Oncam is a global technology company that delivers effective and intelligent video and video-based analytic and business intelligence solutions for our global customers. As a pioneer of 360-degree video technology and with over 10 years’ experience, Oncam understands the need to intelligently integrate the business process with technology to create modern, scalable solutions. Oncam is part of Oncam Technologies and operates in multiple sectors across a diverse range of countries.

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**360o 5 MEGAPIXEL MINI PANEL-MOUNT VIDEO 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>.** **The normal default is presented in [bracketed bold text].**

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

**Important Note to Security Systems Specifiers**

CSI MasterFormat 2016 incorporates numerous significant changes affecting electronic safety and security since MasterFormat 2014. 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 21 00 Surveillance Cameras

 28 21 13 IP Cameras

 28 21 13.11 Panoramic 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 01.13 Video Surveillance Communications Conductors and Cables

 27 20 00 Data Communications

 28 05 07.21 PoE Power Sources for Electronic Safety and Security

 28 05 11 Cyber Requirements for Electronic Safety and Security

 28 05 19 Storage Appliances for Electronic Safety and Security

 28 05 19.15 Network Video Recorders

 28 05 33 Safety and Security Network Communications Equipment

 28 23 00 Video Management System

**360o 5 MEGAPIXEL MINI PANEL-MOUNT VIDEO CAMERA**

1. **GENERAL**
	1. **SUMMARY**
		1. Section includes a 5 megapixel (MP) IP panel-mount video camera providing 360 degree video surveillance with no moving parts.
		2. Product – Mount behind a thin panel, a low profile 4.5-inch diameter x 2.7-inch height, 5 MP indoor panel-mount video camera employing one 2592H x 1944V image sensor, capable of providing 360 degree surveillance with no moving parts in light conditions down to 0.2 lux at 50 IRE.

## 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. API – Application Programming Interface
			2. ARP – Address Resolution Protocol
			3. AWB - Automatic White Balance
			4. DHCP - Dynamic Host Configuration Protocol
			5. DNS - Domain Name Server
			6. fps - frames per second
			7. FTP - File Transfer Protocol
			8. GOP – Group of Pictures
			9. GUI – Graphical User Interface
			10. HTTP - Hypertext Transfer Protocol
			11. HTTPS – Secure Hypertext Transfer Protocol
			12. ICMP – Internet Control Message Protocol
			13. IGMP – Internet Group Management Protocol
			14. IP - Internet Protocol
			15. JPEG - Joint Photographic Experts Group
			16. MJPEG - Motion JPEG
			17. MP - Megapixel
			18. MPEG - Moving Pictures Experts Group
			19. NTP - Network Time Protocol
			20. PoE - Power over Ethernet
			21. RTP - Real-Time Transport Protocol
			22. RTSP - Real-Time Streaming Protocol
			23. SDK - Software Development Kit
			24. SMTP - Simple Mail Transfer Protocol
			25. TCP - Transmission Control Protocol
			26. UDP - User Datagram Protocol
			27. UPnP - Universal Plug and Play
			28. VCam – Virtual Camera
			29. VMS - Video Management System
			30. WDR – Wide Dynamic Range
		2. Reference Standards
			1. Network
				1. IEEE 802.3 Ethernet Standards
				2. IEEE 802.1x – Port-based authentication
			2. Video
				1. ISO / IEC 14496 –10, MPEG-4 Part 10 ( ITU H.264)
				2. ISO / IEC 10918 – JPEG
				3. ONVIF – Profile S
				4. PSIA
			3. Emissions
				1. FCC-47 CFR Part 15 Subpart B, Class A
				2. ANSI C63.4-2014
				3. CE

EN 55032:2015/AC:2016-07, AS/NZS CISPR 32:2015/COR1:2016, Class A Conducted and Radiated Power

EN 61000-3-2:2014 Harmonic Current Emissions

EN 61000-3-3:2013 Voltage Fluctuations and Flicker

* + - * 1. ICES-003, Issue 6-2016
				2. EN 55024 2010+A1:2015 & CISPR 24:2010+A1:2015
			1. Environmental
				1. BS EN 60529 – Degrees of Protection Provided by Enclosures – IP40
				2. EN 50155:2007 – Covers electronic equipment used on rolling stock for railway applications. The standard covers aspects of this electronic equipment, including temperature, humidity, shock, vibration, and other parameters
			2. Safety
				1. Underwriters Laboratories (UL) and cUL 60950, UL/IEC 62368-1 – Information Technology Equipment
				2. EN 45545: Railway Applications – Fire Protection on Railway Vehicles
		1. Definitions
			1. Dewarping – A process in which an image or set of images is rendered in a flat plane with spatial distortions corrected by a curvilinear type algorithm to create a normal appearance.
			2. Virtual Camera (VCam) – An image stream which is the result of taking a selected portion of a camera’s field of view and presenting it as if it were a single camera dedicated to that view.
	1. **SUBMITTALS**
		1. Product Data
			1. Manufacturer’s printed or electronic data sheets
			2. Manufacturer’s installation and operation manuals
			3. Warranty documentation
	2. **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.
	3. **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 controlled environment protected from mechanical and environmental conditions as designated by the manufacturer.
	4. **WARRANTY AND SUPPORT**
		1. Manufacturer shall provide a limited 5 year warranty for the product to be free of defects in material and workmanship.

END OF SECTION

1. **PRODUCTS**
	1. **EQUIPMENT**
		1. Manufacturer: Oncam Global Ltd.

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* + 1. Model
			1. M12 Connector EVO-05-LCM (White)
			2. RJ45 Connector EVO-05-LCD (White)
		2. Alternates: None
	1. **GENERAL DESCRIPTION**
		1. The 360o 5 MP mini panel-mount video camera (“360degreecamera”) shall have no moving parts and be capable of providing 360 degree surveillance with no blind spots.
		2. The 360 degree camera shall possess the following primary characteristics:
			1. suitable for mounting on panels of 0.04” to 0.12” (1 – 3 mm) thickness
			2. employ a single image sensor capable of providing 2592H x 1944V resolution
			3. provide dewarping software to convert the spherical video image into a continuous flat view
			4. H.264 and MJPEG compression
			5. 30fps for 1MP and ¼MP resolution, 15fps for 2MP resolution, 10fps for 4MP full resolution
			6. Unicast support for up to 20 simultaneous users depending on the resolution settings
			7. Multicast supported for all H.264 camera streams
			8. 0.2 lux minimum illumination, providing clarity in low light
			9. 10x zoom with Oncam 3D client-side dewarping software
			10. 10 configurable privacy regions
			11. 8 polygonal Video Motion Detection regions
			12. built-in microSD card slot. Supports cards up to 128 GB capacity. Speed class 10 or higher required
			13. video file transfer available by FTP
			14. image snapshot transferred by email
			15. operate on an embedded Linux platform
			16. include a built-in web server
			17. PoE (IEEE standard 802.3af) powered
			18. EN50155 / EN45545 transport certification
	2. **VIDEO**
		1. Imager
			1. Sensor: 5 MP, Array Format 2592H x 1944V = 5,038,848 pixels and 1/2.5-Inch CMOS Sensor
			2. Minimum illumination: 0.2 lux (50 IRE, F/2.0)
			3. Scanning: Progressive
		2. Image Control Settings
			1. Automatic white balance (AWB): 2,500K to 8,000K (approximately)
			2. Privacy zone definition: 10 configurable zones
			3. Wide Dynamic Range (WDR): Electronic WDR 60dB
			4. Brightness
			5. Contrast
			6. Saturation
			7. Exposure compensation
			8. Compression – image quality Multi-levels of compression and frame rate adjustment
		3. Lens: 185o fixed, F/2.0
			1. Angle of view: 180o horizontal, 168o vertical(hemispherical)
		4. Video Streams
			1. The 360 degree camera shall support three configurable video streams, two of which can be streamed concurrently, whose properties are detailed in Attachment A.
			2. Available compression types:
				1. H.264, available in 2 streams
				2. MJPEG, available in 1 stream
				3. Available resolutions:

H.264 compression

2144 x 1944 (4 MP)

1488 x 1360 (2 MP)

1056 x 960 (1 MP)

528 x 480 (1/4 MP)

MJPEG compression

2144 x 1944 (4 MP)

1488 x 1360 (2 MP)

1056 x 960 (1 MP)

528 x 480 (1/4 MP)

* + - 1. Bit rate
				1. Range: 0.8 Mbps – 5 Mbps (Constant Bit Rate)
				2. H.264 options:

Constant Bit Rate

Variable Bit Rate

Capped Variable Bit Rate

GOP length

Maximum frames per second

* + - * 1. MJPEG options:

maximum frames per second

quality

* + - 1. Frame rate: 0 – 30 fps
			2. Presentation: Three configurable video streams in the form of fisheye views (one of which shall be MJPEG)
			3. Video streams shall support ONVIF profile S.
		1. Video Viewing
			1. Video and snapshots shall be capable of being accessed through the following means:
				1. JPEG images accessible through a web browser
				2. Video streaming through an available media player
				3. ONVIF driver
		2. Storage and Recording
			1. The 360 degree camera shall have the facility for onboard microSD card storage up to 128 GB.
			2. Compatible with ONVIF Profile G (Recording)
		3. Video Motion
			1. Video motion analytics shall be pre-loaded in the 360 degree camera.
			2. The 360 degree camera shall have the ability to detect motion within up to 8 user defined polygonal areas of the video image.
		4. Pan Tilt Zoom (PTZ) Functionality - The 360 degree camera shall support 10x digital zoom with Oncam 3D client side dewarping software.
	1. **ADDITIONAL FEATURES**
		1. Event management – The 360 degree camera shall perform selected response actions when triggered by selected inputs as follows:
			1. Response actions:
				1. FTP file transfer
				2. e-mail via SMTP
				3. local recording
			2. Trigger inputs:
				1. motion in a pre-defined area
				2. HTTP event
				3. network connection lost
		2. Integrations – The 360 degree camera shall have available an API and an SDK to support integrations with third party manufacturers, including VMS and network storage providers.
	2. **NETWORK**
		1. Connectivity: 100BASE-TX Ethernet with **[RJ-45] <M12 socket>** connector
		2. Protocols supported
			1. Transmission Control Protocol (TCP), Internet Protocol (IP) v4, User Datagram Protocol (UDP)
			2. Configuration: Dynamic Host Configuration Protocol (DHCP)
			3. Web services: Hypertext Transfer Protocol (HTTP)
			4. Network services: Domain Name System (DNS), Network Time Protocol (NTP), Internet Control Message Protocol (ICMP), Universal Plug and Play (UPnP)
			5. Media: Real-Time Transport Protocol (RTP), Real-Time Streaming Protocol (RTSP)
			6. Multicast: Internet Group Management Protocol (IGMP)
			7. Notifications: File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), Simple Network Management Protocol v2 or v3 (SNMP)
		3. Unicast - The 360 degree camera shall support 20 simultaneous users of independent streams.
		4. Multicast – The 360 degree camera shall support multicast for all H.264 camera streams
		5. Security
			1. The 360 degree camera shall have a user configurable password feature.
			2. IEEE 802.1x Authentication
	3. **CAMERA SOFTWARE**
		1. Web Server - The 360 degree camera shall have a built in web server which supports browser-based configuration of the camera.
			1. The camera’s web server shall allow access to camera information and all primary software functions to include:
				1. Image settings
				2. Network settings
				3. User privilege levels

minimum number of privilege levels: 3

* + - * 1. Alarm settings, triggers, and actions

Triggers:

motion

network connection lost

Actions:

Email (SMTP)

FTP file transfer

Records to microSD card

* + - * 1. Camera settings

Frames per second

Quality

Bit rate control

Compression settings

* + - * 1. Clock settings
				2. Video stream settings

Resolution

Compression

* + - * 1. microSD card recording settings
				2. Maintenance

Factory reset

Reboot camera

* + - * 1. Image regions

Privacy zones

Motion detection zones

* + - 1. The camera’s web server shall support up to 20 clients simultaneously over the network.
		1. Setup and Maintenance - The Manufacturer shall offer a setup and maintenance software tool to implement the following actions:
			1. Scan local network to discover compatible cameras
			2. Remotely change and configure camera settings, including network settings
			3. Remotely import or export network settings
			4. Upgrade camera firmware
			5. Remotely send commands to camera
			6. Send configuration settings to multiple cameras
		2. Diagnostics
			1. The 360 degree camera shall have a self-monitoring function which automatically resets the camera in the event of malfunction.
			2. The 360 degree camera shall have a diagnostics tool to test hardware functionality, accumulate statistics, and diagnose hardware faults.
			3. The 360 degree camera’s microSD card shall allow the creation and storage of a boot-up function for diagnostics and fault finding.
	1. **ELECTRICAL**
		1. Power
			1. PoE: IEEE 802.3af
			2. Power Consumption: 4.13 W maximum
		2. Connector (Ethernet and PoE): **[RJ-45] <M12 Socket>** connector via 1 m (3 foot) flying lead
	2. **MECHANICAL AND ENVIRONMENTAL**
		1. Housing Material: Polymer
		2. Dimensions: 4.5” D x 2.7” H (114 x 68 mm)
		3. Temperature (operating and storage): 0° C to 40° C (32° F to 104° F)
		4. Relative Humidity: Up to 98% non-condensing

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. Before permanent installation of the system, the Contractor shall test the system in conditions simulating the final installed environment
			1. A report indicating successful test results shall be produced.
	3. **INSTALLATION**
		1. Contractor personnel shall follow all Manufacturer published installation instructions and guidelines.
		2. The 360 degree camera shall not be deployed in air handling spaces.
		3. Contractor shall insure that the camera shall contain the latest revision of Manufacturer firmware.
	4. **STORAGE**
		1. The 360 degree camera hardware shall be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.
	5. **ATTACHMENTS**
		1. Video Stream Properties

END OF SECTION

**Attachment A**

**Video Stream Properties**

