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2 MP NETWORK IR BULLET 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

2 MP NETWORK IR BULLET CAMERA

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes a 2 MP IP video camera.
- B. Product - A 2 MP IP video camera, with multi-streaming (H.265, H.264 and MJPEG) capability in IP67/IK10 housing.
- C. 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.

1.02 REFERENCES

- A. Abbreviations
 - 1. AGC - Automatic Gain Control
 - 2. ARP – Address Resolution Protocol
 - 3. AWB - Automatic White Balance
 - 4. BLC – Back light compression
 - 5. CBR – Constant Bit Rate
 - 6. CVBS – Color, Video, Blanking, Sync
 - 7. DHCP - Dynamic Host Configuration Protocol
 - 8. DNR – Digital Noise Reduction
 - 9. DNS - Domain Name Server
 - 10. DDNS – Dynamic Domain Name Server
 - 11. DSCP – Differentiated Services Code Point
 - 12. fps - frames per second
 - 13. FTP - File Transfer Protocol
 - 14. GOV – Group of Video
 - 15. GUI – Graphical User Interface
 - 16. HD – High Definition
 - 17. HTTP - Hypertext Transfer Protocol
 - 18. ICMP – Internet Control Message Protocol
 - 19. IGMP - Internet Group Management Protocol
 - 20. IP - Internet Protocol
 - 21. JPEG - Joint Photographic Experts Group
 - 22. MJPEG - Motion JPEG
 - 23. MP - Megapixel
 - 24. MPEG - Moving Pictures Experts Group
 - 25. NAS – Network Attached Storage
 - 26. NTP - Network Time Protocol

27. PIM-SM - Protocol Independent Multicast-Sparse Mode
28. PoE - Power over Ethernet
29. PPPoE – Point to Point Protocol over Ethernet
30. RTP - Real-Time Transport Protocol
31. RTCP – Real-Time Control Protocol
32. RTSP - Real-Time Streaming Protocol
33. SDK – Software Development Kit
34. SMTP - Simple Mail Transfer Protocol
35. SNMP – Simple Network Management Protocol
36. SSL – Secure Sockets Layer
37. TCP - Transmission Control Protocol
38. UDP - User Datagram Protocol
39. UPnP – Universal Plug and Play
40. VBR – Variable Bit Rate
41. VMS - Video Management System
42. WDR – Wide Dynamic Range
43. LDC – Lens Distortion Correction
44. DPTZ – Digital PTZ

B. Reference Standards

1. Network - IEEE
 - a. 802.3 Ethernet Standards
 - b. 802.1x Port-based Network Access Control
2. Video
 - a. ISO / IEC 23008-2:2013, MPEG-H Part2 (ITU H.265, HEVC)
 - b. ISO / IEC 14496–10, MPEG-4 Part 10 (ITU H.264)
 - c. ISO / IEC 10918 – JPEG
 - d. ONVIF – Profiles S and G
3. Emissions
 - a. FCC-47 CFR Part 15 Subpart B Class B
 - b. CE EN 55022:2010
4. Immunity - CE
 - a. EN 50130-4:2011
 - b. EN 61000-3-3:2014
 - c. EN 61000-4-2:2009
 - d. EN 61000-4-3:2006+A2:2010
 - e. EN 61000-4-4:2012
 - f. EN 61000-4-5:2014
 - g. EN 61000-4-6:2009
5. Safety
 - a. UL listed
 - b. CE EN 50581:2012 (hazardous substances)

C. Definitions

1. GOV (Group of Video object planes) - A set of video frames for H.264 and H.265 compression, indicating a collection of frames from the initial I-Frame (key frame) to the next I-Frame. GOV consists of 2 kinds of frames: I-Frame and P-Frame.
2. Smart Codec – Smart Codec that controls quantization parameter in H.265 and H.264 to efficiently manage bitrate of the video stream and reduce the storage required while achieving similar quality compared to the one without WiseStream.
3. 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 while achieving similar quality compared to the one without Dynamic GOV.
4. Dynamic FPS – Dynamic assignment of frame rate based on the complexity of the scene to efficiently manage bitrate of the video stream and reduce the storage required while achieving similar quality compared to the one without Dynamic FPS.
5. 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 dark areas and a short exposure is used in bright areas.

1.03 SUBMITTALS**A. Product Data**

1. Manufacturer's printed or electronic data sheets
2. Manufacturer's installation and operation manuals
3. Warranty documentation

1.04 QUALIFICATIONS

- A. Manufacturer shall have a minimum of five years' experience in producing IP video equipment.
- B. Installers shall be trained and authorized by the Manufacturer to install, integrate, test, and commission the system.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver the camera in the manufacturer's original, unopened, undamaged container with identification labels intact.
- B. Store the camera in a temperature environment specified in 2.04 Detailed Specification, protected from mechanical and environmental conditions as designated by the manufacturer.

1.06 WARRANTY, LICENSING AND SUPPORT

- A. Manufacturer shall provide a limited 3 year warranty for the product to be free of defects in material and workmanship.
- B. Manufacturer shall provide embedded camera video analytics free of license charges.

END OF SECTION

PART 2 PRODUCTS**2.01 EQUIPMENT**

- A. Manufacturer: Hanwha Techwin
<http://hanwha-security.com/>
- B. Model XNO-6120R
- C. Alternates: None

2.02 GENERAL DESCRIPTION

- A. 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
 - a. H.265 and H.264 –60 fps at all resolutions
 - b. MJPEG – frame rates up to 30 fps
 2. 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.
 3. Resolution selections
 - a. 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, 320 x 240
 4. Simultaneous unicast access by up to 20 users
 5. Multicast or unicast capable
 6. Dynamic DNS (DDNS) support.
 7. Smart Codec, Dynamic GOV and Dynamic FPS to efficiently manage bitrate of the video stream.
- B. Camera – The camera device shall have the following physical and performance properties:
1. True day/night operation with removable IR cut filter
 - a. Low light level operation to 0.03 lux (color) and 0 lux (black and white)
 2. Integral IR illumination, providing effective visibility of 70m (229.66ft)
 3. 2D and 3D digital noise reduction
 4. 32 privacy masking regions utilizing a polygon with 6 different coloring as below.
 - a. Grey / Green / Red / Blue / Black / White
 - b. Mosaic
 5. True WDR up to 150dB
 6. Hallway view with rotatable lens
 7. It shall have a built-in gyro sensor to enhance DIS (Digital Image Stabilization). It shall greatly reduce false alarm triggered by change in a scene rather than the movement of camera itself.
 8. It shall provide Wi-Fi interface which can stream video to a smart phone for installation purposes. The smart phone application shall be available in iOS and Adroid for free of charge with search keyword, 'Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

- C. Intelligence and Analytics – The camera shall have a suite of integral intelligent operations and analytic functions to include:
1. Motion detection with eight 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 and audio input
 - a. camera tamper (scene change)
 - b. loitering
 - c. directional detection
 - d. defocus detection
 - e. fog detection
 - f. virtual line
 - g. enter/exit
 - h. appear/disappear
 - i. audio detection
 - j. face detection
 - k. motion detection with link to other cameras
 - l. sound classification
- D. Interoperability – The camera shall be ONVIF Profile S and G compliant.
- E. The camera shall possess the following further characteristics:
1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome & Safari
 2. Two slots for micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals. Maximum capacity for each slot is 512GB.
 3. Bi-directional audio
 4. Alarms and notifications
 - a. alarm notification triggers:
 - 1.) alarm input
 - 2.) motion detection
 - 3.) intelligent audio and video analytics
 - 4.) network disconnection
 - b. available notification means upon trigger:
 - 1.) file upload via FTP and e-mail
 - 2.) notification via e-mail
 - 3.) record to local storage (SD/SDHC/SDXC card)
 - 4.) NAS recording
 - 5.) external output
 - 6.) preset
 5. Pixel Counter available in the plug-in web viewer.
 6. POE capable

2.03 CAMERA SOFTWARE

- A. The camera shall have a built in web server which supports browser-based configuration using Internet Explorer, MS Edge, Google Chrome, Mozilla Firefox, and Apple Safari, for which web viewer plug-ins are available, from a PC or Mac.
- B. 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 Playback and Setup menus
- C. The web viewer shall provide a playback screen which provides access to the following functions:
 - 1. Search date and time range
 - 2. Search event type
 - 3. Play an event video
 - 4. Set resolution
 - 5. Play audio if present
 - 6. Generate a backup copy of saved video data
- D. 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
 - a. DDNS
 - b. SSL, including certificate management
 - c. 802.1x authentication
 - d. Quality of Service settings
 - e. SNMP to include version selection and settings
 - f. 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, 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
- E. Minimum client requirements

1. Acceptable Operating Systems: Windows 7 / 8.1 / 10, MAC OS X 10.10~10.12
2. Acceptable browsers: Microsoft Internet Explorer and Edge, Mozilla Firefox, Google Chrome, Apple Safari

2.04 DETAILED SPECIFICATIONS

A. Video

1. Imager

- a. Sensor: 1/2.8" 2 MP CMOS
 - 1.) pixels per sensor: 1945 (H) x 1109 (V) total; 1945 (H) x 1097 (V) effective
 - 2.) scanning : progressive
- b. Minimum illumination
 - 1.) Color mode: 0.03 Lux (F1.6, 1/30 sec)
 - 2.) Black & white mode: 0 Lux (IR LED On)
- c. Signal to noise ratio 50dB
- d. Video out
 - 1.) CVBS 1.0 Vp-p / 75 ohms Composite, 720x480(NTSC), 720x576(P)
 - 2.) USB micro USB type B, 1280x720
- e. The following features with control settings shall be available:
 - 1.) Camera Title Off / On (Displayed up to 85 characters)
 - a.) WW: English / Numeric / Special characters
 - b.) China: English / Numeric / Special / Chinese characters
 - c.) Common: Multi-line (Max. 5), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto scale by resolution
 - 2.) Day/night setting: Auto (ICR) / Color / BW / External / Schedule
 - 3.) Backlight compensation (BLC): Off / BLC / HLC / WDR
 - 4.) WDR 150dB
 - 5.) Contrast Enhancement Off / On
 - 6.) Digital Noise Reduction (DNR): Off / On (2D + 3D noise filter)
 - 7.) Digital Image Stabilization Off / On (with gyro sensor)
 - 8.) Defog Off / On
 - 9.) Motion Detection Off / On (8ea, 8 point polygonal zones)
Link to other cameras
 - 10.) Privacy Masking Off / On (32ea polygonal zones)
 - a.) colors grey / green / red / blue / black / white
 - b.) mosaic Yes
 - 11.) Gain Control Off / Low / Middle / High
 - 12.) White Balance ATW / AWC / Manual / Indoor / Outdoor
including Mercury and Sodium light
 - 13.) LDC Off / On (5 levels with min / max)
 - 14.) Electronic shutter speed:
 - a.) settings: min, max, anti-flicker (2 ~ 1/2,000 sec)

- | | |
|-----------------------------|---|
| 15.)Presets | 300ea |
| 16.)Image flip: | Off / On |
| 17.)Image mirror: | Off / On |
| 18.)Hallway view: | Off / On (90°, 270°) |
| 19.)Video & Audio Analytics | tampering, loitering, directional detection, defocus detection, fog detection, virtual line, enter / exit, (Dis)Appear, audio detection, face detection, motion detection, sound classification |
| 20.)Alarm I/O | Input 1 / Output 1 |
| 21.)Alarm Triggers | alarm input, motion detection, video & audio analytics, network disconnection |
| 22.)Alarm Events | File upload via FTP and E-mail, local storage recording at event, notification via E-mail, external output, preset |
| 23.)Pixel Counter | Available in the plug-in viewer. |
- f. Lens: 5.2 ~ 62.4 mm (Optical 12x)
- | | |
|--------------------------|---|
| 1.) Max. Aperture Ratio | F1.6 (Wide) ~ F3.0 (Tele) |
| 2.) Angle of View: | H: 54.58° ~ 5.30° / V: 32.19° ~ 3.00° / D: 61.40° ~ 6.06° |
| 3.) Min. Object Distance | 1.5 m (4.92 ft.) |
| 4.) Focus Control | |
| a.) Auto | |
| b.) Manual | |
| c.) One shot auto focus | |
| 5.) Lens Type | DC auto iris |
| 6.) Mount Type | Board-in Type |
2. Video Streams
- a. The camera shall be able to produce 10 video profiles, each of which may have the following properties:
- | | |
|------------------------------|---|
| 1.) Encoding type: | |
| a.) H.265 | |
| b.) H.264 | |
| c.) MJPEG | |
| 2.) 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, 720 x 480, 640 x 480, 640 x 360, 320 x 240 |
| 3.) Maximum frame rate: | |
| a.) H.265 and H.264: | Max. 60 fps at all resolutions |
| b.) MJPEG: | Max. 30 fps |
| 4.) Smart Codec | Manual mode, WiseStream, Dynamic GOV, Dynamic FPS |
| 5.) Bit rate control method: | |

- a.) H.265 and H.264
 - i. target bitrate level control
 - ii. constant bit rate (CBR) or variable bit rate (VBR)
 - b.) MJPEG
 - i. target bitrate level control
 - ii. variable bit rate (VBR)
 - 3. Number of multi-streaming profiles: 10 maximum
 - 4. Simultaneous users (total): 20 maximum (unicast)
 - 5. Storage and Recording
 - a. The camera shall have onboard SD card storage.
 - 1.) Card type: Micro SD/SDHC/SDXC
 - 2.) Capacity: Up to 512 GB
 - 3.) No. of slots 2 (available for continuous recording)
 - 4.) Image content on the card shall have the ability to be downloaded to a selected destination.
 - b. NAS
 - c. Local PC for instant recording
 - 6. Interoperability - Video streams shall be capable of supporting ONVIF protocol, profiles S and G.
 - 7. Single Images - The camera shall support jpg file image screenshot and export.
- B. Network
- 1. Connectivity: 10/100 Base-T Ethernet via RJ-45 connector
 - 2. Protocols supported:
 - a. Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP)
 - b. Configuration: Dynamic Host Configuration Protocol (DHCP)
 - c. Web services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS)
 - d. 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)
 - e. Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP)
 - f. Multicast: Internet Group Management Protocol (IGMP)
 - g. Notifications: File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP)
 - h. 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:
 - a. user password protection
 - b. IP address filtering - list of allowed or blocked IP addresses
 - c. HTTPS(SSL) login authentication

- d. HTTPS(SSL) secured communications
- e. Digest login authentication
- f. User access log
- g. 802.1x authentication
- 6. Discovery - Manufacturer shall offer a discovery program to identify all devices of his manufacture on the network.
- 7. Configuration – Manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
- C. Audio
 - 1. Direction: Bi-directional
 - 2. Audio In
 - a. Selectable (MIC in / line in)
 - b. Supply voltage: 2.5V DC (4mA)
 - c. Input Impedance: approx. 2K Ohm
 - 3. Compression:
 - a. G.711 u-law/G.726 selectable
 - 1.) G.726 (ADPCM) 8KHz, G.711 8KHz
 - 2.) G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps
 - 3.) AAC-LC: 48Kbps at 8/16/32/48 kHz
- D. Electrical
 - 1. Power
 - a. Input Voltage / Current PoE (IEEE802.3af Class 3), 12V DC, 24V AC
 - b. Power Consumption: <12.95 W (PoE), <12.5 W (12V DC), <14.5 W (24V AC)
- E. Mechanical And Environmental
 - 1. Material:
 - a. Housing: Aluminum
 - 2. Dimensions (W x H): 91.0 x 368.6 mm (3.58 x 14.51 in.)
 - 3. Weight 2.18Kg (4.81 lb.)
 - 4. Temperature:
 - a. Operating: -40° C to 55° C (-40° F to 131° F)
 - b. Storage: -50° C to 60° C (-58° F to 140° F)
 - 5. Humidity: 0 - 90%, non-condensing
 - 6. Environmental Rating
 - a. Mechanical (Impact) Protection IK10
 - b. Ingress Protection IP67, IP66, NEMA 4X

END OF SECTION

PART 3 EXECUTION

3.01 INSTALLERS

- A. Contractor personnel shall comply with all applicable state and local licensing requirements.

3.02 PREPARATION

- A. The network design and configuration shall be verified for compatibility and performance with the camera(s).
- B. Network configuration shall be tested and qualified by the contractor prior to camera installation.
- C. 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).
- D. 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.

3.03 INSTALLATION

- A. 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.
- B. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.
- C. Before permanent installation of the system, the contractor shall test the system in conditions simulating the final installed environment.

3.04 STORAGE

- A. The hardware shall be stored in an environment where temperature and humidity are in the range specified by the manufacturer.

END OF SECTION