



# Supporting Electric Grids with Space Level AI

Prof. Reza Arghandeh  
Dr. Torleif Lunde

IEEE Austria  
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# // World view

24 Offices. 7 Operation Centers. More than 500 Employees. 24/7/365 Support.

North America  
// 3 operations centers



Europe  
// 11 offices  
// 2 operations centers



Middle East  
// 2 offices  
// 1 operation center



Asia  
// 5 offices  
// 1 operation center

Latin America  
// 3 offices  
// 1 operation center



# Western Norway University of Applied Sciences

- Førde
- Sogndal
- Bergen
- Stord
- Haugesund



**Climate Change  
will increase the  
risk of wildfires  
and extreme  
weather.**





# ENEL Power Lines 5x to the moon

Italy 1,140,215 km  
Iberian Peninsula 317,675 km  
Latin America 316,496 km \*

# Conventional

Inspection of vegetation near power lines is a manual and work intensive process

Likely using helicopters, people on the ground or drones

# GridEyeS

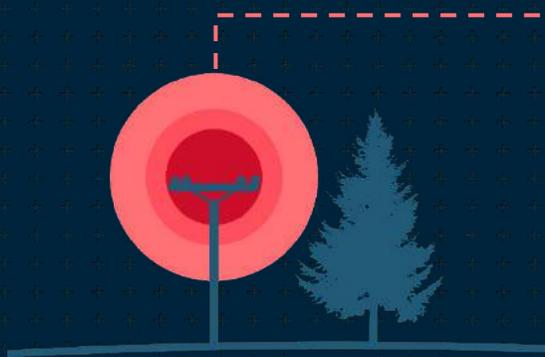
We are using a fully automated satellite based AI algorithm to

- **lower the cost** of vegetation management per line of mile
- **reduce inspection time**
- **increase inspection frequency**
- **ultimately increasing grid resilience**



**Vegetation (and weather) is the main reason for power outage.**

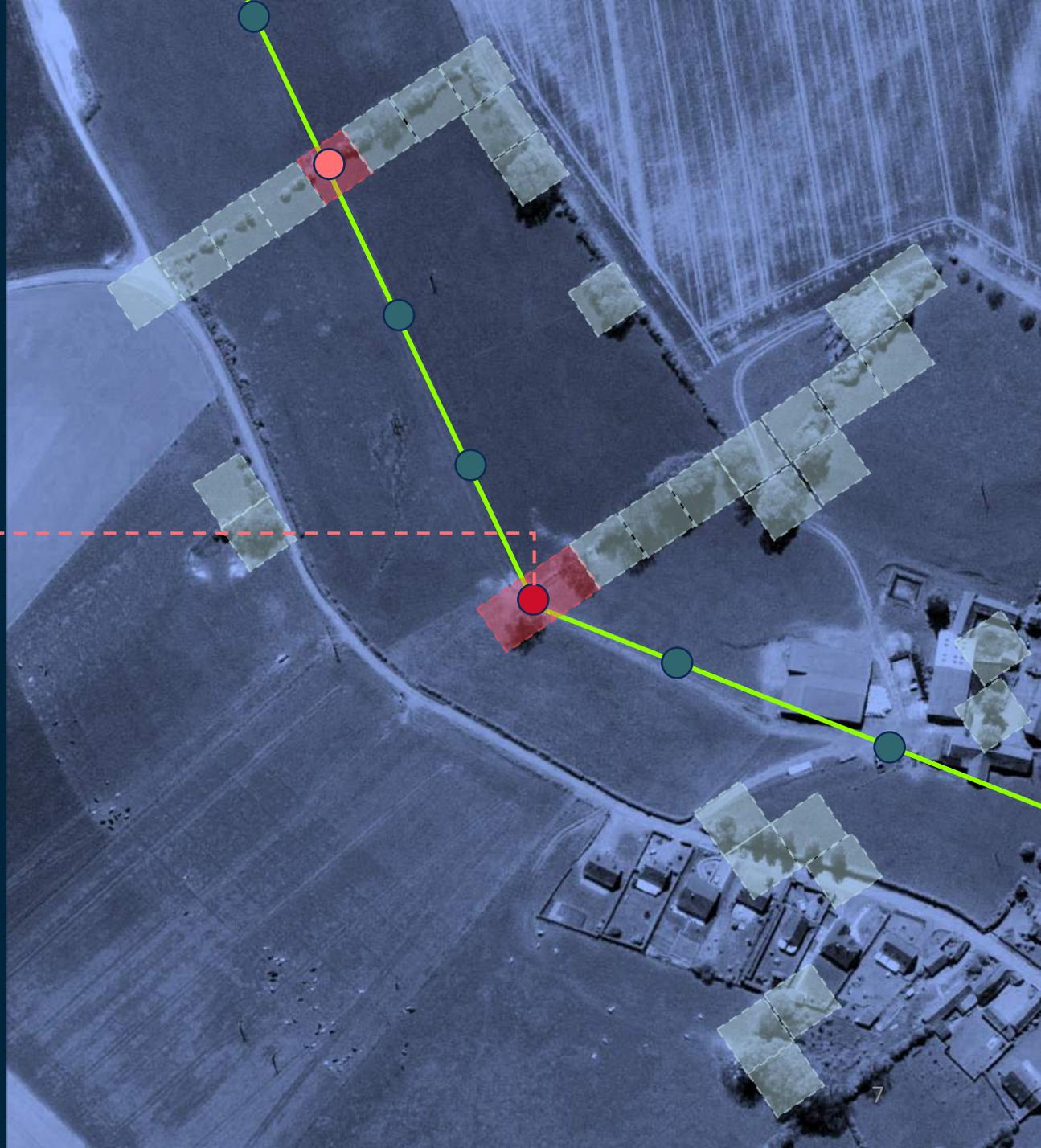
**Electric utilities' inspection costs range from 60 to \$1000/km of line/ year**



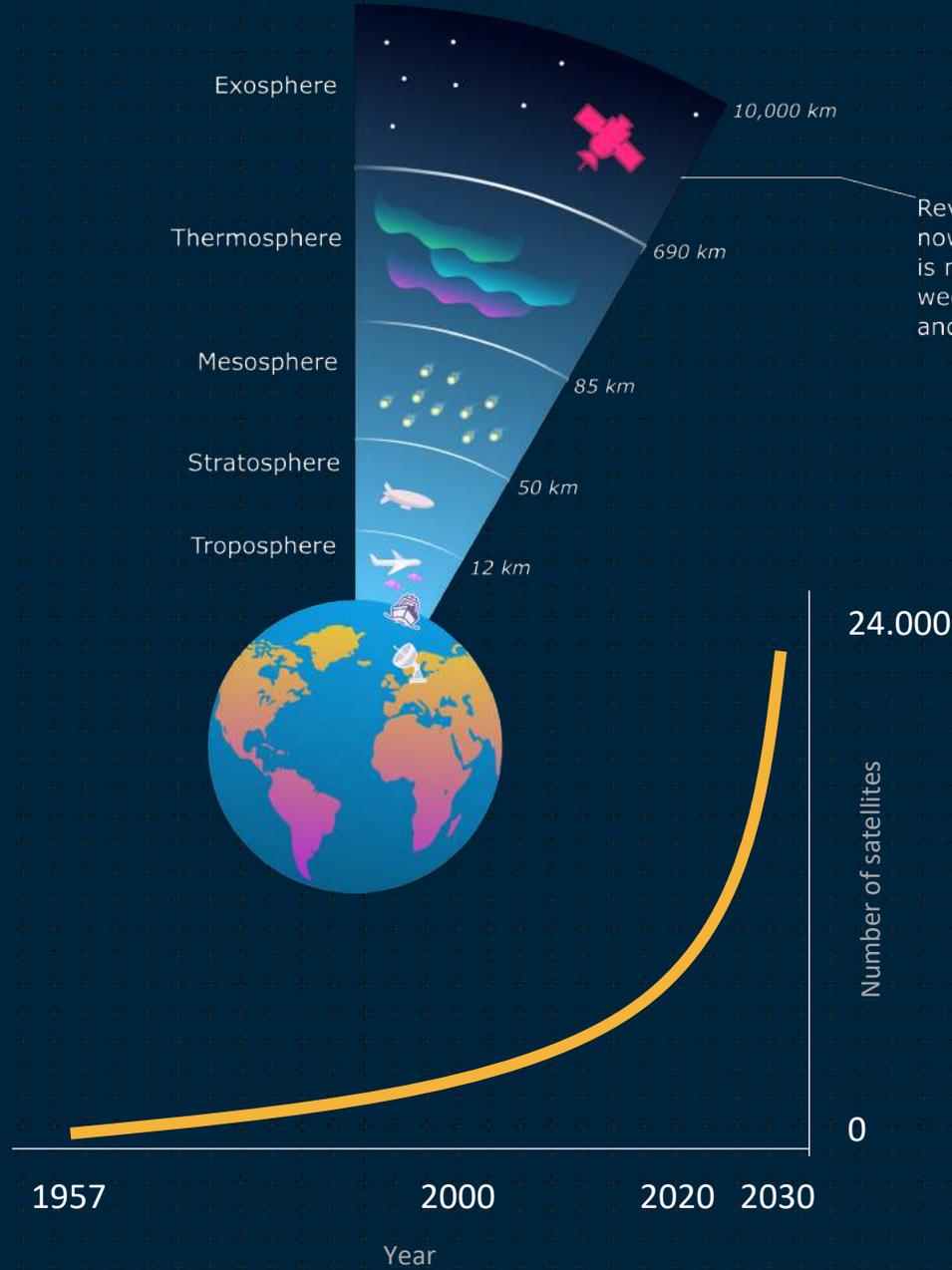
Awareness Zone

Notice Zone

Alert Zone

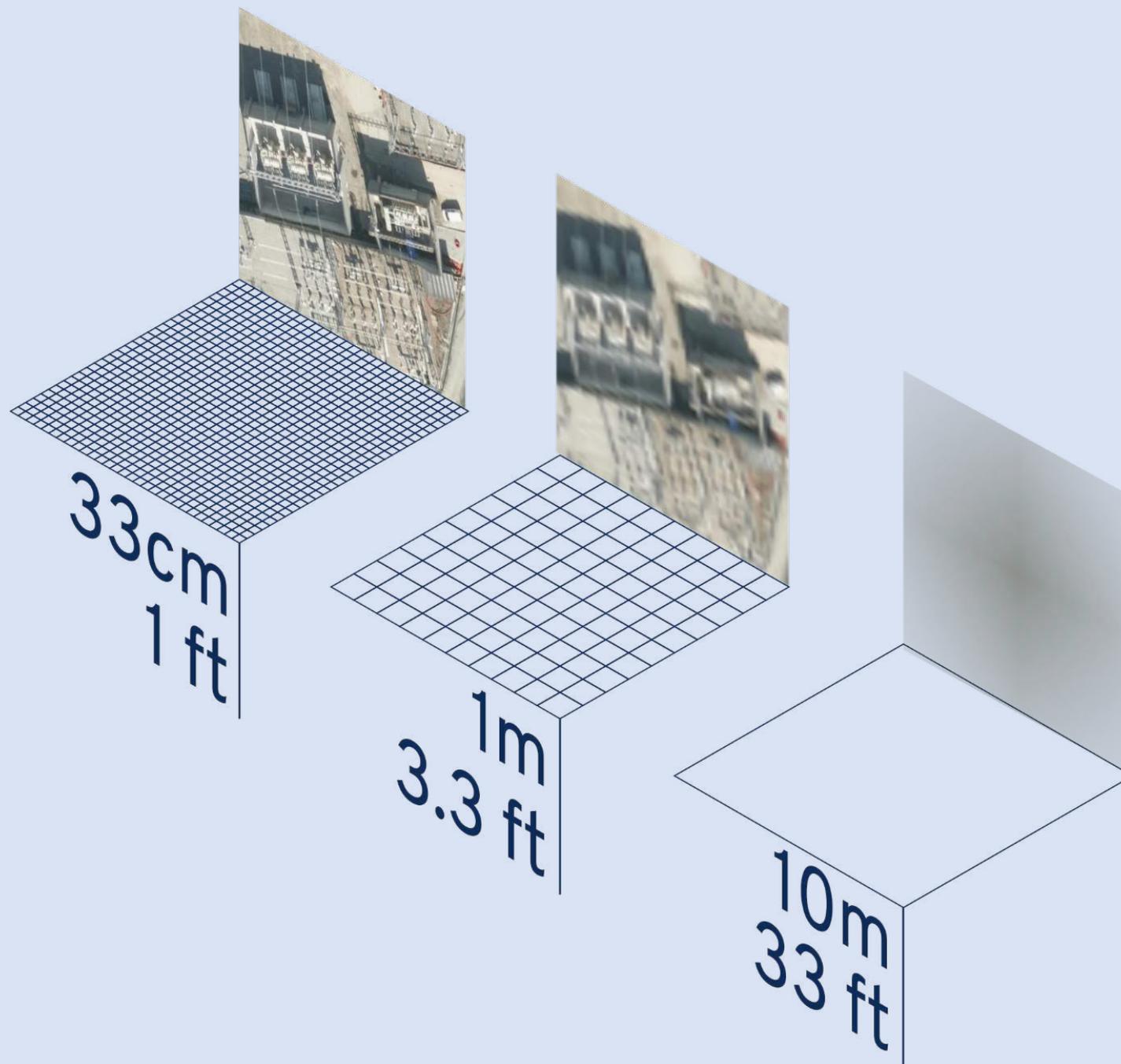


# The space revolution is taking off now



Revolution is happening now. Small, cheap satellites is making it possible with weekly/monthly surveillance and AI driven decision support.

What  
higher  
resolution  
at  
lower cost  
means



# Gearing towards space based grid asset surveillance

	Now	Near future ambitions	Future satellite / drone
 Drone / helicopter	10%	50%	20%
 People on ground	90%	40%	10%
 Satellite	0%	10%	70%



### Inspect

Gather data from satellites, IoT, UAS, weather models and experts

### Organise

Clean and control data ensuring information is standardized for AI

### Detect

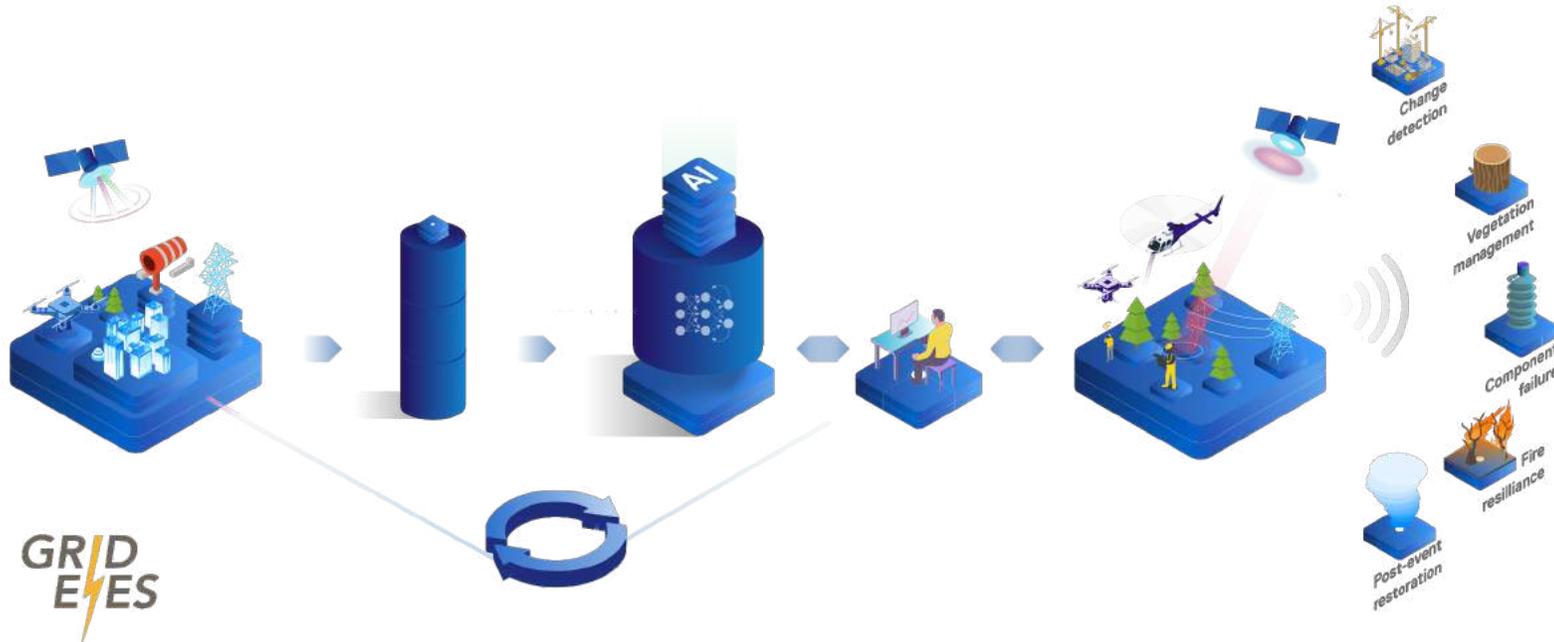
Automatically detect threats for reliable transport and delivery of energy

### Act

Use location insights to prevent failures, gather more data, and document actions.

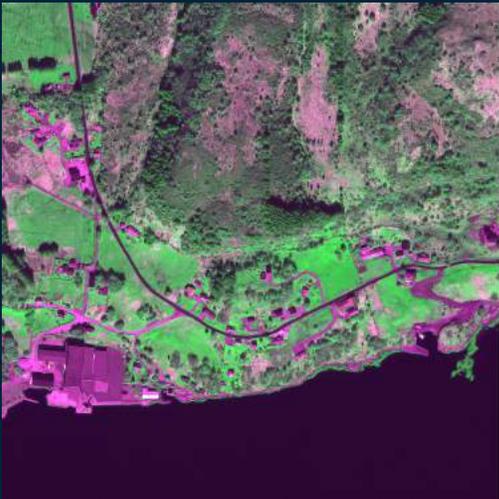
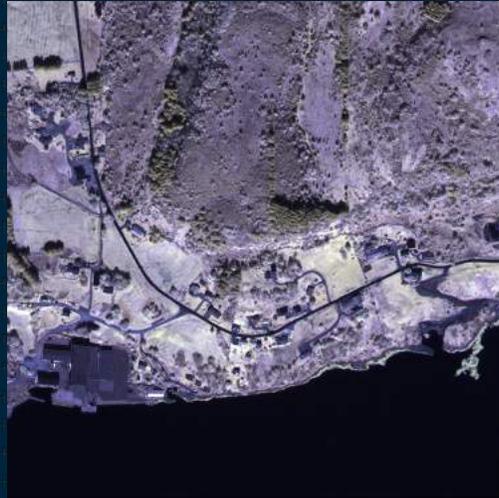
### Resilience

Enable autonomous operations and reliable delivery of renewable and clean energy

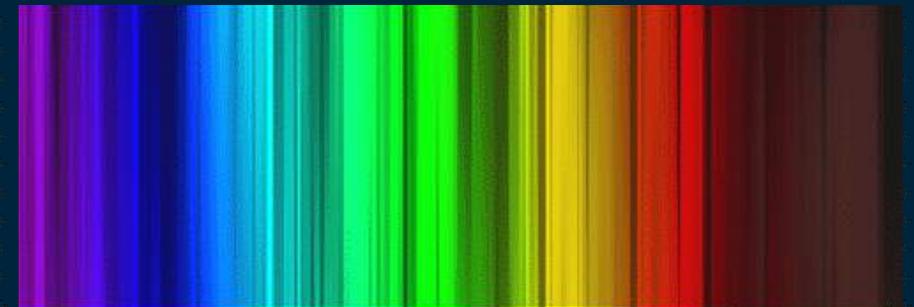


**Bridging the gap between data, knowledge and process**

# Multispectral Perception



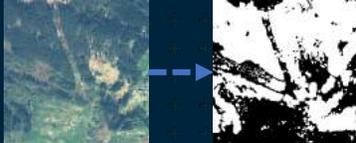
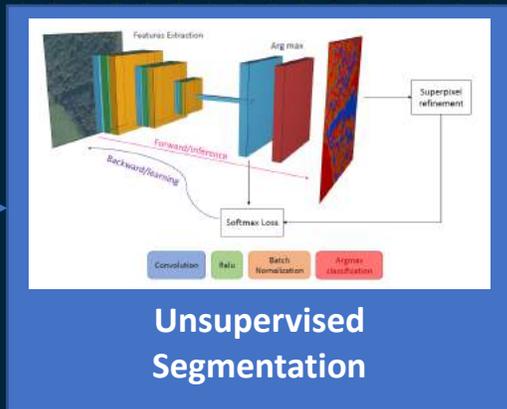
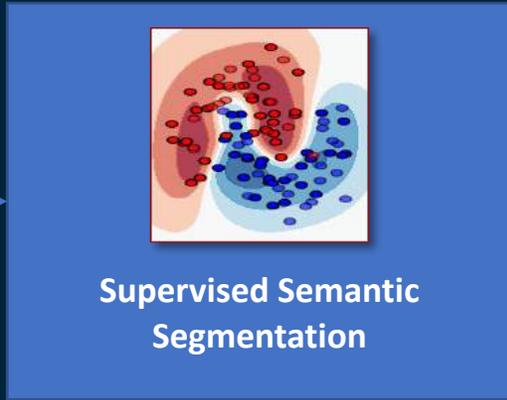
Compared to a human, AI can see more in each image



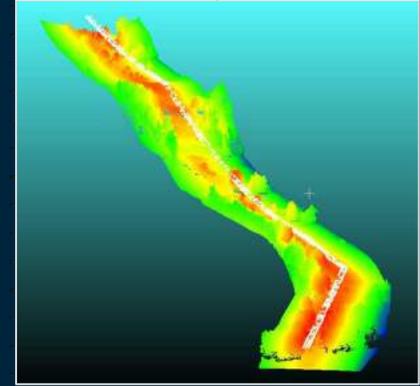
Visible

Near Infrared

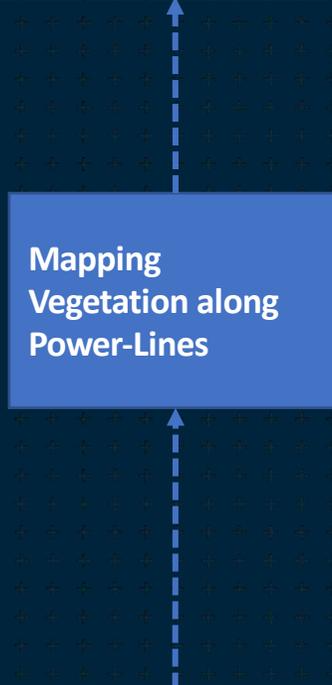
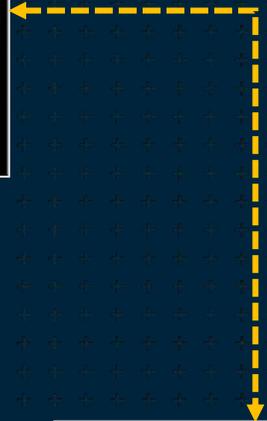
# Vegetation Detection using AI



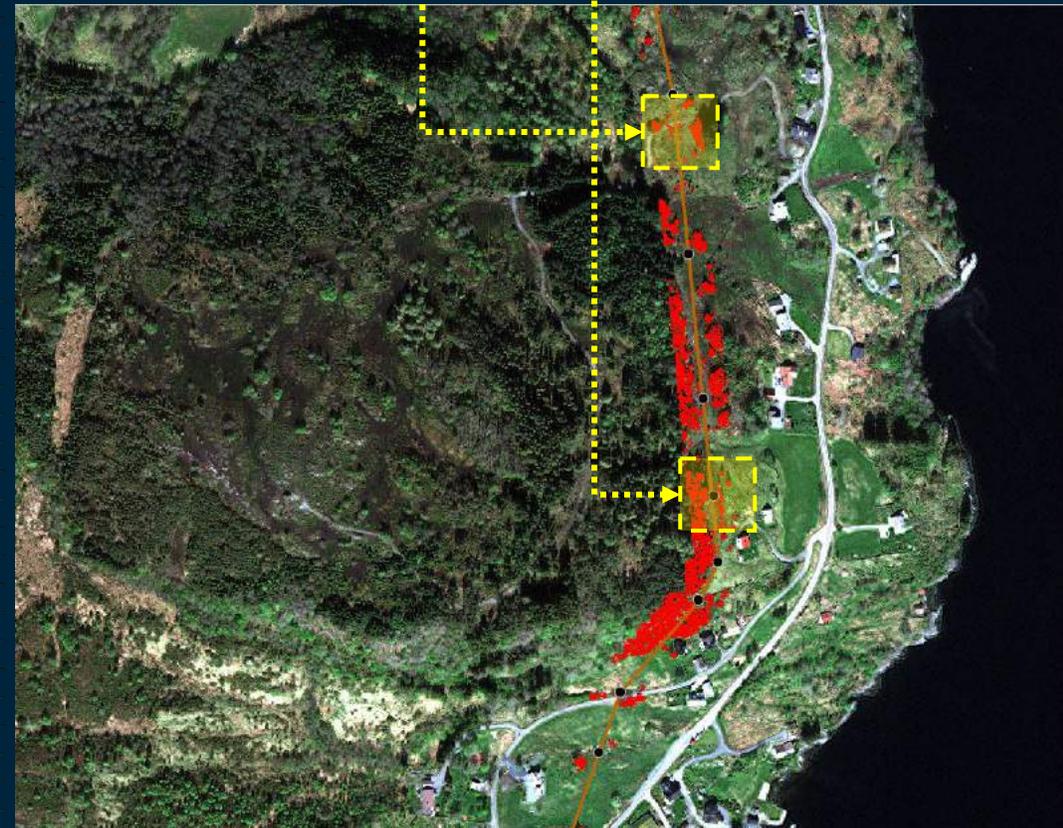
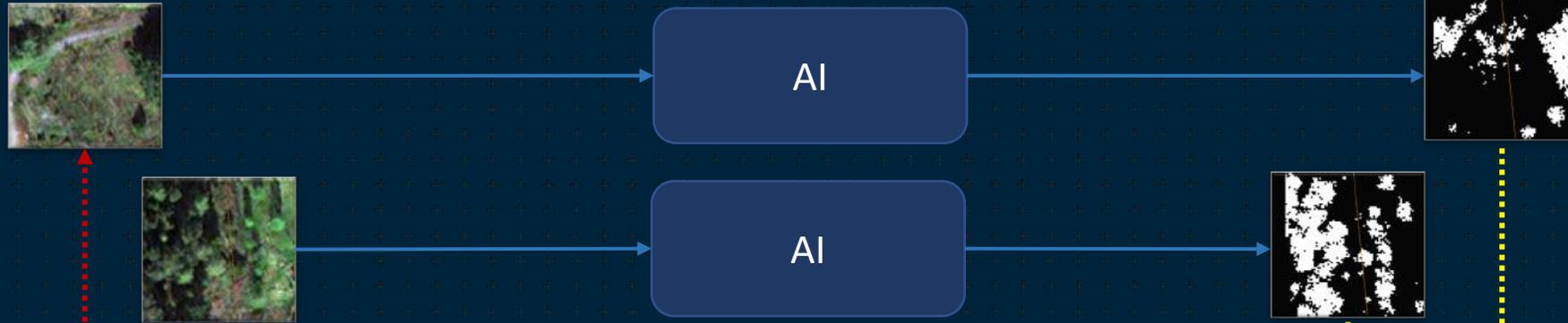
Vegetation Risk Map



LiDAR for cross validation

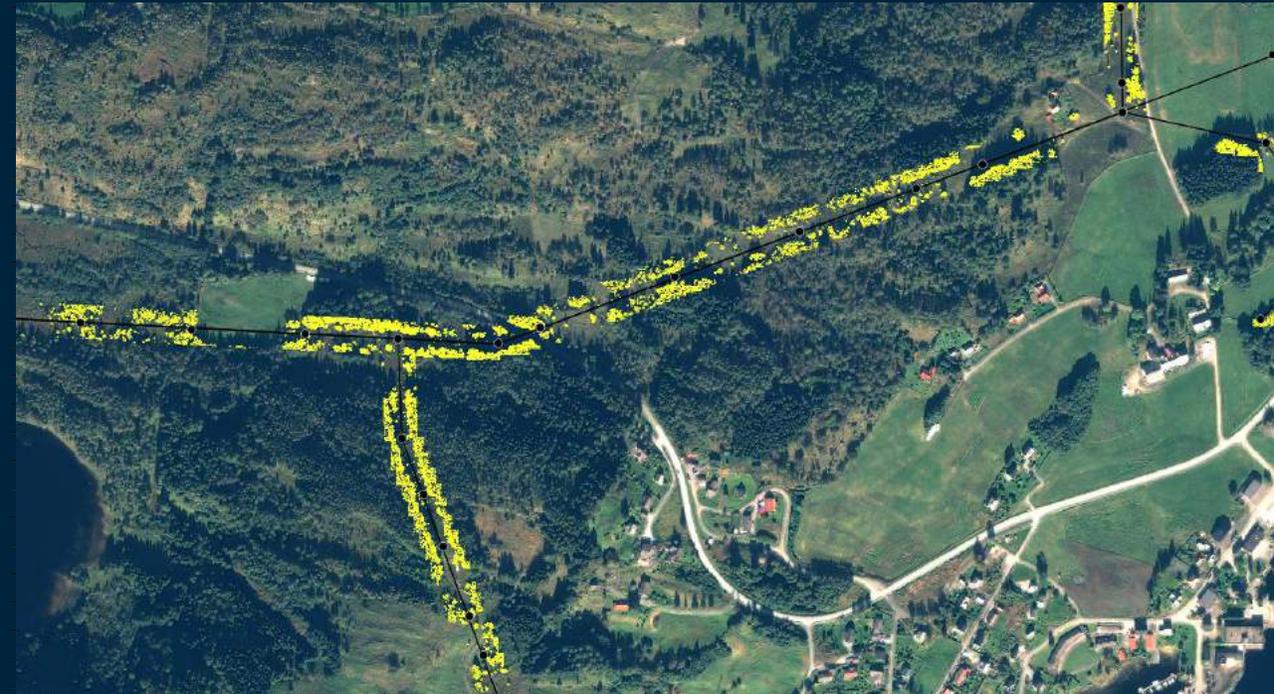


# How Our AI Algorithm Sees Satellite Images



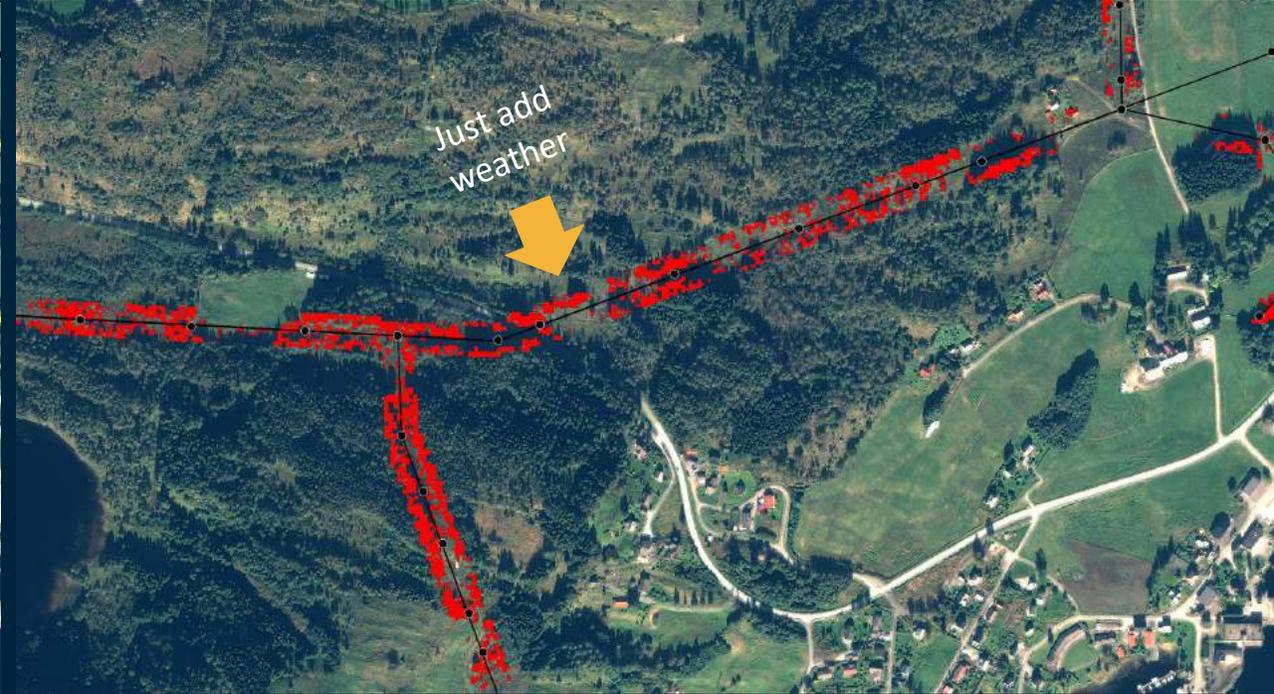
# Satellites enable cheaper and more scalable operations

LiDAR – the most accurate way to  
Detect vegetation



Require helicopter, pilots, airports,  
enourmous data amounts and data  
processing, ...

Satellites – good enough at less than  
1/10 of the price



AI detection from satellites

# AI assisting humans to navigate data - becoming more effective and accurate



Accuracy

84.6 %

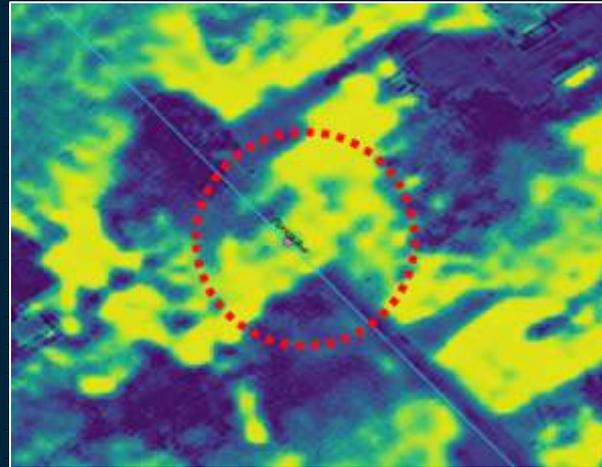
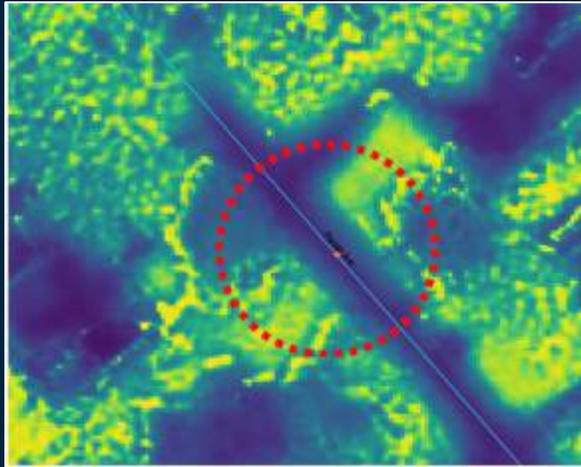
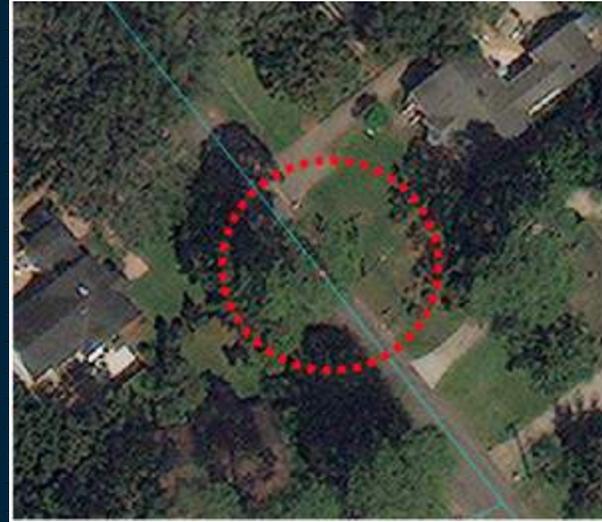
True Negative Rate  
(No Vegetation Risk)

98,2 %

# Before



# After



## The future of disaster management

### Drones

Limited by battery range  
and weather conditions,  
need operator

### Satellites

- Flexible scheduling  
- Can provide insights even  
under cloudy conditions  
with SAR

Use Case



Right-of-Way Encroachment (Vegetation)

Cost +  
Technology +

Medium cost, but consistent

Expensive



Right-of-Way Encroachment (Construction, Dumping, etc.)

Cost +  
Technology +

Medium cost, but consistent

Expensive

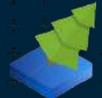


Geo-Location Confirmation of Assets

Image resolution

Cost +  
Technology +  
Data pipeline -

Expensive and inconsistent



Storm Damage Assessment

Cost of just-in-time imagery

Ground covered

Ground covered



Storm Damage Recovery

Cost of just-in-time imagery

Ground covered

Ground covered

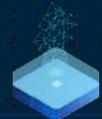


Structural Integrity of Towers and Poles

Not good enough quality

Medium cost, but consistent

Expensive and inconsistent



Flooding: Water Levels

Cost +  
Technology +

Flight time

Ground covered

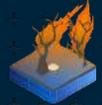


Load forecasting

Frequency of images

Expensive

Inexpensive



Fire monitoring

Frequency of images

Expensive

Expensive

Ample of future opportunities



*StormGeo*



**We are open for working  
with TSOs and DSOs for  
demonstration, contact us!**

# Thank You

Reza Arghandeh  
Professor in Data Science, HVL  
Lead Data Scientist , StormGeo  
[Reza.arghandeh@hvl.no](mailto:Reza.arghandeh@hvl.no)

Torleif Markussen Lunde,  
EVP Innovation, StormGeo  
[TorleifMarkussen.Lunde@stormgeo.com](mailto:TorleifMarkussen.Lunde@stormgeo.com)