![eleven-x logo]

Active Indoor Air Quality Management

Wireless, Real-Time Monitoring

Ongoing risk assessment policies and procedures have been identified as required for buildings, workplaces, and all indoor environments in a post-COVID world. Following a structured risk assessment model is an important strategic tool in terms of re-occupying workspaces, as well as part of meeting on-going occupancy safety guidelines.

A key aspect of the risk mitigation involves addressing potential airborne transmission by managing ventilation rates, relative humidity and filtration and communicating these controls with staff and tenants. ASHRAE* has suggested a variety of ventilation strategies to help mitigate airborne transmission. CO_2 is the key indicator of how well an area is ventilated relative to the occupant load. High CO_2 concentrations can indicate poor ventilation and/or locations where groups are gathering.

Additionally, research indicates that maintaining relative humidity levels between 40% and 60% reduces the bioburden of infectious particles in the space and decreases the infectivity of many viruses in the air. Real-time monitoring of CO_2 and humidity levels can help building owners demonstrate that they are meeting ASHRAE's ventilation and humidity recommendations.

ASHRAE recommends that mechanical filter efficiency be at least MERV 13 and preferable MERV 14 or better to help mitigate the transmission of infectious aerosols. Many existing HVAC systems were designed and installed to operate using MERV 6 to MERV 8 filters.

Building Monitoring:
- Indoor Environments:
  - Commercial
  - Healthcare
  - Residential
  - Schools
  - Transportation

- Required KPI's Include:
  - CO_2-carbon dioxide
  - RH-relative humidity
  - Filtration effectiveness

- Real-time data
- Remote Management
- Wireless connectivity

Real-Time Air Quality Monitoring
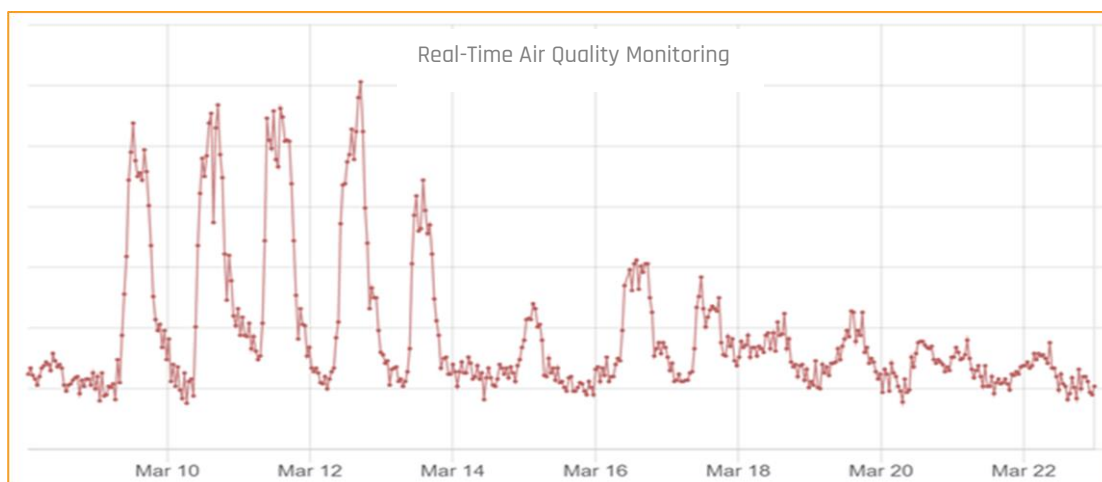
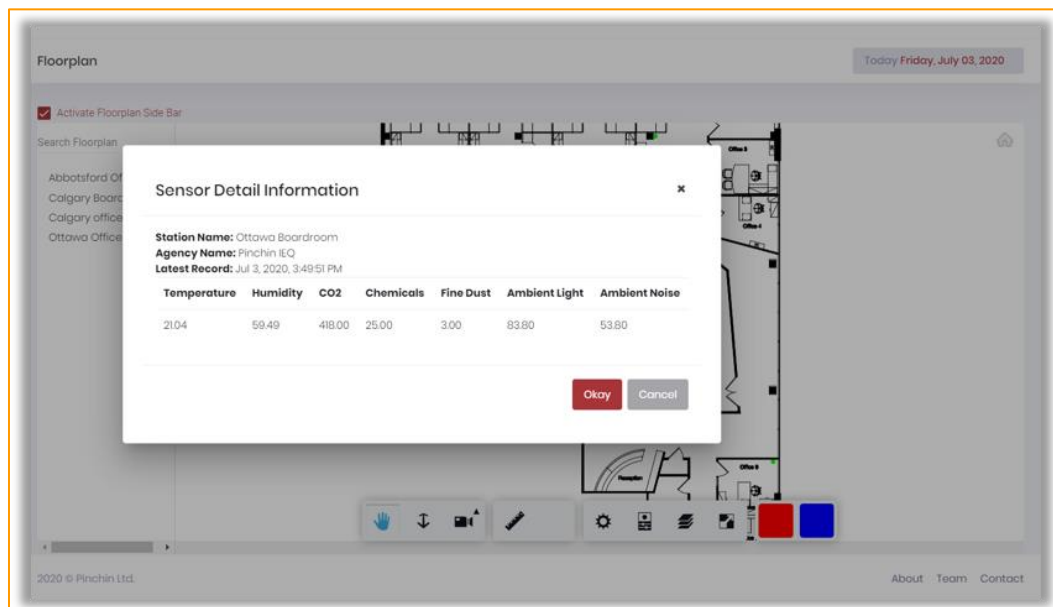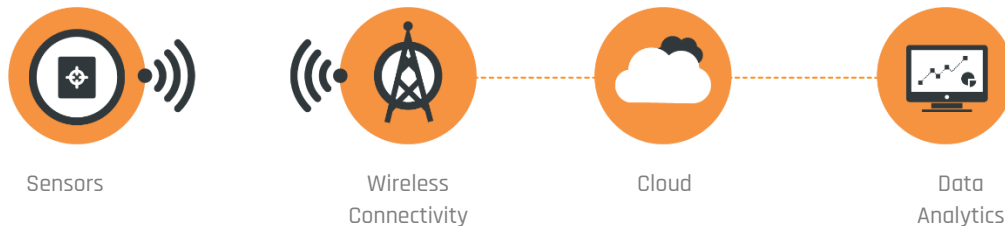Real-Time Risk Management Via Active Indoor Air Quality Monitoring

Real-time monitoring provides the most up-to-date data on key indoor air quality metrics and facilitates quick, evidence-based decisions. The collection of historical data enables the tracking of trends and allows for reliable long-term planning opportunities and automated reporting for compliance which results in providing the safest air quality and most comfortable indoor environments. All these elements combined provide a real-time framework for on-going risk assessment.

eleven-x's Active Indoor Air Quality monitoring solution includes the sensors, wireless connectivity and data analytics/collection to support on-going building monitoring models like those outlined by ASHRAE via accurate, remote, real-time tracking of important indoor environmental factors – ventilation, relative humidity and filtration. The solution provides:

- o Real-time monitoring
- o Historical data collection
- o Wireless connectivity
- o Easy operation
- o Near-zero maintenance
- o Long lasting – device battery life up to 10-years

Features:

- Real-time air quality monitoring
- Measurements include:
  - o CO$_2$
  - o Relative Humidity
  - o Temperature
- Historical data collection
- Wireless connectivity
- Easy to deploy & use (wireless sensors can be placed anywhere via single screw or adhesive mounting)
- Near-zero maintenance
- Sensors:
  - o Battery powered
  - o Lasts up to 10 years

| Sensors | Wireless Connectivity | Cloud | Data Analytics |

Floorplan

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Sensor Detail Information   ✕

Station Name: Ottawa Boardroom
Agency Name: Pinchin IEQ
Latest Record: Jul 3, 2020, 3:49:51 PM

Temperature	Humidity	CO2	Chemicals	Fine Dust	Ambient Light	Ambient Noise
21.04	59.49	418.00	25.00	3.00	83.80	53.80

Okay   Cancel

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TECHNICAL SPECIFICATIONS	
Communications	
Communication Protocol	LoRaWAN® 1.0.3
Device Class	Class A/C (configurable) end-device
Frequency	902-928 MHz-North American Standard ISM Band
Transmit Power	Up to 20dBm
Sampling Interval	Configurable via NFC and downlink configuration
Data Upload Interval	Configurable via NFC and downlink configuration
Mechanical	
Enclosure	Plastic enclosure
Antenna	Internal
Mounting	Wall Mounting
Dimensions	86 × 86 × 27mm
Security	AES-128 encryption
Provisioning	Secured key injection and key exchange
	Key management with join server
	NFC provisioning support [optional]
	Infield or backoffice secure provisioning
Environments	
Operating Ambient	0°C to 40°C
Humidity	0 to 85%RH (non-condensing)
Battery	10-year battery life (depending on sample & transmit intervals and data rate)
Battery Type	2x 3.6V AA Lithium batteries
Warranty	1 year

Sensor Specifications:

- CO_2:
  - ○ Range: 0-10,000ppm
  - ○ Accuracy: ± 50ppm/±3% of reading
  - ○ Noise: 14ppm@400ppm/25ppm @1000ppm

- Relative Humidity:
  - ○ Resolution: 0.1%RH
  - ○ Accuracy at 25°C: ± 2% RH

- Temperature:
  - ○ Resolution: 0.1 °C
  - ○ Accuracy: ± 0.2% °C

Also monitors:

- Light levels
  - ○ Range: 4-2,000 LUX
  - ○ Resolution: 1 LUX
  - ○ Accuracy: ± 10 LUX

- Motion (PIR)
  - ○ 3MH x 4mW x 5mL
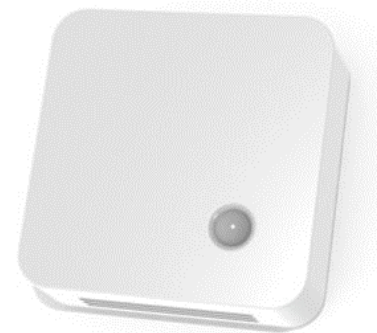
FOR MORE INFORMATION: web: www.eleven-x.com | email: collaborate@eleven-x.com

About eleven-x Inc.

eleven-x simplifies IoT and facilitates faster, evidence-driven decisions through wireless connectivity and real-time data collection for Intelligent Cities, Campuses, Buildings and Industry. We offer complete device to cloud LoRaWAN® solutions, comprised of accurate and reliable sensor networks delivering secure data to our customers through easy to use dashboards and industry standard APIs. Organizations rely on eleven-x's wireless connectivity expertise to deliver turnkey solutions that improve operations, simplify processes and deliver value in today's connected world.

*ASHRAE - The American Society for Heating Refrigeration and Air-Conditioning Engineers
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