**CSI 2010 Specification for:**

**FLIR Quasar™ Premium Mini-Dome
CM-640x Cameras**

**Notes to Specifier:**

1. **This CSI 2010-compliant specification is designed to allow the specifier to specify FLIR or similar products for any type of project. Specifier can easily customize this specification to his/her needs.**
2. **The specification is not proprietary to FLIR. Any suitable brand can be specified using this specification.**
3. **FLIR has placed Text Boxes such as this in bold to alert the specifier of important information. Delete all Text Boxes after editing.**
4. **FLIR has also placed edit prompts “[ ]” throughout the specification to prompt the specifier to add or modify information relative to the paragraph at hand. Delete all Edit Prompts “[ ]” after editing.**
5. **Delete this section after editing this document.**

# GENERAL

* 1. Summary:
		1. This Specification is for a 5-megapixel HD (CM-6405) or a 4K UHD (CM-6408) True (Shutter) Wide Dynamic Range (WDR), quad-stream, mini-dome digital video camerawith an integrated infrared (IR) illuminator and variable-focus 2.7-12mm F1.6 (CM-6405) or 4.46-11mm F1.47-F2.5 (CM-6408) lens, and true day/night modes, for installation into a fully operational digital video system. This Specification is part of a larger project which may be covered in one or more of the Specification sections listed below.
		2. Alternatively, if no related specification references are listed below, this Specification shall be used to describe the purchase and supply of cameras alone. In such a case, installation of said cameras may or may not be included in the scope of work. See Articles 1.5, and 1.7 below for a descriptive narrative of any applicable installation requirements.
	2. Section Contents and Related Specification References:
		1. This Specification may be part of a larger security system project. ***[If so, utilize the appropriate specification sections below.]*** Refer to the appropriate CSI 2010 Specification sections as referenced below: ***[Delete any sections not for coordination to this work.]***
			1. 000000 – Procurement and Contracting Requirements (Division 0)
			2. 010000 – General Requirements (Division 1)
			3. 020000 – Existing Conditions (Division 2)
			4. 080000 – Openings (Doors, Door Hardware and other Openings) – (Division 8)
			5. 101400 – Signage (Division 10)
			6. 111200 – Parking Control Equipment (Division 11)
			7. 142000 – Elevators (Division 14)
			8. 250000 – Integrated Automation Systems (Division 25)
			9. 260000 – Electrical (Division 26)
			10. 270000 – Communications (Division 27)
				1. 271000 – Data Communications Network Equipment (including Firewalls, Routers, Codecs, Switches and Access Points)
				2. 272200 – Data Communications Hardware (including Servers, Storage, Workstations, Printers, etc.)
				3. 273000 – Voice Communications
			11. 280000 – General Security System Specification (Division 28)
				1. 280800 – Commissioning of Electronic Safety and Security
				2. 281000 – Electronic Access Control and Intrusion Detection

# Section 281600 – Intrusion Detection

# Section 281619 – Intrusion Detection Remote Devices and Sensors

# Section 282000 – Electronic Surveillance

# Section 282300 – Video Surveillance

# Section 282313 – Video Surveillance Control and Management Systems

# Section 282316 – Video Surveillance Monitoring and Supervisory Interfaces

# Section 282323 – Video Surveillance Systems Infrastructure

# Section 282329 – Video Surveillance Remote Devices and Sensors

* 1. Drawings and Specifications:

# Drawings:

* + - 1. ***[Include this paragraph if Drawings were included.]*** Drawings delivered with these Specifications show device locations, and may show conduits, details, device schedules and single-line or detailed schematics.
			2. ***[Include this paragraph if Drawings were not included.]*** Drawings are not included. See the descriptive narratives in Articles 1.5 and 1.7 below.

# Specifications: The Specifications describe the Scope of Work including:

* + - 1. Section 1 – System Descriptions, all items to be delivered and installed and all services to be performed.
			2. Section 2 – Products, describes acceptable products.
			3. Section 3 – Execution, describes the standards and practices to be used by the installer for this work.
	1. Project Background and Site Conditions:
		1. ***[Fill in Project Background and Site Conditions for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]***
		2. See Section 282313 – Video Surveillance Control and Management Systems

# Scope of Work – Product Description:

* + 1. ***[Furnish] or [Furnish and Install]*** a quantity of H.265/H.264/MJPEG quad-stream digital video cameras of the quantity as shown on the associated Purchase Order or Bill of Quantities.

# Submittals:

* + 1. ***[Fill in Submittal Requirements for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]***
		2. See Section 013300 – Submittal Procedures

# Quasar Premium Mini-Dome CM-640x Installation and User Guide

# Quasar Premium Mini-Dome CM-640x Quick Install Guide

# Delivery, Storage and Handling:

# *[Fill in Submittal Requirements for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# See Section 016000 – Product Requirements

# Quality Assurance:

# *[Fill in Submittal Requirements for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# Manufacturer:

# Minimum 10 years’ experience in manufacture and design of IP Video Surveillance Systems.

# ISO 9001:2008 certification

# Installer:

# Minimum 5 years’ experience in installing IP Surveillance Systems.

# All camera installation, configuration and commissioning shall be performed by technicians fully authorized by manufacturer.

# Applicable Codes and Standards:

# *[Fill in Applicable Codes and Standards for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# USA: UL, FCC Part 15 (subpart B, class A)

# International:

# CE marked

# EN 55032: 2015 + AC: 2016, Class A (Emissions for Multimedia Equipment)

# EN 50130-4: 2011 + A1: 2014 (Immunity for Alarm Systems)

# EN 61000-6-4: 2007 + A1: 2011 (Emissions for Industrial)

# EN 61000-3-2: 2014 (Limits for Harmonic Current Emissions)

# EN 61000-3-3: 2013 (Limits for Voltage Fluctuations and Flickers)

# EN 62368-1: 2014 + A11: 2017 (Product Safety for AV & IT Equipment)

# EN 62262: 2002 – IK10 Upper (Impact Resistance)

# IEC 60529: 2013 – IP66 (Enclosure Ratings)

# IEC 60068-2-27: 2008 (Non-Operating Mechanical Shock)

# IEC 60068-2-64: 2008 (Non-Operating Vibration)

# RoHS II

# RCM

# H.265, H.264, MJPEG

# See Section 282313 – Video Surveillance Control and Management Systems

# Warranty:

# *[Fill in specific services for this work here or delete this paragraph and include the paragraph below if this is part of a complete system.]*

# Manufacturer’s warranty will cover four years for replacement or repair of defective equipment.

# PRODUCTS

* 1. Acceptable Manufacturer/Model:
		1. Provide FLIR Quasar 5-megapixel HD (CM-6405) or a 4K UHD (CM-6408) quad-stream H.265/H.264/MJPEG True (Shutter) WDR, mini-dome digital video camera or approved equivalent by a major manufacturer.
	2. General Product Description:
		1. 5-megapixel HD (CM-6405) or a 4K UHD (CM-6408) quad-stream H.265/H.264/MJPEG, True (Shutter) WDR, IP66-rated day/night digital video camera with variable-focus 2.7-12mm F1.6 (CM-6405) lens or variable-focus 4.46-11mm F1.47-F2.5 (CM-6408) lens, within an IK10 vandal-resistant housing for indoor/outdoor ceiling, wall, or pendant mounting.
		2. The digital video camera shall support H.265/H.264/MJPEG compression on four (4) simultaneous video streams, up to 5 megapixels (CM-6405) or 4K UHD (CM-6408) through a digital network.
		3. Resolution and bandwidth shall be scalable.
		4. The camera shall incorporate a fully digital 1/2.7" CMOS 2688x1944 (5MP) or 1/1.8" CMOS
		3864x2180 (4K UHD) Progressive Scan BSI CMOS imaging system with IR illumination and electronic day/night ICR for infrared sensitivity.
		5. The camera shall support infrared illumination up to 40 meters (131 feet); with sun shield, up to 28 meters (91.8 feet).
		6. The camera shall provide bi-directional audio via audio I/O.
		7. The camera shall accommodate one (1) alarm input and provide one (1) relay output.
		8. The camera shall provide a microSD card slot and support microSD/microSDHC/microSDXC 8GB to 512GB (Class 10) cards.
		9. The camera may be powered by DC12V, AC24V, or IEEE 802.3af PoE (Class 0).
		10. The camera shall be IEEE-compliant utilizing the multicast networking protocol such that a single camera may be transmitted to multiple viewers/archivers on the network simultaneously, reducing bandwidth and providing greater flexibility in network monitoring/recording configurations.
		11. The camera shall support an optional sun shield.
		12. The camera shall support direct surface mounting; it shall not require a backbox and shall not include a system cable.
	3. Product Performance Requirements:
		1. The digital video camera shall provide the user with H.265/H.264/MJPEG video compression on up to four digital streams simultaneously.
		2. Resolution shall be scalable from D1 to 5MP (CM-6405) or 4K UHD (CM-6408) for selected digital streams, which may be set to unicast or multicast.
		3. Bandwidth shall be scalable between 64Kbps and 20Mbps.
		4. The audio capabilities shall support either half-duplex or full-duplex audio on two-way connections.
		5. The camera shall support G.711 a/μ-law and AAC audio compression, and PCM audio.
		6. The camera shall accommodate one (1) digital alarm input and provide one (1) digital alarm relay output.
		7. The camera shall provide a browser-based web page for live video viewing; configuration; and control.
		8. Motion Detection:
			1. The camera shall provide intelligent multi-zone video motion detection with the following configurable parameters:
				1. Sampling pixel interval (1-10)
				2. Detection level (1-100)
				3. Sensitivity level (1-100)
				4. Time interval (sec) (0-7200)
		9. Storage and Bandwidth Efficiency:
			1. Motion Compensation and Processing:
				1. The camera shall employ industry-standard motion compensation methods as described and recommended by the Motion Pictures Experts Group (MPEG) to control and reduce the storage and bandwidth consumption associated with scene motion.
				2. Compliant motion compensation shall employ a block-matching algorithm covering an area of at least 256 macro-blocks surrounding each block to be processed.
				3. The motion compensation process shall output industry-standard H.265/H.264 compliant motion vectors as described and recommended by the Motion Pictures Experts Group (MPEG) to control and reduce storage and bandwidth consumption associated with scene motion.
				4. The compliant motion vectors shall be compatible with and verifiable using Windows Media Player equipped with FFDSHOW or equivalent utility to visualize the motion vectors contained within the resulting H.265/H.264 video stream.
			2. Compression Efficiency:
				1. The camera shall provide an effective rate control algorithm which maintains set frame rates of full 30fps (NTSC) or 25fps (PAL) at 5MP or 4K UHD using no more than 45 (+/-10%) pixels per bit of storage with full screen (100%) motion including panning/tilting velocities of at minimum 25% of the camera field of view per second.
				2. The images shall remain free of objectionable compression artifacts when operating as defined in paragraph “H.2.a” under recommended lighting conditions.
				3. Pixels per bit (ppb) efficiency shall be defined as ppb = (ppf)\*(fps)/(bps) where:

ppb = pixels per bit

ppf = pixels per frame (= horizontal resolution x vertical resolution)

fps = frames per second

bps = bits per second. This is a bandwidth measurement which equals the Kb/s generated by the camera x1000

* 1. Technical Specifications:
		1. Camera:
			1. Image Sensor:
				1. CM-6405: 1/2.7” CMOS
				2. CM-6408: 1/1.8” CMOS
			2. Sensor Resolution:
				1. CM-6405: 5 megapixels (2688x1944)
				2. CM-6408: 4K UHD (3864x2180)
			3. Scanning Mode: Progressive
			4. CM-6405 Sensitivity, measured at 30 IRE:
				1. Color (Day) Mode: 0.08 Lux
				2. B/W (Night) Mode: 0.008 Lux, 0 Lux with IR illuminator on
			5. CM-6408 Sensitivity, measured at 30 IRE:
				1. Color (Day) Mode: 0.04 Lux
				2. B/W (Night) Mode: 0.002 Lux, 0 Lux with IR illuminator on
			6. CM-6405 Lens Type:
				1. Variable-focus 2.7-12mm F1.6 lens
				2. HFOV: 31.5°-102°
				3. VFOV: 22.7°-70.2°
			7. CM-6408 Lens Type:
				1. Variable-focus 4.46-11mm F1.47-F2.5 lens
				2. HFOV: 40.43°-110.76°
				3. VFOV: 22.65°-57.14°
			8. IR Illuminator:
				1. Type: High-power/high-efficiency SMD devices with wide-angle illumination
				2. Effective IR range: 40 meters (131 feet); with sun shield, up to 28 meters (91.8 feet)
				3. IR Modes: Auto/Night/Day/Light Sensor/Light On/Light Off/Smart. Smart mode eliminates erroneous switching from night (B/W) to day (color) mode when the IR illuminator is on.
				4. Day/Night and Night/Day Thresholds: 1-9 (darker-brighter)
			9. White Balance: Auto/ATW/Smart/One Push/Smart Touch/Manual
			10. Automatic Electronic Shutter: 1/1 to 1/32,000 sec.
			11. Digital Slow Shutter: 1~60 fps (NTSC)/1~50 fps (PAL)
			12. Noise Reduction: 2D (On/Off), 3D (Off/3 levels), ColorNR (Off/3 levels)
			13. Exposure Modes:

|  |  |  |
| --- | --- | --- |
| **Mode** | **CP-6405** | **CP-6408** |
| Auto Iris | - | ● |
| P-Iris Priority | ● | ● |
| Iris Priority | - | ● |
| Auto | - | ● |
| Shutter Priority | - | ● |
| Manual | ● | ● |

* + - 1. True (Shutter) Wide Dynamic Range: 130dB
			2. Tamper Detection (On/Off)
			3. Privacy Zones: Up to 5 (On/Off)
			4. Video Motion Detection: Up to 4 independent zones (On/Off/By schedule)
			5. Digital Zoom: (Off/2x-10x)
		1. Video:
			1. Compression: H.265 (MPEG-H Part 2) Main Profile; H.264 (MPEG-4 Part 10) Main/High Profile; and MJPEG
			2. CM-6405 Maximum Performance:

H.264/H.265 30/25 FPS @ 5M (NTSC/PAL) + 30/25 FPS @ D1 or
H.264/H.26515/12 FPS @ 5M + 1080P + D1 (NTSC/PAL) or
H.264/H.265 60/50 FPS @ 1080P + 30/25 FPS @ 720P + D1 (NTSC/PAL)

* + - 1. CM-6408 Maximum Performance:

H.264/H.265 30/25 FPS @ 4K (NTSC/PAL) + 30/25 FPS @ D1 or

H.264/H.265 15/12 FPS @ 4K + 1080P + D1 (NTSC/PAL) or

H.264/H.265 60/50 FPS @ 1080P + 30/25 FPS @ 720P + D1 (NTSC/PAL)

* + - 1. Resolution Range: Up to 4 user-selectable resolutions from D1 to 5MP (CM-6405) or 4K UHD (CM-6408).
			2. Bandwidth:
				1. Configurable between 64Kbps to 20Mbps
				2. Rate Control (H.265 or H.264): CBR/VBR/LBR
			3. Video Motion Detection (VMD):
				1. Intelligent multi-zone VMD
				2. Up to four independent zones
		1. Audio:
			1. Bi-directional:
				1. 1 line-level input
				2. 1 line-level output
			2. Compression: G.711 a/µLAW, AAC
		2. Alarms:
			1. Input: 1 dry alarm contact 5V, 10k Ω pull up
			2. Output: 1 relay contact max DC 5V 130mA
		3. Network:
			1. Ethernet: 10/100/1000, IEEE 802.3, auto sensing 1 x RJ45
			2. Protocols: IPV4/6, HTTP, HTTPS, UPnP, DNS, NTP, RTSP, RTP, TCP, UDP, ICMP, IGMP, DHCP, ARP, IEEE 802.1X, SNMP, QoS, TLS, SMTP, FTP, DDNS, PPPoE, RTCP
			3. Digital Streams: Four video streams plus bi-directional audio on Ethernet connection
			4. Web Browsers: Internet Explorer, Firefox, Chrome, Edge, Safari
		4. Management:
			1. Remote Configuration: Via browser-based interface or supported video management software
			2. Firmware Upgrades: Flash memory for upgrade of camera firmware over the network
		5. Power:
			1. Input Voltage:
				1. DC12V or AC24V, max 11.5 watt (CM-6405) or 12.43 watt (CM-6408)
				2. PoE: IEEE 802.3af (Class 0)
			2. Power Consumption:
				1. CM-6405: 11.5W with heater and IR
				2. CM-6408: 12.5W with heater and IR
		6. Connectors:
			1. RJ45: Network and PoE
			2. Four-pin power terminal block connector:
				1. DC12V
				2. AC24V
			3. Nine-pin I/O terminal block:
				1. Audio In/Out
				2. Alarm In/Out
			4. microSD card slot: For onboard storage, supporting microSD/microSDHC/microSDXC 8GB to 512GB (Class 10) cards (card not included)
		7. Physical and Mechanical:
			1. Physical:
				1. Dimensions: 161x128.6 mm (6.3 x 5 in.)
				2. Unit Weight: 1.3kg (2.86 lbs.)
				3. Enclosure: Indoor/outdoor IP66 and IK10 vandal-resistant
			2. Mechanical:
				1. Pan / Tilt / Spin: 356° / ±80° / ±98°
		8. Environmental:
			1. Operating Temperature:
				1. -30°C~60°C (-22°F~140°F) without heater
				2. -55°C~60°C (-67°F~140°F) with heater
				3. Cold start: -40°C~60°C (-40°F~140°F) with heater
			2. Storage Temperature: -20°C~70°C (-4°F~158°F)
			3. Humidity: Up to 90% (non-condensing)
			4. Internal Heater: Automatic
		9. Regulatory:
			1. USA: UL, FCC Part 15 (subpart B, class A)
			2. International:
				1. CE marked
				2. EN 55032: 2015 + AC: 2016, Class A (Emissions for Multimedia Equipment)
				3. EN 50130-4: 2011 + A1: 2014 (Immunity for Alarm Systems)
				4. EN 61000-6-4: 2007 + A1: 2011 (Emissions for Industrial)
				5. EN 61000-3-2: 2014 (Limits for Harmonic Current Emissions)
				6. EN 61000-3-3: 2013 (Limits for Voltage Fluctuations and Flickers)
				7. EN 62368-1: 2014 + A11: 2017 (Product Safety for AV & IT Equipment)
				8. EN 62262: 2002 - IK10 Upper (Impact Resistance)
				9. IEC 60529: 2013 - IP66 (Enclosure Ratings)
				10. IEC 60068-2-27: 2008 (Non-Operating Mechanical Shock)
				11. IEC 60068-2-64: 2008 (Non-Operating Vibration)
				12. RoHS II
				13. RCM
		10. Optional Accessories:
			1. Recessed mount kit
			2. Corner mount kit
			3. Pole mount kit
			4. Sun shield
			5. Clear bubble
			6. Smoked bubble
			7. Pendant mount shroud kit
			8. Pendant mount kit

# EXECUTION

# Examination:

# See Section 282313 – Video Surveillance Control and Management Systems

# Installation:

# See Section 282313 – Video Surveillance Control and Management Systems

# Preparation:

# See Section 282313 – Video Surveillance Control and Management Systems

# Quality Control:

# See Section 282313 – Video Surveillance Control and Management Systems

# Testing and Commissioning:

# See Section 282313 – Video Surveillance Control and Management Systems

# Handing Over:

# See Section 282313 – Video Surveillance Control and Management Systems

--- End of Specifications ---