Hanwha Techwin is a leading supplier of advanced video surveillance solutions for IP-video, analog and hybrid systems. Building on the company's history of innovation, Hanwha Techwin is dedicated to providing systems solutions with the highest levels of performance, reliability and cost-efficiency. Hanwha Techwin is committed to the continued development of innovative systems products for professional security applications.

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VGA NETWORK THERMAL 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

VGA NETWORK THERMAL CAMERA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes a VGA Thermal IP camera with explosion-proof certificates.

B. Product – VGA Thermal camera, with multi-streaming (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	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
57. LCE Local Contrast Enhancement

B. Reference Standards
   1. Network - IEEE
      a. 802.3 Ethernet Standards
      b. 802.1x Port-based Network Access Control
      c. IPv4 IP addressing version 4
      d. IPv6 IP addressing version 6
      e. QoS Quality of Service
   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 / 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: 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 - enclosures are made of stainless steel, aluminum, fiberglass, or polycarbonate. NEMA 4X enclosures are used in harsh environments where corrosive materials and caustic cleaners are used

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. 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. WiseStream – 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.

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

B. Model TNO-4030TR

C. Alternates: None

2.02 GENERAL DESCRIPTION

A. Thermal VGA camera shall have a metal housing which can prevent any inside sparks caused by the electronic components from igniting gases and conductive dust and causing explosion in a hazardous area.

B. 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, H.264 – maximum of 30 fps at all resolution
   b. MJPEG – maximum of 30 fps at all resolution
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. 16:9 aspect ratio : 640 x 360
   b. 4:3 aspect ratio : 640 x 480, 320 x 240
4. The camera shall support unicast video streaming up to 20 users.
5. The camera shall support multicast 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 WiseStream Ⅱ, Dynamic GOV and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage.

C. Camera – The camera device shall have the following physical and performance properties:

1. IK10 rated for protection against impacts.
2. Dust proof and water proof (IP66 rated)
3. NEMA 4X
4. The camera shall be able to configure 32 privacy masking areas with polygons.

D. Intelligence and Analytics – The camera shall have a suite of intelligent analytic functions.

1. Motion detection with 8 definable detection areas with 8 point polygonal zones, and minimum/maximum object size.
2. Detection of logical events of specified conditions from the camera's video input
   a. Tampering, Loitering, Directional Detection, Virtual Line, Enter/Exit, Appear/Disappear
   b. Motion Detection, Audio Detection, Sound Classification
   c. Shock Detection
   d. Temperature Detection

E. Interoperability – The camera shall be ONVIF Profile S and G compliant.

F. The camera shall possess the following further characteristics:

1. Built-in web server, accessed via non-plugin browsers including Google Chrome, IE11, MS Edge, Mozilla Firefox and Apple 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. 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 and e-mail
        2) Notification via e-mail
        3) Local storage (SD / SDHC / SDXC) or NAS recording at event triggers
        4) External output
5. Pixel Counter available in the web viewer
6. PoE capable
7. IP66, IK10, NEMA 4x capable

2.03 CAMERA SOFTWARE

A. The camera shall have a built in web server which supports non-plugin browsers including Google Chrome, IE11, MS Edge, 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. Audio and Microphone control
6. Access recorded data playback and camera configuration menus
7. Alarm out are supported with two ports
8. Temperature display on live view in real time

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. 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. IP Filtering
      d. 802.1x authentication
      e. Quality of Service settings
      f. SNMP to include version selection and settings
      g. Auto configuration
   5. Video setup
      a. Flip / mirror mode
      b. Hallway view
      c. Video output type
      d. Privacy zone
   6. Audio setup to include source, audio codec type, gain and bit rate.
   7. Camera settings to configure image preset, SSDR, LCE, exposure, DIS, sharpness, contrast, color level and on-screen display.
   8. Temperature setup to configure temperature unit, color patterns, spot emissivity and color bar.
   9. Event detection setup to configure notification parameters, recording rules, time schedule, tamper protection, motion detection, temperature detection and event triggers.
   10. Analytics setup to configure temperature detection, shock detection, motion detection, tampering detection, IVA, audio detection and sound classification.
   11. System function to control reboot, upgrade, check system and event logs and application (SDK) management.
   12. View profile information

E. Client requirements
   1. Acceptable Operating Systems: Windows 7 / 8.1 / 10, MAC OS X 10.10, 10.11, 10.12
   2. Acceptable browsers:
      a. Non-plugin WebViewer — Google Chrome, IE11, MS Edge, Mozilla Firefox, Safari (Mac OS X only)

2.04 DETAILED SPECIFICATIONS

A. Video

1.	Imaging device	Uncooled Microbolometer
2.	Image Pixels	17um

3.	Effective Pixels	640(H) x 480(V)
4.	NETD	< 50mK
5.	Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720 x 480(N), 720 x 576(P), for installation USB : Micro USB type B, 1280 x 720, for installation

B. Lens

1.	Focal length	13mm Fixed
2.	Max. Aperture Ratio	F1.0
3.	Field of View	H: 48.6˚, V: 36.4°, D: 61.6°
4.	Min. Object Distance	5m (16.40ft)
5.	Focus Control	Fixed
6.	Mount Type	Board-in Type

C. Radiometry

1.	Temperature detect range	-20°C ~ 130°C(-4°F ~ 266°F)
2.	Temperature accuracy	±5°C (≤100°C), ±20°C(> 100°C)
3.	Temperature detection	Off / On(3ea Rectangle)
4.	Additional	Hybrid palettes, Spot temperature reading

D. Operational Functions

1.	Camera Title	Off / On (Displayed up to 85 characters)
	a. W/W	English / Numeric / Special characters
	b. China	English / Chinese / Numeric / Special characters
	c. Common	Multi-line (Max. 5), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto scale by resolution
2.	Motion Detection	Off / On (8ea, 8-point polygonal)
3.	Privacy Masking	Off / On (32 zones, polygonal) - Color: Gray / Green / Red / Blue / Black / White - Mosaic
4.	Image Rotation	Flip: Off / On Mirror: Off / On Hallway view: 0˚ / 90˚ / 270˚
5.	Digital Image Stabilization	Off / On (Built-in Gyro Sensor)
6.	Alarm I/O	Input 1ea / Output 2ea
7.	Alarm Triggers	Alarm Input, Motion Detection, Video & Audio Analytics, Network Disconnection
8.	Alarm Events	File Upload via FTP and E-mail, Notification via E-mail, Local storage (SD/SDHC/SDXC) or NAS recording, External output
9.	Intelligent Analytics	Tampering, Loitering, Directional Detection, Virtual Line, Enter/Exit, Appear/Disappear, Fence Detection Shock Detection, Motion Detection, Audio Detection, Temperature Detection

		Sound Classification (Scream / Gunshot / Explosion / Crashing glass)
	10. Pixel Counter	Support
	11. Storage	Micro SD/SDHC/SDXC 256GB (256GB x 1 slot) , NAS support

E. Video Streams

1.	Video compression	H.265, H.264, MJPEG
2.	Resolution	640x480, 640x360, 320x240
3.	Maximum Framerate	
	a. H.265 / H.264 / MJPEG	Max. 30fps at all resolutions
4.	WiseStream Ⅱ	Support
5.	Bitrate Control Method	VBR (H.265 / H.264 / MJPEG), CBR (H.265 /H.264)
6.	Streaming Capability	Up to 10 profiles
7.	Streaming Method	Unicast / Multicast
8.	Simultaneous Users	20 maximum (Unicast)
9.	Profile set	Max. 10 ea
10.	Interoperability	ONVIF Profile S / G support, SUNAPI, Open Platform

F. Audio

1.	Audio In	Built in Mic / Line-in / External Mic(2.5VDC/4mA supply) (Input impedance: approx. 2K Ohm)
2.	Audio Out	Line out (3.5mm stereo mini jack)
3.	Audio Compression	G.711 u-law / G.726 / AAC Selectable, G.726 (ADPCM) 8KHz, G.711 8KHz, G.726: 16 / 24 / 32 / 40Kbps, AAC-LC: 48Kbps at 8 / 16 / 32 / 48KHz
4.	Communication	Bi-directional (2-Way)

G. Network

1. Connectivity – 10/100 Base-T Ethernet via RJ-45 connector
2. Protocol
   a. IP v4 / v6, TCP, UDP
   b. Configuration: DHCP, LLDP
   c. Web service: HTTP, HTTPS
   d. Network Service: ARP, Bonjour, DNS, ICMP, NTP, PIM-SM, SNMP v1/2c/3 – MIB-2, UPnP
   e. Media: RTP, RTCP, RTSP
   f. Multicast: IGMP
   g. Notifications: FTP, SMTP
   h. Remote Access: PPPoE
3. DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
4. QoS – Layer 3 DSCP
5. Security Feature

a. User password protection
b. The device shall not provide a manufacture default password. Default password change shall be required to access the camera.
c. A minimal level of password complexity shall be required by the camera.
d. The camera shall not have a manufacture back-door password.
e. The manufacturer shall provide a tool that provides the ability to make password changes to multiple cameras at the same time.
f. IP address filtering – List of allowed or blocked IP addresses
g. HTTPS(SSL) login authentication
h. HTTPS(SSL) secured communication
i. Digest login authentication
j. User access log
k. 802.1x authentication

6. Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
7. Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
8. Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
9. Camera backup setting – The manufacturer shall provide a program that provides the ability to save multiple camera settings to a file and restore these camera settings if needed.
10. Reporting – The manufacturer shall provide a tool that can generate a report including thumbnail view, MAC address, IP address, serial number and other camera settings.

H. Electrical

1. Power
   a. Input Voltage / Current — PoE (IEEE 802.3af), DC 12V, AC 24V
   b. Power Consumption — Max 10W (PoE), Max 9W (DC 12V), Max 10.5W (AC 24V)
      Typ. 8.6W (PoE), Typ. 7.5W (DC 12V), Typ. 8.9W (AC 24V)

I. Mechanical and Environmental

1. Color / Material — White(RAL-9003) / Aluminum
2. Dimensions (W x H x D) — Φ101.97 x 401.8mm (Φ 4.01" x 15.82")
3. Weight — 3,124g (6.89 lb)
4. Temperature
   a. Operating — -40°C ~ +60°C(-40°F ~ +140°F)
   b. Storage — -50°C ~ +60°C (-58°F ~ +140°F)
5. Humidity — Less than 90% RH
6. Ingression Protection — IP66, NEMA 4X
7. Vandal Resistance — IK10

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