FLYABILITY

SAFE DRONES FOR INACCESSIBLE PLACES

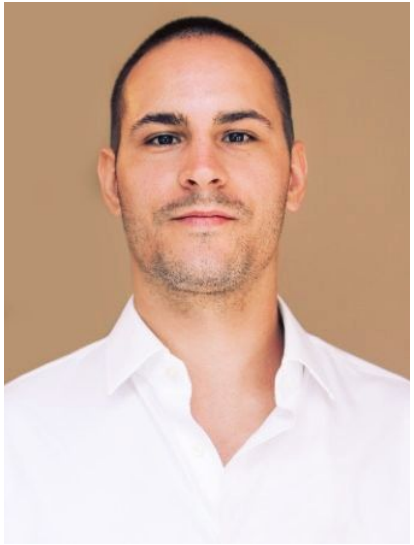
Drones in Power Generation: How Exelon Clearsight Uses Drones to Improve Safety, Reduce Downtimes & Save Money

Thursday, May 14th 2020

04:30 PM - 05:30 PM CEST

10:30 AM - 11:30 AM EST

MODERATOR



Zacc Dukowitz
Content Marketing Manager
—Flyability—

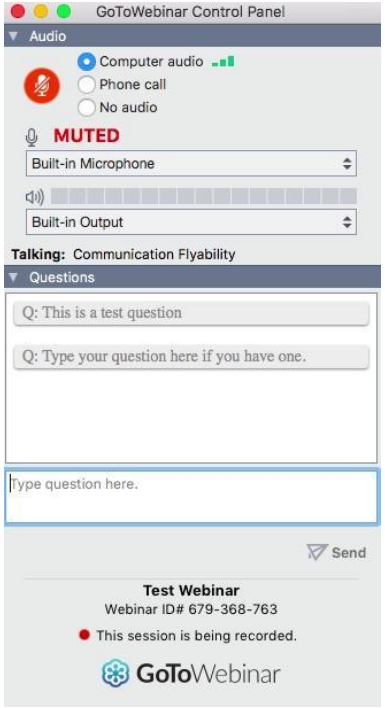
PANELISTS

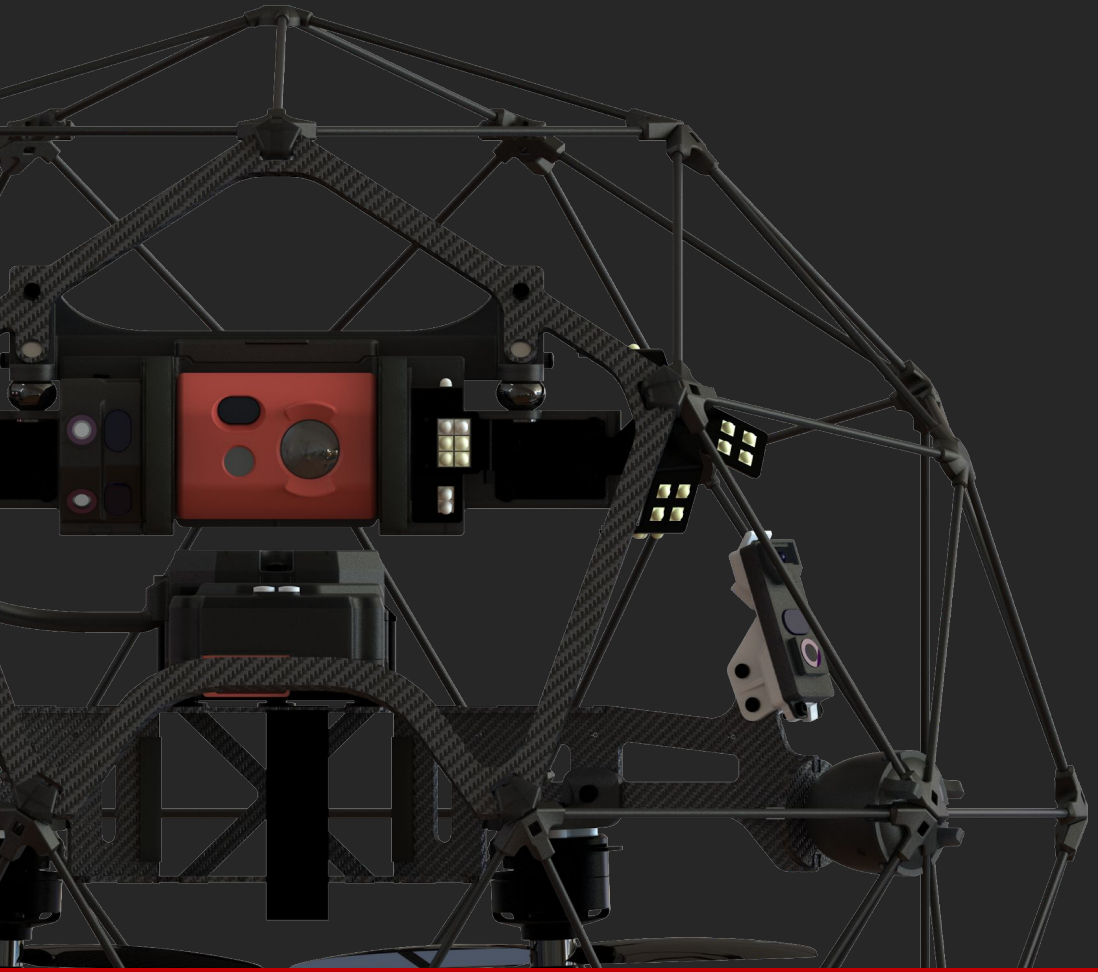
Chris Place
Business Development Manager
—Exelon Clearsight—

Marc Gandillon
Head of Marketing
—Flyability—

WEBINAR ENGAGEMENT

Ask questions during the webinar.





REPLAY

The recording of this webinar will be sent to you afterward.

AGENDA

1 5’ Introduction

2 25’ Chris Place, Exelon Clearsight

Exelon Clearsight—Power Generation Case Studies

3 30’ Panel Discussion/Q&A

Exelon Clearsight—Power Generation Case Studies

Chris Place
Business Development Manager

EXELON CLEARSIGHT – GENERATION CASE STUDIES

Chris Place, Business Development Manager – Generation Segment

Exelon Clearsight℠

OUR MISSION

MISSION

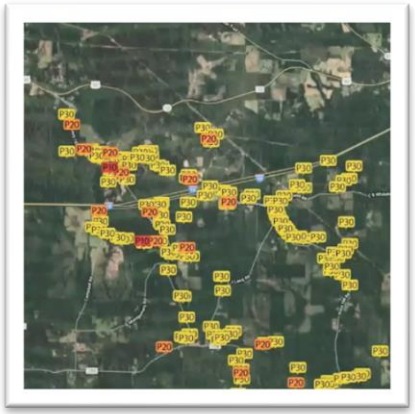
Our mission is to **leverage innovation** and **technology** to become the leading provider of inspection services for critical infrastructure and help drive progress to a sustainable, safer, and more reliable future for our customers and the communities they serve.

VISION

We believe improvements to reliability, safety, and efficiency can be obtained with **more effective inspections of critical infrastructure**. That's why we're committed to innovating world-class services and being thought leaders in the industry to help drive progress for our partners and communities.

VALUES

We are dedicated to **safety**. We actively **pursue excellence**. We innovate to better serve our customers. We act with integrity and are accountable to our communities and the environment. We succeed as an inclusive and diverse team.



1

SAFETY

2

EFFICIENCY

3

THOROUGH INSPECTIONS

4

HIGHER QUALITY DATA

5

DOWNSTREAM BENEFITS

GENERATION SERVICES

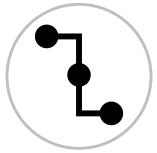
COOLING TOWER/STACK INSPECTIONS

ASME SECTION XI IWL CONCRETE INSPECTIONS

DAM SAFETY INSPECTIONS

CONFINED SPACE INSPECTIONS

SUBMERSIBLE/DIVER OFFSET SERVICES

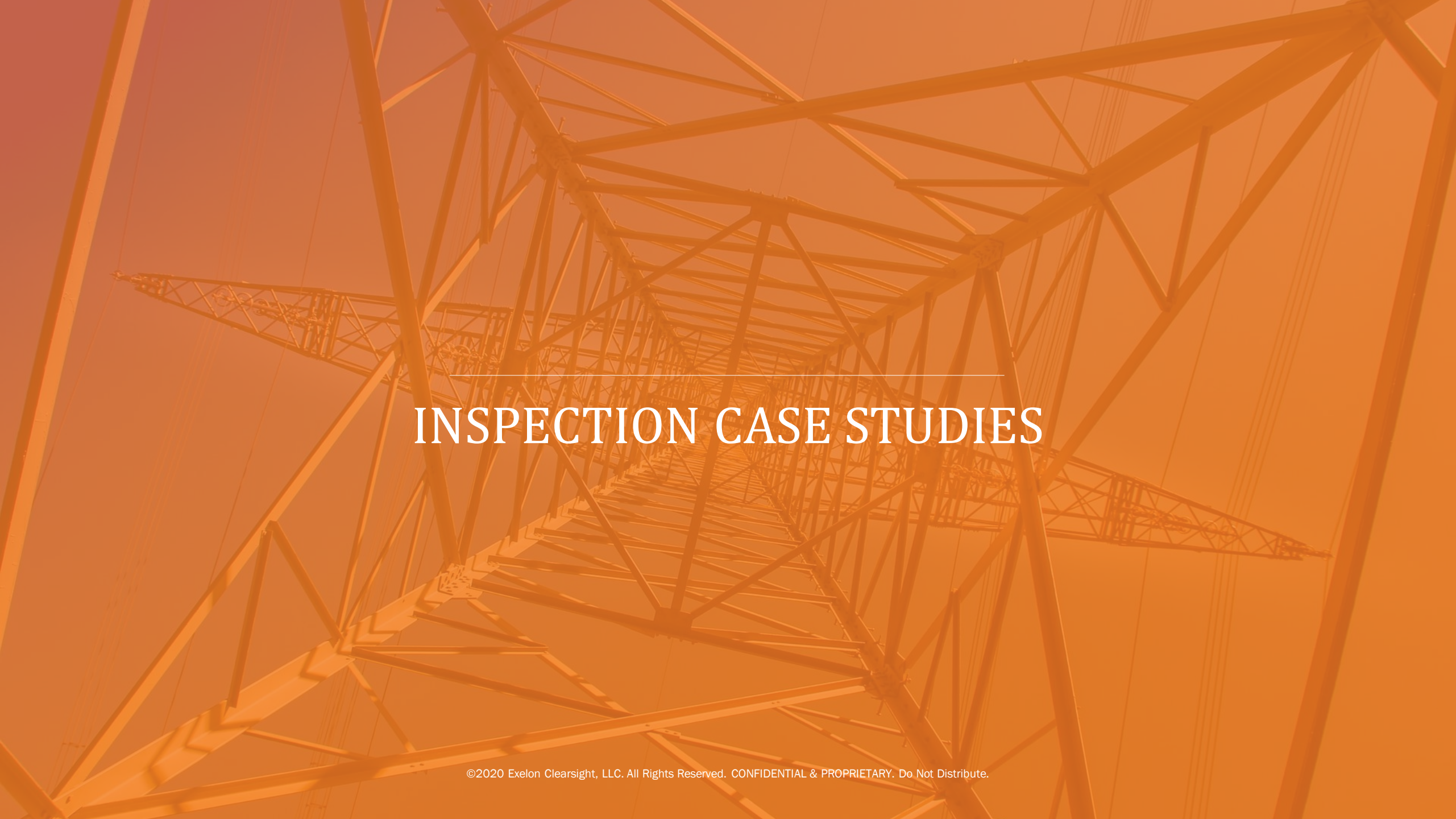


FLYABILITY RESELLER

AUTOMATED ROBOTICS MONITORING SYSTEMS

CONDENSER BAY/ CONDENSER STEAM SIDE INSPECTIONS

HRSG GAS PATH INSPECTIONS



INSPECTION CASE STUDIES

CONDENSER STEAM SHIELDING INSPECTION

Objective: Inspect steam-side shielding in three condenser units during refueling outage

Cost savings and metrics:

- Eliminated need for scaffolding and permits
- Saved time and money
- Improved safety
- Lessened personnel required

Cost avoidance of approx. $65,000 by eliminating scaffold builds

Over 3 Rem dose spared

8 hours vs 5 days

Online Valve Assessment

Objective: Non-intrusively inspect suspect valves in normally inaccessible areas to evaluate steam leaks

Cost savings and metrics:

- Used infrared to identify insulation inefficiency and packing leak
- Enabled the site to make targeted decisions on corrective actions
- Eliminated need for scaffolding and permits
- Improved industrial safety by eliminating need for personnel entry

250 mRem dose spared

2 hours vs 2 days

STEAM LEAK IDENTIFICATION

Objective: Locate unidentified steam leak in condenser bay, determine if steam impinging on critical components

Cost savings and metrics:

- ~$750k daily cost avoidance if site had to de-rate to 25% power to access area
- Gained critical insight which prevented plant from derating
- Eliminated industrial safety risk of heat stress
- Dose rates recorded at 2.2 Rem per hour at source of leak
- Eliminated need for scaffold ~ $45,000

600 mRem occupational dose exposure saved

5 minutes vs 8 hours

Reactor Cavity Liner Inspection

Objective: Inspect weld seams for degradation and leaks

Cost savings and metrics:

- Reduced labor requirements
- Reduced personnel occupational dose exposure from 1,100 mRem, to 100 mRem
- Significant outage time savings
  - Outage critical path time can cost $1million+ per day
- Improved industrial safety by eliminating need for personnel entry

Saved two days of outage time, and need to build scaffolding

6 hours vs 2 days

CONDENSER EXPANSION JOINTS

Objective: Respond to emergent leak in steam space, locate and collect data for immediate remediation

Cost savings and metrics:

- Reduced radiation exposure
- Eliminated need for scaffolding and permits to perform inspection
- Saved significant time and money
- Nearly eliminated industrial safety risk
- Enabled the plant to come back online very quickly

250 mRem dose spared

2 hours vs 2 days

Boiler Inspection

Objective: Perform a full inspection of the waterwall and burners to support an emergent request. Looking for damage, corrosion, and “out of shape” tubes.

Cost savings and metrics:

- Eliminated need for scaffolding
- Enabled plant to get back online quickly
- Greatly reduced the number of personnel required
- Improved safety and greatly reduced industrial safety risk

Saved $30K by eliminating scaffolding

8 hours vs 72 hours of outage time

HRSG Inspection – Gas path and exterior components

Objective: Collect visual data (imagery, video, thermography) to provide insights for increasing system reliability

Cost savings and metrics:

- Saved substantial time and money
  - Eliminated need for scaffolding to assess conditions
- Greatly reduced industrial safety risk
  - No personnel entered confined or hazardous spaces
- Provided better vantage points for actionable insights

Saved tens of thousands of dollars by eliminating need for scaffolding

12 hours vs 5 days

Emergency Cooling Tower Pool – Foreign Material Retrieval

Objective: Inspect pump suction strainer of emergency cooling tower pool, and retrieve any debris identified (expanded scope)

Cost savings and metrics:

- During inspection, identified and removed 10 foreign objects
- Reduced operability risk of emergency diesel generator system
- Eliminated need for divers, thus eliminating industrial safety risk

Saved thousands of dollars by eliminating need for divers and associated set-up activities

8 hour shift vs several shifts for diving operations

MUNICIPAL WATER TANK STRUCTURAL INSPECTION

Objective: Submersible inspections of internal piping and structural components in a 600,000 gallon municipal water tank

Cost savings and metrics:

- Eliminated need for divers and equipment at the access point on top of tank
- Satisfied fire safety requirements
- Reduced industrial safety risk
- Estimated silt depth at tank bottom

Net neutral cost for divers, however mitigated safety risk for dive activities

3 hours start to finish, includes mobilization/demobilization

PUBLIC MARINA DREDGING SURVEY

Objective: Perform underwater depth survey after desilting operation, and gather aerial imagery of the marina channel

Cost savings and metrics:

- Project leadership used video/photos during public outreach to show before/after result of desilting
- Traditionally requires a geologic survey of the channel, at a high cost, to provide same data

Offset high cost of geologic survey

8 hours

PRIMARY COOLANT LEAK SEARCH

Objective: Generation facility was challenged for 6 months to identify source of a primary coolant system leak. Site had exhausted all resources to find the leak source. Through use of robotic crawler, the source was identified in less than 1 minute after entry into area

Cost savings and metrics:

- Site expended 6 Rem of occupational exposure looking for source
- 2M utility customers power remained on

Site avoidance of ~$1M daily loss of generation revenue if unit was shut down

6 hours from accessing site to completion of mission

STORM DRAIN INSPECTION

Objective: Inspect 100% of storm drain system inside the protected and owner-controlled areas to satisfy requirements of the nuclear insurance carrier, search for cracks and verify proper flow ability

Cost savings and metrics:

- Eliminated need for confined space permits or excavation (to inspect)
- Saved significant time and money
  - Major cost avoidance benefit
- Reduced industrial safety risk
- Site received vendor quote ($750,000) to seal weld pipe outfalls and use vacuum truck prior to assessing pipe

Cost avoidance of approx. $720,000 of O&M budget by using robotics

5 days vs 3 months

HOW DO OUR RESULTS COMPARE?

Inspections by Traditional Means

- Often expose personnel to radiological occupational dose and personnel safety risk
- Generally warrant more personnel (RP, environmental monitoring, scaffolders), time, and cost to complete
- Require putting subject matter experts at risk
- May require the plant to derate or enter a force outage, resulting in loss of generation revenue
- Imagery/data may be captured, but not with high-resolution video and thermography simultaneously

Our Approach

- Reduce or eliminate radiological dose exposure and industrial safety risk, and provide better and quicker insights
  - Replace the need to erect scaffolds when visual inspections are required
- Enable SMEs to stay in the office and let the data come to them
- Inspections are sometimes conducted while plant is at full power
- We are capable of deploying sensors for high-resolution visual, thermal, Lidar, and dosimetry data

Exelon Clearsight SM

QUESTIONS?

300 Exelon Way
Kennett Square, PA 19348

(267) 533 1623

Exelonclearsight-info@exeloncorp.com

www.exelonclearsight.com

PAST WEBINARS

Thursday, April 9
10:30 AM EST / 04:30 PM CEST

Learn How API and ASME Experts Are Working to Expand Drone Inspection Applications

- Suzanne Lemieux, Manager, Operations Security & Emergency Response Policy at API
- Luis Pulgarin, Project Engineering Advisor at ASME

Tuesday April 14
11:30 AM EST / 05:30 PM CEST

How Country-of-Origin Drone Bans Impact U.S. Companies & Agencies Including Public Safety Agencies Fighting COVID-19

- Jordan Gross, Senior Government Relations Lead at DJI
- Romeo Durscher, Senior Director of Public Safety Integration at DJI

Tuesday, April 21
10:30 A.M. EST / 04:30 PM CEST

3D Modeling with Indoor Drones: Applications and Implications

- Andrew McIntyre, Technical Trainer and mapping expert at Pix4D
- Marc Gandillon, Head of Marketing at Flyability

Wednesday April 22
10:30 AM EST / 04:30 PM CEST

How to Build and Scale a Drone Program at Your Company

- Calvin Rieb, Head of Global Unmanned Systems at Cargill
- James Manni, UAS Program Manager at TVA

Tuesday April 28
10:30 AM EST / 04:30 PM CEST

Drones in Oil & Gas: How Chevron Uses Drones to Improve Safety, Reduce Downtimes, and Save Money

- Mauricio Calva, Non-Destructive Examination Expert at Chevron
- Larry Barnard, Downstream & Chemicals, Manufacturing ~ UAS Governance at Chevron

PAST WEBINARS

Thursday, April 30
11:30 AM EST / 5:30 PM CEST

Indoor 3D Modeling Use Cases: Photogrammetry in Action

- Laurie McBean, Geospatial Data Specialist at UAS, Inc.
- Gregory Spirlet, Professional Services Engineer at Flyability

UPCOMING WEBINARS

Wednesday, May 20
2:00 PM EST / 12:00 PM MST

How to Perform Safer Confined Spaces Inspections Using Drones

- Alexandre Meldem, VP of Sales at Flyability

Thursday, June 4
10:30 AM EST / 4:30 PM CEST

Drones in the Cement Industry: How LafargeHolcim Uses Drones to Improve Safety, Reduce Downtimes & Save Money

- Laurent Seyler, Head of New Technologies at LafargeHolcim
- Fabrice Berthoud, Facility Manager at LafargeHolcim

https://www.flyability.com/news/user-conference-webinars

Exelon Clearsight SM

QUESTIONS?

300 Exelon Way
Kennett Square, PA 19348

(267) 533 1623

Exelonclearsight-info@exeloncorp.com

www.exelonclearsight.com