Cyber and physical security

Protecting Critical Infrastructure from UAV Threats- Developing an Integrated Multi-Sensor System for UAV Detections

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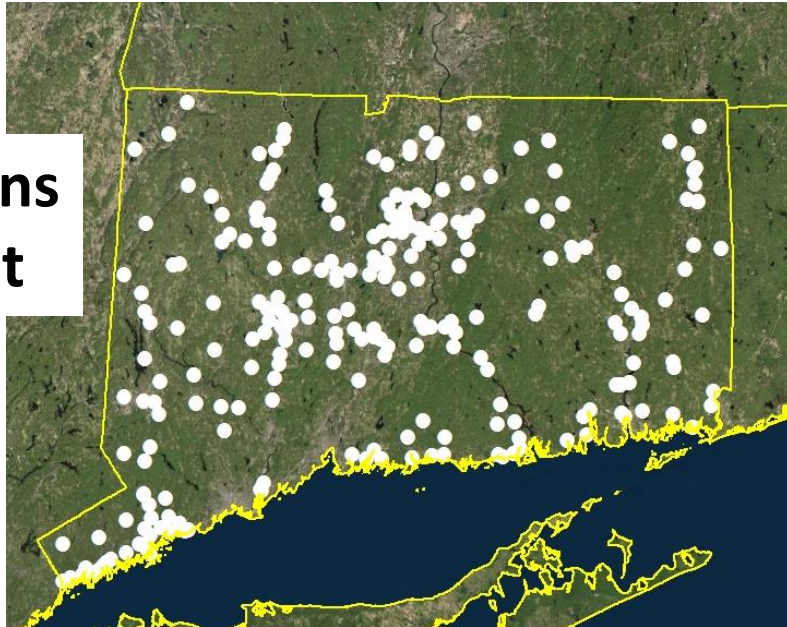Dept. of Agricultural and Resource Economics

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Unmanned Aerial Vehicle(UAVs) (*drones*) can pose a threat to critical infrastructure through accidental or intentional crashes or by delivering damaging payloads to substation components.
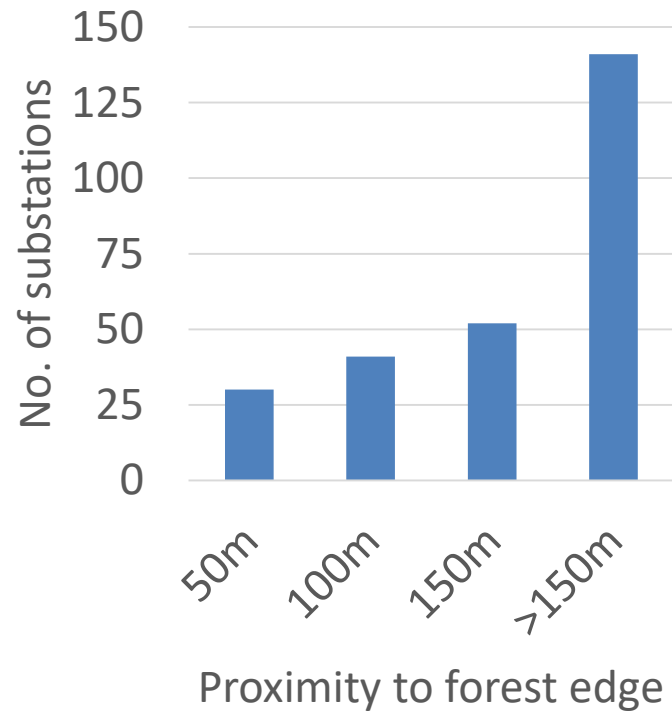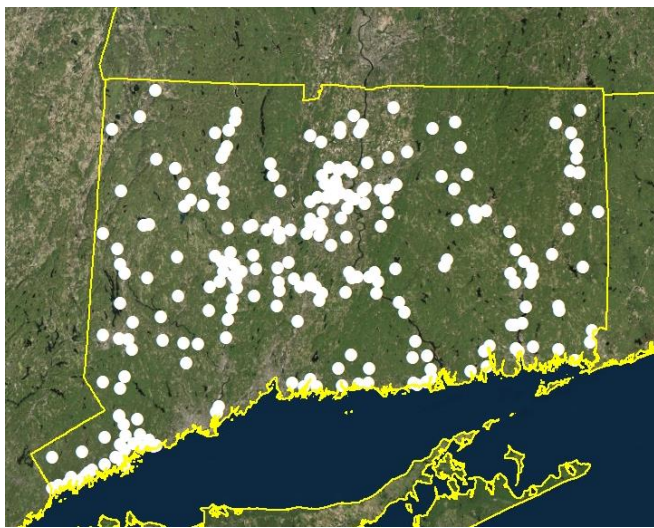
264 substations in Connecticut
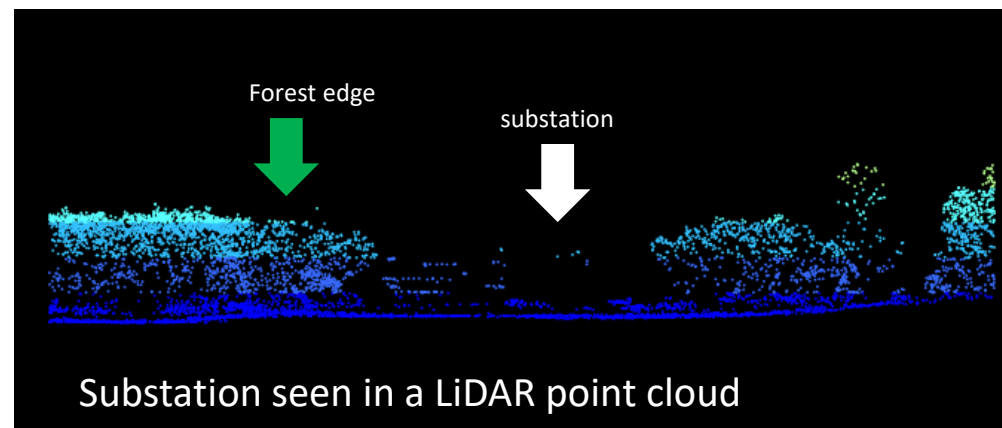

Cost ~ $600

Cost ~ $6,000
Payload: 13.23 lbs. (6 kg)

Investigate existing products and technologies for detecting UAVs.

- Development of UAV test facility integrating multiple types of sensors and UAVs.

- Set up commercial UAV detection products (RADAR, LiDAR, Radio Frequency) at a pilot substation.

- Evaluate the effectiveness of sensors during various weather conditions, UAV flight scenarios, environment settings, and determine the benefits of combining multiple sensor types into a detection system.

- Development of a gateway to integrate multiple sensors and maximize performance.

- Perform an economic cost-benefit analysis for investments in securing substations against UAV threats.
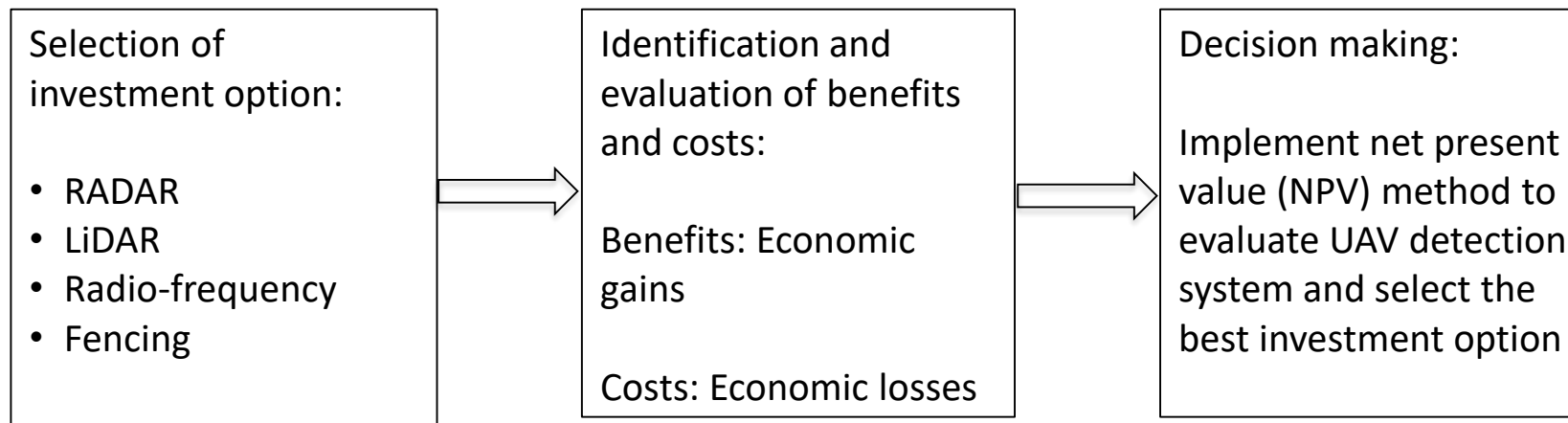
No. of substations (y-axis)

150
125
100
75
50
25
0

50m   100m   150m   >150m

Proximity to forest edge

Forest edge   substation

Substation seen in a LiDAR point cloud

Economic Analysis

Determine if it is worthwhile to invest in UAV detection systems .
Find the equipment option with the best return on investment.

Cost-Benefit Analysis: Economic evaluation technique that quantifies and compares the benefits and costs of different investment options.

Selection of investment option:	Identification and evaluation of benefits and costs:	Decision making:
• RADAR • LiDAR • Radio-frequency • Fencing	Benefits: Economic gains Costs: Economic losses	Implement net present value (NPV) method to evaluate UAV detection system and select the best investment option

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