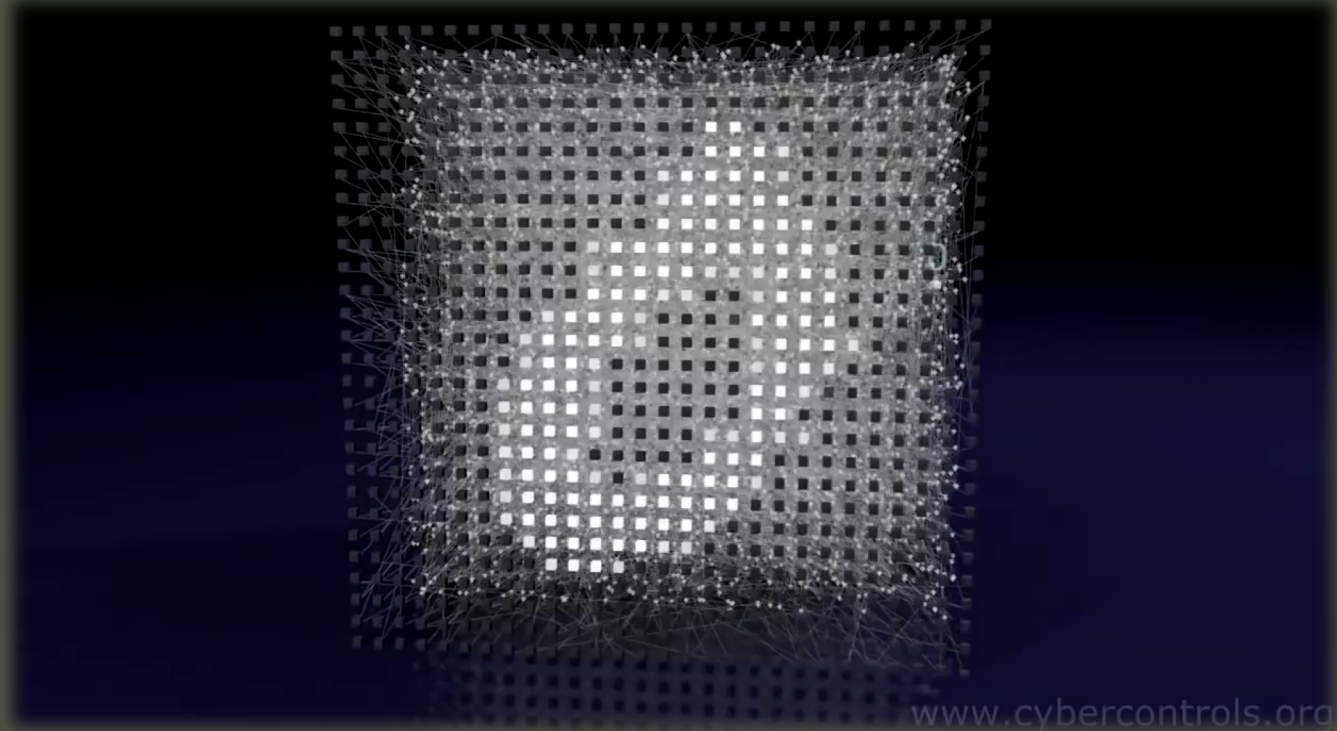
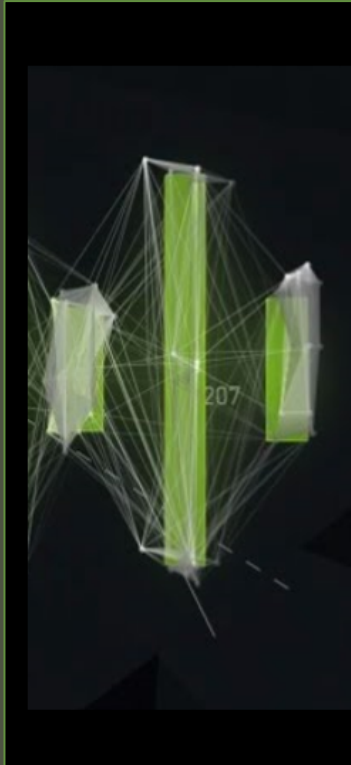
<http://grail.cs.washington.edu/projects/AudioToObama/>

Prime Minister Erna Solberg
Speech to the nation
March 15, 2019



Artificial Neural Networks – Early Stage

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Source: Cybercontrols



An irreversible and dramatic change in human history

Three technologies converge into
extreme power

Digital Technology Convergence

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Exponential growth in volume of data

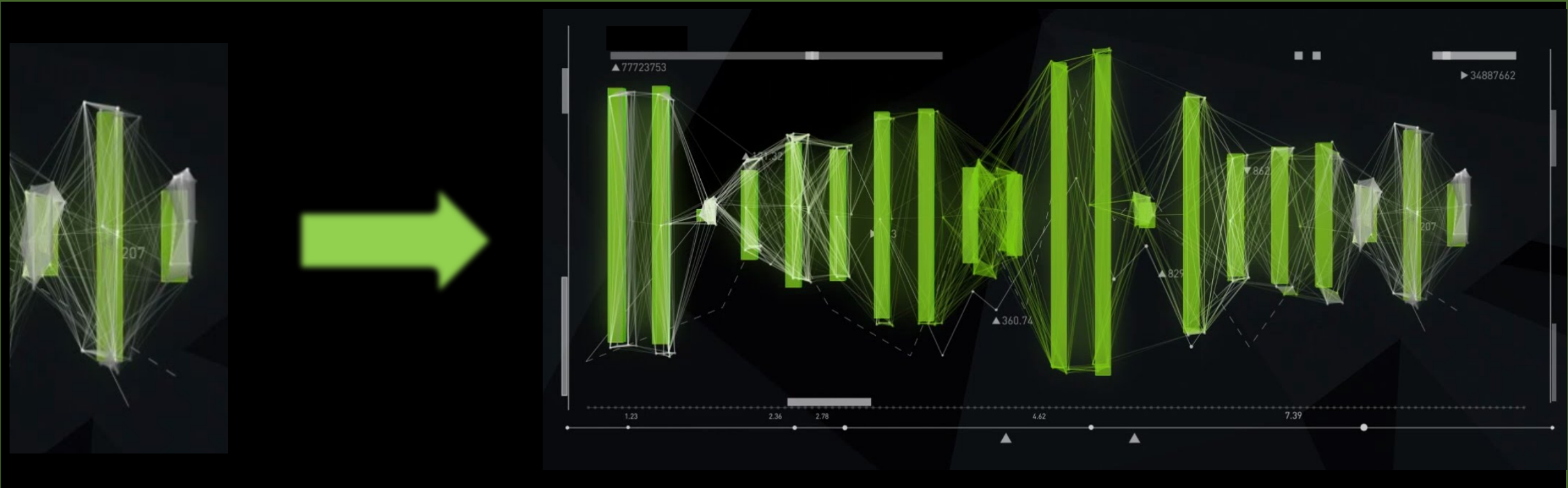
Exponential growth in computational power and storage

Exponential development of sophisticated AI algorithms

The Age of Artificial Intelligence

Deep Learning (Neural Networks) - Today

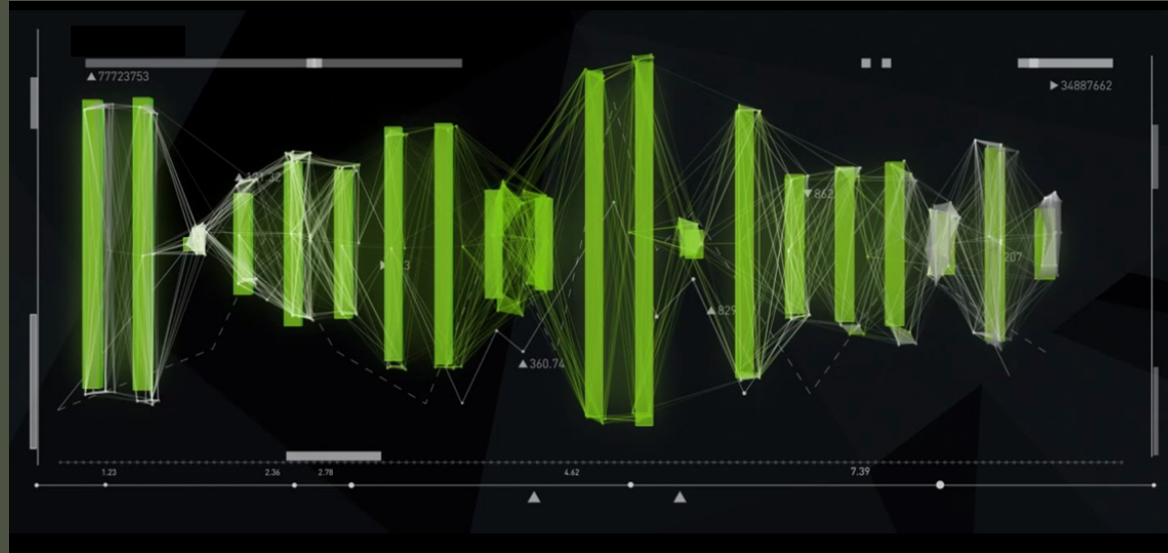
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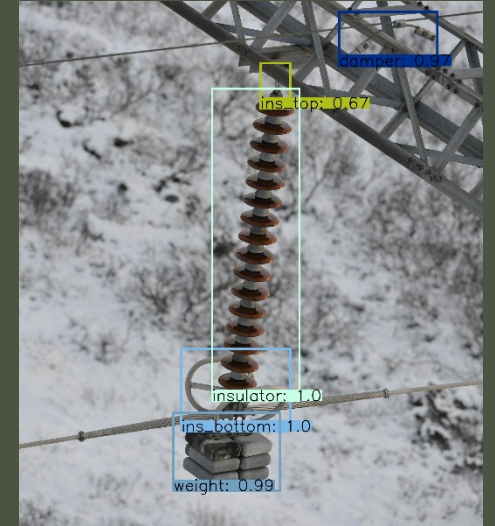
Source: NVIDIA

Deep Learning (Neural Networks) - Today

Input



Output



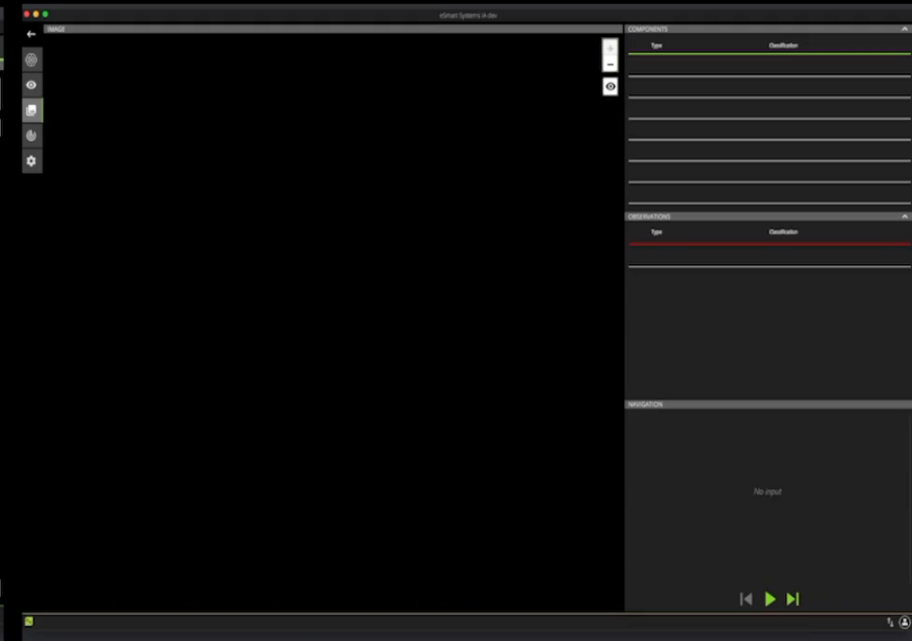
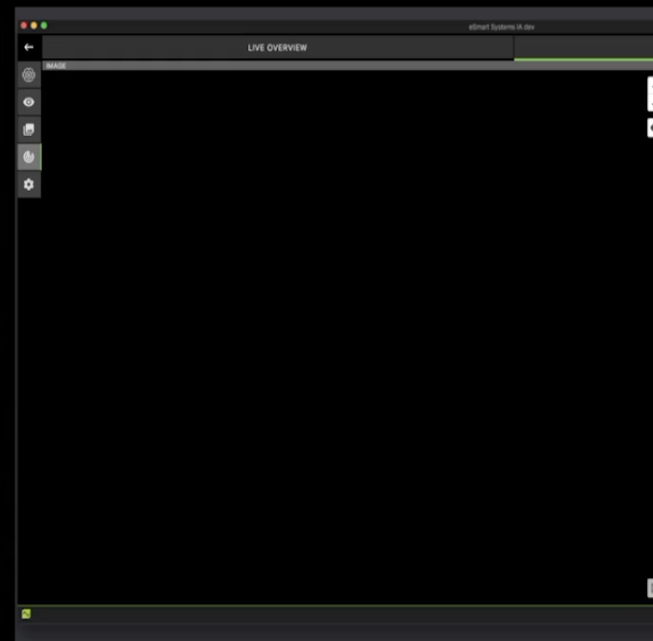
Proven Products with an Increasing Market Traction

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Connected Drone: Analytics software for infrastructure inspections

Connected Prosumer: Analytics software for distributed energy resources





THUNDERCLOUD

THE INTELLIGENT MOBILE OPERATION CENTER

eSmart Systems proudly presents Thundercloud. Thundercloud contains the best tools for analysis, visualization and communication.

Thundercloud optimize cloud computing by using edge computing. This enables Deep Learning for the drone, while operating in the air.

Thundercloud consists of six components; Connected Grid, Connected Drone, Broadband Radio Communication, Sensor Package, UAVs and the Mobile Operational Center.

MONITORING AND COMMUNICATION

Connected Grid is the main client operating on top of a big data lake. The client grants access to real time monitoring of all components and objects in the grid, and includes an AI-platform that predicts future outcomes based on numerous inputs.

Thundercloud also includes world class technology that ensures stable communication under all circumstances.



CONNECTED DRONE



THE INTELLIGENT ASSISTANT

By using Deep Learning, The Intelligent Assistant is capable of identifying components and detecting faults and potential problems.

New intelligent features are defined together with our customers, developed by the Analytics team and deployed to the Thundercloud system seamlessly.

Running on eSmart Systems Connected Platform and Microsoft Azure, The Intelligent Assistant can analyze 180,000 Images in less than one hour.

INTUITIVE CLIENT INTERFACE

The results from the analysis is presented through an intuitive and user-friendly client interface, giving the users a fast and efficient tool to view the status of their infrastructure as well as exporting reports as a basis for their maintenance tasks.

Tens of thousand of findings are presented in the matter of seconds, and all data is geotagged and accessible through the interactive map.

QUALITY THROUGH PARTNERSHIP

The Connected Drone's product portfolio is being developed in close collaboration with a number of utilities and our close partners, ensuring world class quality and maximum customer value.







- Jacksonville, Florida – smart metering (AMI) of water and electricity – 300 000 customers
- 7500 truck rolls a year to check zero consumption meters - 80% are wasted
- Advanced analytics to estimate likelihood of broken water meters
- 86.5 % prediction accuracy
- Annual net value for JEA \$1.1 million



Leveraging smart meter (AMI) data to improve operations and recover lost revenues

An aerial photograph of a city skyline at dusk or dawn, viewed from across a wide river. The skyline includes several prominent skyscrapers, with one tall, thin building featuring a distinctive trapezoidal top. A large steel truss bridge spans the river in the foreground on the right. The water reflects the sky and the city lights.

THE ZERO CONSUMPTION
PROJECT

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Thank You!