



Air Resource Specialists, Inc.

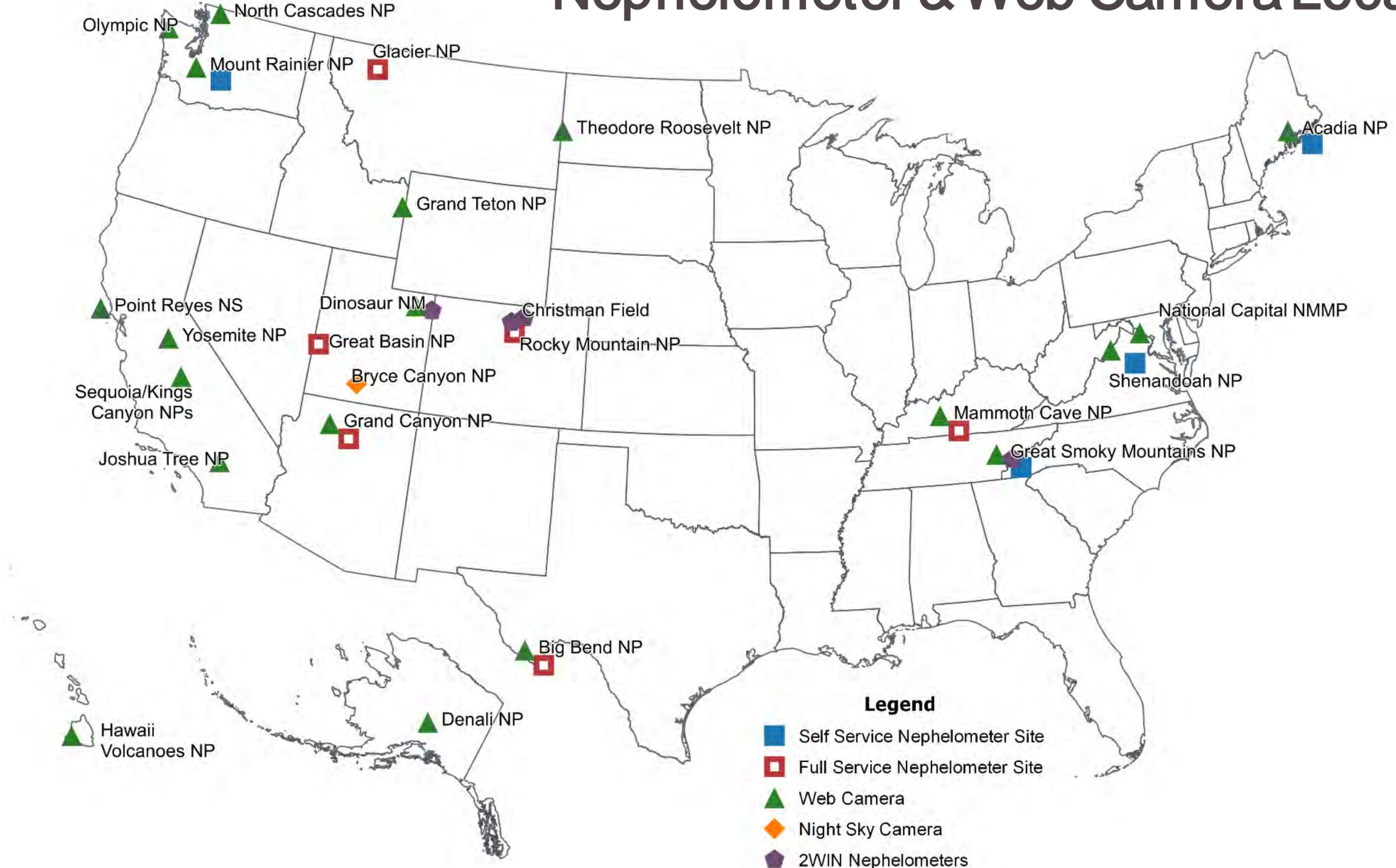
# National Park Service Visibility Monitoring Network

## IMPROVE Steering Committee Meeting

Presented By  
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Presented On  
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# Nephelometer & Web Camera Locations



# Reasons to Replace the Optec NGN2 Ambient Air Nephelometer

The Optec 2, and associated support infrastructure, has been in service for over 25 years!

- Many parts are no longer available
- The manufacturer no longer supports the instrument
- The supply of instruments to cannibalize for parts is dwindling
- Data storage capability is low (2.5 days) compared to modern electronic instrumentation (months to years).
- The open-air inlet concept has chamber high RH limitations. Wall scattering climb is also rapid and episodic. Spiderwebs cause frequent noise and require cleaning. Precipitation can enter the chamber in the right conditions.
- The Optec power supply, data logging and user interface are not integrated.
- New technology and capabilities beckon.





# Optec Nephelometer Replacement Candidate: Airphoton LN102

## PROS

- 450 nm, 532 nm and 632 nm
- 7 to 170 degree integration angle
- Multiple particle size cuts achieved with variable flow rate and size selective inlet
- Chamber near ambient temperature. RH of particles not significantly reduced during measurement
- Used in Surface Particulate Matter Network (SPARTAN)

## CONS

- Environmental robustness
- Documentation and support
- No data collection software, data storage card
- Support has diminished in since the purchase of the test instrument.

# Optec Nephelometer Replacement Candidate: Ambilabs 2-WIN



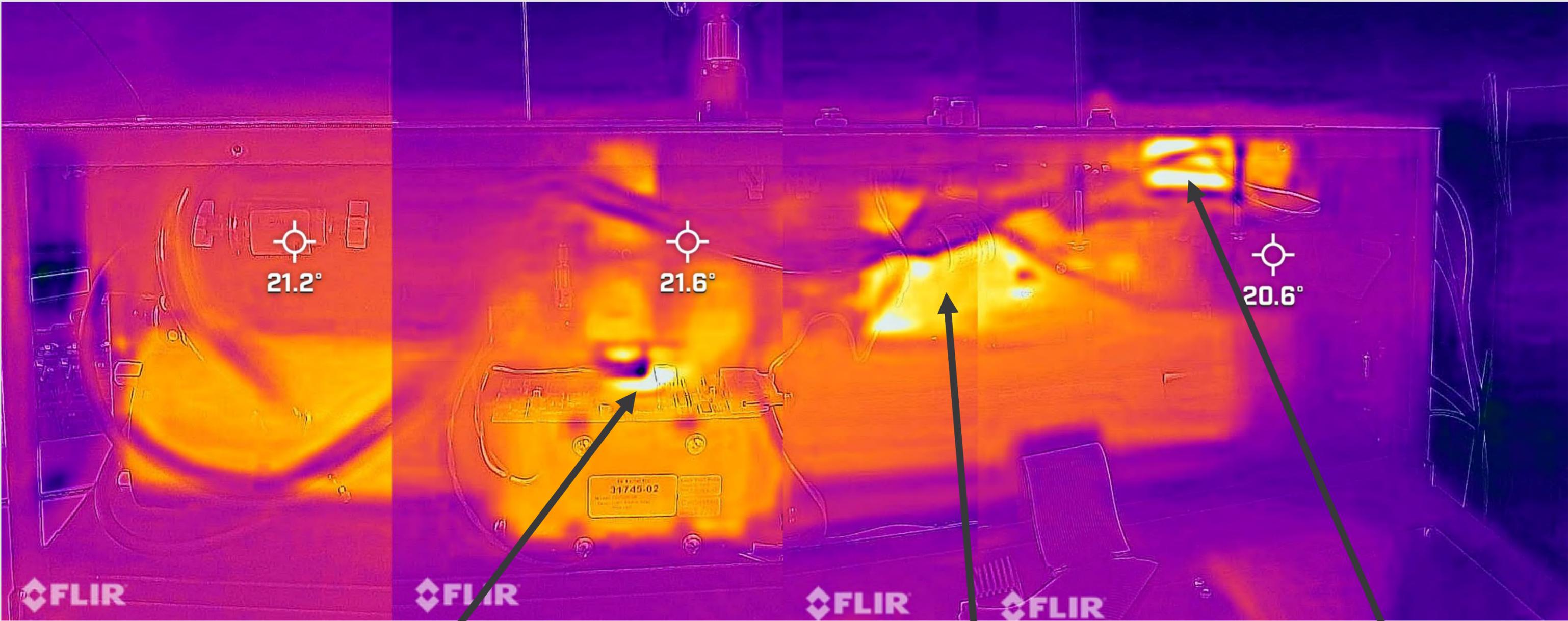
## PROS

- 525 nm and 635 nm
- PM<sub>2.5</sub> size selective inlet.
- 10 to 170 degree integration angle.
- Manufacturer has been anxious to help NPS test and reach operational goals

## CONS

- Chamber temperature heated actively and passively
- Remote control and data collection capable

# Qualitative Infrared Image of 2WIN



LED Power Supply

Power Transistors on Motherboard

Sample Pump

# Sample Heating Mitigation Efforts

## AMBILABS 2-WIN

- 2-WIN inlet heater off for no RH control
- 2-WIN instrument case opened to assist in removing waste heat
- Both 25 CFM enclosure fans replaced with 115 CFM fans



# Great Smoky Mountains NP – Look Rock



## AMBILABS 2-WIN

- 2-WIN was installed in May 2022
- Environmental enclosure and inlet installed near Optec and IMPROVE Sampler inlet height
- 2-WIN inlet insulated and reflective tape covered to mitigate temperature change
- Both 25 CFM enclosure fans replaced with 115 CFM fans
- 2-WIN inlet heater off for no RH control
- 2-WIN instrument case opened to assist in removing waste heat