



Geospatial Sensor- Driven Analytics Using Drones

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AeroVironment - An Aviation Pioneer



Nano Air Vehicle

- Multiple world records, including first human powered flight and highest altitude flight
- 7 AeroVironment Vehicles are in the Smithsonian permanent collection
 - Dragon Eye, SUAS
 - Pathfinder, Solar HALE UAS
 - Gossamer Condor, Human Powered AV
 - Gossamer Albatross, Human Powered AV
 - Solar Challenger, Solar AV
 - Pterosaur, Dinosaur UAV
 - Sunraycer, Solar Road Vehicle

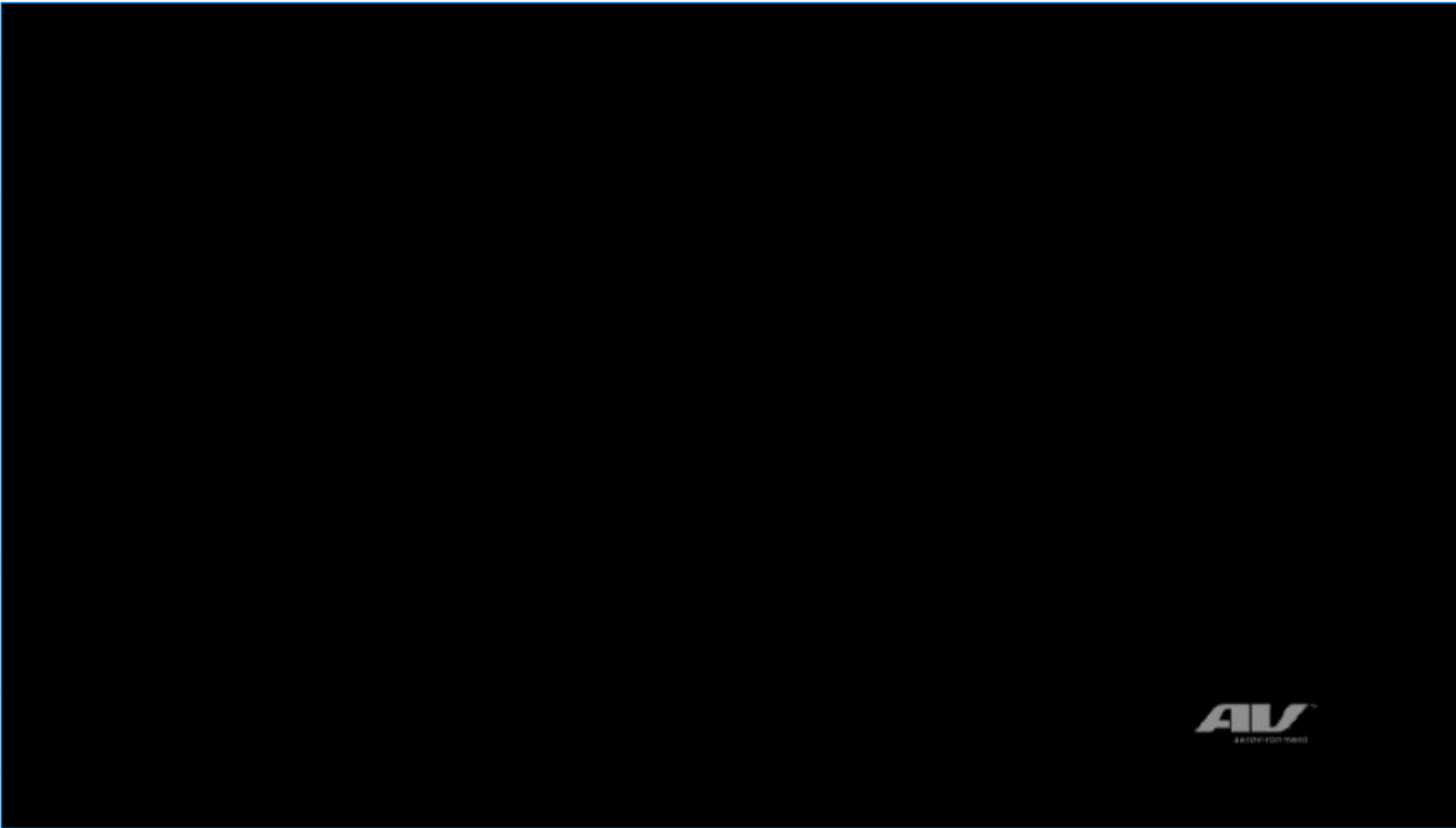


Dragon Eye



EV1





Brief AeroVironment History

AV SUAS Family of Systems



Drone Systems

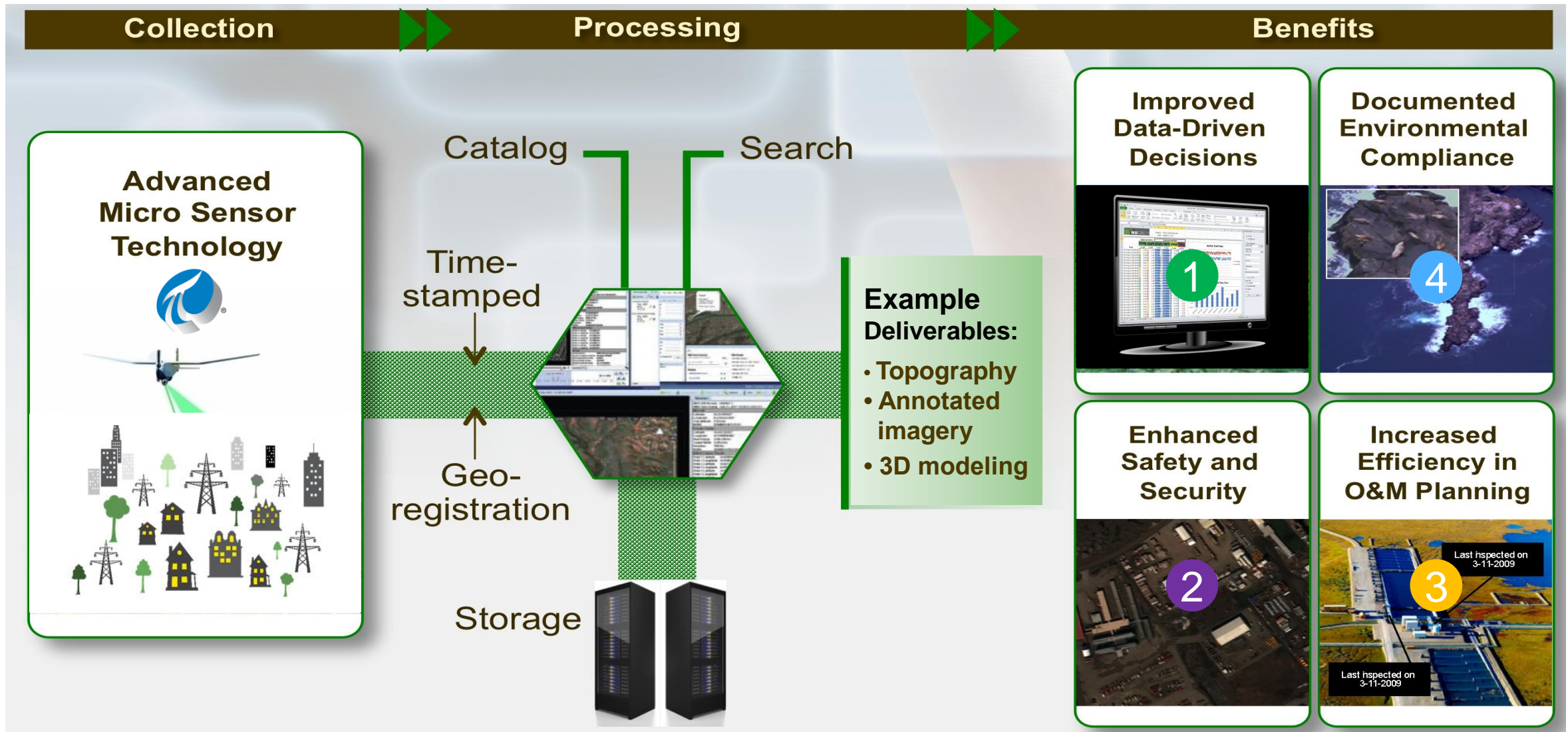


- Puma AE – Fixed Wing – designed to be a dependable, ruggedized UAS platform for ease of operation, reliability, and quick interchange of sensors for various data collection tasks
- Quantix – VTOL/Fixed Wing – Unique, hybrid design that allows the aircraft to launch vertically and transition into horizontal flight, maximizing aerodynamic efficiency and range
- Altura Zenith ATX-8 – VTOL – Can be launched and recovered in confined and unprepared terrain



Quantix Launch

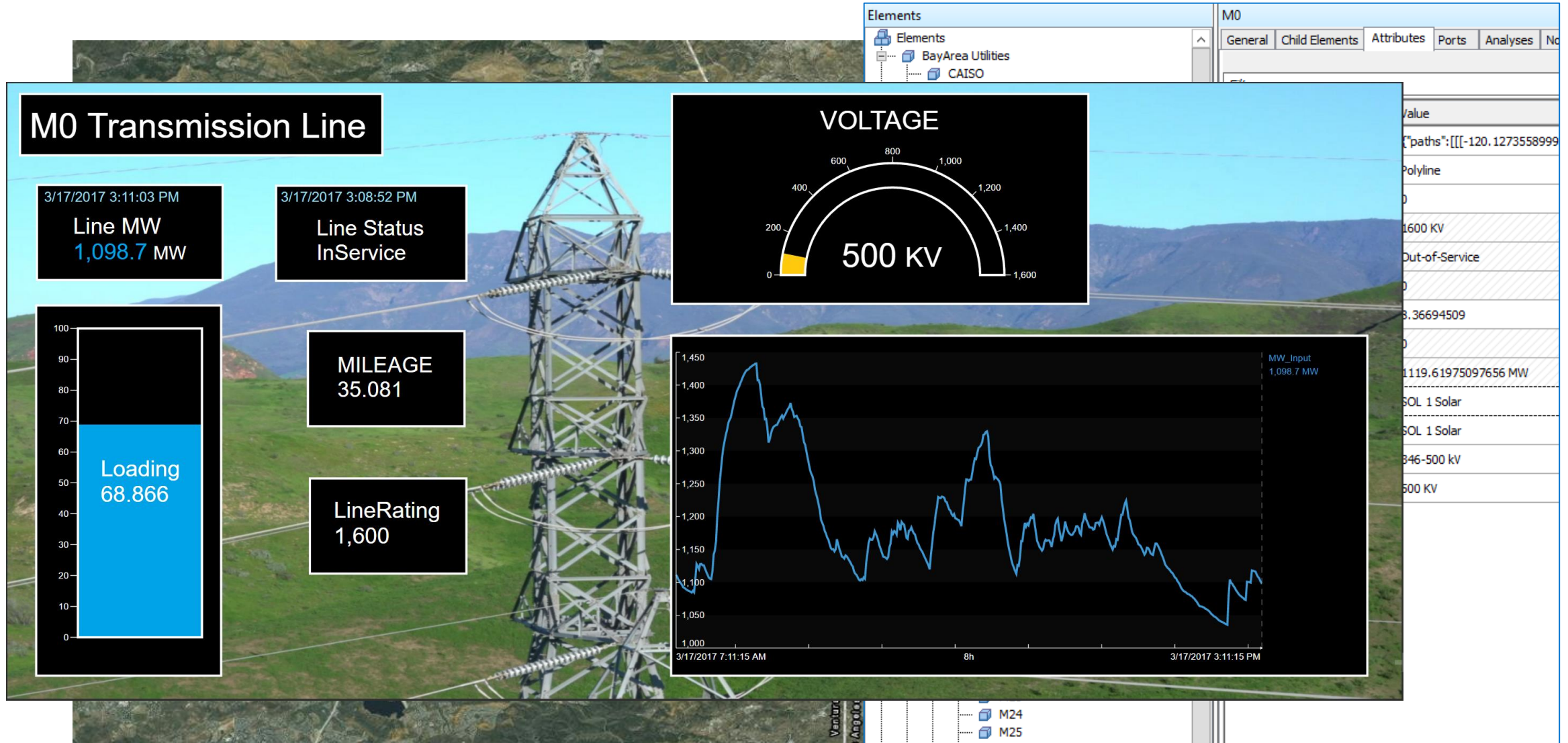
AeroVironment's Decision Support System (AV DSS)



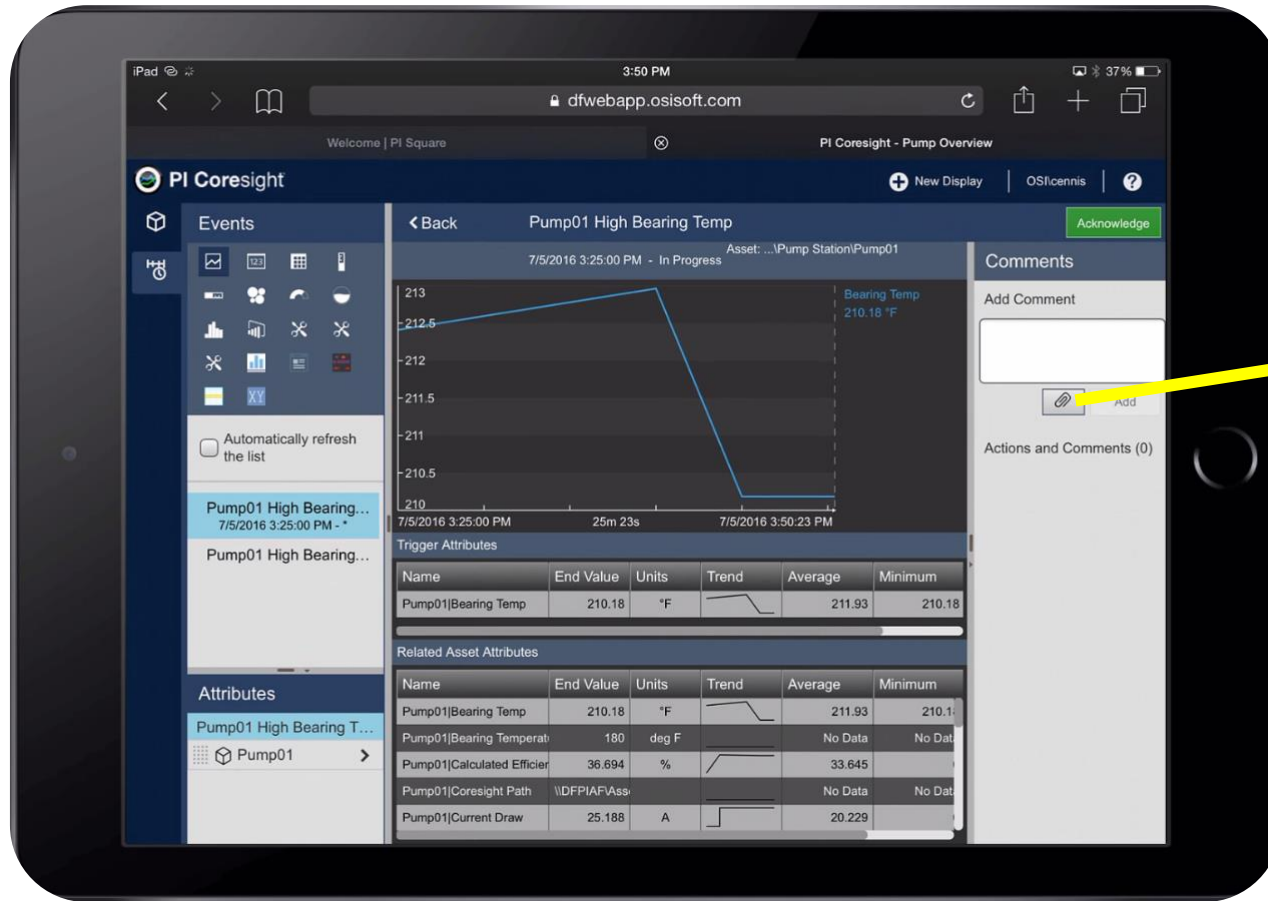


1.) Improved Data-Driven Decisions

Transmission Line with Towers Identified



Annotating Event Frames





2.) Enhanced Safety and Security

Substation Security

TETHER EYE UAS

Deploy From Fixed Locations or Mobile Platforms

24-hour continuous ISR and security operations

Heights up to 150 feet above launcher

EO/IR payload



AV
AeroVironment™

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Tether Eye Solution

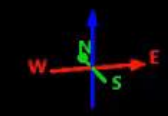


3.) Increased Efficiency in O&M Planning

- BayArea Utilities
 - CAISO
 - DT45385
 - DT453999
 - Emergency Services
 - Generation Assets
 - Power Outages
 - Substations
 - Cambria
 - Cayucos
 - City and County of San Francisco
 - Cuyama
 - Grapevine
 - Jolon
 - Kelley
 - Lamont
 - Livermore
 - Midsun
 - Midway
 - Monterey
 - Monterey Navy Lab
 - Morro Bay
 - Oil Fields
 - Old River

Filter

Name	Value
Category: <None>	
Bank_1_Circuit_Breaker	Closed
Bank_1_Power	0.330757226320241 MW
Bank_2_Circuit_Breaker	CLOSED
Bank_2_Power	1.7415801695684 MW
Bank_3_Circuit_Breaker	CLOSED
Bank_3_Power	0.0501343452712784 MW
Temp	2.2862613201141357
Category: Geometry	
ArcGIS feature shape	{ "x": -119.62135741391347, "y": 34...
ArcGIS feature shape type	Point



Display: Substation.Transformer Asset: TX511+

TX511|LTC Position
4
3/13/2017 8:59:00 PM

TX511|LTC Unbalanced Time
0 s
3/13/2017 8:59:00 PM

TX511|LTC Position Change - 24 Hours
682
3/13/2017 8:59:00 PM

LTC Position Change Alarm High ●

LTC Position Change Alarm Low ●

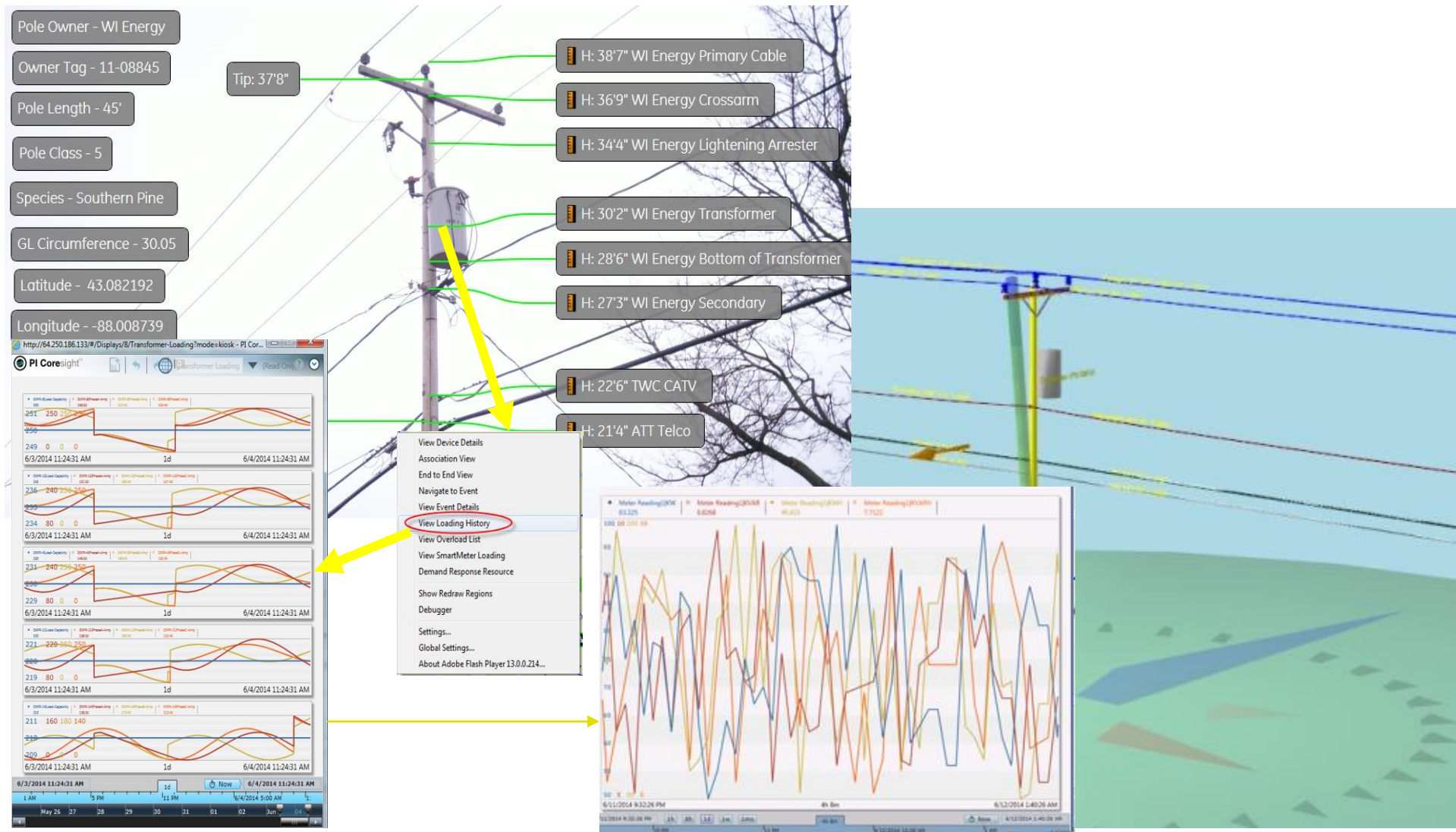
Name	Value
TX511 Winding Exponent	1
TX511 Transformer Number	511
TX511 Substation	Tulare
TX511 Model	508B
TX511 Manufacturer	Westinghouse


Hot-Spot Temperature
85.000 °C
Hot-Spot Temperature High
103 °C

3/12/2017 9:00:10 PM 1d Now 3/13/2017 9:00:10 PM

Substation Asset Management

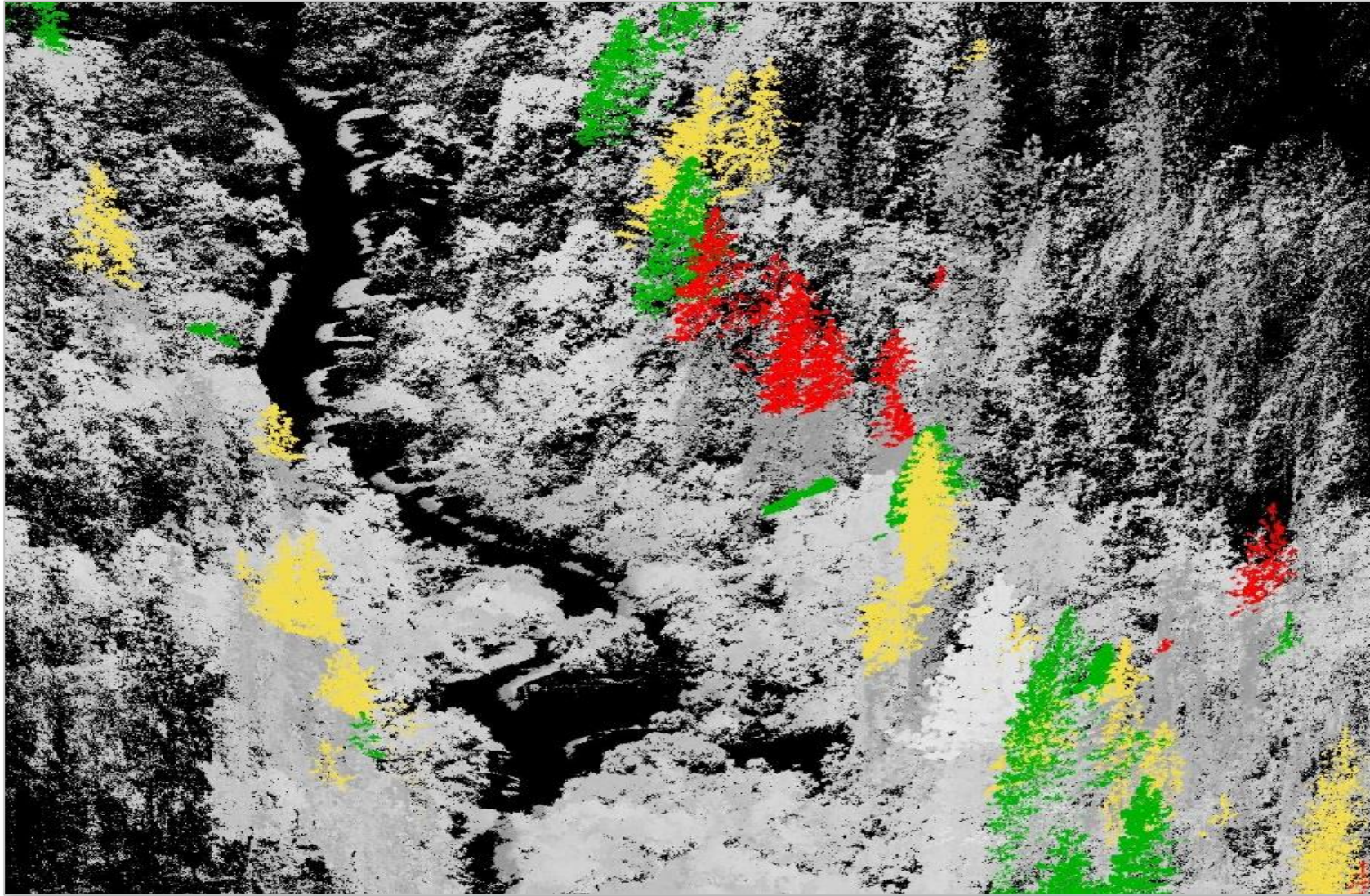
Pole Loading Analysis – Pole Attachments and Heights

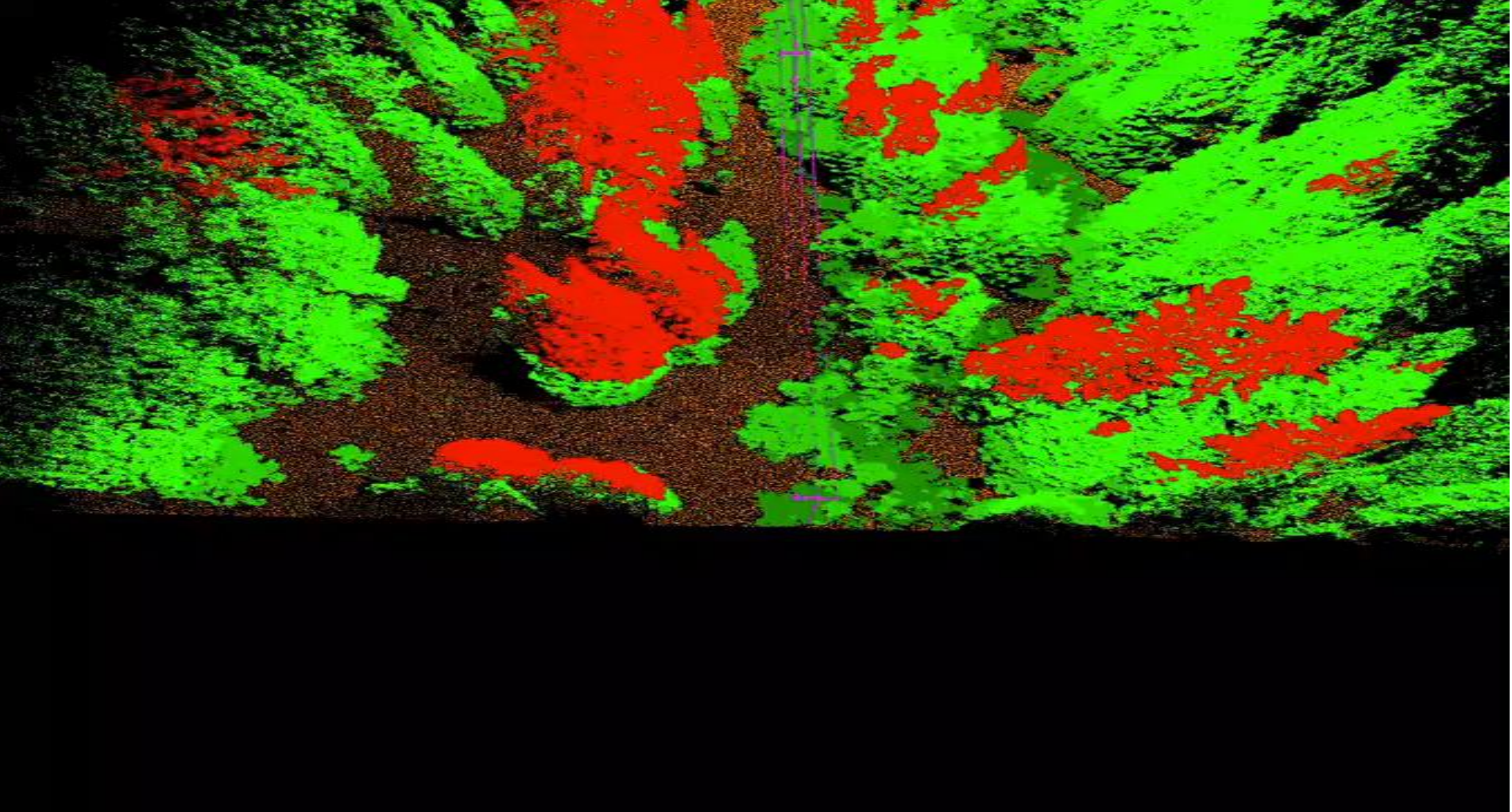




4.) Documented Environmental Compliance

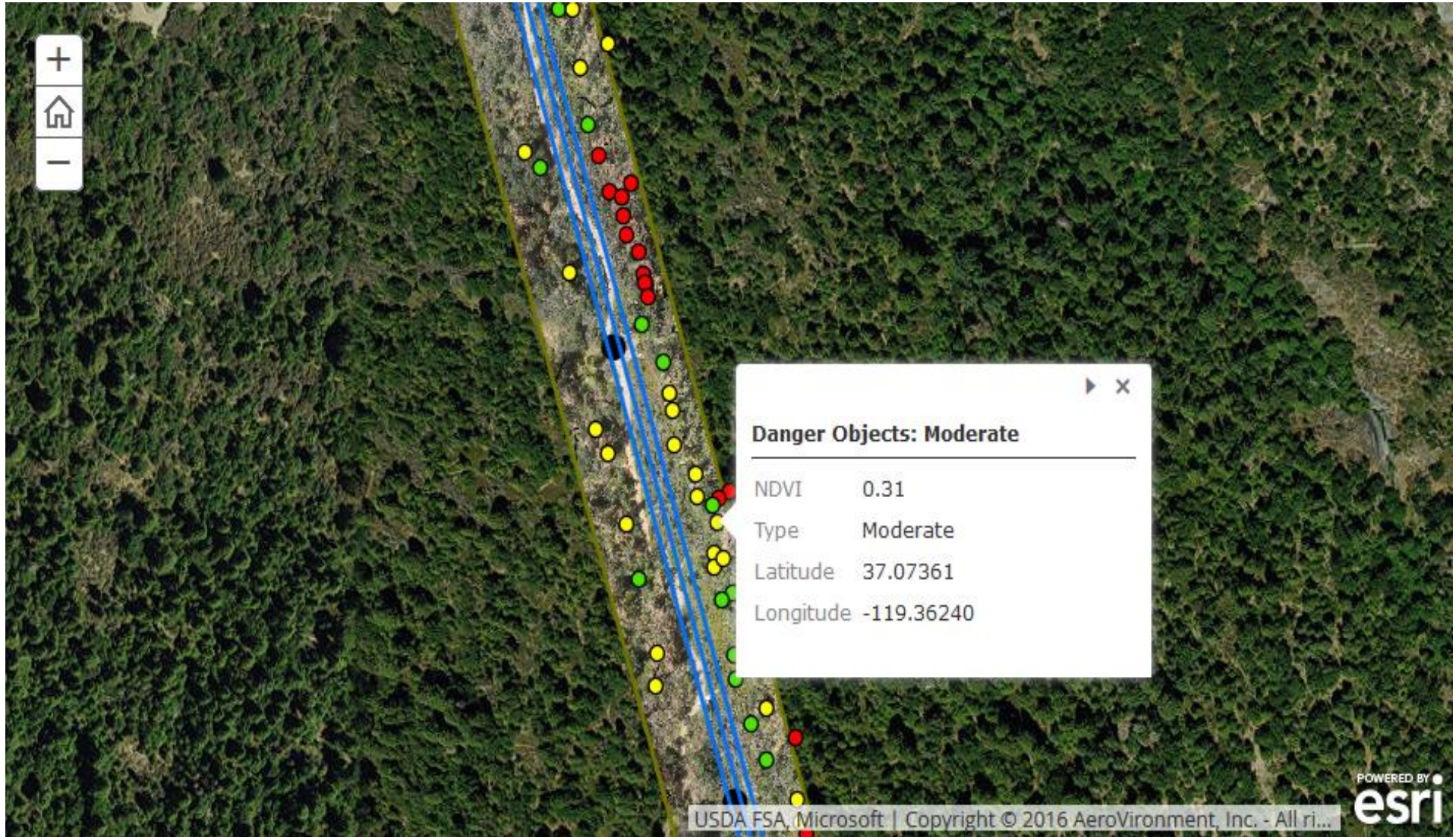
Vegetation Management





Vegetation Management

Vegetation Management



FAA Regulatory Environment

- Current
 - Drones operated under Part 107 must weigh no more than 55 lbs
 - Commercial UAS operation must take place within visual line of sight (VLOS) of the operator
 - ATC approval is required before flying in controlled airspace
 - Operations must take place during daylight hours, or within the hours of civil twilight (immediately before sunrise and after sunset)
 - Drones weighing between 0.55 lbs. and 55 lbs. must be registered with the FAA
- Future
 - Applying for waivers in remote areas to fly Beyond Line of Sight (BLOS)
 - BLOS capability as part of the regulatory change
 - End-state – air ops operations – solar coming



Summary

- Integration of **PI sensor data**, data capture from **AV drones**, and **geospatial information** can provide actionable intelligence
- Drone technology and PI is industry agnostic
- Drones are a *disruptive technology*
- Cost effective and safe
- Next steps

감사합니다

谢谢

Danke

Merci

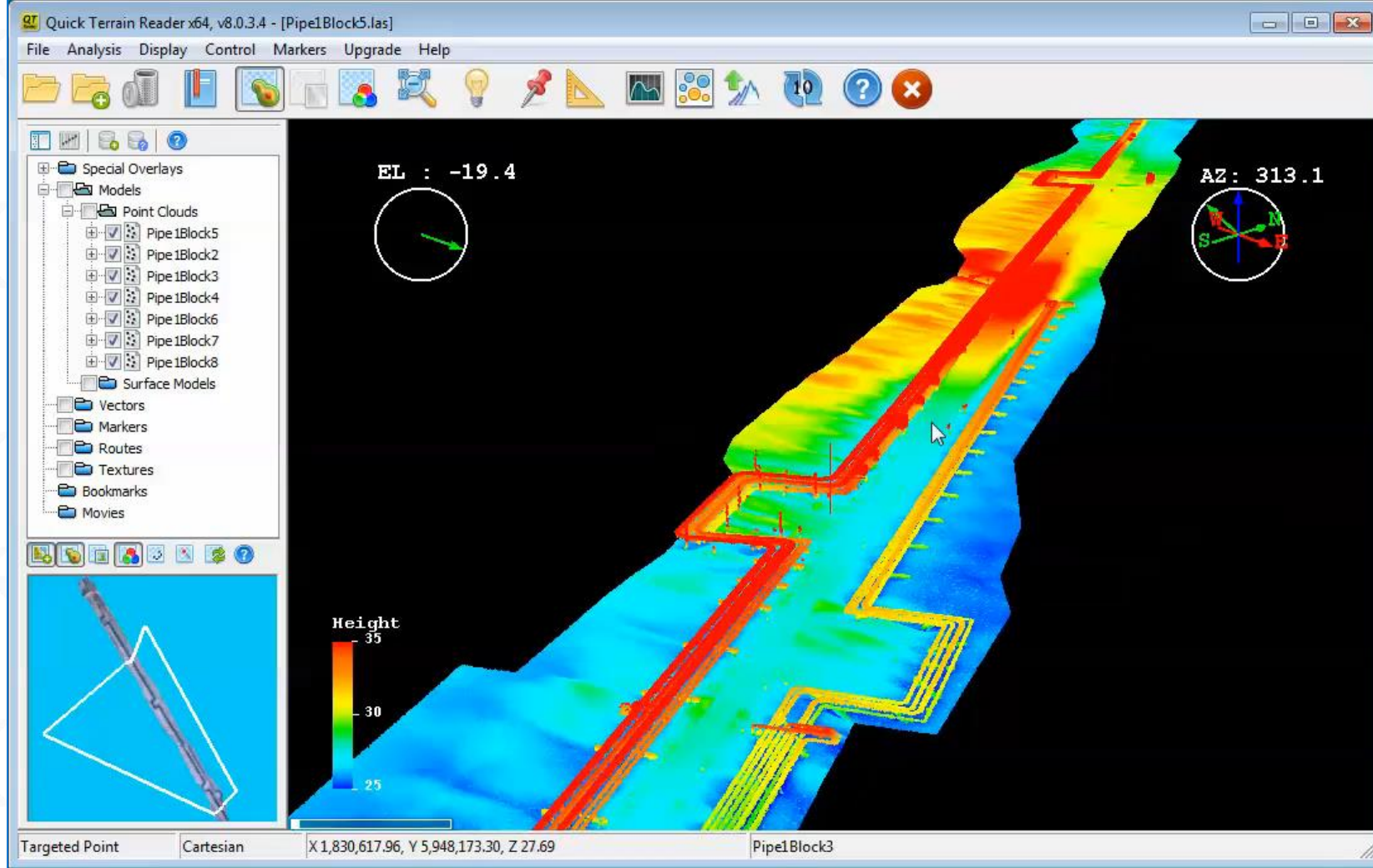
Gracias

Thank You

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Спасибо

Obrigado



Pipeline Monitoring



Gravel Pit Analysis