June 2017

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**Product Guide Specification**

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format, based on *MasterFormat 2016* and *The Project Resource Manual—CSI Manual of Practice. The Manufacturer is responsible for technical accuracy.*

The section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Words and sentences within brackets [ ] are choices to include or exclude a particular item or statement. Coordinate this section with other specification sections and the Drawings. Delete all “Specifier Notes” after editing this section.

**Section 28 21 00: Video Surveillance**

**Section 28 21 13: IP Cameras**

**Section 28 21 13.11: Panoramic Cameras**

**MULTI-SENSOR PANORAMIC PLUS PTZ NETWORK CAMERA: 8 X 2 MP MULTI-SENSOR 360° PANORAMIC + PTZ NETWORK CAMERA**

1. **– GENERAL**
	1. SUMMARY
		1. Section Includes
			1. Section 28 21 13: Video Surveillance – Surveillance Cameras – IP Cameras
			2. Section 28 21 17: Video Surveillance – Surveillance Cameras – Camera Housings
			3. Section 28 21 19: Video Surveillance – Surveillance Cameras – Camera Mounts
			4. Section 28 27 00: Video Surveillance – Video Surveillance Sensors
		2. Related Sections
			1. [Section 28 33 15: Security Detection, Alarm and Monitoring – Security Monitoring and Control – Security Monitoring and Control Software].

\*\*\*\*\*\*\*\*\*\*Specifier’s note: Include those standards referenced elsewhere in this SECTION.

* 1. REFERENCES
		1. Electromagnetic Compatibility
			1. FCC Part 15 Subpart B
		2. Underwriters Laboratories, Inc. (UL) (www.ul.com)
			1. UL60950-1
		3. European Standards
			1. EN 60950:2000
		4. HD standards
			1. Complies with the SMPTE 274M-2008 Standard in:
				1. Resolution: 1920x1080
				2. Scan: Progressive
				3. Color representation: complies with ITU-R BT.709
				4. Aspect ratio: 16:9
				5. Frame rate: 25 and 30 frames/s
			2. Complies with the 296M-2001 Standard in:
				1. Resolution: 1280x720
				2. Scan: Progressive
				3. Color representation: complies with ITU-R BT.709
				4. Aspect ratio: 16:9
				5. Frame rate: 25, 30, 50 and 60 frames/s
				6. Interference-Causing Equipment Standards
	2. SYSTEM DESCRIPTION
		1. Section Includes
			1. Video Surveillance – Surveillance Cameras – IP Cameras
		2. Performance Requirements
			1. The Multi-Sensor Panoramic plus PTZ camera shall be a full-featured network dome video camera for discrete video surveillance applications in indoor or outdoor environment.
			2. The Multi-Sensor Panoramic plus PTZ camera shall produce a 360° panoramic image using eight (8) 2-MP cameras plus another image from one (1) 2-MP PTZ camera.
			3. The Multi-Sensor Panoramic plus PTZ camera shall deliver a maximum resolution of 2 x 4096 x 1800 pixels from the panoramic cameras and 1080p from the PTZ camera.
			4. The Multi-Sensor Panoramic plus PTZ camera shall employ Starlight Ultra-low Light Technology to capture color images in low light down to:
				1. Panoramic Camera: 0.005 lux.
				2. PTZ Camera: 0.002 lux.
			5. The Multi-Sensor Panoramic plus PTZ camera shall utilize an algorithm that dynamically restores the true color of scene illuminated by a sodium-vapor lamp.
			6. The Multi-Sensor Panoramic plus PTZ camera shall provide direct network connection using H.265 andH.264 compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
			7. The Multi-Sensor Panoramic plus PTZ camera shall offer the following sensors:
				1. Panoramic Cameras: 1/1.9-in Progressive-scan CMOS sensors.
				2. PTZ Camera: 1/1.9-in. Progressive Scan CMOS sensor.
			8. The Multi-Sensor Panoramic plus PTZ camera shall come with a day/night mechanical IR cut filter to deliver color images in daylight and monochrome images as the scene darkens.
			9. The Multi-Sensor Panoramic plus PTZ camera shall offer Digital Wide Dynamic Range for clear images in extreme high-contrast environments.
			10. The Multi-Sensor Panoramic plus PTZ camera shall offer the Intelligent Video System to detect and analyze moving objects for improved video surveillance.
			11. The Multi-Sensor Panoramic plus PTZ camera shall offer Auto-tracking (PTZ camera only) that controls the pan/tilt/zoom actions of the camera to automatically track an object in motion and to keep it in the scene.
			12. The Multi-Sensor Panoramic plus PTZ camera shall incorporate a built-in defog mode (PTZ camera only) that dynamically adjusts the camera’s contrast to provide improved image quality in scenes affected by fog, smog, mist, smoke or other low-contrast interference.
			13. The Multi-Sensor Panoramic plus PTZ camera shall conform to the ONVIF, PSIA, and to the CGI standard to provide interoperability with other conformant systems.
			14. The Multi-Sensor Panoramic plus PTZ camera shall offer three separate and configurable streams with individually configurable HD streams.
			15. The Multi-Sensor Panoramic plus PTZ camera shall offer bi-directional audio.
			16. The Multi-Sensor Panoramic plus PTZ camera shall accept seven (7) incoming alarm connections and offer two (2) outgoing alarm connections.
			17. The Multi-Sensor Panoramic plus PTZ camera shall include a built-in heater to allow operation down to –40° C (–40° F).
			18. The Multi-Sensor Panoramic plus PTZ camera housing shall conform to the IP67 Ingress Protection and to the IK10 Vandal Resistance standards.
	3. SUBMITTALS

* + 1. Submit under provisions of Section [01 33 00.]
		2. 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.
		3. Dimensional Drawings; include
			1. Overall device dimensions.
			2. Dimensions specific for installation.
		4. Closeout Submittals
			1. User manual.
			2. Parts list.
			3. Maintenance requirements.
	1. QUALITY ASSURANCE
		1. Manufacturer:
			1. Minimum of [10] years of experience in manufacture and design Video Surveillance Devices.
		2. Video Surveillance System:
			1. List certifying bodies (UL, CSA, etc.)
			2. Provide evidence of compliance upon request.
		3. Installer:
			1. Minimum of [5] years of experience installing Video Surveillance System.
	2. DELIVERY, STORAGE AND HANDLING
		1. Comply with requirements of Section 01 60 00.
		2. Deliver materials in manufacture’s original, unopened, undamaged containers; and unharmed original identification labels.
		3. Protect store materials from environmental and temperature conditions following manufacturer’s instructions.
		4. Handle and operate products and systems according to manufacturer’s instructions.
	3. WARRANTY
		1. Provide manufacturer’s warranty covering [2] years for replacement and repair of defective equipment. Warranty varies country to country.
	4. MAINTENANCE
		1. Make ordering of new equipment for expansions, replacements, and spare parts available to dealers and end users.
		2. Provide factory direct technical support via phone and e-mail.
1. **– PRODUCTS**
	1. MANUFACTURERS
		1. [Acceptable Manufacturer:

Dahua Technology USA Inc.

23 Hubble, Irvine, CA 92618

Tel: (949) 679-7777

Fax: (949) 679-5760

Email: sales.usa@global.dahuatech.com]

* + 1. Substitutions: [Not permitted.] [Under provisions of Division 1.]
			1. [All proposed substitutions must be approved by the Architect or Engineer professional.]
			2. [Proposed substitutions must provide a line-by-line compliance documentation.]
	1. MULTI-SENSOR PANORAMIC + PTZ NETWORK CAMERA DH-PSD81602N-A360

		1. General Characteristics:
			1. The Multi-Sensor Panoramic plus PTZ camera shall be a full-featured network dome video camera for discrete video surveillance applications in indoor or outdoor environment.
			2. The Multi-Sensor Panoramic plus PTZ camera shall produce a 360° panoramic image using eight (8) 2-MP cameras plus another image from one (1) 2-MP PTZ camera.
			3. The Multi-Sensor Panoramic plus PTZ camera shall deliver a maximum resolution of 2 x 4096 x 1800 pixels from the panoramic cameras and 1080p from the PTZ camera.
			4. The Multi-Sensor Panoramic plus PTZ camera shall employ Starlight Ultra-low Light Technology to capture color images in low light down to:
				1. Panoramic Camera: 0.005 lux.
				2. PTZ Camera: 0.002 lux.
			5. The Multi-Sensor Panoramic plus PTZ camera shall utilize an algorithm that dynamically restores the true color of scene illuminated by a sodium-vapor lamp.
			6. The Multi-Sensor Panoramic plus PTZ camera shall provide direct network connection using H.265 andH.264 compression and bandwidth throttling to efficiently manage bandwidth and storage requirements while delivering outstanding image quality.
			7. The Multi-Sensor Panoramic plus PTZ camera shall offer the following sensors:
				1. Panoramic Cameras: 1/1.9-in Progressive-scan CMOS sensors.
				2. PTZ Camera: 1/1.9-in. Progressive Scan CMOS sensor.
			8. The Multi-Sensor Panoramic plus PTZ camera shall come with a day/night mechanical IR cut filter to deliver color images in daylight and monochrome images as the scene darkens.
			9. The Multi-Sensor Panoramic plus PTZ camera shall offer Digital Wide Dynamic Range for clear images in extreme high-contrast environments.
			10. The Multi-Sensor Panoramic plus PTZ camera shall offer the Intelligent Video System to detect and analyze moving objects for improved video surveillance.
			11. The Multi-Sensor Panoramic plus PTZ camera shall offer Auto-tracking (on the PTZ camera) that controls the pan/tilt/zoom actions of the camera to automatically track an object in motion and to keep it in the scene.
			12. The Multi-Sensor Panoramic plus PTZ camera shall incorporate a built-in defog mode (PTZ camera only) that dynamically adjusts the camera’s contrast to provide improved image quality in scenes affected by fog, smog, mist, smoke or other low-contrast interference.
			13. The Multi-Sensor Panoramic plus PTZ camera shall conform to the ONVIF, PSIA, and to the CGI standard to provide interoperability with other conformant systems.
			14. The Multi-Sensor Panoramic plus PTZ camera shall offer three separate and configurable streams with individually configurable HD streams.
			15. The Multi-Sensor Panoramic plus PTZ camera shall offer bi-directional audio.
			16. The Multi-Sensor Panoramic plus PTZ camera shall accept seven (7) incoming alarm connections and offer two (2) outgoing alarm connections.
			17. The Multi-Sensor Panoramic plus PTZ camera shall include a built-in heater to allow operation down to –40° C (–40° F).
			18. The Multi-Sensor Panoramic plus PTZ camera housing shall conform to the IP67 Ingress Protection and to the IK10 Vandal Resistance standards.
		2. Imaging
			1. Panoramic Camera
				1. The Panoramic camera shall offer eight (8) 1/1.9-inch 2 MP CMOS progressive-scan imagers.
				2. The Panoramic camera shall offer 2 x 4096(H) x 1800(V) effective picture elements.
				3. The Panoramic cameras shall offer a 5 mm fixed lens.
				4. The Panoramic camera shall have a horizontal angle of view of 360° and a vertical angle of view of 80°.
				5. The Panoramic camera shall offer an aperture of F2.2.
				6. The Panoramic camera shall produce a color image with a minimum scene illumination of 0.005 lux at F2.2 and a monochrome image, when in the night mode, with a minimum illumination of 0.003 lux at F2.2.
			2. PTZ Camera
				1. The PTZ camera shall offer one (1) 1/1.9-inch 2 MP CMOS progressive-scan imager.
				2. The PTZ camera shall offer 1920(H) x 1080(V) effective picture elements.
				3. The PTZ cameras shall offer a 5.5 mm to 206.0 mm vari-focal lens.
				4. The PTZ camera shall offer 37x optical zoom.
				5. The PTZ camera shall have a horizontal angle of view of 65.8° to 2.0°.
				6. The PTZ camera shall offer an aperture of F1.5.
				7. The PTZ camera shall produce a color image with a minimum scene illumination of 0.002 lux at F1.5 and a monochrome image, when in the night mode, with a minimum illumination of 0.001 lux at F1.5.
		3. PTZ Features
			1. The PTZ camera shall provide a pan range of 360° endless.
			2. The PTZ camera shall provide a tilt angle of -20° to 90° relative to the horizon.
			3. The PTZ camera shall provide an automatic flip feature to automatically rotate and flip the camera as it tilts through the vertical position to maintain the correct orientation of the image.
			4. The PTZ camera shall provide the following manual variable pan/tilt speeds:

Pan: 0.1°/s to 240°/s

Tilt: 0.1°/s to 120°/s

* + - 1. The PTZ camera shall provide a feature that automatically rotates, or pivots, the camera to simplify tracking of a person walking directly under the camera.
			2. The PTZ camera shall support 300 presets.
			3. The PTZ camera shall support the following PTZ modes:
				1. Five (5) PTZ pattern modes.
				2. Eight (8) PTZ tour modes.
				3. One (1) Auto Pan mode.
				4. One (1) Auto Scan mode.
			4. The PTZ camera shall automatically activate a preset, pan, scan, tour, or pattern mode if the camera does not receive a command during a specified period.
			5. The PTZ camera shall automatically restore the previous PTZ and lens status after the camera powers up after a power failure.
			6. The PTZ camera shall support the DH-SD and the Pelco-P/D (auto-recognition) protocols.
		1. Video Characteristics
			1. The Multi-Sensor Panoramic plus PTZ camera shall offer CBR/VBR bit rate control.
			2. The Multi-Sensor Panoramic plus PTZ camera shall offer the following video compression protocols
				1. Smart H.265+
				2. H.265
				3. Smart H.264+
				4. H.264
				5. MJPEG
			3. The Multi-Sensor Panoramic plus PTZ camera shall offer the following bit rates:
				1. Panoramic

H.265: 2 x 14 Kbps to 8192 Kbps

H.264: 2 x 24 Kbps to 8192 Kbps

* + - * 1. PTZ

H.265: 4 Kbps to 8192 Kbps

H.264: 8 Kbps to 7168 Kbps

* + - 1. The Multi-Sensor Panoramic plus PTZ camera shall offer BLC, HLC, and Digital WDR modes of backlight compensation.
			2. The Multi-Sensor Panoramic plus PTZ camera shall offer Auto, Natural, Street Lamp, Outdoor, and Manual white balance modes.
			3. The Multi-Sensor Panoramic plus PTZ camera shall offer 3D DNR noise reduction.
			4. The Multi-Sensor Panoramic plus PTZ camera shall offer motion detection (four zones) and region of interest (four zones) controls.
			5. The Multi-Sensor Panoramic plus PTZ camera shall offer four (4) privacy masking areas for the Panoramic camera and 24 privacy masking areas for the PTZ camera.
		1. Streaming Capability
			1. The Multi-Sensor Panoramic plus PTZ camera shall offer three separate configurable video streams.
			2. The Multi-Sensor Panoramic plus PTZ camera shall generate the following maximum frames rates:
				1. Panoramic Camera: 2 x 4096 x 1800 at 25 fps with H.265 compression.
				2. PTZ Camera: 1080p at 60 fps
			3. The Multi-Sensor Panoramic plus PTZ camera shall offer Unicast and Multicast streaming methods.
			4. The Multi-Sensor Panoramic plus PTZ camera shall offer the following resolutions:
				1. Panoramic Camera:

2 x 4096 x 1800

2 x 3840 x 1680

2 x 2880 x 1264

2 x 1920 x 832

2 x 1280 x 560

2 x 1024 x 452

* + - * 1. PTZ Camera

1080p (1920 x 1080)

1.3 MP (1280 x 960)

720p (1280 x 720)

D1 (704 x 480)

CIF (352 x 240)

* + - 1. The Multi-Sensor Panoramic plus PTZ camera shall generate three streams at the following maximum resolutions:
				1. Panoramic Camera:

Main Stream: 2 x 4096 x 1800 at 25 fps

Sub Stream 1: 2 x 1024 x 452 at 30 fps

Sub Stream 2: 2 x 1920 x 832 at 30 fps

* + - * 1. PTZ Camera

1080p at 60 fps

D1 at 60 fps

1080p at 60 fps

* + 1. IP Connectivity
			1. The Multi-Sensor Panoramic plus PTZ camera shall allow full camera control and configuration capabilities via a TCP/IP network.
			2. The Multi-Sensor Panoramic plus PTZ camera shall deliver 2 x 4096 x 1800 resolution at rates up to 25 frames per second, and 1080p resolution at rates of up to 60 frames per second, via TCP/IP over an RJ-45 (100/1000 Base-T) connection.
			3. The Multi-Sensor Panoramic plus PTZ camera shall conform to the ONVIF, PSIA, and to the CGI standard.
			4. The Multi-Sensor Panoramic plus PTZ camera shall offer Quality of Service (QoS) configuration options.
			5. The Multi-Sensor Panoramic plus PTZ camera shall support the IPv6 internet-layer protocol for packet switched internetworking across multiple IP networks.
			6. The Multi-Sensor Panoramic plus PTZ camera shall offer local and network storage options that include: MicroSD, Network Attached Storage (NAS), and recording to a local PC for instant recording.
			7. The Multi-Sensor Panoramic plus PTZ camera shall support the following protocols: HTTP, HTTPs, TCP, ARP, RTSP, RTP, UDP, SMTP, FTP, DHCP, DNS, DDNS, PPPOE, IPv4/v6, QoS, UPnP, NTP, Bonjour, 802.1x, Multicast, ICMP, IGMP, SNMP.
			8. The Multi-Sensor Panoramic plus PTZ camera shall support the Smart PSS and DSS management software.
			9. The Multi-Sensor Panoramic plus PTZ camera shall support the Android, Windows, and the IOS mobile operating systems.
		2. Interfaces
			1. The Multi-Sensor Panoramic plus PTZ camera shall support the following audio compression technologies: G.711a, G.711Mu, AAC, G.726.
			2. The Multi-Sensor Panoramic plus PTZ camera shall offer two (2) audio inputs and one (1) output.
			3. The Multi-Sensor Panoramic plus PTZ shall offer one (1) video out port (PTZ camera only).
			4. The Multi-Sensor Panoramic plus PTZ shall offer one (1) RS485 port for PTZ control.
			5. The Multi-Sensor Panoramic plus PTZ camera shall offer seven (7) alarm input channels and two (2) alarm output channels.
		3. Intelligent Video System
			1. The Multi-Sensor Panoramic plus PTZ shall offer intelligent video analytics built-in to the camera.
			2. The Intelligent Video System shall be capable of processing and analyzing video within the camera itself, with no extra hardware required.
			3. The Intelligent Video System shall detect multiple object behaviors such as abandoned or missing objects.
			4. The Intelligent Video System shall support Tripwire analytics to detect when an object has crossed a pre-determined line on the video image.
			5. The Intelligent Video System shall offer Facial Detection to search and identify individuals.
			6. The Intelligent Video System shall offer Auto-tracking, a feature that automatically controls the pan, tilt, and zoom functions of the camera to track a moving object and keep it in the scene.
		4. Installation Requirements
			1. The Multi-Sensor Panoramic plus PTZ camera shall be capable of operating in an outdoor environment within a temperature range of –40° C to +60° C (–40° F to 140° F).
			2. The Multi-Sensor Panoramic plus PTZ camera shall accept a 36 VDC power input.
		5. Housing Options
			1. The Multi-Sensor Panoramic plus PTZ camera shall be offered in a metal housing.
			2. The Multi-Sensor Panoramic plus PTZ camera housing shall conform to the IP67 Ingress Protection standard.
			3. The Multi-Sensor Panoramic plus PTZ shall conform to the IK10 Vandal Resistance standard.
	1. ACCESSORIES
		1. The Multi-Sensor Panoramic plus PTZ camera shall offer the following included accessories:
			1. Power supply.
			2. Wall mount.
			3. Mount adapter.
1. **– EXECUTION**
	1. EXAMINATION
		1. Examine areas to receive devices and notify adverse conditions affecting installation or subsequent operation.
		2. Do not begin installation until unacceptable conditions are corrected.
	2. PREPARATION
		1. Protect devices from damage during construction.
	3. INSTALLATION
		1. Install devices in accordance with manufacturer’s instruction at locations indicated on the floor drawings plans.
		2. Perform installation with qualified service personnel.
		3. Install devices in accordance with the National Electrical Code or applicable local codes.
		4. Ensure selected location is secure and offers protection from accidental damage.
		5. Location must provide reasonable temperature and humidity conditions, free from sources of electrical and electromagnetic interference.
	4. FIELD QUALITY CONTROL
		1. Test snugness of mounting screws of all installed equipment.
		2. Test proper operation of all video system devices.
		3. Determine and report all problems to the manufacturer’s customer service department.
	5. ADJUSTING
		1. Make proper adjustment to video system devices for correct operation in accordance with manufacturer’s instructions.
		2. Make any adjustment of camera settings to comply with specific customer’s need.
	6. DEMOSTRATION
		1. Demonstrate at final inspection that video management system and devices functions properly.

END OF SECTION