PART 1 GENERAL

1.01 SYSTEM DESCRIPTION

A. General Requirements

1. The specified unit shall be of manufacturer's official product line, designed for commercial and/or industrial 24/7/365 use.
2. The specified unit shall be based upon standard components and proven technology using open and published protocols.

B. Sustainability

1. The specified unit shall be manufactured in accordance with ISO 9001.
2. The specified unit shall be compliant with the EU directives 2011/65/EU (CE).
3. The specified unit shall be compliant with the EU regulation 1907/2006 (REACH).
4. The specified unit shall be Halogen-free in accordance with IEC 61249-2-21.

1.02 CERTIFICATIONS AND STANDARDS

A. General abbreviations and acronyms

1. AES: Advanced Encryption Standard
2. API: Application Programming Interface
3. AQI: Air Quality Index
4. Aspect ratio: A ratio of width to height in images
5. BACnet: Building Automation and Control (BAC) Network
6. Bit Rate: The number of bits/time unit sent over a network
7. Bonjour: Enables automatic discovery of computers, devices, and services on IP networks.
8. DHCP: Dynamic Host Configuration Protocol
9. DNS: Domain Name System
10. FPS: Frames per Second
11. FTP: File Transfer Protocol
12. IEEE 802.1x: Authentication framework for network devices
13. HTTP: HyperText Transfer Protocol
14. HTTPS: Hypertext Transfer Protocol Secure
15. IAQ: Indoor Air Quality
16. IP: Internet Protocol
17. ISO: International Standards Organization
18. LAN: Local Area Network
19. LED: Light Emitting Diode
20. MPEG: Moving Picture Experts Group
21. MJPEG: Motion JPEG (M-JPEG or MJPEG) is a video compression format in which each video frame or interlaced field of a digital video sequence is compressed separately as a JPEG image.
22. Multicast: Communication between a single sender and multiple receivers on a network
23. NTP: Network Time Protocol
24. PoE: Power over Ethernet (IEEE 802.3af Class 3 Compliance, 80 mA) standard for providing power over network cable

25. QoS: Quality of Service
26. RTSP: Real Time Streaming Protocol
27. SMTP: Simple Mail Transfer Protocol
28. SNMP: Simple Network Management Protocol
29. SSL: Secure Sockets Layer
30. TCP: Transmission Control Protocol
31. TLS: Transport Layer Security
32. Unicast: Communication between a single sender and single receiver on a network

B. The specified unit shall carry the following EMC approvals:
   1. EN 55024:2010
   2. FCC 47 CFR Part 15 - Subpart B Class A
   3. EN 55032:2012 + AC:2013
   4. ICES-003 ISSUE 6:2016
   5. EN 60950-1:2006 /A11:2009 / A1:2010

C. The specified unit shall meet the following product safety standards:
   1. IEC / EN / CE / WEEE / UL 60950-1 / UL 2043 / CUL 60950-1 / ROHS

D. The specified unit shall meet the following standards
   1. Networking:
      a. IEEE 802.3af Class 3 Compliance, 125 mA)
      b. IEEE 802.1X (Authentication)
      c. IPv4 (RFC 791)
      d. IPv6 (RFC 2460)
      e. WiFi
   2. Mechanical Environment:
      a. IEC/EN 62262
      b. Vandal Resistance with at least an IK-10 rating

1.03 QUALITY ASSURANCE

A. All installation, configuration, setup, program and related work shall be performed by electronic technicians thoroughly trained by the manufacturer in the installation and service of the equipment provided.

B. The contractor or designated sub-contractor shall submit credentials of completed manufacturer certification, as proof of the knowledge.

C. The specified unit shall be manufactured in accordance with ISO9001.

1.04 WARRANTY

A. The manufacturer shall provide warranty for (1) one year and optional extended warranty for the sensor for a total period of three years.

PART 2 PRODUCTS

2.01 GENERAL

A. Sensor shall be IP-based and comply with established network standards.

B. Sensors shall be powered by the switch utilizing the network cable. Power injectors (midspans) shall be provided by the contractor when required for proper operation.

C. Sensors shall be fully supported by an open and published API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third party applications.

2.02 SENSOR SCHEDULE

A. Sensors listed below shall be supplied by a single manufacturer.

B. The sensor manufacturer and model numbers will be as follows:
   1. IPVideo Corporation Halo Smart Sensor v2.0.

2.03 SENSORS

A. Interior mounted Smart Sensor
   1. The sensor shall meet or exceed the following design specifications:
      a. The sensor shall operate on an open source; Linux-based platform and include a built-in web server.
      b. The sensor shall provide local database storage utilizing internal memory.
      c. The sensor shall be manufactured with an IP30-rated, IK10 impact-resistant, polycarbonate casing.
      d. The sensor certified to operate in plenum space.
   2. The sensor shall meet or exceed the following performance specifications:
      a. Detection and measurement of
         1. Particulates Size 1 µm particulates µg/m³
         2. Particulates Size 2.5 µm particulates µg/m³
         3. Particulates Size 10 µm particulates µg/m³
         4. Carbon Dioxide Equivalents
         5. Total Volatile Organic Compounds
         6. Carbon Monoxide
         7. Ammonia
         8. Temperature/Humidity
         9. Barometric Pressure
         10. Light Level
         11. Sound Levels
         12. Tamper
         13. Vape
         14. Vape THC
         15. Spoken Keyword
         16. Gunshot
         17. Aggression
         18. Masking / Spray Paint

19. Indoor Air Quality, AQI: Air Quality Index

b. Scheduling
    1. Shall have day and time selection for notification of detection.
    2. Shall have the scheduling be adjustable separately for each detection type.

c. Audio microphones
    1. Shall have (2) two microphones
    2. Sensor shall perform audio analysis only
    3. Sensor shall not record live audio stream

d. LED Indicator Light
    1. The sensor shall have a multi-color LED indicator.

e. Speaker
    1. The sensor shall have a speaker.

f. Encoding of Data Screen
    1. The sensor shall support the following video encoding algorithms:
        a. Motion JPEG encoding of 1 frame per second.

g. Video Transmission
    1. The sensor shall allow for video to be transported over:
        a. HTTP (Unicast)
        b. HTTPS
        c. RTSP

h. User Interface
    1. Web server
        a. The sensor shall contain a built-in web server making video and configuration available to multiple clients in a standard operating system and browser environment using HTTP and HTTPS, without the need for additional software.

i. IP addresses
    1. The sensor shall support both fixed IP addresses and dynamically assigned IP addresses provided by a Dynamic Host Control Protocol (DHCP) server.
    2. The sensor shall allow for automatic detection of the sensor based on UPnP and Bonjour when using a PC with an operating system supporting this feature.
    3. The sensor shall provide support for IPv4.
    4. The sensor shall provide support for IPv6.

j. Event functionality
    1. The sensor shall be equipped with an integrated event functionality, which can be triggered by:
        a. Sensor tampering
        b. Manual Trigger/Virtual Inputs
        c. Event threshold met
    2. Response to triggers shall include:
        a. Relays Outputs
            1. (2) Two relay outputs
            2. Normally Open or Closed
            3. Rated at 48VDC at 1 amp
        b. Status Light
        c. Speaker

1. Pre-Recorded Files
2. Programmable

d. Send notification, using HTTP, HTTPS, TCP, RTSP, or Email

e. Send images, using FTP, HTTP, HTTPS, RTSP, network share or email

f. Identification in data logs

k. Protocol

1. The sensor shall incorporate support for at least IPv4/v6, HTTP, HTTPS, SSL/TLS, TCP, ICMP, SMTP, DHCP, UPnP, ARP, DNS, NTP, RTSP, Bonjour, BACnet.
2. The SMTP implementation shall include support for SMTP authentication.

l. Security

1. The sensor shall be in compliance with California's law for IoT device cyber security, California Civil Code Section 1798.91.04.
2. The sensor shall restrict access to the built-in web server by usernames and passwords at two different levels.
3. The sensor shall have minimum user-name and password criteria requirements.

m. Configurability

1. The sensor shall permit configuration of Event thresholds, time requirements, filters, and combinational Events. Built in test functions shall be provided.
2. The sensor shall permit configuration live viewing elements, live viewing style/colors, and live viewing ranges
3. Sensor shall permit configuration of Actions including lighting patterns and colors, audible alerts, relay outputs, Email alerts, SMS alerts, and TCP/IP socket alerts.
4. Sensor shall permit configuration of user accounts, network parameters, SMTP connection parameters with built in test function.

n. API support

1. The sensor shall be fully supported by an API (Application Programmers Interface), which shall provide necessary information for integration of functionality into third party applications.

o. Installation and maintenance

1. The sensor shall provide built-in means which allows the assignment of IP addresses, upgrade of firmware and backup of the sensor' configuration without use of external software.
2. The sensor shall be supplied with Windows-based management software which allows the assignment of IP addresses, upgrade of firmware and backup of the sensor' configuration.
3. Sensor shall provide means to restore configuration with selection of desired sections of configuration to be restored.
4. The sensor shall allow updates of the software (firmware) over the network, using FTP, HTTP, or HTTPS.
5. Sensor shall provide logging and means to download daily files of Events, System States, and System Operation.
6. The sensor shall accept external time synchronization from an NTP (Network Time Protocol) server.
7. The sensor shall store all customer-specific settings in a non-volatile memory that shall not be lost during power cuts or soft reset.
8. Sensor shall provide a built-in complete system test that can be performed at any time.

p. Hardware interfaces

1. Network interface
    a. The sensor shall be equipped with one 10BASE-T/100BASE-TX Fast Ethernet-port using a shielded RJ45 connector and shall support auto negotiation of network speed (100 MBit/s and 10 MBit/s) and transfer mode (full and half duplex).

q. Enclosure
1. The sensor shall:
    a. Be manufactured with an IP30-rated, IK10 impact-resistant, polycarbonate casing.
    b. Secure the outer cover with anti-tamper TORX screws
    c. Be provided with self-locking mounting features for installation in materials up to ¾" (19MM) in thickness.

r. Power
1. Power over Ethernet IEEE 802.3af

s. Environmental
1. Operate in a temperature range of 0 °C to +50 °C (+32 °F to 122 °F).
2. Operate in a humidity range of 0–90% RH (non-condensing).

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractors or subcontractors' main resources within the project shall carry proper professional certification or training issued by the manufacturer.

B. The Contractor shall carefully follow instructions in documentation provided by the manufacturer to ensure all steps have been taken to provide a reliable, easy-to-operate system.

C. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.

D. All firmware found in products shall be the latest and most up to date provided by the manufacturer.

E. All equipment requiring users to log on using a password shall be configured with individually unique password/passwords. No system/product default passwords shall be allowed.

F. A proper installation shall meet NEC (National Electrical Code – US only) per the guidelines of that year's revision. When properly installed equipment meets Low Voltage, Class 2 classification of the NEC.

END OF SECTION