Executive Summary – Low Altitude Weather Network (L.A.W.N.)

Landing Zone Visibility Technology

Weather satellites, ground RADAR and vehicle-mounted sensors are not currently capable of providing low-altitude meteorological data to support safe or efficient VTOL ops; thus, the FAA, NASA, USAF & industry have identified lack of low-altitude weather data as a critical need for the VTOL industry.

To address this need and accelerate AAM technology to the forefront of VTOL industry support; **our team has built & deployed an inexpensive, scalable, ground-based, weather sensor network whose data will be used to provide a real-time, high-fidelity, low-altitude, atmospheric environment visualization**. "LAWN" (Low Altitude Weather Network) will provide VTOL's and the AAM ecosystem with the weather data needed to reduce accidents, comply with FAA regulations, and improve VTOL operator efficiency in the low-altitude/BVLOS airspace they frequently use. We intend to combine this program with a similarly timed $750K Agility Prime Phase 2 and at the conclusion of both programs drive to a $20MM Phase 3.
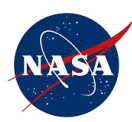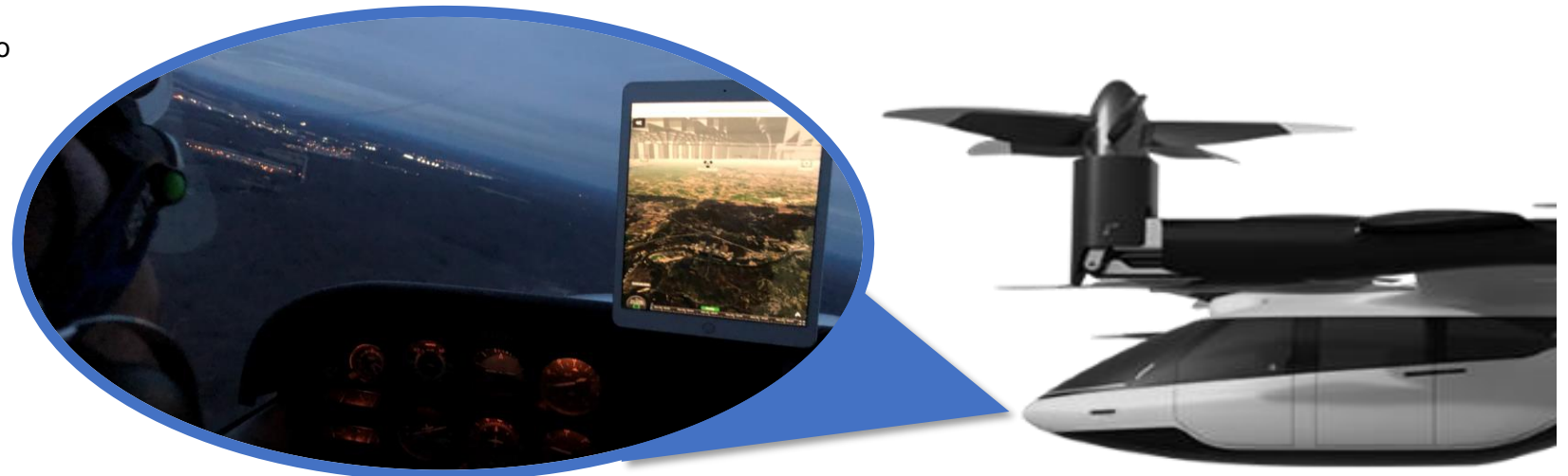
Visibility, wind & icing are the 3 weather factors most critical to VTOL's and other air vehicles. Starting with 25 networked sensors spaced at 1-mile increments, this technology will gather visibility data using COTS (TRL5) components and communicate that meteorological data to a server (bolt-on wind & icing sensors will follow). Using existing 3D Weather Visualization Tech developed with the FAA (TRL8) and being enhanced via an on-going USAF Agility Prime contract (see pic below), we will then produce a computer-generated, low-altitude atmospheric visualization for VTOL pilots & controllers.

After validation in Ohio, coverage will spread statewide and then be expanded to cover other states. Wind & icing sensors will be added to the device after visibility "goes live."

The 5-year economic impact will be 75 jobs in Ohio producing/supporting sensors as well as the software dev & support.
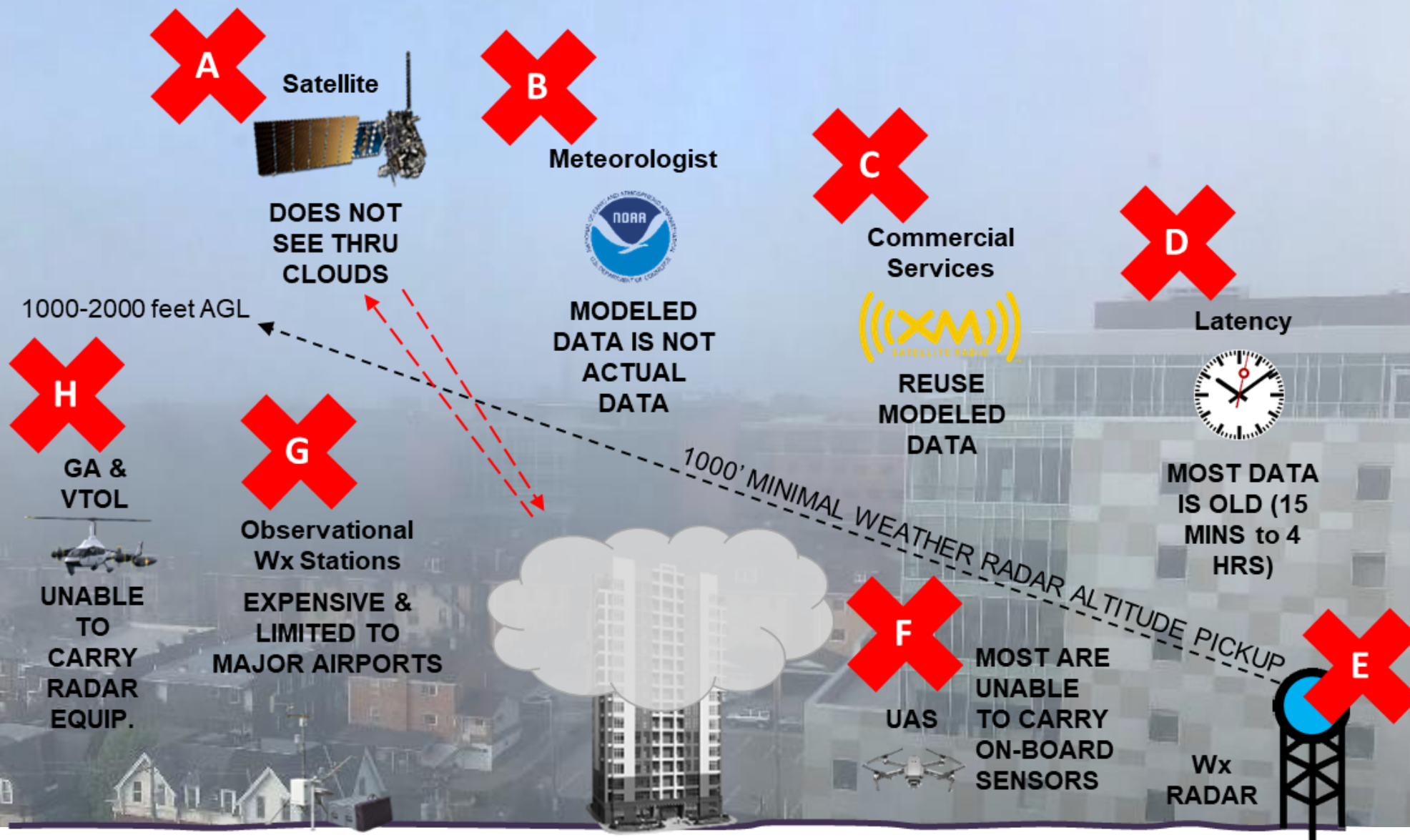
Flightprofiler will produce the low altitude visualization, OU will lead data mgmt. and OSU's CDME ctr will lead sensor dev & prod.

3 Fed Partners are collaborating with our team: **AFRL (utilizing this tech for Agility Prime), NASA (focused on Wx sensors & airspace management) and NAMRU-D (for safer patient transport in austere environments).**


Confidential. Please do not share.   * https://pilotinstitute.com/aviation-accident-causes/

Only 3% of US covered by low altitude weather data*

* ASTM F38

A Satellite — DOES NOT SEE THRU CLOUDS

B Meteorologist — MODELED DATA IS NOT ACTUAL DATA

C Commercial Services — REUSE MODELED DATA

D Latency — MOST DATA IS OLD (15 MINS to 4 HRS)

H GA & VTOL — UNABLE TO CARRY RADAR EQUIP.

G Observational Wx Stations — EXPENSIVE & LIMITED TO MAJOR AIRPORTS

F UAS — MOST ARE UNABLE TO CARRY ON-BOARD SENSORS

E Wx RADAR

1000-2000 feet AGL

1000' MINIMAL WEATHER RADAR ALTITUDE PICKUP

The status quo for full met detection? AWOS and ASOS stations are >$1MM (equip & install), require maintenance, land footprint, and are only calibrated to the sensor standard
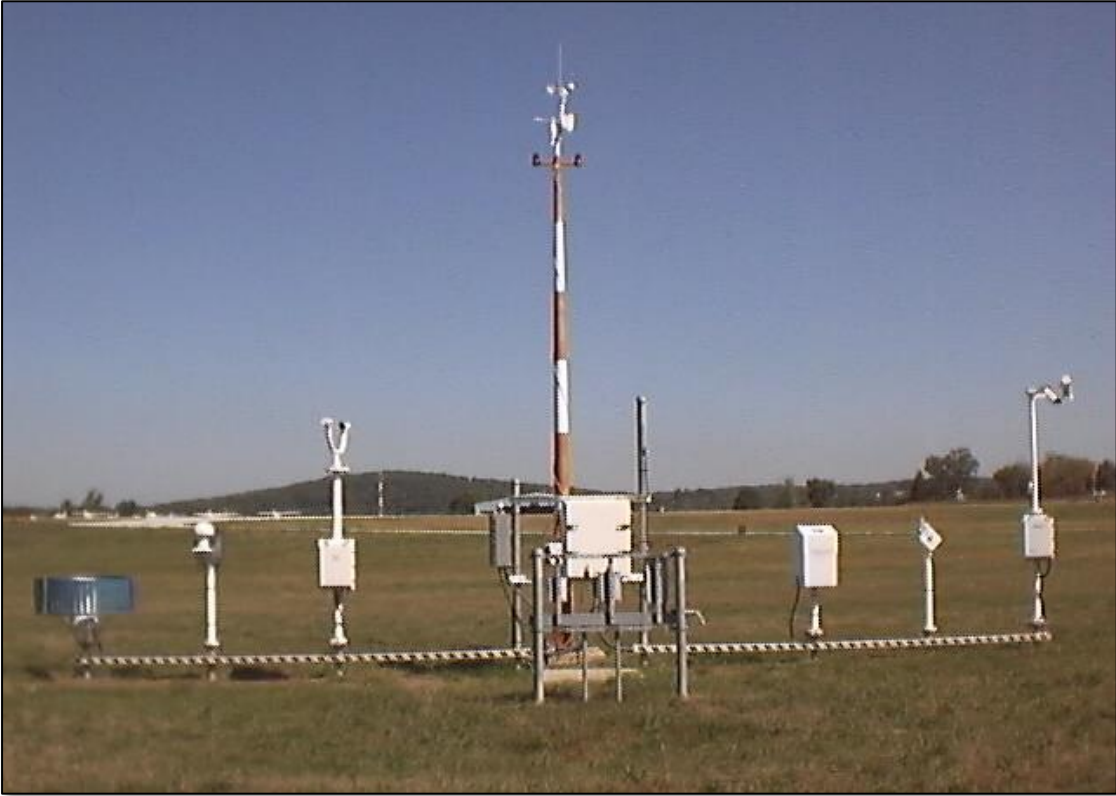
Low Altitude Weather Network (LAWN) is a meshed network of low-cost, self-healing, solar-powered, ground-based sensors that provide high-resolution, low-altitude meteorological data
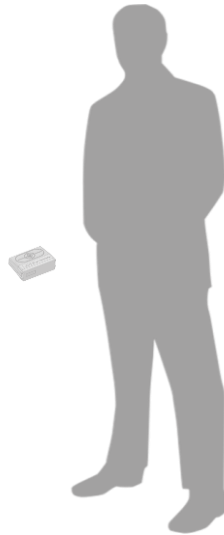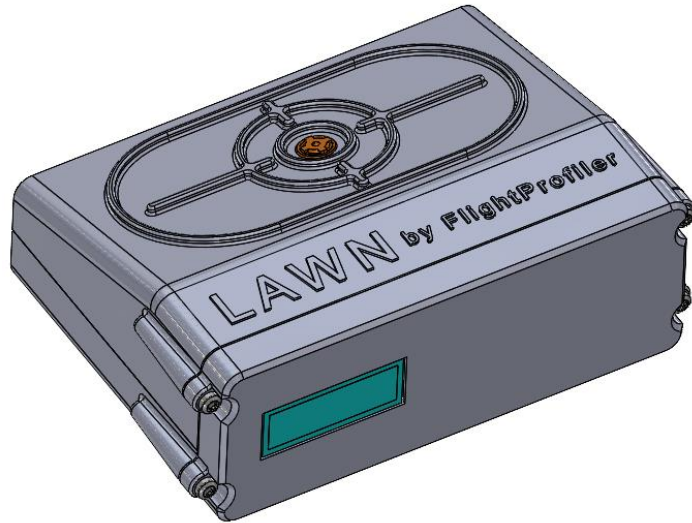
Launched in 2021 via Ohio Federal Research Network (OFRN) to solve the visibility gap

- **$904K funding**

- **USAF, USN & NASA sponsorship**

- **Responsibilities:**
  - ✓ **Hardware (OSU): Charlie Young**
  - ✓ **Software (OU): Chad Mourning**
  - ✓ **Interface (FlightProfiler): Ethan Krimins**

  …entire team is ~20 Ohio scientists
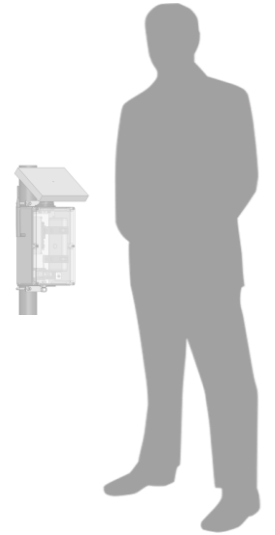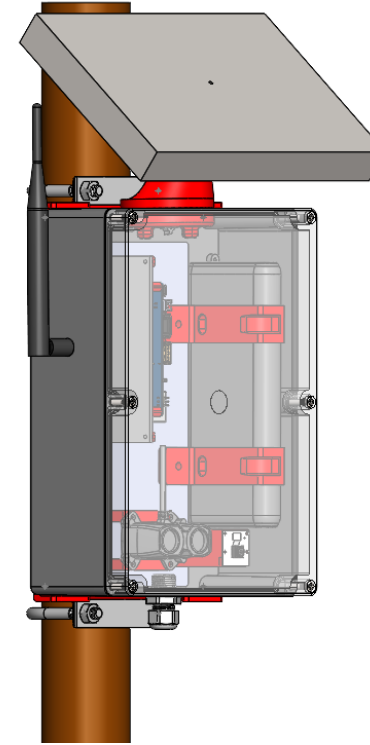
Low Altitude Weather Network (LAWN) led to two products

LAWN LZ

LAWN

Process goal: less than 60 seconds to LZ visibility

#1

10 seconds

First responder (or person setting up LZ) removes device from case

#2

3 seconds

Cable plugged into USB or lighter port and device placed on dashboard or roof

#3

7 seconds

Visibility measurement is read off LCD display

#4

20 seconds

Via radio, cell or other comms, first responder relays reading to dispatch or straight to helicopter
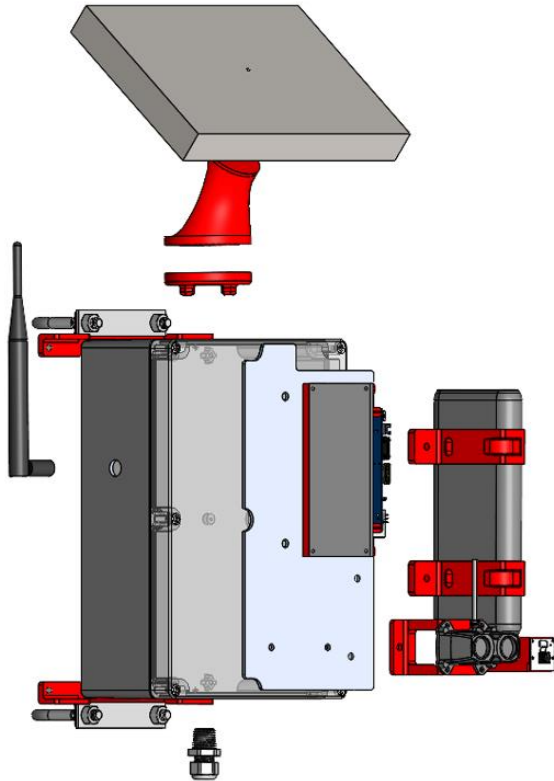
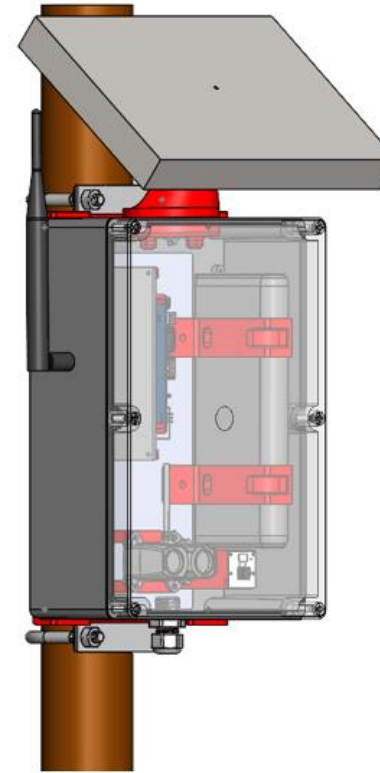# V.2 (LAWN LZ) improved via help from Ohio Sherriff's, Fire Chiefs and Metro Aviation

Mechanical componentry continually improved with field testing at SGH and throughout Ohio

CDME fabricated components highlighted in RED

- **Solar panel**

- **LoRa + Cellular comms**

- **US Board/TI chip**

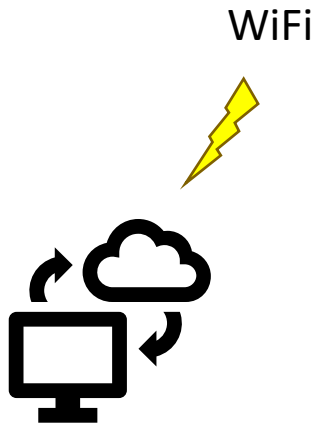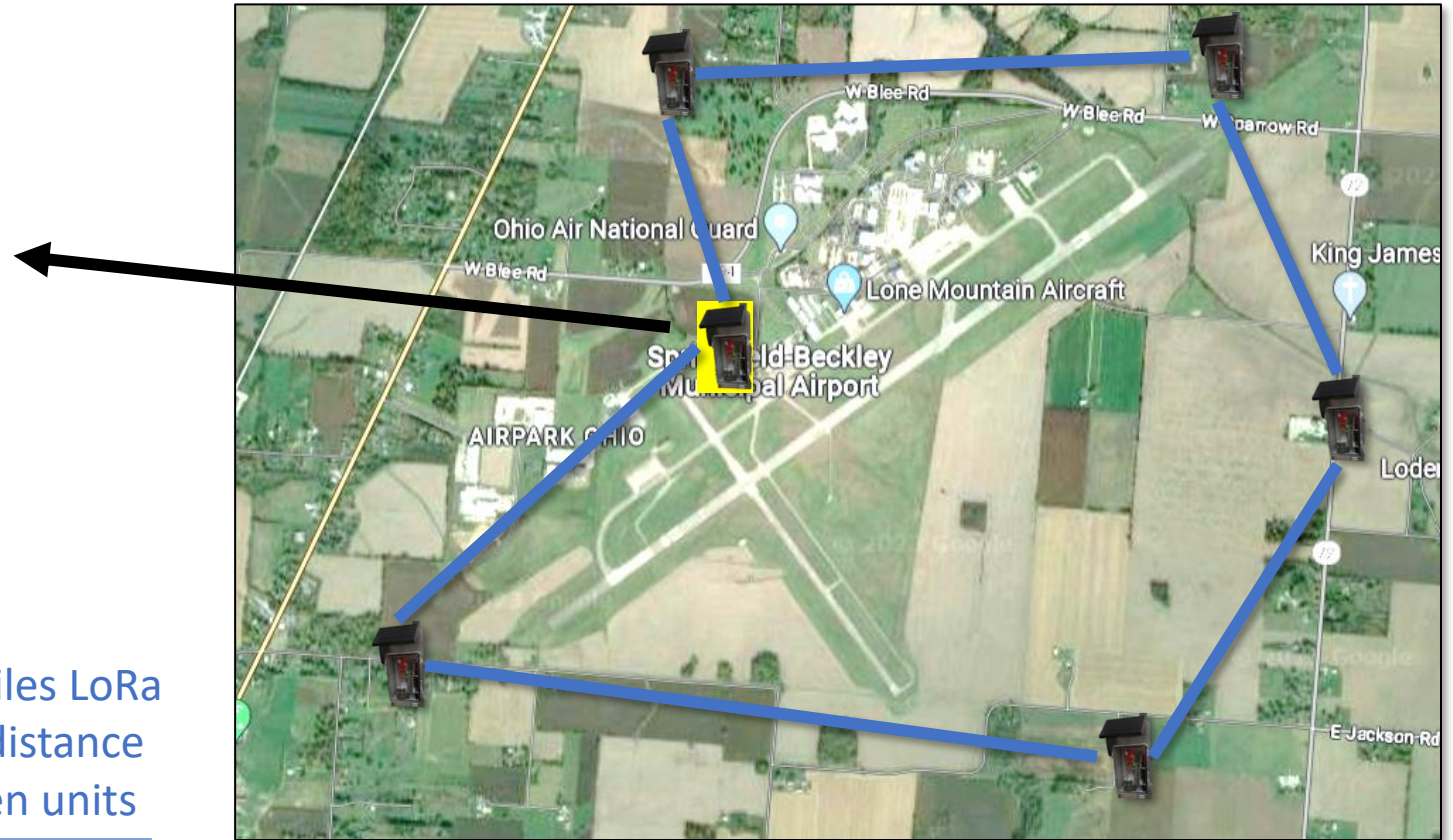- **Mechanical attachment to any post from 1" to 6'**

- **Weatherproof case**

- **Lith. Battery**

- **LiDAR & Optical sensors (visibility)**

- **Bolt-ons: wind, precip, etc.**

LAWN perimeter network (for qualification, certification & testing)

WiFi

1 to 3 miles LoRa comm distance between units

Data output: 3D Weather … comprehensive visualization of the atmospheric environment (including in relation to FAA regulations)

Meta Data Feeds into 3D Wx:
- HRRR
- METAR
- TAF
- NDFD (disabled)
- LAWN
- Almost any other source