



**Federal Aviation
Administration**

AIRPORT TECHNOLOGY R&D SOLAR POWERED LIGHTING RESEARCH

Presented to: 2021 IESALC Virtual Spring Meeting

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Date: April 14, 2021







Evaluation of Solar Powered Lighting Systems on Airports

Research Request:

Conduct Research to Evaluate Solar Lighting Systems at Five GA Airports in Diverse Geographic Regions Based on Varied Solar Insolation, Ambient Temperature Range, and Snow Fall.

1. Geographic Regions Selected:

- *Cape May, NJ (Initial Prototype Installation)*
- Central Upstate New York
- Pacific Northwest (Washington State)
- Central/Southern Arizona
- Central Oklahoma

2. Site Survey:

Conduct surveys at candidate GA airports in each region to identify most suitable locations

3. Site Selection:

Select one GA airport from each region for evaluation



Timeframe:

Evaluations to be conducted over a sufficient period of time to allow for assessment of seasonal solar insolation and related battery charging capabilities.

Objectives

1. Determine Compliance:

- FAA [photometric](#) requirements
- Reserve [battery](#) requirements EB 76 and AC 150/5345-50B (FAA, 2007)

2. Assess functionality and durability:

- under various [environmental conditions](#), assess the overall functionality and durability of the solar-powered lighting devices
- outside of controlled laboratory conditions,

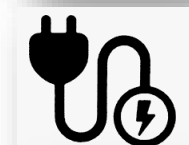
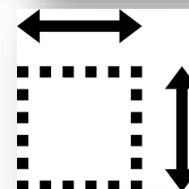
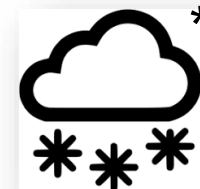
3. Cost comparison:

- [installation and operating costs](#) of decentralized solar airfield devices compared to conventionally-powered versions of these devices.

Site Survey Process

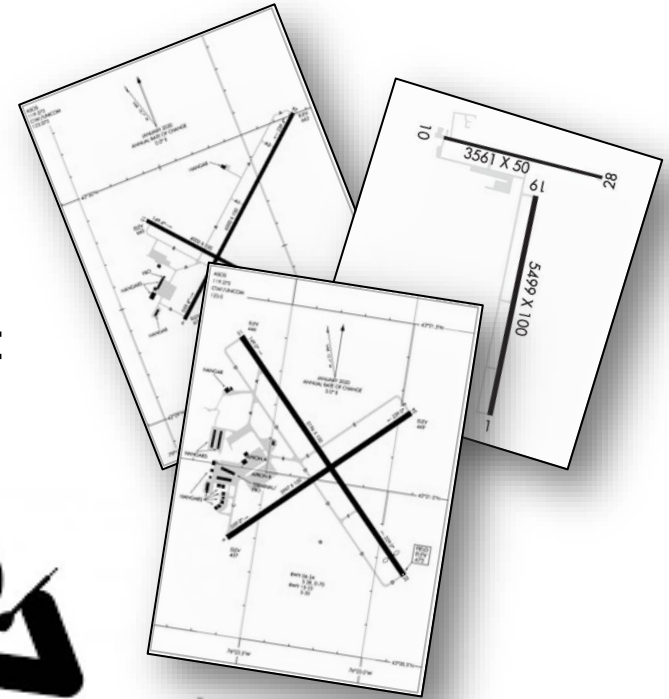
Site Surveys will Evaluate GA Airports Based on Following Criteria:

- ✓ Willingness of GA airports to support project.
- ✓ Physical layout of available space to support equipment.
- ✓ Clearance of proposed test sites from runway and taxiway obstacle free areas.
- ✓ Availability of electrical power and internet network connections.
- ✓ Security for installed equipment.

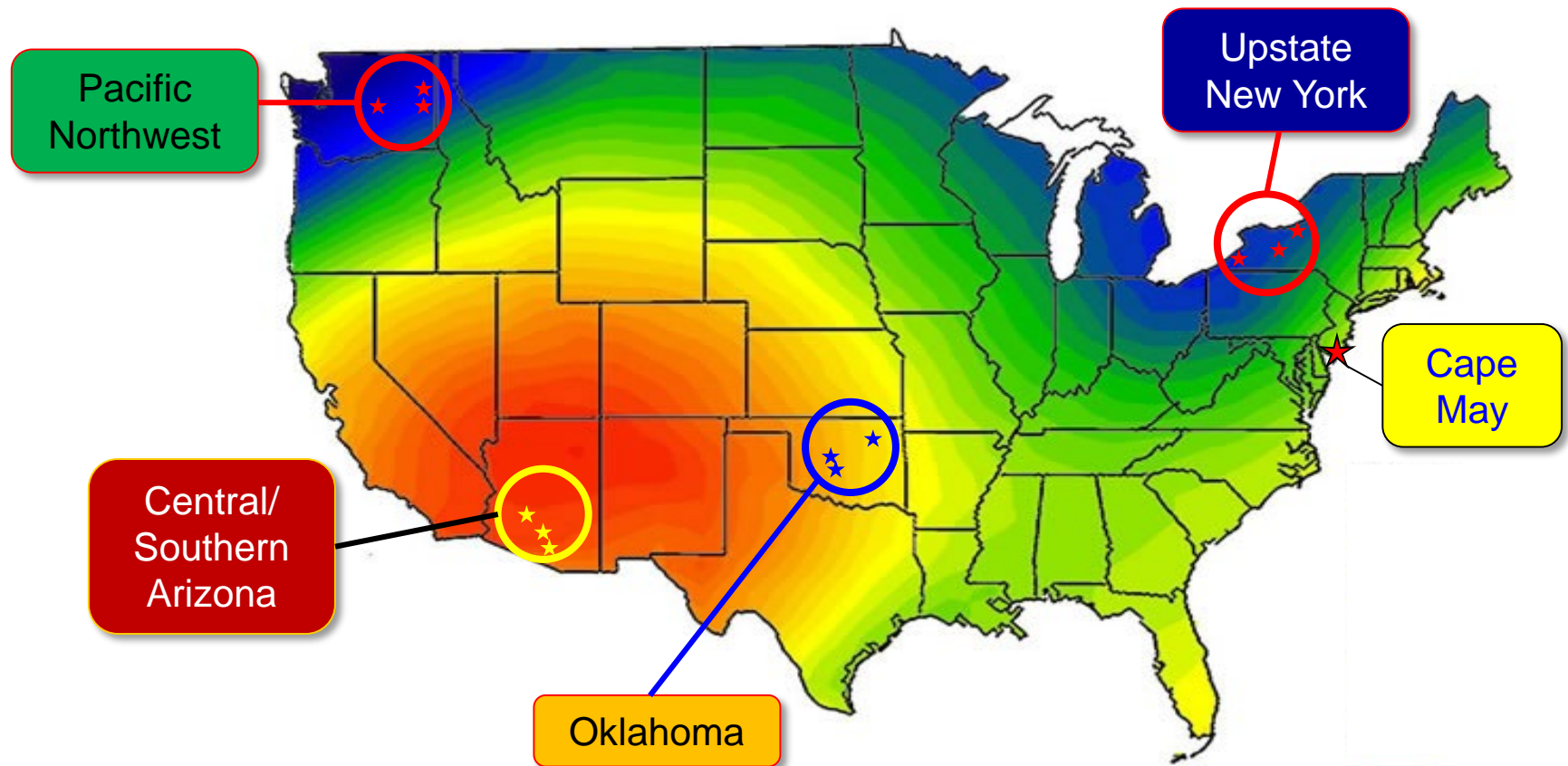


Candidate Airports

- **Central Upstate New York:**
 - Oswego County (FZY)
 - Dunkirk (DKK)
 - Penn Yan (PEO)
- **Pacific Northwest (Washington State):**
 - Felts Field (SFF),
 - Deer Park (DEW),
 - Ephrata Municipal (EPH)
- **Central Arizona:**
 - Phoenix Goodyear (GYR)
 - Casa Grande (CGZ)
 - Pinal Airpark (MZJ)
- **Central Oklahoma:**
 - U. of Oklahoma (OUN)
 - Wiley Post (PWA)
 - William Pogue (OWP)



Proposed Test Site Locations



Components

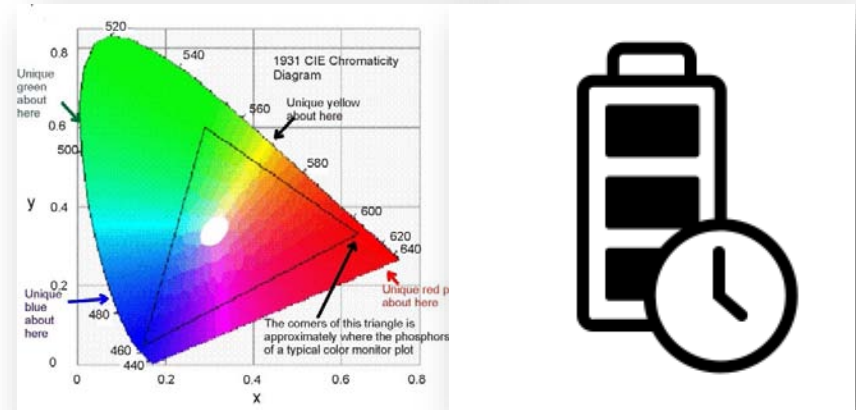
- **Airfield Components (total of 46):**
 - L-861 Runway Edge/Threshold Lights
 - L-861T Taxiway Edge Lights
 - L-810 Obstruction Lights
 - Elevated Runway Guard Lights
 - Wind Cones
 - Airfield Guidance Signs
- **Each component is “decentralized” i.e. each component has its own solar panel and battery charging system**
- **Two manufacturers**
 - Carmanah and AvLite



System Evaluations

1. Laboratory Evaluations:

- Photometric Testing
 - Luminous Intensity (Candela)
 - Chromaticity
- Autonomy Testing
 - Determine device operational duration from a fully charged battery

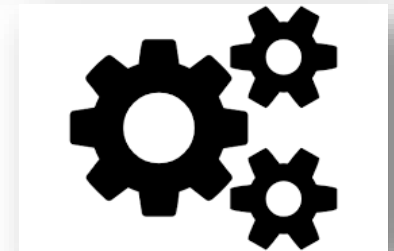


2. Field Testing:

- Varying environmental conditions
- Functionality Assessment
- Durability Assessment

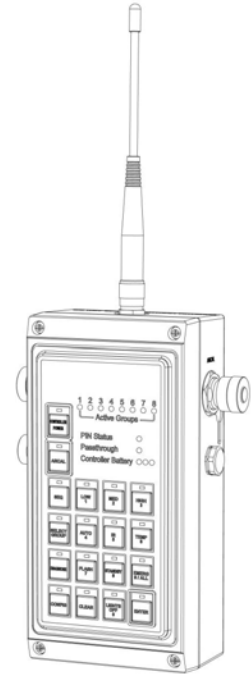


[Note: Lab evaluations performed prior to and after field testing]



Field Testing Procedures

- **Pilot Radio Activated Lighting Tests**
 - Simulates activation of solar devices by pilots at non-towered GA airports.
 - Testing sequences will vary
 - Dusk to Dawn lighting tests conducted at a Selected Lighting Intensity (As Applicable)
 - Number of Activations per Night (15 to 20) with a 15 Minute Timeout Value
- **Remote Monitoring**



Project Status

- Laboratory Testing at Intertek and RPI is complete
- Cape May “Prototype” Installation is complete
- Data Acquisition formally began on February 1, 2021
- Preliminary* Site Survey Report for candidate sites in Upstate NY delivered on December 31, 2020
- Interim (~30% submittal) field test data report delivered
- Final NY Site Surveys are being conducted right now.
- Installation at NY airport to begin shortly after site survey, weather permitting
- Site surveys to other regions to begin shortly after installation of NY evaluation

Cape May Installation



Solar Powered Devices Located on an Abandoned Section of Former Runway 14-32.

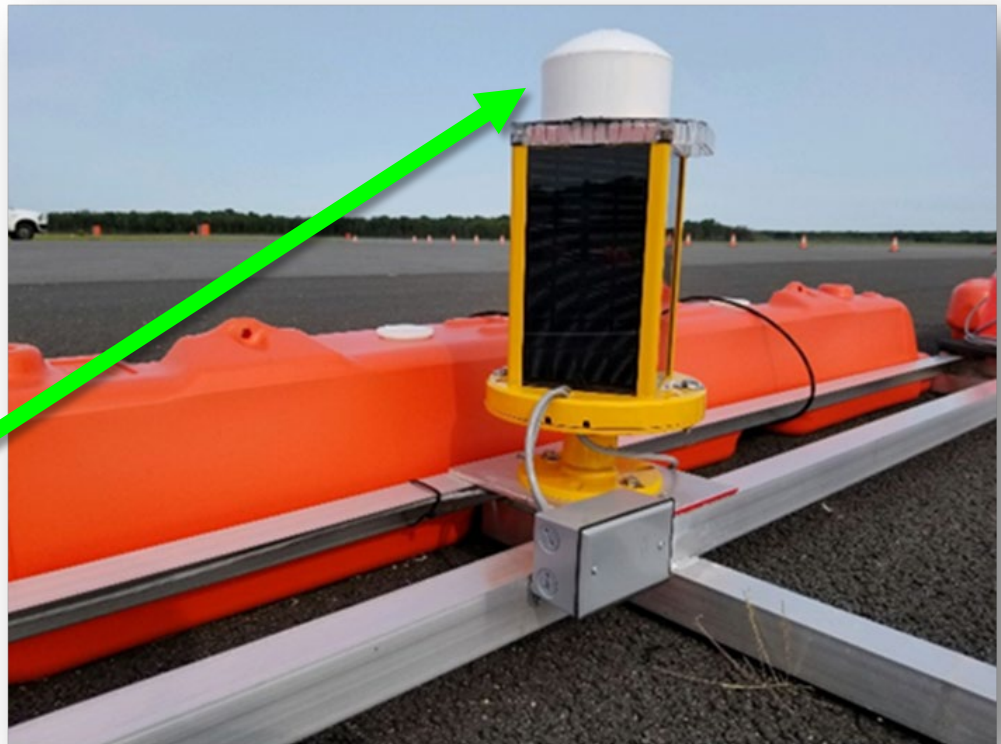
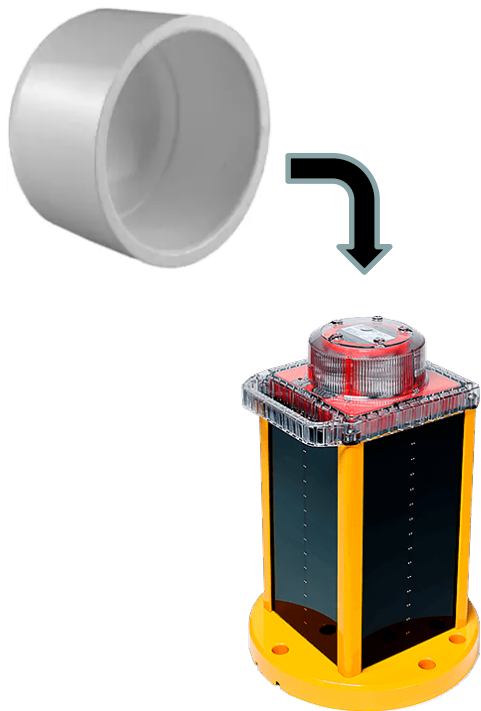
Solar Device Test Beds will Have a Combined Foot Print of Approximately 100 feet x 70 feet.



Portable Test Beds



Lights are baffled



Questions?

