SECTION 282329: VIDEO SURVEILLANCE DEVICES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes
   1. Video Surveillance Remote Devices for Common Interior and Exterior Surveillance.
   2. Elevator Cab Video Surveillance through EoC System.
   3. Video Surveillance Remote Devices in Stairwells.
   4. PTZ Camera in entry corridor.

B. Related Sections: Communications
   1. 27 00 00 Communications
   2. 27 05 53 Identification for Communications Systems
   3. 27 11 19 Communications Termination Blocks and Patch Panels
   4. 27 15 13 Communications Copper Horizontal Cabling

C. Related Sections: Electronic Safety and Security
   1. 28 16 00 Intrusion Detection
   2. 28 23 19 Digital Video Recorders

1.2 REFERENCES

A. European Norm
   1. CE Declaration of Conformity
   2. EN55022 class B (CE) – Information Technology Equipment – Radio Disturbance Characteristics – Limits and Methods of Measurement for Emission

B. Federal Communications Commission (FCC) (www.fcc.gov)
   1. FCC CFR 47 part 15 class B – Telecommunications – Radio Frequency Devices – Digital Device Emission.

C. HD Standards
   1. Complies with the 296M-2001 standard

D. Immunity
   1. EN50121-4 (CE) – Railway applications – Electromagnetic compatibility. Emission and immunity of the signaling and telecommunications apparatus.
   2. EN50130-4 (CE) (PoE, +12 VDC, 24 VAC) Alarm Systems, Part 4 – Electromagnetic Compatibility – Product Family Standard: Immunity Requirements for Components of Fire, Intruder and Social Alarm Systems

E. International Electrotechnical Commission (IEC)
   1. Camera with 500 g (1.1 lb) lens according to IEC 60068-2-6 Vibration.

F. International Organization for Standardization (ISO)
   1. 9001 – Quality System.

G. Safety
   1. EN60950-1 - Information technology equipment. Safety. General requirements
   2. UL60950-1 Second Edition - Information technology equipment. Safety. General requirements
   3. CAN/CSA 22.2 No 60950-1 - Information technology equipment. Safety. General requirements

H. Underwriters Laboratories, Inc. (UL) (www.ul.com)
   1. UL certified

I. Vibration
   1. Camera with lens as per IEC 60068-2-6 (5 m/s2, operational)

1.3 DEFINITIONS

A. Day/Night (infrared sensitive): A camera that has normal color operation in situations where there is sufficient illumination (day conditions), but where the sensitivity can be increased when there is little light available (night conditions). This is achieved by removing the infrared cut filter required for good color rendition. The sensitivity can be further enhanced by integrating a number of fields to improve the signal-to-noise ratio of the camera (this may introduce motion blur).

B. Privacy Masking: The ability to mask out a specific area to prevent it from being viewed in order to comply with privacy laws and particular site requirements.

C. SensUp (sensitivity up): Increases camera sensitivity by increasing the integration time on the CMOS sensor (lowering shutter time from 1/50s to 1/5 s – PAL; 1/60s to 1/6s - NTSC). This is accomplished by integrating the signal from a number of consecutive video fields to reduce signal noise.

D. Smart BLC (Back Light Compensation): Smart back-light compensation allows the camera to automatically compensate for bright areas of a high contrast scene without having to define a window or area.

E. CBIT (Content Based Imaging Technology): By intelligently combining information from the sensor, the image processor, the encoder and IVA subsystems, the image quality is boosted and the bit rate is reduced significantly.

F. iAE (intelligent Auto Exposure): Intelligent Auto Exposure ensures clear visibility of dark moving objects in the scene against a bright background or vice versa

G. iDNR (intelligent Dynamic Noise Reduction): The Intelligent Dynamic Noise Reduction applies temporal noise filtering when no motion is detected. The filtering reduces the noise in the image and this makes the encoder step more effective.

1.4 SYSTEM DESCRIPTION – Interior/Exterior Cameras

A. Video Surveillance Remote Devices
   1. FLEXIDOME starlight HD 720p60 VR Camera

B. Performance Requirements
   1. 1/3-inch CMOS HD with progressive scan.
   2. High resolution 720p60, HD format.
   3. Ultra-high sensitivity in color and monochrome modes.
   4. Local storage with microSD card.
   5. Multiple H.264 HD video streams.
   6. Intelligent noise reduction reduces bandwidth and storage requirements by up to 30%.
   7. Aesthetic vandal-resistant enclosure, suitable for indoor or outdoor applications.
   8. IP66 and NEMA 4 Type 4X rating.
   9. IK10 impact protection (the equivalent of 55 kg (120 lbs))
   10. ONVIF conformant.

1.5 SYSTEM DESCRIPTION – PTZ Cameras

A. Section Includes
   1. PTZ Video Surveillance Remote Devices

B. Performance Requirements
   1. The HD PTZ camera shall be a full-featured HD PTZ unit designed for discrete video surveillance applications in indoor and outdoor environments.
   2. The HD PTZ camera shall be a high performance 1/3-in. progressive scan day/night Exmor CMOS sensor with 720p60 resolution.
   3. The HD PTZ camera shall offer enhanced system flexibility with dual recording (iSCSI and SD card) options.
   4. The HD PTZ camera shall support the following dual, redundant power options:
      a. [Outdoor Pendant Models using the Heater:
         1) 24 VAC
         2) High PoE (using the Bosch NPD-6001A Midspan)]
      b. [Indoor Pendant Models (not using the heater) and In-ceiling Models:
         1) 24 VAC
         2) PoE+ (IEEE 802.3at, class 4) or High PoE (using the Bosch NPD-6001A Midspan)]
      c. The HD PTZ camera shall default to use power from the 24 VAC power supply, if connected.
      d. The HD PTZ camera shall switch to the High PoE or PoE+ power supply if power from the 24 VAC power supply is lost with no interruption to camera operation.
   5. The HD PTZ camera shall provide Intelligent Tracking to continuously track objects in motion.
   6. The HD PTZ camera shall offer a Wide Dynamic Range of 90 dB for clear images in extreme high-contrast environments.
   7. The HD PTZ camera shall provide direct network connection using H.264 and JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
   8. The HD PTZ camera shall offer embedded Intelligent Video Analysis (IVA) that eliminates dedicated PCs and associated software maintenance.
   9. The HD PTZ camera shall conform to the ONVIF standard to provide interoperability with other conformant systems.

10. The HD PTZ camera shall offer configurable quad streaming with individually configurable HD streams.
11. The HD PTZ camera shall have an autofocus lens with 360x zoom (30x optical/12x digital)
12. The HD PTZ camera shall have variable pan and tilt speeds, and autopivot capability for optimal camera control and viewing at all zoom levels.
13. The HD PTZ camera shall offer bi-directional audio.
14. The HD PTZ camera shall support 256 user-defined presets.
15. The HD PTZ camera shall:
    a. [for Pendant Housings
        1) Offer IP66 environmental protection]
        2) Conform to the NEMA 4X standard for the following:
            a) Access to Hazardous parts
            b) Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)
            c) Ingress of water (dripping and light splashing, hosedown and splashing)
            d) Corrosive agents
        3) Meet the requirements for NEMA 4X certification with use of a polycarbonate bubble.
        4) Meet the requirements for NEMA 4X certification, except impact test, with use of an acrylic bubble.]
    b. [for In-ceiling Housings:
        1) IP54 environmental protection.
        2) Plenum rating.
        3) IK8 rating when using an optional polycarbonate bubble.]
16. The HD PTZ camera housing shall be a durable, rugged design with an acrylic bubble..

1.6 SYSTEM DESCRIPTION

A. Video Surveillance Remote Devices
    1. FLEXIDOME corner 9000 MP Camera
    2. For elevator cab and stairwell locations.
B. Performance Requirements
    1. The camera shall be Integrated Day Night active-infrared type.
    2. The camera shall incorporate IP Infrared Imaging design to optimize the combined benefits of IP and infrared illumination for critical imaging applications.
    3. The camera shall have IP network capability.
    4. The camera shall provide daytime color performance.
    5. The camera shall provide night-time active-infrared monochrome performance.
    6. The camera shall have a progressive scanning system.
    7. The camera shall be vandal resistant.
    8. The camera shall be designed to be grip-less and anchor-free for maximum safety
    9. The camera shall be energy efficient, drawing no more than 11W maximum.
    10. The camera shall operate with high reliability.
    11. The camera shall have been rigorously tested and proven for use by the manufacturer.

1.7 SUBMITTALS

A. Submit under provisions of Section [01 33 00].

B. Product Data:
   1. Manufacturer's data, user and installation manuals for all equipment and software programs including computer equipment and other equipment required for complete video management system.

C. Shop Drawings; include
   1. System device locations on architectural floor plans.
   2. Full Schematic of system, including wiring information for all devices.

D. Closeout Submittals
   1. User manual.
   2. Parts list.
   3. System device locations on architectural floor plans.
   4. Wiring and connection diagram.
   5. Maintenance requirements.

1.8 QUALITY ASSURANCE

A. Manufacturer:
   1. Minimum of [10] years experience in manufacture and design Video Surveillance Devices.
   2. Manufacturer's quality system: Registered to ISO 9001 Quality Standard.

B. Video Surveillance System
   1. Listed by [UL] [EN] [FCC] specifically for the required loads. Provide evidence of compliance upon request.

C. Installer:
   1. Minimum of [5] years experience installing Video IP Surveillance System.

1.9 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section [01 60 00].

B. Deliver materials in manufacture's original, unopened, undamaged containers; and unharmed original identification labels.

C. Protect store materials from environmental and temperature conditions following manufacturer's instructions.

D. Handle and operate products and systems according to manufacturer's instructions.

E. Bosch provides off-the-shelf availability for our top selling products and same-day or 24-hour shipping.

1.10 WARRANTY

A. Provide manufacturer's warranty covering [3] years for replacement and repair of defective equipment.

1.11 MAINTENANCE

A. Make ordering of new equipment for expansions, replacements, and spare parts available to dealers and end users.

B. Provide factory direct technical support from 8:00 a.m. to 8:00 p.m. via phone and e-mail.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
[Bosch Security Systems, Inc.
130 Perinton Parkway
Fairport, New York, 1450, USA
Phone: + 1 800 289 0096
Fax: + 1 585 223 9180
security.sales@us.bosch.com
www.boschsecurity.us]

B. Substitutions:
1. All proposed substitutions must be approved by the Architect or Engineer professional.

2.2 BOSCH FLEXIDOME starlight HD 720p60 VR CAMERA [NIN-733-V03IPS]

A. General Characteristics:
1. For Interior and exterior common area cameras (not including stairwells).
2. The vandal resistant HD camera shall be capable of operating in an indoor or an outdoor environment.
3. The vandal resistant HD camera shall utilize a 1/3-inch CMOS HD image sensor.
4. The vandal resistant HD camera shall offer a 3-9 mm or a 10-23 mm automatic varifocal, super resolution lenses with an advanced iris design.
5. The vandal resistant HD camera shall have high light sensitivity
   a. [Lens 3-9 mm:
      1) Color: 0.017 lx (0.0017 fc)
      2) Monochrome: 0.0057 lx (0.00057 fc)]
   b. [Lens 10-23 mm:
      1) Color: 0.03 lx (0.003 fc)
      2) Monochrome: 0.01 lx (0.001 fc)]
6. The vandal resistant HD camera shall offer Content-based Imaging Technology (C-BIT).
7. The vandal resistant HD camera shall utilize Intelligent Dynamic Noise Reduction (iDNR) technology to reduce the bitrate and storage requirements by removing noise artifacts.
8. The vandal resistant HD camera shall produce a resolution of 1280 x 720 pixels (HD 720p) at 60 ips with a 16:9 image format.
9. The vandal resistant HD camera shall produce a D1 resolution of 704 x 480 pixels at 30 ips with a 4:3 image format.
10. The vandal resistant HD camera shall provide direct network connection using H.264 and JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
11. The vandal resistant HD camera shall provide a CVBS (PAL/NTSC), 1 Vpp, BNC, 75 Ohm analog output that allows hybrid video output.
12. The vandal resistant HD camera shall be capable of operating as an indoor/outdoor camera within a temperature range of -30°C to 50°C (-22°F to 122°F).
13. The vandal resistant HD camera shall be rated to IP 66 (NEMA Type 4X) standard against water and dust ingress.
14. The vandal resistant HD camera shall be rated to IK10 impact protection (the equivalent of 55 kg (120 lbs)).
15. The vandal resistant HD camera shall work with Power over Ethernet IEEE 802.3af (802.3at Type 1).
16. The vandal resistant HD camera shall support AutoMDIX.
17. The vandal resistant HD camera shall conform to the ONVIF Profile S specification.
18. A user shall be able to view video on a PC using a Web browser, with the Bosch Video Management System, Bosch Video Client, Bosch Recording System, or with the Bosch Video Security iPad App.
19. The vandal resistant HD camera shall provide six configurable user modes that provide optimized settings for distinct applications.
20. The vandal resistant HD camera shall offer Intelligent Video Analysis (IVA).
21. The vandal resistant HD camera shall provide four independent, fully programmable privacy mask areas.
22. The vandal resistant HD camera shall provide an on-screen display to simplify the camera/lens back focus and network configuration settings.

23. The vandal resistant HD camera shall provide enhanced night viewing through the increase of IR sensitivity by automatically switching a motorized IR filter from color to monochrome operation in low-light or IR illuminated applications. Allow the IR filter to be switched manually via the alarm input, preprogrammed in a camera mode or profile.
24. The vandal resistant HD camera shall utilize pixel-by-pixel analysis to automatically compensate for bright areas of a high contrast scene (Back light) without having to define a window or area.
25. The vandal resistant HD camera shall provide intelligent Auto Exposure (iAE) to improve visibility of dark objects against a light background and vice versa. Use IVA to detect in which parts of the image local contrast enhancement can improve image usability.

B. Imaging
1. The vandal resistant HD camera shall utilize a 1/3-inch CMOS HD image sensor.
2. The vandal resistant HD camera shall produce a resolution of 1280 x 720 pixels (HD 720p) at 60 ips with a 16:9 aspect ratio.
3. The vandal resistant HD camera shall produce a resolution of 704x 480 pixels (D1) at 30 ips with a 4:3 aspect ratio.
4. [The vandal resistant HD camera shall utilize a 3 to 9 mm automatic varifocal super resolution lens.]
5. [The vandal resistant HD camera shall utilize a 10 to 23 mm automatic varifocal super resolution lens.]
6. The vandal resistant HD camera shall offer intelligent Dynamic Noise Reduction to reduce bandwidth and storage requirements by optimizing the detail-to-bandwidth ratio via temporal and spatial noise filtering.
7. The vandal resistant HD camera shall offer two regions of interest to zoom into a specific area of the full iinage.
8. The vandal resistant HD camera shall allow regions of interest to be sent in separate streams so it is possible to view both an overview and a detail at the same time.
9. The vandal resistant HD camera shall offer a Wide Dynamic Range of 84 dB (typical) for clear images in extreme high-contrast environments.
10. The vandal resistant HD camera shall provide a frame integration mode that can increase the integration time up to 10 times on the CMOS sensor.
11. The vandal resistant HD camera shall produce images with a minimum scene illumination of (at 30 IRE):
    a. [Lens 3-9 mm:
        1) Color: 0.017 lx (0.0017 fc)
        2) Monochrome: 0.0057 lx (0.00057 fc)]
    b. [Lens 10-23 mm:
        1) Color: 0.03 lx (0.003 fc)
        2) Monochrome: 0.01 lx (0.001 fc)]
12. The vandal resistant HD camera shall provide enhanced night viewing through the increase of IR sensitivity by automatically switching a motorized IR filter from color to monochrome operation in low-light or IR illuminated applications. Allow the IR filter to be switched manually via the alarm input, preprogrammed in a camera mode or profile.
13. The vandal resistant HD camera shall utilize pixel-by-pixel analysis to automatically compensate for bright areas of a high contrast scene (Back light) without having to define a window or area.

C. HD Characteristics
   1. The vandal resistant HD camera shall generate HD 720p60 resolution using H.264 compression.
   2. The vandal resistant HD camera shall generate multiple simultaneous video streams in H.264 and M-JPEG with configurable frame rates and bandwidth.
   3. The vandal resistant HD camera shall offer the following audio standards:
      a. AAC
      b. G.711, 8 kHz sampling rate
      c. L16, 16 kHz sampling rate

D. Video Streaming
   1. The vandal resistant HD camera shall deliver multiple H.264 video streams and an M-JPEG stream.
   2. The vandal resistant HD camera shall offer an upright streaming mode that delivers an image of 400 x 720 (9:16 aspect ratio) that is cropped from the full sensor image.

E. Installation Requirements
   1. The vandal resistant HD camera shall be capable of operating within a temperature range of -30°C to +50°C (-22°F to 122°F).
   2. The vandal resistant HD camera shall offer a cold start temperature of -20°C (-4°F).
   3. The vandal resistant HD camera shall have power and alarm cable connectors which can be removed when the camera is mounted.
   4. The vandal resistant HD camera shall provide power, video, and control via an Ethernet connection and a PoE switch.
   5. The vandal resistant HD camera shall be capable of simultaneous connection to PoE and to 12 VDC / 24 VAC power supplies.
   6. The vandal resistant HD camera shall provide an automatic zoom/focus lens wizard to zoom and focus the camera.
   7. The vandal resistant HD camera shall provide a multi-language on-screen display.

F. Storage Management
   1. The vandal resistant HD camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array.
   2. The vandal resistant HD camera shall support iSCSI storage targets to enable the camera to function as a conventional DVR.
   3. The vandal resistant HD camera shall have a microSD card slot that uses standard; off-the-shelf microSD (SDHC and SDXC) cards for local storage (up to 2 TB).
   4. The local storage feature shall be capable of storage for Automatic Network Replenishment (ANR).

G. Alarm Handling Features:
   1. The vandal resistant HD camera shall provide an alarm input that may be triggered by either a normally opened or normally closed contact.
   2. The day/night HD camera shall provide the capability on alarm to display up to a 31 character, programmable alarm message.
   3. The vandal resistant HD camera shall provide a relay output that may be selected for normally opened or normally closed operation. The relay can be activated from an external alarm input to the camera, manual activation from the browser, upon video motion detection, an alarm task script or video loss.
   4. The vandal resistant HD camera shall provide email alarm messaging with optional JPEG posting.

H. IP Connectivity
   1. The vandal resistant HD camera shall allow full camera control and configuration capabilities over the network.
   2. The vandal resistant HD camera shall accept Power over Ethernet (IEEE 802.3at Type 1).
   3. The vandal resistant HD camera shall deliver 720p HD video, at rates up to 60 images per second.
   4. The vandal resistant HD camera shall conform to the ONVIF Profile S standard.
   5. The vandal resistant HD camera shall offer Embedded Intelligent Video Analytics (IVA).

I. Embedded Video Content Analysis
   1. The day/night HD camera shall be VCA enabled.
   2. The day/night HD camera shall offer MOTION+ video motion analysis that uses an algorithm based on pixel change.
   3. The day/night HD camera MOTION+ feature shall include object size filtering and tamper-detection capabilities.

J. [Intelligent Video Analysis
   1. The vandal resistant HD camera shall be capable of processing and analyzing video within the camera itself, with no extra hardware required.
   2. The vandal resistant HD camera shall be capable of detecting and sending alarms for abnormal events.
   3. The vandal resistant HD camera shall allow users to set up to 10 separate profiles and switch profiles based on a day/night or holiday schedules
   4. The vandal resistant HD camera shall offer a tracking feature that can follow objects within a defined region of interest.]

K. Surveillance Software
   1. The vandal resistant HD camera shall be accessible from a web browser, with the Bosch Video Management System, with the Bosch Recording System, with the Bosch Video Client, or with the Bosch Video Security iPad App.
   2. The vandal resistant HD camera shall be accessible from the Bosch Security System iPad App. The App shall allow complete camera control and shall display images over low bandwidth connections.

L. Construction
   1. The vandal resistant HD camera shall be enclosed in a cast-aluminum housing with an aluminum trim ring.
   2. The vandal resistant HD camera shall come with a clear polycarbonate dome bubble (with UV blocking anti-scratch coating) and a hardened inner liner.
   3. The vandal resistant HD camera shall be able to withstand the equivalent of 55 kg (120 lbs) for force (> IK10).
   4. The vandal resistant HD camera shall be protected against dust and water to the IP 66 (NEMA 4X) standard.
   5. The vandal resistant camera shall be capable of being mounted to a surface, wall, corner, or suspended ceiling (specific mounting options may require optional accessories).

M. Access Security
   1. The vandal resistant HD camera shall offer three levels of password protection.
   2. The vandal resistant HD camera shall support 802.1x authentication using a RADIUS (Remote Authentication Dial In User Service) server.
   3. The vandal resistant HD camera shall store a SSL certificate for use with HTTPS.
   4. [The vandal resistant HD camera shall be capable of being independently AES encrypted with 128-bit keys.]

N. Image Posting
   1. The vandal resistant HD camera shall offer periodic JPEG image posting to an FTP server or to a Dropbox account.
   2. The vandal resistant HD camera shall offer best face detection and JPEG best face image posting to FTP server or to a Dropbox account.

O. Specifications
   1. Electrical:
      a. Power Supply:
         1) 24 VAC, 50/60 Hz
         2) 12 VDC
         3) PoE 48 VDC nominal
      b. Current Consumption:
         1) 12 VDC:
            a) With IVA: 600 mA
            b) Without IVA: 500 mA
         2) 24 VAC:
            a) With IVA: 500 mA
            b) Without IVA: 450 mA
         3) PoE (48 VDC):
            a) With IVA: 175 mA
            b) Without IVA: 150 mA

c. Power Consumption:
    1) With IVA: 7.2 W
    2) Without IVA: 6 W

P. Sensor
1. Type: 1/3-inch CMOS HD
2. Active Pixels: 1280 x 720

Q. Video Streams
1. Video Compression: H.264 (ISO/IEC 14496-10), M-JPEG, JPEG
2. Streaming: Multiple individually configurable streams in H.264 and M-JPEG, configurable frame rate and bandwidth.
3. Overall IP Delay: Min. 120 ms, Max. 240 ms
4. GOP Structure: IP, IBP, IBBP
5. Encoding Interval: 1 to 60 (50) ips
6. Resolution (H x V):
    a. 720p HD: 1280 x 720
    b. D1 4:3 (cropped): 704 x 480
    c. SD upright (cropped): 400 x 720
    d. 480p SD
        1) Encoding: 704 x 480
        2) Displayed: 854 x 480
    e. 432p SD: 768 x 432
    f. 288p SD: 512 x 288
    g. 240p SD:
        1) Encoding: 352 x 240
        2) Displayed: 432 x 240
    h. 144p SD: 256 x 144
7. Sensitivity (3200K, Scene Reflectivity 89%, 30 IRE)
    a. Lens 3-9 mm (F1.2):
        1) Color: 0.017 lx (0.0017 fc)
        2) Monochrome: 0.0057 lx (0.00057 fc)
    b. Lens 10-23 mm (F1.2):
        1) Color: 0.03 lx (0.003 fc)
        2) Monochrome: 0.01 lx (0.0001 fc)
8. Day/Night: Color, Monochrome, Auto
9. White Balance:
    a. ATW (2500 to 10000K)
    b. ATW hold and manual
    c. Indoor and Outdoor ATW
10. Shutter:
    a. Automatic Electronic Shutter (AES)
    b. Fixed (1/30 [1/25] to 1/1500000) selectable
    c. Default shutter
11. Backlight Compensation:
    a. IVA: On, Off, Intelligent AE (iAE)
    b. Non-IVA: Off/Auto/BLC
12. Noise Reduction: Intelligent Dynamic Noise Reduction (iDNR) with separate temporal and spatial adjustments
13. Contrast Enhancement: On/Off
14. Sharpness: Sharpness enhanced level selectable

15. Wide Dynamic Range: 84 dB
16. Privacy Masking: Four (4) independent areas, fully programmable
17. Video Motion Analysis: Motion+ or Intelligent Video Analysis

R. Audio
1. Standard:
   a. AAC
   b. G.711, 8 kHz sampling rate
   c. L16, 16 kHz sampling rate
2. Signal-to-Noise Ratio: >50 dB
3. Audio Streaming: Full duplex / Half duplex

S. Input/Output
1. Analog Video Out: CVBS (PAL/NTSC), 1 Vpp, BNC, 75 Ohm
2. Analog Video Out (service only): CVBS (PAL/NTSC), 1 Vpp, 2.5 mm jack, 75 Ohm (non-protected)
3. Audio: 1 x mono line in, 1 x mono line out
   a. Signal Line In: 12 kOhm typical, 1 Vrms max.
   b. Signal Line Out: 1 Vrms at 1.5 kOhm, typical
4. Alarms: 2 inputs
   a. Activation Voltage: +5 VDC to +40 VDC (+3.3 VDC with DC-coupled 22 kOhm pull-up resistor)
5. Relay: 1 output
   a. Voltage: 30 VAC or +40 VDC Max 0.5 A continuous , 10 VA

T. Local Storage
1. Memory Card Slot: Supports SDHC and SDXC microSD cards
2. Recording: Continuous recording, ring recording, alarm/events/schedule recording

U. Software Control
1. Unit Configuration: Via Web browser or Configuration Manager
2. Software Update: Flash ROM, remote programmable

V. Network
1. Protocols: IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP, IGMP V2/V3, ICMP, RTSP, FTP, Telnet, ARP, DHCP, SNTP, SNMP (V1, MIB-II), 802.1x, SMTP, iSCSI, UPnP (SSDP)
2. Encryption: TLS 1.0, SSL, AES (optional)
3. Ethernet: STP, 10/100 Base-T, auto-sensing, half/full duplex, RJ45
4. PoE Supply: IEEE 802.3at Type 1-compliant
5. Connectivity:
   a. ONVIF Profile S
   b. Auto-MDIX

W. Optical
   1. Lens: Automatic Varifocal SR (Super Resolution)
      a. [3 to 9 mm]
      b. [10 to 23 mm]
   2. Adjustment: Motorized zoom/focus
   3. Iris Control: Automatic iris control
   4. Viewing Angle (H x V):
      a. [3 to 9 mm
         1) Wide: 96° x 52°
         2) Tele: 32° x 18°]
      b. [10 to 23 mm
         1) Wide: 28° x 15°
         2) Tele: 12.4° x 6.9°]

X. Mechanical:
   1. Dimensions (D x H): 158 x 124 mm (6.22 x 4.89 in.)
   2. Weight:
      a. Camera: 0.85 kg (1.87 lb)
      b. Camera with SMB: 1.28 kg (2.82 lb)
   3. Mounting: Flush mount or surface mount
   4. Color: White (RAL 9010) trim ring with black inner liner
   5. Adjustment Range: 360° pan, 90° tilt, ±90° twist
   6. Dome Bubble: Polycarbonate, clear with UV blocking anti-scratch coating
   7. Trim Ring: Aluminum

Y. Environmental:
   1. Operating Temperature: -30°C to +50°C (-22°F to 122°F)
   2. Cold Start Temperature: -20°C (-4°F)
   3. Storage Temperature: -50°C to +70°C (-58°F to 158°F)
   4. Operating Humidity: 5% to 93% relative humidity
   5. Storage Humidity: up to 98% relative humidity
   6. Water/Dust Protection: IP66 and NEMA Type 4X
   7. Impact Protection: IK10
   8. Environment Test Method: EN 50130-5:2011Alarm systems Part 5 (Class IV Outdoor in general)

2.3 BOSCH FLEXIDOME corner MP CAMERA
[NCN-90022-F1]

A. Performance:
   1. For camera cab and stairwell locations.
   2. The camera shall be able to view the entire floor and all four walls of a 15 foot square room (4.5x4.5 m), including the two walls to which it is attached.
   3. The camera shall be available with a 2.0 mm wide-angle lens allowing a full 121° H-FoV and 91° V-FoV of the entire room.
   4. The camera shall have no exposed wiring or anchor points, making it highly vandal-resistant and suitable for suicide watch.
   5. The camera shall have automatic, photocell-controlled day-night switching.
   6. The camera shall have a 1/2.7" CMOS sensor with mechanical filter technology for vivid daytime color and effective night-time performance under infrared illumination.
   7. The camera shall produce a resolution of 1440 x 1080 pixels at 30 ips.

8. The camera shall produce a signal to noise ratio of greater than 39 dB (AGC off) under normal daylight conditions.
9. The camera shall have a dynamic range of greater than 69 dB under normal daylight conditions.
10. The camera shall incorporate automatic switching between day and night modes.
11. The camera shall have daytime color mode.
12. The camera shall have night-time IR monochrome mode.
13. The camera shall operate at zero lux in night-time monochrome mode.
14. The camera shall have high light sensitivity
    a. Color: 0.3 lx (0.03 fc)
    b. Monochrome: 0.0 lx (IR on)
15. The camera design shall eliminate the possibility of focus shift to ensure accurate focus for a daytime average wavelength of 500 nm and a night-time average wavelength of 940 nm.
16. The camera shall produce accurate color representation by eliminating IR bleed and/or other color distortions.
17. The camera shall produce outstanding contrast characteristics for reduced glare and streaking.
18. The camera shall incorporate infrared illumination to reduce image noise at night, enabling better compression, reducing bit rates and enhancing network stability.
19. The camera shall be equipped with 3 high efficiency LED infrared array allowing for clear pictures in zero lux conditions.
20. The LEDs shall be optimized to produce an evenly-distributed field of illumination at 940 nm.
21. The LEDs shall be intensity-adjustable.
22. The camera shall offer the following audio standards:
    a. AAC
    b. G.711, 8 kHz sampling rate
    c. L16, 16 kHz sampling rate

B. Construction
1. The camera shall be ruggedized for vandal resistance.
2. The camera shall be in a truncated tetrahedron shape ensuring a flush installation into ceiling/wall corners.
3. The camera shall have no exposed wiring or anchor points, making it highly vandal-resistant and suitable for suicide watch.
4. The camera shall incorporate a 45° tilted face to enable viewing of entire rooms, including directly underneath the camera itself.
5. The camera shall have a flush-mounted front faceplate secured in place with three tamper-resistant screws.
6. The camera shall have a gasket behind the faceplate to ensure water-tightness from periodic splashes of liquids caused through attempted vandalism or cleaning.
7. The camera shall be rated to IP 65 standard against water and dust ingress.
8. The camera shall be rated to IK10 impact.
9. The camera housing shall be equipped with two separate windows, one for IR light transmission and the other for video imaging.
10. The camera shall have pre-harnessed connectors allowing simple plug and play installation.
11. The camera housing shall be made of welded aluminum.
12. The camera shall be powder-coat painted in white.

13. The camera shall operate at a temperature range from -10°C to +50°C (14°F to +122°F).
14.

C. General Characteristics:
   1. The camera shall offer Content-based Imaging Technology (C-BIT).
   2. The camera shall utilize Intelligent Dynamic Noise Reduction (iDNR) technology to reduce the bitrate and storage requirements by removing noise artifacts.
   3. The camera shall provide direct network connection using H.264 and JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
   4. The camera shall provide six configurable user modes that provide optimized settings for distinct applications.
   5. The camera shall provide four independent, fully programmable privacy mask areas.
   6. The camera shall provide enhanced night viewing through the increase of IR sensitivity by automatically switching a motorized IR filter from color to monochrome operation in low-light or IR illuminated applications.
   7. The camera shall provide a CVBS (NTSC), 1 Vpp, 75 Ohm analog output on a 2.5 mm jack connector for installation purposes.
   8. The camera shall utilize pixel-by-pixel analysis to automatically compensate for bright areas of a high contrast scene (Backlight) without having to define a window or area.

D. Installation Requirements
   1. The camera shall have power and alarm cable connectors which can be removed when the camera is mounted.
   2. The camera shall provide power, video, and control via an Ethernet connection and a PoE switch.
   3. The camera shall be capable of simultaneous connection to PoE and to 12 VDC/24 VAC power supplies.

E. Storage Management
   1. The camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array.
   2. The camera shall support iSCSI storage targets to enable the camera to function as a conventional DVR.
   3. The camera shall have a microSD card slot that uses standard; off-the-shelf microSD (SDHC and SDXC) cards for local storage (up to 2 TB).

F. Alarm Handling Features:
   1. The camera shall provide an active low alarm input.
   2. The camera shall provide the capability on alarm to display up to a 31 character, programmable alarm message.
   3. The camera shall provide a normally open alarm output. The alarm output can be activated from an external alarm input to the camera, manual activation from the browser, upon video motion detection, an alarm task script or video loss.
   4. The camera shall provide email alarm messaging with optional JPEG posting.

G. IP Connectivity

1. The camera shall generate multiple simultaneous video streams in H.264 and M-JPEG with configurable frame rates and bandwidth.
2. The camera shall allow full camera control and configuration capabilities over the network.
3. The camera shall work with Power over Ethernet IEEE 802.3af (802.3at Type 1).
4. The camera shall deliver 1440x1080 video, at rates up to 30 images per second.
5. The camera shall support AutoMDIX.
6. The camera shall conform to the ONVIF Profile S standard.

H. Embedded Video Content Analysis
1. The camera shall be VCA enabled.
2. The camera shall offer MOTION+ video motion analysis that uses an algorithm based on pixel change.
3. The camera MOTION+ feature shall include object size filtering and tamper-detection capabilities.

I. Surveillance Software
1. The camera shall be accessible from a web browser, with the Bosch Video Management System, with the Bosch Video Client, or with the Bosch Video Security iPad App.
2. The camera shall be accessible from the Bosch Security System iPad App with the separately available Bosch transcoder. The App shall allow complete camera control and shall display images over low bandwidth connections.

J. Access Security
1. The camera shall offer three levels of password protection.
2. The camera shall support 802.1x authentication using a RADIUS (Remote Authentication Dial In User Service) server.
3. The camera shall store a SSL certificate for use with HTTPS.
4. [The camera shall be capable of being independently AES encrypted with 128-bit keys.]

K. Image Posting
1. The camera shall offer periodic JPEG image posting to an FTP server or to a Dropbox account.
2. The camera shall offer best face detection and JPEG best face image posting to FTP server or to a Dropbox account.

L. Specifications
1. Electrical:
   a. Input voltage:
      1) [+12 VDC]
      2) [24 VAC]
      3) [Power-over-Ethernet (48 VDC nominal)]
   b. Power consumption
      1) [8.4 W max. (12 VDC, PoE)]
      2) [10.8 VA max. (+24 VAC)]
   c. PoE: IEEE 802.3af (802.3at Type 1) Power level: Class 3

2. Video

a. Sensor type: 1/2.7-inch CMOS
b. Resolution: 1440 x 1080
c. Sensitivity Color:
    1) Color: 0.3 lx
    2) Mono: 0.0 lx (IR on)
d. Dynamic range: 69 dB
e. True Day/Night: Auto, Color, Monochrome
f. Shutter speed:
    1) Automatic Electronic Shutter (AES)
    2) Fixed 1/30 (1/25) to 1/15000
g. SD Video resolution: VGA, QVGA
h. Video compression: H.264 MP (Main Profile); M-JPEG
i. Max. frame rate: 30 ips (M-JPEG frame rate can vary depending on system loading)
j. Video Settings: Video watermarking, Alarm mode stamping, Image mirror, Image flip, Contrast, Saturation, Brightness, White balance, Sharpness level, Contrast enhancement, Backlight Compensation, Privacy Mask, Motion detection, Tamper alarm, Upright mode, Pixel counter

3. Night vision
    a. IR LEDs: 3 high efficiency LEDs, 940 nm
    b. IR coverage: 9 m (30 ft)

4. Lens
    a. Lens type: Fixed 2.0 mm, F2.0
    b. Lens mount: Board mounted:
    c. Horizontal field of view: 121°
    d. Vertical field of view: 91°

5. Connection
    a. Analog video out (for installation only): 2.5 mm jack connector (1 Vpp CVBS, NTSC)
    b. Alarm input: 0 to 3.3 VDC, low active
    c. Alarm output: 60 VDC or 60 VAC (max), load current: 1 A (max)

6. Audio
    a. Audio input:
        1) Line in 3.5 mm mono connector
        2) 0.707 Vrms, impedance 20k Ohm (typical)
    b. Audio output:
        1) Line out 3.5 mm mono connector
        2) 0.707 Vrms, impedance 10k Ohm (typical)
    c. Audio communication: Two-way, full duplex
    d. Audio compression: AAC, G.711, L16 (live and recording)

7. Local Storage

a. Internal RAM: 10 s pre-alarm recording
b. Memory card slot: Supports up to 32 GB microSDHC / 2 TB microSDXC card. (An SD card of Class 6 or higher is recommended for HD recording)
c. Recording: Continuous recording, ring recording. alarm/events/schedule recording

8. Software Control
   a. Unit configuration: Via web browser or PC surveillance software

9. Network
   a. Protocols: IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, Telnet, ARP, DHCP, SNTP, SNMP (V1, MIB-II), 802.1x, DNS, DNSv6, DDNS, SMTP, iSCSI, UPnP (SSDP), DiffServ (QoS), LLDP, SOAP, Dropbox, CHAP, Digest Authentication.
   b. Encryption: TLS 1.0, SSL, DES, 3DES, AES (optional)
   c. Ethernet: 10/100 Base-T, auto-sensing, half/full duplex
   d. Ethernet connector: RJ45
   e. Connectivity: ONVIF Profile S, Auto-MDIX

10. Mechanical
    a. Dimensions (W x H x D): 240 x 146 x 169 mm (9.45 x 5.75 x 6.65 in.)
    b. Weight: 1840 g (4.06 lb) approx.

11. Environmental
    a. Operating temperature: -10 °C to +50 °C (14 °F to +122 °F)
    b. Storage temperature: -30 °C to +60 °C (-22 °F to +140 °F)
    c. Humidity: 20% to 90% relative humidity (non condensing)

2.4 BOSCH AUTODOME 7000 HD SERIES CAMERA [VG5-7130-CPT4] [VG5-7130-EPC4]

A. General Characteristics:
   1. For PTZ camera location noted in plans.
   2. The HD PTZ camera shall provide a 1/3-in. type Exmor CMOS day/night camera with the following:

a. 1305 x 1049 (1.37 MP) effective picture elements.
b. Sensitivity to below 1.0 lux.

3. The HD PTZ camera shall offer a 720p/60 resolution for capturing fast motion.
4. The HD PTZ camera shall provide direct network connection using H.264 and –M-JPEG compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
5. The HD PTZ camera shall support the following dual, redundant power options:
   a. [Outdoor Pendant Models using the Heater:
      1) 24 VAC
      2) High PoE (using the Bosch NPD-6001A Midspan)]
   b. [Indoor Pendant Models (not using the heater) and In-ceiling Models:
      1) 24 VAC
      2) PoE+ (IEEE 802.3at, class 4) or High PoE (using the Bosch NPD-6001A Midspan)]
   c. The HD PTZ camera shall default to use power from the 24 VAC power supply, if connected.
   d. The HD PTZ camera shall switch to the High PoE or PoE+ power supply if power from the 24 VAC power supply is lost with no interruption to camera operation.
6. The HD PTZ camera shall offer a dynamic range of 90 dB for clear images in extreme high-contrast environments.
7. The HD PTZ camera shall offer 256 user-defined pre-positions with 20-character titles.
8. The HD PTZ camera shall offer five configurable, pre-programmed user modes.
9. The HD PTZ camera shall offer bi-directional audio.
10. The HD PTZ camera shall offer Intelligent Tracking that controls the pan, tilt, and zoom movements of the camera to continuously follow an object or individual.
11. The HD PTZ camera shall offer an optional fiber optic media converter kit.
12. The HD PTZ camera shall be able to be mounted to a wall, mounted to a surface, mounted to a pipe, or recessed into an indoor ceiling.
13. The HD PTZ camera shall:
   a. [for Pendant Housings
      1) Offer IP66 environmental protection]
      2) Conform to the NEMA 4X standard for the following:
         a) Access to Hazardous parts
         b) Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)
         c) Ingress of water (dripping and light splashing, hosedown and splashing)
         d) Corrosive agents
      3) Meet the requirements for NEMA 4X certification with use of a polycarbonate bubble.
      4) Meet the requirements for NEMA 4X certification, except impact test, with use of an acrylic bubble.]
   b. [for In-ceiling Housings:
      1) IP54 environmental protection.
      2) Plenum rating.
      3) IK8 rating when using an optional polycarbonate bubble.]
14. The HD PTZ camera shall support the following languages:
   a. Dutch
   b. English
   c. French
   d. German
   e. Italian

f. Japanese
g. Polish
h. Portuguese
i. Spanish

B. Imaging
1. The HD PTZ camera shall offer a 1/3-inch type Exmor CMOS imager.
2. The HD PTZ camera shall offer an effective number of pixels of 1305 x 1049 (1.37 megapixels).
3. The HD PTZ camera shall offer a 16:9 aspect ratio.
4. The HD PTZ camera shall offer a 30x optical zoom lens (4.3 to 129 mm).
5. The HD PTZ camera shall have 2.1° to 59° field of view.
6. The HD PTZ camera shall produce a color image with a minimum scene illumination of 0.052 lux and a monochrome image, when in the night mode, with a minimum illumination of 0.0103 lux at 30 IRE.
7. The HD PTZ camera shall offer automatic focus and iris control with manual override.
8. The HD PTZ camera shall offer a dynamic range of 90 dB.
9. The HD PTZ camera shall offer a Sodium Vapor White Balance mode that automatically compensate for light from a sodium vapor lamp to restore objects to their true color.
10. The HD PTZ camera shall offer an anti-fog image feature that assists the camera in registering a usable image through the heaviest fog.

C. Image Processing
1. The HD PTZ camera shall provide an AutoPivot feature to automatically rotate and flip the camera as it tilts through the vertical position to maintain the correct orientation of the image.
2. The HD PTZ camera shall provide an AutoScaling feature that reduces the pan/tilt speed as the camera zooms in on an object, so that the relative speed on the screen remains constant.

D. System Features
1. The HD PTZ camera shall allow an optional fiber optic media converter module designed to accept a wide-range of 10/100 Mbps SFP modules for use with Multimode or Singlemode optical fiber with LC or SC connectors.
2. The HD PTZ camera PTZ camera shall be compatible with the Bosch Video Client and the Bosch Video Management System.
3. The HD PTZ camera shall provide one (1) audio mono line in and one (1) audio mono line out.

E. PTZ Features
1. The HD PTZ camera shall provide the following modes for variable pan/tilt speeds:
   a. Turbo Mode (manual control):
      1) Pan: 0.1°/s to 400°/s
      2) Tilt: 0.1°/s to 300°/s
   b. Normal Mode:
      1) Pan: 0.1°/s to 120°/s
      2) Tilt: 0.1°/s to 120°/s
2. The HD PTZ camera shall provide a preposition speed of:
   a. Pan: 0.1°/s to 400°/s
   b. Tilt: 0.1°/s to 300°/s
3. The HD PTZ camera shall provide a pan range of 360° continuous.
4. The HD PTZ camera shall provide a tilt angle of
   a. [18° above the horizon for pendant housings.]
   b. [1° above the horizon for in-ceiling housings.]
5. The HD PTZ camera shall provide pan and tilt preset repeatability accurate to within ±0.1 degrees.
6. The HD PTZ camera shall provide a feature that automatically rotates, or pivots, the camera to simplify tracking of a person walking directly under the camera.
7. The HD PTZ camera shall divide the cameras 360° rotation into 16 independent sectors with 20-character titles per sector. Any or all of the 16 sectors can be blanked from the operator's view.
8. The HD PTZ camera shall offer the ability to define 24 masks with up to 8 masks per scene that prohibit areas of the field of view from being seen even if the camera is panned, tilted, or zoomed.
9. The HD PTZ camera shall store up to 256 preset scenes with each preset programmable for 20 character titles.
10. The HD PTZ camera shall support the following tour modes:
    a. One (1) preset tour capable of 256 sequential pre-positions and a configurable dwell time between positions.
    b. Two (2) separate tours of an operator's keyboard movements consisting of pan, tilt and zoom activities. The recorded tours can be continuously played back.
    c. One (1) 360° AutoPan mode.
    d. One (1) AutoPan mode between limits.
11. The HD PTZ camera shall execute one of the following programmable options when an operator stops manual control of the camera, and a programmed period of time is allowed to expire: return to a stored preset number, return to the automated tour previously executed, and do nothing.

F. Pre-programmed Modes
   1. The HD PTZ camera shall offer five (5) pre-programmed but configurable user modes.
   2. The pre-programmed modes shall be optimized with the best settings for the following environments:
      a. Outdoor
      b. Indoor
      c. Low Light
      d. Motion
      e. Vibrant
   3. The HD PTZ camera shall allow users to customize these modes for the specific requirements of the camera site.

G. Recording and Storage Management
   1. The HD PTZ camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array.
   2. The HD PTZ camera shall support iSCSI storage targets.
   3. The HD PTZ camera shall have an SD card slot that uses a standard, off-the-shelf SD (Secure Digital), SDHC (Standard Digital High Capacity) or a SDXC (Secure Digital eXtended Capacity) card for local storage (up to 2 TB).
   4. The HD PTZ camera shall be compatible with the Bosch Video Recording Manager (VRM) to control and manage video recording.

H. HD Characteristics
   1. The HD PTZ camera shall generate full HD 720p50/60 resolution using H.264 compression (ISO/IEC 14496-10).
   2. The HD PTZ camera shall generate multiple simultaneous configurable HD video streams.
   3. The HD PTZ camera shall allow simultaneous streaming of individual HD streams, and allow a choice of HD resolution in combination with SD resolutions.

I. IP Connectivity
   1. The HD PTZ camera shall allow full camera control and configuration capabilities via a TCP/IP network.
   2. The HD PTZ camera shall support the following dual, redundant power options:
      a. [Outdoor Pendant Models using the Heater:
         1) 24 VAC
         2) High PoE (using the Bosch NPD-6001A Midspan)]
      b. [Indoor Pendant Models (not using the heater) and In-ceiling Models:
         1) 24 VAC
         2) PoE+ (IEEE 802.3at, class 4) or High PoE (using the Bosch NPD-6001A Midspan)]
      c. The HD PTZ camera shall default to use power from the 24 VAC power supply, if connected.
      d. The HD PTZ camera shall switch to the High PoE or PoE+ power supply if power from the 24 VAC power supply is lost with no interruption to camera operation.
   3. The HD PTZ camera shall be capable of capturing and storing images using H.264 compression at HD 720p resolution.
   4. The HD PTZ camera shall deliver 720p video, at rates up to 60 images per second via TCP/IP over Cat5/Cat6 UTP cable.
   5. The HD PTZ camera shall support iSCSI devices to allow the network-enabled camera to stream video directly to an iSCSI RAID array.
   6. The HD PTZ camera shall conform to the ONVIF standard.

7. The HD PTZ camera shall offer Quality of Service (QoS) configuration options.
8. The HD PTZ camera shall support the IPv6 internet-layer protocol for packet switched internetworking across multiple IP networks.
9. The HD PTZ camera shall offer embedded Intelligent Video Analysis (IVA) that eliminates dedicated PCs and associated software maintenance.

J. Intelligent Video Analysis
1. The HD PTZ camera shall be capable of processing and analyzing video within the camera itself, with no extra hardware required.
2. The HD PTZ camera shall be capable of detecting and sending alarms for abnormal events.
3. The HD PTZ camera shall be configurable to analyze up to 10 different scenes for one or more of the following events: Line Crossing, Loitering, Idle Object, Removed Object, Conditional Change, Trajectory Tracking, and Filters.
4. The HD PTZ camera shall allow users to set up to 10 separate profiles and switch profiles based on a day/night or holiday schedules.
5. The HD PTZ camera shall support scene tours that automatically reposition the camera to each scene for a specified duration.
6. The HD PTZ camera shall support Bird's Eye View (BEV) people counting.
7. The HD PTZ camera shall incorporate an Alarm Rule Engine, enabling abnormal events that IVA detects to prompt the camera to take one or more actions such as:
   a. Trigger a relay connected to an alarm siren and/or strobe
   b. Trigger a visual alert to be displayed on the operator's screen
   c. Go to a specified scene (preset position)

K. Motion Tracking
1. The HD PTZ camera shall offer Intelligent Tracking to continuously track an object using pan, tilt, and zoom actions.
2. The HD PTZ camera shall provide automatic motion tracking using intelligent video analytics.
3. The HD PTZ camera shall have the ability to follow an object continually when passing behind a privacy mask.
4. The HD PTZ camera shall allow a user to define virtual masks for a scene so certain objects are not considered for flow analysis and will not trigger Intelligent Tracking.
5. The HD PTZ camera shall offer the following control options for the Intelligent Tracking feature:
   a. Off – the HD PTZ camera does not track moving object.
   b. Auto – the HD PTZ camera actively analyzes the video to detect moving objects.
   c. One Click – the HD PTZ camera allows a user to click a moving object in the live video image to activate Intelligent Tracking.
   d. IVA-triggered – the HD PTZ camera continuously analyzes the scene for IVA alarms or an IVA rule violation. If an alarm or rule violation is detected, the camera activates Intelligent Tracking to track the object that triggered the alarm or rule violation.
6. The HD PTZ camera shall have the ability to restart tracking if a target starts moving in the same area where the initial target stopped moving or if the camera detects an object moving along the last known trajectory.
7. The HD PTZ camera shall allow an operator to select an object to track in the live image view.
8. The HD PTZ camera shall automatically start tracking a target that violates an IVA rule or triggers an IVA alarm.

L. Access Security
   1. The HD PTZ camera shall offer three levels of password protection.
   2. The HD PTZ camera shall support 802.1x authentication using a RADIUS (Remote Authentication Dial In User Service) server.
   3. The HD PTZ camera shall store a SSL certificate for use with HTTPS.
   4. [The HD PTZ camera shall be capable of being independently AES encrypted with 128-bit keys.]

M. Installation Requirements
   1. The HD PTZ camera shall be capable of operating in an outdoor environment within the following temperature range:
      a. [Outdoor Pendant: –40°C to +55°C (–40°F to 131°F).]
      b. [Indoor Pendant: –10°C to +55°C (14°F to 131°F).]
      c. [In-ceiling: –10°C to +40°C (14°F to 104°F).]
   2. The HD PTZ camera shall accept power, transmit video, and accept control via TCP/IP connection.
   3. The HD PTZ camera shall support the following dual, redundant power options:
      a. [Outdoor Pendant Models using the Heater:
         1) 24 VAC
         2) High PoE (using the Bosch NPD-6001A Midspan)]
      b. [Indoor Pendant Models (not using the heater) and In-ceiling Models:
         1) 24 VAC
         2) PoE+ (IEEE 802.3at, class 4) or High PoE (using the Bosch NPD-6001A Midspan)]
      c. The HD PTZ camera shall default to use power from the 24 VAC power supply, if connected.
      d. The HD PTZ camera shall switch to the High PoE or PoE+ power supply if power from the 24 VAC power supply is lost with no interruption to camera operation.
   4. The HD PTZ camera shall provide a multi-language on-screen display.

N. Housing Options
   1. The HD PTZ camera shall be offered in
      a. [An indoor/outdoor Pendant housing.]
      b. [An in-ceiling housing.]
   2. The HD PTZ camera housings shall come standard with recessed setscrews and a recessed bubble latch for increased tamper resistance.
   3. The HD PTZ camera shall provide built-in surge protection for power, data, and video and alarm inputs.
   4. The HD PTZ camera dome bubble shall:
      a. Be a high-resolution acrylic bubble.
      b. Offer a clear or tinted version.
   5. [The indoor/outdoor pendant housing shall:
      a. Use a hinge, in-place of a tether, to make installation easier and safer.
      b. Come with an attached sunshield that can be removed by the installer for indoor camera applications.
      c. Allow the camera to view 18° above the horizon.
      d. Conform to the IP66 standard for a weather-resistant package.
      e. Conform to the NEMA 4X standard for the following:
         1) Access to Hazardous parts
         2) Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)
         3) Ingress of water (dripping and light splashing, hosedown and splashing)

4) Corrosive agents

f. Meet the requirements for NEMA 4X certification, except impact test, with use of an acrylic bubble.

g. Be made of cast aluminum for corrosion resistance, and supplied with a built-in heater/blower to provide an operating temperature range of –40°C to 55°C (–40°F to 131°F).

h. Be powder coated with a sand finish in white (RAL 9003).]

6. [The in-ceiling housing shall:
   a. Allow the camera to view 1° above the horizon.
   b. Conform to IP54 and Plenum-rating standards.
   c. Provide an operating temperature of –10°C to 40°C (14°F to 104°F).
   d. Use a low-impact, high-resolution acrylic tinted bubble.]

O. Camera:
1. Imager: 1/3-inch type Exmor CMOS sensor
2. Effective Picture Elements (Pixels): 1305 x 1049 (1.37 MP)
3. Lens:
   a. 30x optical zoom, 4.3 to 129 mm
   b. 12x digital zoom
   c. Field of View: 2.1° to 59°
4. Focus: Automatic with manual override
5. Iris: Automatic with manual override
6. Gain Control: Auto/Manual/Max
7. Aperture Correction: Horizontal and vertical
8. Electronic Shutter Speed (AES): 1/1 sec to 1/0000 sec (22 steps)
9. Wide Dynamic Range (WDR) / High Dynamic Range (HDR): 90 dB (720p/30 = 120 dB)
10. Signal-to-Noise Ration (SNR): >50 dB
11. Backlight Compensation: On/Off
12. White Balance: 2000 K to 10,000 K; ATW, Indoor, Outdoor, AWB Hold, Extended ATW, Manual, Outdoor Auto, Sodium Lamp Auto, Sodium Lamp
13. Day/Night: Monochrome, Color, Auto
14. Anti-fog Image Feature: Allows the camera to "see" and register a usable image through the heaviest fog

P. Mechanical
1. Pan Range: 0 to 360° continuous
2. Tilt Angle:
   a. [In-ceiling: 1° above horizon]
   b. [Pendant: 18° above horizon]
3. Pre-position Speed:
   a. Pan: 400°/s
   b. Tilt: 300°/s
4. Pan/Tilt Modes:
   a. Turbo Mode:
      1) Pan: 0.1°/s to 400°/s
      2) Tilt: 0.1°/s to 300°/s
   b. Normal Mode:
      1) Pan: 0.1°/s to 120°/s
      2) Tilt: 0.1°/s to 120°/s
5. Preset Accuracy: ± 0.1° typical

Q. Electrical
   1. Input Voltage:
      a. [In-ceiling:
         1) 21-30 VAC, 50/60 Hz (class 2)
         2) High PoE
         3) PoE+ (IEEE 802.3at, class 4)]
      b. [Pendant:
         1) 21-30 VAC, 50/60 Hz (class 2)
         2) High PoE]
   2. Power Consumption (typical):
      a. [In-ceiling: 24 W / 44 VA]
      b. [Pendant:
         1) with heater connected: 60 W / 69 VA
         2) without heater: 24 W / 44 VA]

R. Software Control
   1. Camera Setup/Control: Via Internet Explorer Web browser version 7.0 or later, Bosch Configuration Manager or Bosch Video Management System (BVMS, versions 4.5.5 or later), Bosch Video Client (BVC)
   2. Software Update: Network firmware upload

S. Network
   1. Communications Protocols: Standard Bosch IP protocol, including ONVIF and SNMP v1
   2. Video Compression: H.264 (ISO/IEC 14496-10), M-JPEG, JPEG
   3. Streaming: Two (2) individually configurable streams:
      a. Stream 1
         1) [H.264 MP 720p50/60 fixed]
         2) [H.264 MP SD]
      b. Stream 2:
         1) [Options with H.264 MP 720p25/30 fixed selected for Stream 1:
            a) H.264 MP SD
            b) H.264 MP 720p6/7 fixed
            c) H.264 MP upright (cropped)
            d) H.264 MP D1 4:3 (cropped)]
         2) [Option with H.264 MP SD selected for Stream 1:
            a) H.264 MP SD]
   4. Resolution (H x V):
      a. 720p HD: 1280 x 720
      b. 432p SD: 768 x 432
      c. 288p SD: 512 x 288
      d. 144p SD: 256 x 144
   5. Protocols: IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, Telnet, ARP, DHCP, SNTP, SNMP (v1, MIB-II), 802.1x, DNS, DNSv6, DDNS (DynDNS.org, selftHOST.de, no-ip.com), SMTP, iSCSI, UPnP (SSDP), DiffServ (QoS), LLDP, SOAP, Dropbox, CHAP, digest authentication
   6. Ethernet: 10-Base T/100 Base-TX, auto-sensing, half/full duplex, RJ45
   7. Encryption: TLS 1.0, SSL, DES, 3DES, AES
   8. GOP Structure: IP, IBP, IBBP
   9. Data Rate: 9.6 kbps to 6 Mbps (per stream)
   10. Overall IP Delay: 240 ms

11. Audio
    a. Standard:
        1) G.711, 8 kHz sampling rate
        2) L16, 16 kHz sampling rate
        3) AAC, 16 kHz sampling rate
    b. Signal-to-Noise Ratio: >50 dB
    c. Audio Streaming: Bidirectional (full-duplex)

T. Local Storage
    1. Memory Card Slot: SD/SDHC/SDXC memory card (maximum 2TB – SDXC)
    2. Recording: Continuous recording of video and audio, alarm/events/schedule recording

U. Miscellaneous
    1. Sectors/Titling: 16 independent sectors with 20-character titles/sector
    2. Masking: 24, individually configurable
    3. Pre-positions: 256, each with 20-character titles
    4. Guard Tours: Two (2) types of tours:
        a. Recorded tours – two (2), total duration of 30 minutes
        b. Preset tour – one (1), consisting of up to 256 scenes, consecutively
    5. Supported Languages: Chinese, Dutch, English, German, French, Italian, Japanese, Portuguese, Polish, Russian, and Spanish

V. User Connections:
    1. Power
        a. Camera:
            1) RJ-45 100 Base-TX Ethernet (High Power over Ethernet) or PoE+ (IEEE 802.3at, class 4 standard)
            2) 21-30 VAC, 50/60 Hz
        b. Heater:
            1) RJ-45 100 Base-TX Ethernet (High Power over Ethernet)
            2) 21-30 VAC, 50/60 Hz
    2. Video and Control: RJ-45 10/100 Base-TX Ethernet
    3. Alarm Inputs (7): 2 supervised; 5 non-supervised; programmable for "normally open" or "normally closed"
    4. Alarm Outputs (4): 1 dry contact relay; 3 open collector/transistor outputs 32 VDC @ 150 mA, maximum
    5. Audio:
        a. Signal Line In: 12 kOhm typical, 1 Vrms max
        b. Signal Line Out: 1 Vrms at 1.5 kOhm, typical

W. Environmental
   1. Ingress Protection Rating/Standard (with acrylic bubble):
      a. [In-ceiling: IP54, Plenum rated]
      b. [Pendant: IP66]
      c. [Pendant: NEMA 4X for:
         1) Access to Hazardous parts
         2) Ingress of solid foreign objects (falling dirt, circulating dust, settling dust)
         3) Ingress of water (dripping and light splashing, hosedown and splashing)
         4) Corrosive agents
      d. [Pendant: Meet the requirements for NEMA 4X certification, except impact test, with use of an acrylic bubble.]
   2. Operating Temperature:
      a. [In-ceiling: –10°C to +40°C (14°F to 104°F)]
      b. [Outdoor Pendant: –40°C to +55°C (–40°F to 131°F)]
      c. [Indoor Pendant: –10°C to +55°C (14°F to 131°F), without heater connected in power supply box for indoor applications]
   3. Storage Temperature:
      a. [In-ceiling: –40°C to +60°C (–40°F to 140°F)]
      b. [Pendant: –40°C to +60°C (–40°F to 140°F)]
   4. Humidity:
      a. [In-ceiling: 0% to 90% relative, non-condensing]
      b. [Indoor Pendant/Outdoor Pendant with Heater: 0% to 100% relative, non-condensing]

X. Construction
   1. Product Weight:
      a. [In-ceiling: 2.58 kg (5.69 lb)]
      b. [Indoor/Outdoor Pendant: 3.06 kg (6.75 lb)]
   2. Bubble Size: 153.1 mm (6.03 in.)
   3. Construction Material:
      a. Housing:
         1) [In-ceiling: Magnesium]
         2) [Pendant: Cast aluminum]
      b. Bubble:
         1) [In-ceiling: High-resolution acrylic, tinted]
         2) [Pendant: High-resolution acrylic, clear]
   4. Standard Color: White (RAL9003)
   5. Standard Finish: Powder coated, sand finish

2.5 ACCESSORIES

A. Mounts
   1. VDA-WMT-DOME Wall mount bracket for FLEXIDOME cameras
   2. VDA-CMT-DOME Corner mount bracket for FLEXIDOME cameras (for stairwells and elevators).
   3. VGA-IC-SP In-ceiling Support Kit
   4. VDA-455SMB-IP Surface Mount Box for FLEXIDOME VR (not recessed)
B. Single Entry Station EoC Transmission System
   1. Manufacturer: NVT: Model NV-EC1701-KIT1 (consists of);
      a. Transceivers (NV-EC1701) – Count: 2
      b. Power Supply with IEC line card(NV-PS48-60W) – Count: 1
      c. Shelf (rack mount chassis) NV-RMEC16: - Count: 1

d. Patch Cords included.

C. Software Options
   1. MVC-FENC-AES BVIP AES 128 bit Encryption License

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas to receive devices and notify adverse conditions affecting installation or subsequent operation.

B. Do not begin installation until unacceptable conditions are corrected.

3.2 PREPARATION

A. Protect devices from damage during construction.

3.3 INSTALLATION

A. Install devices in accordance with manufacturer's instruction at locations indicated on the floor drawings plans.

B. Ensure selected location is secure and offers protection from accidental damage.

C. Location must provide reasonable temperature and humidity conditions, free from sources of electrical and electromagnetic interference.

3.4 FIELD QUALITY CONTROL

A. Test snugness of mounting screws of all installed equipment.

B. Test proper operation of all video system devices.

C. Determine and report all problems to the manufacturer's customer service department.

3.5 ADJUSTING

A. Make proper adjustment to video system devices for correct operation in accordance with manufacturer's instructions.

B. Make any adjustment of camera settings to comply with specific customer's need.

3.6 DEMONSTRATION

A. Demonstrate at final inspection that video management system and devices function properly.

END OF SECTION