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**2M 32x NETWORK POSITIONING CAMERA**

**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

**Notes to Specifier:**

1. Where several alternative parameters or specifications exist, or where, the specifier has the option of inserting text, such choices are presented in **<bold text>.**

2. Explanatory notes and comments are presented in **colored** text.

**Important: See further notes on the following page.**

**Important Note to Security Systems Specifiers**

CSI MasterFormat 2016 incorporates numerous significant changes affecting electronic safety and security. This document is written to provide flexibility in using either format, although adoption of MasterFormat 2016 is encouraged. The following is a guide to the MasterFormat numbers relevant to the product referenced in this specification.

**Primary Specification Area:**

**MasterFormat 2014**:

28 20 00 Electronic Surveillance

28 23 00 Video Surveillance

28 23 29 Video Surveillance Remote Devices and Sensors

**MasterFormat 2016**:

28 20 00 Video Surveillance

28 2x xx Surveillance Cameras

28 2x xx IP Cameras

**Related Requirements:**

**MasterFormat 2014**:

27 20 00 Data Communications

28 23 13 Video Surveillance Control and Management Systems

28 23 16 Video Surveillance Monitoring and Supervisory Interfaces

28 23 19 Digital Video Recorders and Analog Recording Devices

28 23 23 Video Surveillance Systems Infrastructure

**MasterFormat 2016**

27 15 01.xx Video Surveillance Communications Conductors and Cables

27 20 00 Data Communications

28 05 xx.xx PoE Power Sources for Electronic Safety and Security

28 05 xx Storage Appliances for Electronic Safety and Security

28 05 xx.xx Network Video Recorders

28 05 xx Cyber Requirements for Electronic Safety and Security

28 05 xx Safety and Security Network Communications Equipment

28 2x 00 Video Management System

**2M 32x NETWORK POSITIONING CAMERA**

1. **GENERAL**
   1. **SUMMARY**
      1. Section includes a 2 megapixel IP camera with positioning system.
      2. Product - A 2MP IP camera, with multi-streaming (H.265, H.264 and MJPEG) capability in IP66 housing.

## Related Requirements

**Refer to MasterFormat notes at the beginning of this document to select requirements specific to the MasterFormat version being used in the specification.**

* 1. **REFERENCES**
     1. Abbreviations
        1. AGC Auto Gain Control
        2. AES Advanced Encryption Standard
        3. API Application Programming Interface
        4. ARP Address Resolution Protocol
        5. AWB Auto White Balance
        6. BLC Back light compensation
        7. CBR Constant Bit Rate
        8. CVBS Composite Video Blanking and Sync
        9. DHCP Dynamic Host Configuration Protocol
        10. DNR Digital Noise Reduction
        11. DNS Domain Name Server
        12. DDNS Dynamic Domain Name Server
        13. DSCP Differentiated Services Code Point
        14. fps frames per second
        15. FTP File Transfer Protocol
        16. GOV Group of Video
        17. GUI Graphical User Interface
        18. HD High Definition
        19. HTTP Hypertext Transfer Protocol
        20. HTTPS Secure HTTP
        21. ICMP Internet Control Message Protocol
        22. IGMP Internet Group Management Protocol
        23. IP Internet Protocol
        24. IR Infrared
        25. JPEG Joint Photographic Experts Group
        26. LAN Local Area Network
        27. LED Light Emitting Diode
        28. LDC Lens Distortion Correction
        29. LLDP Link Layer Discovery Protocol
        30. LPR License Plate Recognition
        31. MJPEG Motion JPEG
        32. MP Megapixel
        33. MPEG Moving Pictures Experts Group
        34. NAS Network Attached Storage
        35. NTP Network Time Protocol
        36. NVR Network Video Recorder
        37. PIM-SM Protocol Independent Multicast-Sparse Mode
        38. PoE Power over Ethernet
        39. PPPoE Point to Point Protocol over Ethernet
        40. QoS Quality of Service
        41. RTP Real-Time Transport Protocol
        42. RTCP Real-Time Control Protocol
        43. RTSP Real-Time Streaming Protocol
        44. SDK Software Development Kit
        45. SFP Small Form factor Pluggable
        46. SMTP Simple Mail Transfer Protocol
        47. SNMP Simple Network Management Protocol
        48. SSDR Super Smart Dynamic Range
        49. SSNR Super Smart Noise Reduction
        50. SSL Secure Sockets Layer
        51. TCP Transmission Control Protocol
        52. UDP User Datagram Protocol
        53. UPnP Universal Plug and Play
        54. VBR Variable Bit Rate
        55. VMS Video Management System
        56. WDR Wide Dynamic Range
     2. Reference Standards
        1. Network - IEEE
           1. 802.3 Ethernet Standards
           2. 802.1x Port-based Network Access Control
        2. Video
           1. ISO / IEC 23008-2:2013, MPEG-H Part2 (ITU H.265, HEVC)
           2. ISO / IEC 14496–10, MPEG-4 Part 10 ( ITU H.264)
           3. ISO / IEC 10918 – JPEG
           4. ONVIF – Profiles S/G/T
        3. Emissions
           1. FCC-47 CFR Part 15 Subpart B Class B
           2. CE EN 55022:2010
        4. Immunity - CE
           1. EN 50130-4:2011
           2. EN 61000-3-3:2014
           3. EN 61000-4-2:2009
           4. EN 61000-4-3:2006+A2:2010
           5. EN 61000-4-4:2012
           6. EN 61000-4-5:2014
           7. EN 61000-4-6:2009
        5. Safety
           1. UL listed
           2. CE EN 50581:2012 (hazardous substances)
     3. Definitions
        1. GOV (Group of Video object planes) - A set of video frames for H.265, H.264 compression, indicating a collection of frames from the initial I-Frame (key frame) to the next I-Frame. GOV consists of two kinds of frames in video surveillance setup: I-Frame and P-Frame.
        2. Dynamic GOV – Dynamic assignment of GOV length based on the complexity of the scene to efficiently manage bitrate of the video stream and reduce the storage required.
        3. Multi-exposure wide dynamic range - Operation which automatically adjusts shutter speed to provide a wide range between dark and light areas visible at the same time, preventing backlighting issues. Long exposure is used for bright areas and a short exposure is used in dark areas.
        4. Dynamic fps – Dynamic assignment of fps (frames per seconds) based on the movement of object(s) in the scene to efficiently manage bitrate of the video stream and reduce the storage required.
        5. Smart Codec – Smart Codec that controls quantization parameter and dynamic fps in H.265 and H.264 to efficiently manage bitrate of the video stream and reduce the storage required.
        6. WiseStream Ⅱ – Technology that controls quantization parameter, fps, and GOV length in H.265 and H.264 to efficiently manage bitrate of the video stream and reduce the storage required.
        7. DORI (Detect, Object, Recognize, Identify) – A standard system (EN-62676-4) for defining the ability of a camera to distinguish persons or objects within a covered area.
           1. Detect : 25PPM / 8PPF
           2. Observe : 63PPM / 19PPF
           3. Recognize : 125PPM / 38PPF
           4. Identify : 250PPM / 76PPF
  2. **SUBMITTALS**
     1. Product Data
        1. Manufacturer’s printed or electronic data sheets
        2. Manufacturer’s installation and operation manuals
        3. Warranty documentation
  3. **QUALIFICATIONS**
     1. Manufacturer shall have a minimum of five years’ experience in producing IP video equipment.
     2. Installers shall be trained and authorized by the Manufacturer to install, integrate, test, and commission the system.
  4. **DELIVERY, STORAGE AND HANDLING**
     1. Deliver the camera in the manufacturer’s original, unopened, undamaged container with identification labels intact.
     2. Store the camera in a temperature environment indicated in 2.04 Detailed Specification, protected from mechanical and environmental conditions as designated by the manufacturer.
  5. **WARRANTY, LICENSING AND SUPPORT**
     1. Manufacturer shall provide a limited 3 year warranty for the product to be free of defects in material and workmanship.
     2. Manufacturer shall provide embedded camera video analytics free of license charges.

END OF SECTION

1. **PRODUCTS**
   1. **EQUIPMENT**
      1. Manufacturer: Hanwha Techwin

http://www.hanwha-security.com/

* + 1. Model TNU-6321
    2. Alternates: TNU-6320
  1. **GENERAL DESCRIPTION**
     1. The positioning camera shall have a metal housing. The camera shall also have PTZ capability.
     2. Video Compression and Transmission – The camera shall have the following properties relating to the video signals it produces.
        1. H.265, H.264 and MJPEG compression, each derived from a dedicated encoder and capable of being streamed independently and simultaneously
           1. H.265 and H.264 – frame rates to maximum 60 fps at all resolution
           2. MJPEG – frame rates to maximum 30 fps

**Maximum frame rates are available at selected resolutions:**

**H.265 and H.264: 60 fps is available at all resolutions.**

**MJPEG: 30 fps is available**

* + - 1. The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
      2. Resolution selections
         1. 16:9 aspect ratio : 1920 x 1080, 800 x 448, 640 x 360
         2. 4:3 aspect ratio : 1280 x 960, 1024 x 768, 800 x 600, 640 x 480,

320 x 240,

* + - * 1. 5:4 aspect ratio : 1280 x 1024, 720 x 576,
        2. 3:2 aspect ratio : 720 x 480
      1. The camera shall be able to stream at least 10 independent video stream type using unicast protocol
      2. The camera shall support multicast and unicast video streaming
      3. The camera shall be able to configure Dynamic DNS (DDNS).
      4. Smart Codec, Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
    1. Camera – The camera device shall have the following physical and performance properties:
       1. True day/night operation with removable IR cut filter
          1. Low light level operation to 0.05 lux at F1.6 in color mode and 0.005 lux at F1.6 in black and white mode
       2. The camera shall support digital noise reduction using both 2D and 3D noise reduction technology
       3. Configurable a privacy masking regions utilizing a 4 point polygon
    2. Intelligence and Analytics – The camera shall have a suite of integral intelligent operations and analytic functions to include:
       1. Motion detection with four definable detection areas, minimum / maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
       2. Detection of logical events of specified conditions from the camera’s video input
          1. camera tamper (scene change)
          2. defocus detection
          3. fog detection
          4. motion detection with metadata
          5. face detection
          6. virtual area based event (intrusion, enter/exit, appear/disappear, loitering)
          7. virtual line based event (directional detection, crossing)
          8. audio detection
    3. Interoperability – The camera shall be ONVIF Profile S,G and T compliant.
    4. The camera shall possess the following further characteristics:
       1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome & Safari
       2. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
       3. NAS recording option with configurable pre-alarm and post-alarm recording intervals
       4. bi-directional audio
       5. Alarms and notifications
          1. alarm notification triggers:

motion detection

tampering detection

alarm input

defocus detection

fog detection

face detection

audio detection

video & audio analytics

network disconnection

* + - * 1. available notification means upon trigger:

file upload via FTP and e-mail

notification via e-mail

Local storage(SD/SDHC/SDXC)

NAS recording at event triggers

external output

* 1. **CAMERA SOFTWARE**
     1. The camera shall have a built in web server which supports browser-based configuration using Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari, for which web viewer plug-ins are available, from a PC or Mac.
     2. The web viewer shall provide a monitoring screen which displays live camera video and simultaneously provides same-screen access to the following functions:
        1. Live view window size
        2. Resolution setting
        3. Image (snapshot) capture
        4. Manual recording to SD or NAS
        5. Audio/microphone control
        6. Access recorded data playback and camera configuration menus
     3. The web viewer shall provide a playback screen which provides access to the following functions:
        1. Recorded data search using date and time range
        2. Recorded data search using event type
        3. Play a recorded video by event triggering
        4. Set resolution
        5. Play audio if present
        6. Generate a backup copy of saved video data
     4. The web viewer shall provide a setup screen which provides access to the following configuration settings and functions in the camera:
        1. Digital video profile to include compression type, maximum or target bit rate, frame rate, multicast parameters, crop encoding area
        2. User profile to include password, access level, authentication
        3. Date and time
        4. Network settings and IP version
           1. DDNS
           2. SSL, including certificate management
           3. 802.1x authentication
           4. Quality of Service settings
           5. SNMP to include version selection and settings
           6. Auto configuration
        5. Video setup to include flip and mirror mode, hallway view mode, video type, privacy zone
        6. Audio setup to include source, audio codec type, gain, and bit rate
        7. Camera settings to include image preset, sensor frame capture, dynamic range, white balance, back light, exposure, day/night operation, on-screen display, IR illumination, sharpness, contrast, color level, lens distortion correction.
        8. Event detection setup to include notification parameters, recording rules, time schedule, tamper protection, motion detection, event triggers
        9. System function to include reboot, upgrade, check system and event logs, application (SDK) management
        10. View profile information
     5. Client requirements
        1. Acceptable Operating Systems: Windows 7 / 8.1 / 10, MAC OS X 10.10, 10.11, 10.12
        2. Acceptable browsers: Microsoft Internet Explorer and Edge, Mozilla Firefox, Google Chrome,

Apple Safari

* 1. **DETAILED SPECIFICATIONS**
     1. Video
        1. Imager
           1. Sensor: 1/2.8" CMOS
           2. Minimum illumination

Color mode: 0.05 Lux (F1.3, 1/30sec)

Black & white mode:0.005 Lux (F1.6, 1/30sec)

* + - * 1. Video out(installation) CVBS: 1.0 Vp-p / 75Ω composite, 720 x 480(N), 702 x 576(P)
        2. The following features with control settings shall be available:

Camera Title Off / On (Displayed up to 85 characters per line)

W/W: English / Numeric / Special characters

China: English / Numeric / Special / Chinese characters

Common: Multi-line (Max. 5), Color (Grey/Green/Red/Blue/Black/White),

Transparency, Auto scale by resolution

Day/night setting: True Day & Night

Backlight compensation (BLC): Off / BLC / HLC / WDR / SSDR

WDR 120dB

Digital Noise Reduction (DNR): Off/On (Samsung Super Noise Reduction Ⅴ)

Motion Detection Off / On (8ea, 8point polygonal zones)

Privacy Masking Off / On (32ea, 4point polygonal zones)

Gain Control Off / Low / Middle / High

White Balance ATW / AWC / Manual / Indoor / Outdoor

Electronic shutter speed:

settings: min, max, anti-flicker (1 ~ 1/12,000sec)

Alarm I/O Input 1 / Output 1

Alarm Triggers Analytics,

Network disconnection,

Alarm input

Alarm Events File upload via FTP and E-mail,

Notification via E-mail,

SD/SDHC/SDXC or NAS recording at event triggers

Alarm output, Handover

* + - * 1. Lens: 4.44 ~ 142.6 mm (optical 32x)

Max. Aperture Ratio F1.6 (Wide) / F4.4 (Tele)

Angle of view: H: 61.8˚(Wide) ~ 2.19˚(Tele) / V: 36.2˚(Wide) ~ 1.24˚(Tele)

Min. Object Distance: Wide: 1.5 m (4.92ft), Tele: 1.5m (4.92ft)

Focus Control Auto Focus, One-shot Auto Focus

Lens Type DC Auto Iris

* + - * 1. Pan, Tile

Pan 360˚ Endless

Tilt 130˚ (-90˚ ~ 40˚)

Pan/tilt speed 0.036˚ ~ 120˚/sec (Pan), 0.012˚ ~ 40˚/sec (Tilt)

Sequence Preset (255ea), Swing, Group (6ea), Tour (1ea),

Auto run, Schedule

Preset accuracy ±0.3˚

Azimuth Yes (E / W / S / N / NE / NW / SE / SW OSD)

IR illuminator(Optional) support (Auto/Manaual)

Wiper support (with Wiper)

* + - * 1. DORI Distance

Detect Wide: 64.2m(210.62ft) / Tele: 2009.0m(6591.3ft)

Observe Wide: 25.7m(84.32ft) / Tele: 803.6m(2636.53ft)

Recognize Wide: 12.8m(42.10ft) / Tele: 401.8m(1318.26ft)

Identify Wide: 6.4m(21.0ft) / Tele: 200.9m(659.13ft)

* + - 1. Video Streams
         1. The camera shall be able to produce 10 video profiles, each of which may have the following properties:

Encoding type:

H.265

H.264

MJPEG

Resolution:

1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768,

800 x 600, 800 x 448, 720 x 576, 640 x 480, 640 x 360, 320 x 240

Maximum frame rate:

H.265 and H.264: 60 fps at all resolutions

MJPEG: Max. 15fps at 1920 x 1080, 1280 x 1024, 1280 x 960,

1280 x 720, 1024 x 768

Max. 30fps at 800 x 600, 800 x 448, 720 x 576,

640 x 480, 640 x 360, 320 x 240

Smart Codec WiseStreamⅡ, Dynamic GOV, Dynamic fps

Bit rate control method:

H.265 and H.264

target bitrate level control

constant bit rate (CBR) or variable bit rate (VBR)

MJPEG

quality level control

variable bit rate (VBR)

* + - 1. Number of multi-streaming profiles: 10 maximum
      2. Simultaneous users (total): 20 maximum (unicast)
      3. Storage and Recording
         1. The camera shall have onboard SD card storage

Card type: Micro SD/SDHC/SDXC

Capacity: Up to 256 GB

Image content on the card shall have the ability to be downloaded to a selected destination.

* + - * 1. NAS
      1. Interoperability - Video streams shall be capable of supporting ONVIF protocol, profiles S,G and T.
      2. Single Images - The camera shall support png file image screenshot and export.
    1. Audio
       1. Audio communication Bi-directional
       2. Audio compression format G.711 u-law/G.726 selectable

G.726(ADPCM) 8KHz, G.711 8KHz

G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps

AAC-LC : 48Kbps at 16KHz

* + - 1. Audio In Selectable(Mic in/Line in),

Supply voltage: 2.5VDC(4mA), Input impedance: approx.. 2K Ohm

* + - 1. Audio Out Line out(Mono), Max output level:1 Vrms
    1. Network
       1. Connectivity: 10/100 Base-T Ethernet via RJ-45 connector
       2. Protocols supported:
          1. Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP)
          2. Configuration: Dynamic Host Configuration Protocol (DHCP)
          3. Web services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS)
          4. Network services: Address Resolution Protocol (ARP), Bonjour, Domain Name System (DNS), Internet Control Message Protocol (ICMP), Network Time Protocol (NTP), Protocol Independent Multicast-Sparse Mode (PIM-SM), Simple Network Management Protocol (SNMP v1/2c/3 – MIB-2), Universal Plug and Play (UPnP), Link Layer Discovery Protocol(LLDP)
          5. Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP), Real Time Control Transport (RTCP), Secure Real-time Transport Protocol(SRTP)
          6. Multicast: Internet Group Management Protocol (IGMP)
          7. Notifications: File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP)
          8. Remote Access: Point-to-Point Protocol over Ethernet) (PPPoE)
       3. DDNS – The camera shall support DDNS services offered by the Manufacturer and other publicly available service offerings.
       4. Quality of Service (QoS) – Layer 3 DSCP
       5. Security features:
          1. user password protection
          2. IP address filtering - list of allowed or blocked IP addresses
          3. HTTPS(SSL) login authentication
          4. Digest login authentication
          5. User access log
          6. 802.1x authentication(EAP-TLS, EAP-LEAP)
       6. Discovery - Manufacturer shall offer a discovery program to identify all devices of his manufacture on the network.
    2. Electrical
       1. Power
          1. Input Voltage / Current 24V AC / 6A (Max.)
          2. Power Consumption: Max. 100W (Heater on), Max. 25W (Heater off)
    3. Mechanical And Environmental
       - 1. Material: Aluminum
         2. Color White
         3. RAL Code RAL9003
       1. Dimensions (W x H x D): 219 x 528.2 x 460 mm (8.62 x 20.79 x 18.11 inch)
       2. Weight 14kg (30.86 lb.)
       3. Temperature:
          1. Operating: -40° C to 55° C (-40° F to 131° F)
          2. Storage: -45° C to 60° C (-49° F to 140° F)
       4. Humidity: 0 - 90%, non-condensing
       5. Environmental Rating:
          1. Ingress Protection IP66
       6. Certification
          1. Safety UL, KC-SDOC
          2. EMC FCC, CE, VCCI, RCM, KC

END OF SECTION

1. **EXECUTION**
   1. **INSTALLERS**
      1. Contractor personnel shall comply with all applicable state and local licensing requirements.
   2. **PREPARATION**
      1. The network design and configuration shall be verified for compatibility and performance with the camera(s).
      2. Network configuration shall be tested and qualified by the Contractor prior to camera installation.
      3. All firmware found in products shall be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of the Video Management Application (VMA) or Network Video Recorder (NVR).
      4. All equipment requiring users to log on using a password shall be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.
   3. **INSTALLATION**
      1. The Contractor shall carefully follow instructions in documentation provided by the manufacturer to insure all steps have been taken to provide a reliable, easy-to-operate system.
      2. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.
      3. Before permanent installation of the system, the Contractor shall test the system in conditions simulating the final installed environment.
   4. **STORAGE**
      1. The hardware shall be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.

END OF SECTION