

# Airport Safety Technology R&D

## Obstruction Lighting Research

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Federal Aviation  
Administration



# Obstruction Lighting Research

## Project Description/Purpose:

At the request of the Obstruction Evaluation Services Team and the Airport Engineering Division (AAS-100), the Airport Safety Technology Sub Team is conducting a research project that includes the following three requirements:

Evaluate differences in the conspicuity of flashing vs. steady burning obstruction lights.

Evaluate differences in new technology lighting (LEDs).

Evaluate new Audio Visual Warning Systems (AVWS) technologies like the Obstruction Collision and Avoidance System (OCAS).

# Audio Visual Warning Systems

New technologies are available that use radar or other detection technologies to detect approaching aircraft and turn on the obstruction light when it determines the aircraft may need it.

- Lights stay off most of the time.
- Lights only come on when aircraft is detected.

# Audio Visual Warning Systems

At present time, there are three active vendors:

- Obstacle Collision Avoidance System (OCAS) (Norway)
- Laufler Wind Group (NY)
- DeTect (FL)



# Audio Visual Warning Systems

- **FAA Tech Center research:**
  - **Review and Validation of OCAS History.**
  - **Site visit and assessment of deployed OCAS systems (power lines and wind turbine)**
  - **Site visit and assessment of LWG and DeTect systems.**
  - **Consolidation of all information into an FAA Technical Note.**
  - **Recommendation to Air Traffic Services to develop new AVWS chapter in FAA Advisory Circular 70/7460-1K (ie. performance specification)**

# OCAS



# OCAS

















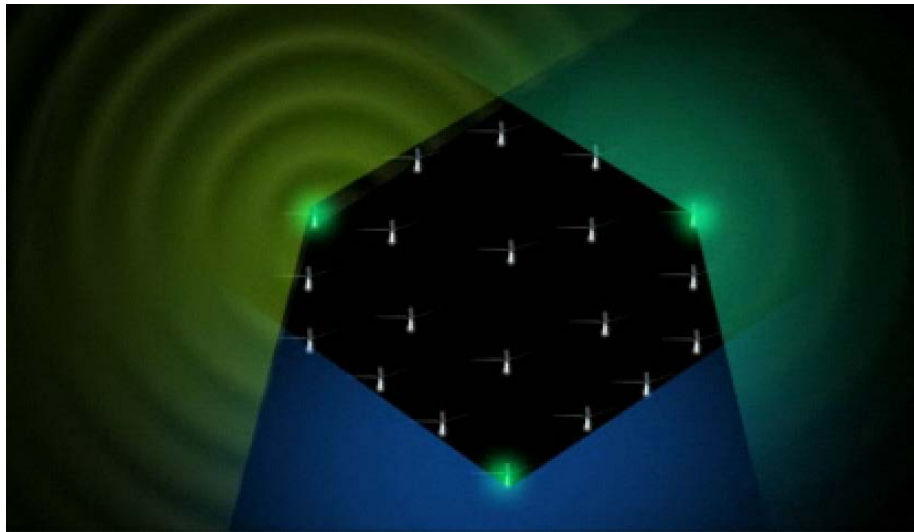






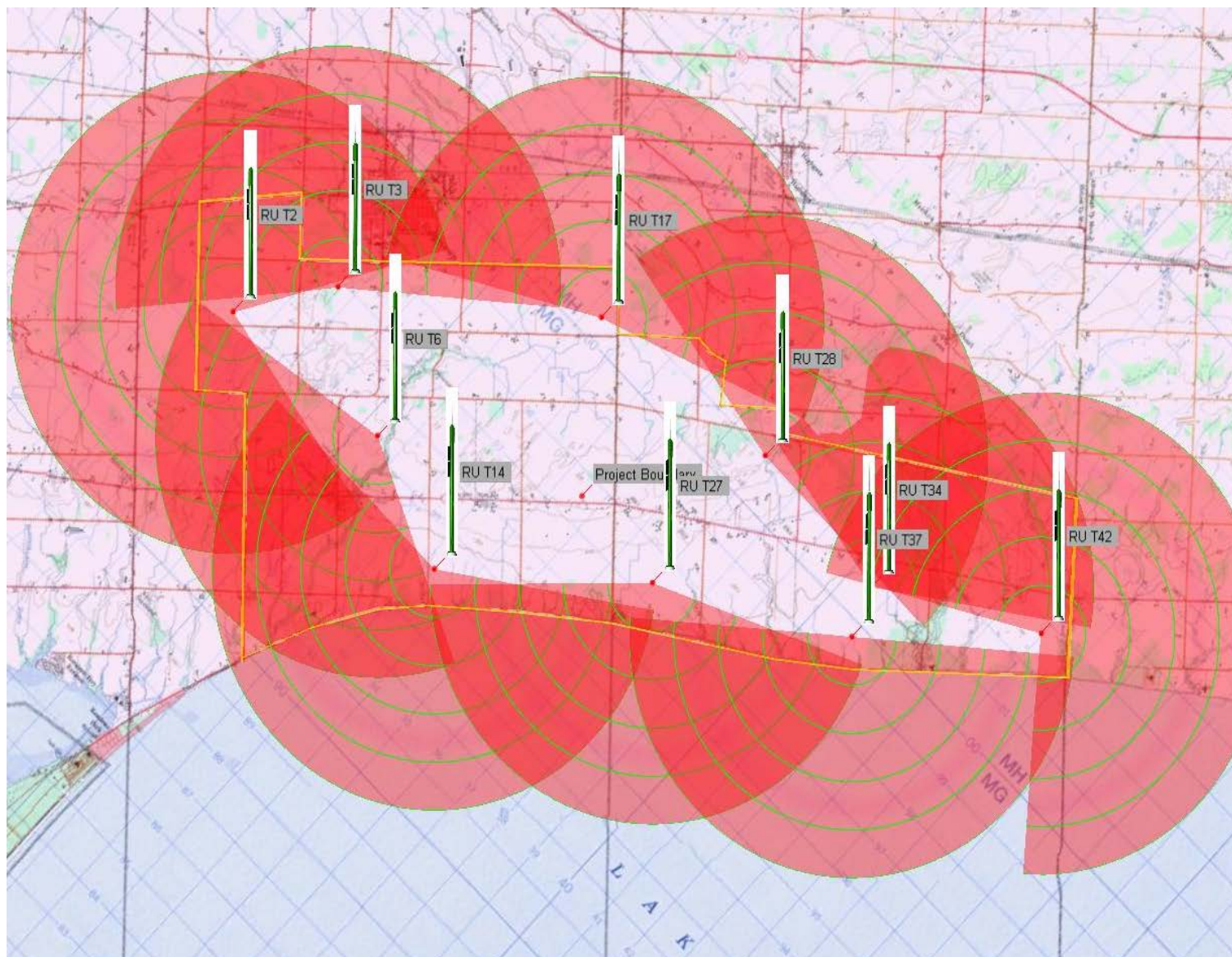
# Wind Turbine Concept

- Installed at turbine tower
- 2 or more radars at perimeter of park
- Radar mounted to tower using steel bands
  - Bracket for radar
  - All equipment mounted below turbine blades



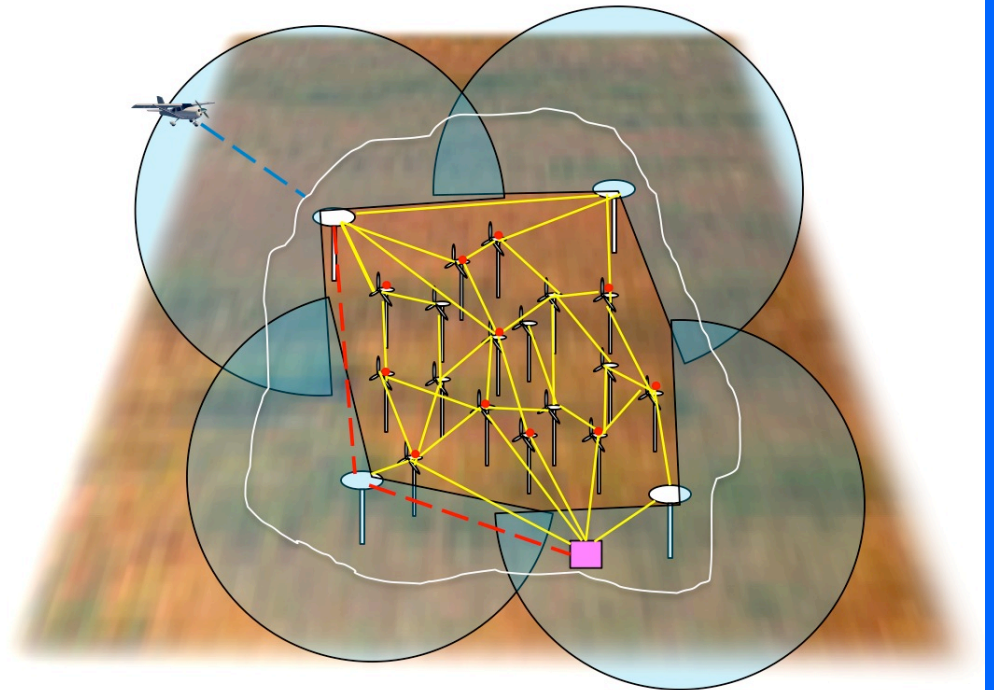


# Radar primary search pattern



# LWG System Operation

- As aircraft penetrates radar coverage information is transmitted from detecting radar to central controller via mesh network
  - Radar coverage is greater than required light activation perimeter
- If aircraft continues to fly toward wind farm, track information is generated at central controller



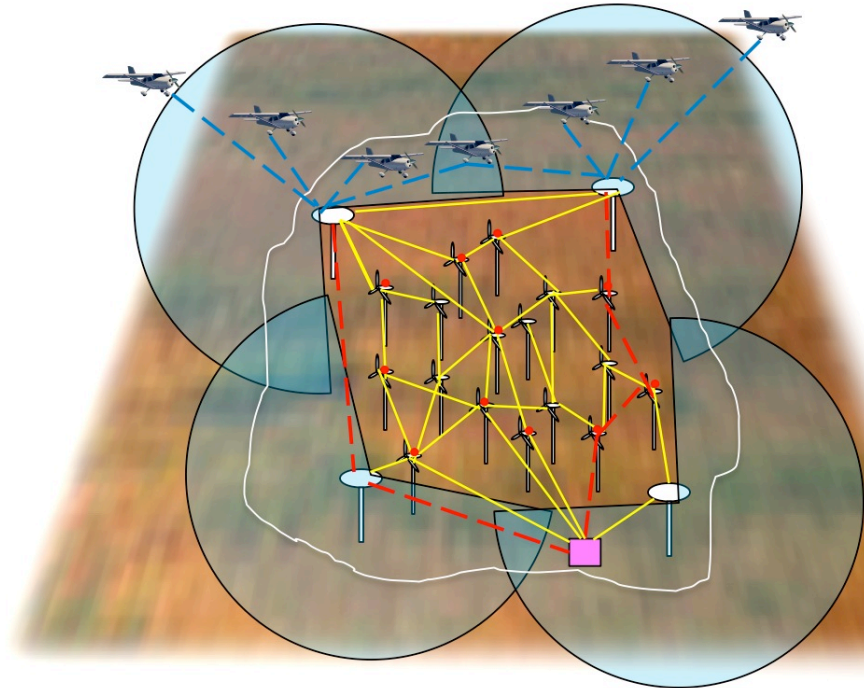
**ADSS operation:** Aircraft is detected by radar, information sent to controller, signal is sent to all turbines with obstruction lights to turn them on.





# LWG System Operation Continued

- Central controller determines when obstruction lights should be turned on
- Signal is sent to all turbines with obstruction lights via mesh network
- Lights activated
- Central controller determines when aircraft leaves detection perimeter and can safely send signal to turn off obstruction lights



Schematic illustrating aircraft tracking through wind farm using multiple radars with fused detection information



# Audio Visual Warning Systems

## Performance Standards (Draft):

- Lights should be activated when aircraft is within 2nm of outer perimeter of wind turbine farm.
- Lights should be activated when aircraft is within 1000 feet of the top tip of the highest turbine while within 2nm perimeter of farm.
- Lights should stay on until the aircraft exits area (if tracked) or for pre-determined amount of time until aircraft flies over the entire farm (if not tracked).
- Fail safe mechanisms.
- Terrain masking issues.
- Interference from nearby turbine farms.
- Interference from vehicles and from waterways.

# Audio Visual Warning Systems

## Performance Standards (Draft): (Continued)

- Limit on proximity to airports and known airways.
- Option to have voice warning transmission.
- Liability is with site developer/vendor to meet FAA specification.









# Airport Safety Technology R&D

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