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2 MP VANDAL-RESISTANCE NETWORK DOME 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 VANDAL-RESISTANCE NETWORK DOME CAMERA**PART 1 GENERAL****1.01 SUMMARY**

- A. Section includes a 2 MP vandal-resistance IP video camera developed for use in ultra-low light environments.
- B. Product - A 2 MP dome type IP camera with multi-streaming (H.265, H.264 and MJPEG) capability.
- 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

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)
- 6. Ingress Protection and Vandal Resistance

- a. ANSI / IEC60529 – Degrees of protection Provided by Enclosures: IP67, IP66
- b. IEC EN 62262 - Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts: IK10
- c. IEC 60068-2-75: IK10
- d. NEMA 4X: A degree of protection of equipment inside the enclosure against ingress of solid foreign objects (windblown dust), ingress of water (rain, sleet, snow, splashing water, and hose directed water), and the external formation of corrosion and ice on the enclosure.

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 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 dark areas and a short exposure is used in bright 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 –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. Smart Codec may be referred to as WiseStream in this document.

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 section 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 at least 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

GUIDE SPECIFICATION

MasterFormat 2014: Section 28 23 29

MasterFormat 2016: Section 28 2x xx

PART 2 PRODUCTS**2.01 EQUIPMENT**

- A. Manufacturer: Hanwha Techwin
<http://www.hanwha-security.com/>
- B. Model XNV-6085
- 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 – maximum of 60 fps at all resolution
 - b. MJPEG – maximum of 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. The camera shall be able to configure various 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. The camera shall be able to stream at least 10 independent video stream types using unicast protocol.
 5. The camera shall support multicast and unicast video streaming.
 6. The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 7. The camera shall provide smart codec (WiseStream, Dynamic GOV, and Dynamic fps) to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
- B. Camera – The camera device shall have the following physical and performance properties:
1. 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.

2. 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.
3. The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range. It shall be able to stream video with 2MP resolution at 30fps while producing 150dB WDR.
4. Dustproof, waterproof and IP67 rated.
5. The camera shall have NEMA 4X rated enclosures and provide protections again dusts, water, and formation of corrosion and ice on the enclosure.
6. IK10 rated for protection against impacts.

7. Day/night operation with infrared cut filter.
 - a. Low light level operation to 0.004 lux (F0.94, 1/30 sec) in color mode and 0.0004 (F0.94, 1/30 sec) in black and white mode.
8. The camera shall provide 4x optical zoom with focal length ranges from 4.1 to 16.4mm. In addition focus control shall be available via remote control with the following options.
 - a. Simple Focus
 - b. Manual
9. The camera shall support digital noise reduction using both 2D and 3D noise reduction technology.
10. Configurable 32 privacy masking regions utilizing a polygon
11. Defog feature to remove fogginess of scene using advanced image processing algorithms.
- 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 with eight point polygonal zones, minimum/maximum object size.
 2. Motion detection hand-over to PTZ cameras. The camera shall be able to call a preset of PTZ camera when motion event is triggered.
 3. Detection of logical events of specified conditions from the camera's video
 - a. Tampering
 - b. Loitering
 - c. Directional detection
 - d. Defocus detection
 - e. Fog detection,
 - f. Virtual line
 - g. Enter / Exit
 - h. (Dis) Appear
 - i. Audio detection
 - j. Face detection,
 - k. Motion detection
 - l. Digital auto tracking
 4. Detection and classification of the following sound.
 - a. Scream
 - b. Gunshot
 - c. Explosion
 - d. Crashing glass
- 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, Firefox, Chrome & Safari.
 2. The camera shall provide streaming to multiple smart phones with DDNS provided freely from the manufacturer. In addition, the application shall be available for both iOS and Android, free of charge with search keyword, 'Wisenet Mobile'.

3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
4. NAS recording option with configurable pre-alarm and post-alarm recording intervals
5. Alarms and notifications
 - a. alarm notification triggers:
 - 1.) Alarm Input
 - 2.) Motion detection
 - 3.) Video & Audio analytics
 - 4.) Network disconnect
 - b. available notification means upon trigger:
 - 1.) File Upload Via FTP
 - 2.) E-mail, Notification Via E-mail
 - 3.) Local storage (SD / SDHC / SDXC) or NAS recording at event triggers
 - 4.) External output
 - 5.) DPTZ preset
6. Pixel Counter available in the web viewer.
7. PoE capable

2.03 CAMERA SOFTWARE

- A. The camera shall have a built in web server which supports browser-based configuration using Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari 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. Access recorded data playback and camera configuration menus
 6. PTZ
- C. 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. 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, video type, and privacy zone
- 6. 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.
- 7. Event detection setup to include notification parameters, recording rules, time schedule, tamper protection, motion detection, event triggers
- 8. System function to include reboot, upgrade, check system and event logs, application (SDK) management
- 9. View profile information
- E. Client requirements
 - 1. Acceptable Operating Systems: Windows 7 / 8 / 10, MAC OS X 10.10, 10.11, 10.12
 - 2. Acceptable browsers:
 - a. Non-plugin WebViewer Google Chrome 56, MS Edge 39, Mozilla Firefox 61 (Windows 64bit only), Safari 10 (Mac OS X only)
 - b. Plug-in WebViewer MS Explore 11, Apple Safari 10 (Mac OS X only)

2.04 DETAILED SPECIFICATIONS

A. Video

- 1. Imager
 - a. Sensor: 1/2" 2.17MP CMOS
 - 1.) pixels per sensor: 1952 (H) x 1113 (V) total; 1945 (H) x 1097 (V) effective
 - 2.) scanning : progressive
 - b. Minimum illumination
 - 1.) Color mode: 0.004Lux (F0.94, 1/30 sec)
 - 2.) Black & white mode: 0.0004Lux (F0.94, 1/30 sec)
 - c. S/N Ratio 50dB
 - d. Video Out (Installation) CVBS: 1.0 Vpp / 75Ω composite, 720 x 480(N), 720 x 576(P)
USB: micro USB type B, 1280 x 720 for installation
 - e. The following features with control settings shall be available:
 - 1.) Camera Title Off / On (Displayed up to 85 characters per line)
 - a.) W/W: 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 / B/W / External / Schedule
3.) Backlight compensation (BLC):	Off / BLC / HLC (Masking / Dimming), WDR
4.) WDR	150dB
5.) Contrast Enhancement	Off / On (Samsung Super Dynamic Range)
6.) Digital Noise Reduction (DNR):	Off / On (Samsung Super Noise Reduction V) 2D + 3D Noise Filter
7.) Digital Image Stabilization	Off / On (Built-in Gyro Sensor)
8.) Defog	Off / Auto / Manual
9.) Motion Detection	Off / On (8ea, 8point polygonal zones) Handover to PTZ
10.) Privacy Masking	Off / On (32ea, polygonal zones) - Color: Gray/Green/Red/Blue/Black/White - Mosaic
11.) Gain Control	Off / Low / Middle / High
12.) White Balance	ATW / AWC / Manual / Indoor / Outdoor Including Mercury and Sodium
13.) Electronic shutter speed:	
a.) settings:	min, max, anti-flicker (2 ~ 1/12,000sec)
14.) Digital PTZ	24x digital zoom, Digital PTZ (preset, group)
15.) Image flip:	Off / On
16.) Image mirror:	Off / On
17.) Hallway View	90°/270°
18.) Alarm I/O	Input 1ea / Output 1ea
19.) Alarm Triggers	Alarm Input, Motion detection, Video & Audio analytics, Network disconnect
20.) Alarm Events	File Upload Via FTP, E-mail, Notification Via E-mail, Local storage (SD / SDHC / SDXC) or NAS recording at event triggers, External output, DPTZ preset
21.) Pixel Counter	Available in the web viewer.
f. Lens:	4.1 ~ 16.4mm (Optical 4X)
1.) Max. Aperture Ratio	F0.94 (wide) ~ F2.4 (Tele)
2.) Angle of view:	H: 100°(Wide)~26.2°(Tele) V: 54° ~ 14.8°, D: 116° ~ 30°
3.) Min. Object Distance	0.7m (2.30ft)
4.) Focus Control	Simple Focus (motorized V/F), Manual
5.) Lens Type	DC Auto Iris
6.) Mount Type	Board-in Type
g. Pan / Tilt / Rotate	

- 1.) Pan Range $\pm 175^\circ$
- 2.) Tilt Range $\pm 73^\circ$
- 3.) Rotate Range $\pm 175^\circ$
- 4.) Pan/Tilt/Rotate Control Remote adjustment (Max. 200 cycles)
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 WiseStreamII, 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: 512 GB (256 GB x 2 slots)
 - 3.) Image content on the card shall have the ability to be downloaded to a selected destination.
 - b. NAS
 6. Interoperability - Video streams shall be capable of supporting ONVIF protocol, profiles S and G.
 7. Single Images - The camera shall support image screenshot and export.
 8. The camera shall support open platform to allow users to install third party applications.
- 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. Electrical
1. Power
 - a. Input Voltage / Current 24V AC, , 12V DC, PoE (IEEE802.3af, Class3)
 - b. Power Consumption: Max. 13.5W (24V AC), Max. 11.1W (12V DC), Max. 12.1W (PoE)
- D. Mechanical And Environmental
1. Material: Aluminium
 2. Dimensions (W x H): Ø160.0 x 140.0mm (Ø6.30" x 5.51")
 3. Weight 1.40Kg (3.09 lb)
 4. Temperature:
 - a. Operating: -40° C to 55° C (-40° F to 131° F)
 - b. Storage: -40° C to 60° C (-40° F to 140° F)
 5. Humidity: 0 ~ 90%, non-condensing
 6. Ingress Protection / Vandal Resistance

- a. IP67
- b. IP66
- c. IK10
- d. 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