

21. VIDEO SURVEILLANCE SYSTEM

MobileView 9000 Series system shall be distributed by UTC Climate, Controls & Solutions or an approved equal.

21.1. Supported Cameras include:

- a. MVC-9000-28-WI
- b. MVC-9000-40-WI
- Cameras shall have the ability to capture, encode and transmit video over a network.
- Cameras shall support the encoding of all images with a digital watermark. The verification of watermarked images shall reside solely with the manufacturer.

21.2. Exterior Cameras

- a. The 9000 Series camera shall include, but not be limited to the following:
 - The camera shall provide 1/3" Progressive Scan CMOS sensor.
 - The camera shall provide IR Cut filter.
 - The camera shall provide infrared LED lights.
 - The camera shall provide smart IR function, to avoid over-exposure.
 - The camera shall provide 15m IR range at minimum.
 - The camera shall provide low-light capabilities with sensitivity down to 0.5Lux at 70 IRE in Color @ f1.2 (AGC on), and 0Lux at 70 IRE in B/W with IR @ f1.2 (AGC on).
 - The camera shall provide integrated heater.
 - The camera shall provide 2.8mm/4mm lens.
 - The camera shall support both +12VDC and PoE (802.3af) power supply.
 - The camera shall consume no more than 8.5W.
 - The camera shall provide reset button.
 - The camera shall provide 3D noise reduction function.
 - The camera shall provide Digital Wide Dynamic Range function.

- The camera shall provide White balance function.
 - The camera shall support 3-axis adjustment.
 - The camera shall support mirror and rotate mode.
- b.** The camera shall support protocol:
- TCP/IP
 - HTTP
 - FTP
 - DHCP
 - DNS
 - DDNS
 - RTP
 - RTSP
 - PPPoE
 - NTP
 - UPnP
 - SMTP
 - SNMP
 - 802.1X
 - QoS
 - IPv4
 - IPv6
- c.** The camera shall support:
- ONVIF (Profile S)
 - PSIA
 - CGI

21.3. Recording

- a. Video compression shall support three simultaneous streams:
- Primary Stream: H.264
 - Alternate Stream: H.264/MJPEG
 - Alarm Stream: H.264
 - Resolution shall be user configurable with the following options: 1280 x 960, 1280 x 720, 704 x 480, 640 x 480, 352 x 240, 320 x 240
 - The camera shall support the following user programmable frame rates: 30, 25, 22, 20, 18, 16, 15, 12, 10, 8, 6, 4, 2, 1, 1/2, 1/4, 1/8, 1/16
 - The camera shall support the following bit rate: 64Kbps - 6Mbps
 - The camera shall be able to continue streaming without disruption when the user adjusts the frame rate.
 - The camera shall be user configured via Ethernet with a personal computer running a current web browser.
- b. The camera shall have an integrated web client interface to configure, upgrade and view the following information:
- View live video
 - Hear live audio
 - Configure system settings
 - Configure network settings
 - Configure camera settings
- c. Configurable options shall include:
- Service:
 - Auto-Defog (Heater)
 - Video:
 - Resolution, frame rate and bit rate

- Camera title and date/time
- Image:
- Saturation
- Brightness
- Contrast
- Sharpness
- Exposure
- Day/Night Settings
- Backlight / Wide Dynamic Range
- Digital Noise Reduction
- Orientation (Rotate, Mirror)
- Alarms:
- Video Tampering
- d. IP Settings:
 - TCP/IP
 - Port

21.4. Physical

- a. The camera shall include the following connectors:
 - 12V Molex 39-01-2021
 - Communication: 1 RJ45 10 M/100M Ethernet port
 - Video Output: 1.0V peak-to-peak, 75 Ohm
 - Electrical:
 - Power Supply: 12VDC, PoE (IEEE 802.34af)
 - Environmental:
 - Ratings: IP68 and IK-10

- Operating temperature: -30°C to +65°C (-22°F to 149°F) (cold start at -30°C, and continuous operation at -30°C)
- b. Physical Dimensions:
 - Dimension: 156 x 111 x 60 mm
 - Weight: 0.9 kg
- c. The camera shall conform to these internationally recognized compliance standards:
 - FCC
 - CE
 - UL
 - RoHS

21.5. Accessory

- a. The camera shall include the following accessories in the package box:
 - Y Splitter Cable
 - Drill Template
 - Hex Wrench
 - Quick Operation Guide
 - Molex Connector/Pins

21.6. Interior Cameras

MobileView™ 9100 Series cameras shall be distributed by UTC Climate, Controls & Security or an approved equal.

- a. Supported Cameras include:
 - MVC-9100-28-BK
 - MVC-9100-80-BK
 - MVC-9100-28-WI
 - MVC-9100-40-WI

- MVC-9100-60-WI
- Cameras shall have the ability to capture, encode and transmit video over a network.
- Cameras shall support the encoding of all images with a digital watermark. The verification of watermarked images shall reside solely with the manufacturer.
- b. Accessory
- c. The camera shall include the following accessories in the package box:
- d. Y Splitter Cable
- e. Drill Template
- f. Hex Wrench
- g. Quick Operation Guide
- h. Lens Adjusting Tool
- i. Molex Connector/Pins
- j. Molex Adapter Cable
- k.
 - The camera shall provide 1/3" Progressive Scan CMOS sensor.
 - The camera shall provide IR Cut filter.
 - The camera shall provide infrared LED lights.
 - The camera shall provide smart IR function, to avoid over-exposure.
 - The camera shall provide 15m IR range at minimum.
 - The camera shall provide low-light capabilities with sensitivity down to 0.5Lux at 70 IRE in Color @ f1.2 (AGC on), and 0Lux at 70 IRE in B/W with IR @ f1.2 (AGC on).
 - The camera shall provide integrated heater.
 - The camera shall provide 2.8mm/4mm lens.
 - The camera shall support both +12VDC and PoE (802.3af) power supply.
 - The camera shall consume no more than 8.5W.

- The camera shall provide reset button.
- The camera shall provide 3D noise reduction function.
- The camera shall provide Digital Wide Dynamic Range function.
- The camera shall provide White balance function.
- The camera shall support 3-axis adjustment.
- The camera shall support mirror and rotate mode.

l. The camera shall support protocol:

- TCP/IP
- HTTP
- FTP
- DHCP
- DNS
- DDNS
- RTP
- RTSP
- PPPoE
- NTP
- UPnP
- SMTP
- SNMP
- 802.1X
- QoS
- IPv4
- IPv6

m. The camera shall support:

ONVIF (Profile S)

PSIA

CGI

21.7. Camera

- a.** The 9100 Series camera shall include, but not be limited to the following:
- The camera shall provide 1/3" Progressive Scan CMOS sensor.
 - The camera shall provide IR Cut filter.
 - The camera shall provide infrared LED lights.
 - The camera shall provide smart IR function, to avoid over-exposure.
 - The camera shall provide 5m IR range at minimum.
 - The camera shall provide low-light capabilities with sensitivity down to 0.5Lux at 70 IRE in Color @ f1.2 (AGC on), and 0Lux at 70 IRE in B/W with IR @ f1.2 (AGC on).
 - The camera shall provide 2.8mm/4mm/6mm/8mm lens.
 - The camera shall support both +12VDC and PoE (802.3af) power supply.
 - The camera shall consume no more than 5W.
 - The camera shall provide reset button.
 - The camera shall provide built-in microphone.
 - The camera shall provide 3D noise reduction function.
 - The camera shall provide Digital Wide Dynamic Range function.
 - The camera shall provide White balance function.
 - The camera shall support 3-axis adjustment.
 - The camera shall support mirror and rotate mode.
- b.** The camera shall support protocol:
- TCP/IP
 - HTTP

- FTP
- DHCP
- DNS
- DDNS
- RTP
- RTSP
- PPPoE
- NTP
- UPnP
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- IPv4
- IPv6
- c. The camera shall support:
 - ONVIF (Profile S)
 - PSIA
 - CGI

21.8. Recording

The 9100 Series camera shall support the following:

- a. Video compression shall support three simultaneous streams:
 - Primary Stream: H.264
 - Alternate Stream: H.264/MJPEG
 - Alarm Stream: H.264

- Audio compression shall support:
 - G.711ulaw/G.711alaw/MP2L2/G.726
 - Audio Environmental Noise Filter
 - Resolution shall be user configurable with the following options: 1280 x 960, 1280 x 720, 704 x 480, 640 x 480, 352 x 240, 320 x 240
 - The camera shall support the following user programmable frame rates: 30, 25, 22, 20, 18, 16, 15, 12, 10, 8, 6, 4, 2, 1, 1/2, 1/4, 1/8, 1/16
 - The camera shall support the following bit rate: 64Kbps - 6Mbps
 - The camera shall be able to continue streaming without disruption when the user adjusts the frame rate.
- b. The camera shall be user configured via Ethernet with a personal computer running a current web browser.
- c. The camera shall have an integrated web client interface to configure, upgrade and view the following information:
 - View live video
 - Hear live audio
 - Configure system settings
 - Configure network settings
 - Configure camera settings
- d. Configurable options shall include:
 - Video:
 - Resolution, frame rate and bit rate
 - Camera title and date/time
- e. Image:
 - Saturation
 - Brightness
 - Contrast
 - Sharpness

- Exposure
- Day/Night Settings
- Backlight / Wide Dynamic Range
- Digital Noise Reduction
- Orientation (Rotate, Mirror)
- f. Alarms:
 - Video Tampering
- g. IP Settings:
 - TCP/IP
 - Port

21.9. Physical

- a. The camera shall include the following connectors:
 - 12V & Line Level Audio: Molex 39-01-4036
 - Communication: 1 RJ45 10 M/100M Ethernet port
 - Video Output: 1.0V peak-to-peak, 75 Ohm
- b. Electrical:
 - Power Supply: 12VDC, PoE (IEEE 802.34af)
- c. Environmental:
 - Ratings: IP66 and IK-7
 - Operating temperature: -20°C to +60°C (-4°F to 140°F) (cold start at -20°C, and continuous operation at -20°C)
- d. Physical Dimensions:
 - Dimension: 99 x 97 x 53 mm
 - Weight: 0.4 kg
- e. The camera shall conform to these internationally recognized compliance standards:

- FCC
- CE
- UL
- RoHS

21.10. Accessory

- a. The camera shall include the following accessories in the package box:
- Y Splitter Cable
 - Drill Template
 - Hex Wrench
 - Quick Operation Guide
 - Lens Adjusting Tool
 - Molex Connector/Pins
 - Molex Adjusting Tool

21.11. Central Station

- a. The DVR system shall include, at a minimum, three Central Stations. The Central Station shall be a personal computer (PC) operating under Windows®. The Central Station Browser software can search and recall previously recorded video from the DVR's removable drive and shall include playback features (such as "animate") and selectable speed utilizing a slide speed bar. The Central Station software can also output the recorded images to other devices. The Central Station shall meet the following specifications, capabilities and features.
- Central Processing Unit (CPU): The Central Station shall be a minimum dual core Intel processor based PC with 8 gigabytes of RAM. The display card shall be sufficient to operate the 24 inch LED display in its native resolution.
 - Random Access Memory (RAM): The Central Station shall include a minimum of 8 GB of RAM.
 - Internal Hard Drive: The Central Station shall include a minimum of 1TB hard drive.
 - Monitor: The Central Station shall include a wide screen 24" LED color WSXGA monitor with a native resolution of 1600x1200, with a

minimum contrast ratio of 1000:1 and a minimum refresh rate of 8ms.

- Keyboard: The Central Station shall include a full-size PC keyboard.
 - Mouse: The Central Station shall include a mouse.
 - Operating System: The Central Station shall operate under the latest 64 bit Windows® operating system supported by Mobile View.
 - Docking Station: The Central Station shall include an external docking station that is compatible with the DVR's removable unit.
 - Ports and Expansion Slots: The Docking Station shall include a 10base T Ethernet port.
 - Digital Output: Once files are downloaded standard software tools may be used to export video data to digital recording devices such as tapes or any high capacity storage medium.
 - Web Browser: Microsoft Internet Explorer® 10.0 or above, Firefox, Chrome
- b. Windows® Compatible Printing Device: The Central Station can output still frames of previously recorded video sequences to a Windows® compatible printer with suitable graphics capabilities.

21.12. Network Video Recorder (NVR) System specifications

- The NVR shall have a digital video imaging processor capable of recording video images from up to 16 digital (IP) cameras at real time (30fps) and 1080P resolution.
- The NVR shall support the ability to individually set the following from each IP camera connected to the recorder: frame rates, image resolution, and data stream bitrate.
- The NVR shall be capable of increasing camera resolution, bitrate, and/or frame rate on an alarm event.
- For the alarm events, the NVR shall be capable of marking a video clip with a configurable pre and post time period. This alarm video clip shall be protected until downloaded from the system or unprotected by an authorized video reviewer.
- The NVR shall provide the ability to simultaneously record dual streams with independent resolution, frame rate, bit rate settings and audio transmission (if available).
- The NVR shall be capable of recording an audio channel synchronized with all IP cameras. The audio shall be compressed using a G.711 codec.
- The NVR shall be tested and found to meet or exceed the specified standards: SAE-J1455 for shock and vibration, EN50121 for Electromagnetic Compatibility, and FCC Class A, Subpart 15 standards when operating and connected to cameras.

- The NVR shall be powered by a 12 or 24 VDC vehicle power supply and have an operational voltage range from 9 to 36 VDC. It shall be self-regulating and internally protected from power surges and spikes.
- The NVR shall operate within the following environmental specifications: Operating temperature of -20°C - 55°C and Relative humidity of 10 - 95%.
- The NVR chassis shall provide cooling to the system and the NVR shall not utilize cooling fans or vents.
- The system shall be no larger than 8.1" W x 4" H x 11.42" D.
- Weight shall not exceed 15 pounds including media caddy.
- The NVR shall store images on a lockable and removable media caddy.
- Media caddy shall include dual 2.5" disk drives, support SSD and HDD technologies, and include storage options up to 4TB.
- The NVR media caddy shall have a USB port for direct connection to a computer without the need for a docking station.
- The NVR media caddy shall have shock and vibration dampening built-in.
- The NVR shall have an accessible and dedicated service gigabit Ethernet port on the front of the device. This Ethernet port shall be behind a lockable cover or door to limit unauthorized access.
- The NVR shall provide (12) user-configurable digital inputs, (2) user-configurable analog inputs, (2) user-configurable relay outputs that can be used to trigger events and alarms, and (3) analog video outputs.
- The NVR shall have the following ports for data: (1) SD Card slot, (1) eSATA interface, and (1) USB port. These ports must be protected from access behind a lockable door.
- The NVR shall incorporate a 3-axis accelerometer in its chassis that shall be capable of triggering alarm events when the G-force exceeds preset values.
- The NVR shall have a LCD screen on the front that can display diagnostics information in plain text. Diagnostics information shall include, but not limited to: system status, HDD status, camera status, firmware version.
- The NVR shall employ a browser-based interface for full system configuration of all parameters.
- The NVR shall utilize configuration files to expedite the programming of the system and camera settings. The NVR shall be capable of loading and

saving the system configuration file directly from the NVR through the USB port without the use of a computer.

- The NVR shall have firmware that can be upgraded for new functionality. The NVR firmware shall support upgrade directly from the NVR through the USB port.

21.13. NVR System Connectivity

- The NVR shall at a minimum support the defined J1939 network monitoring capabilities. The NVR shall communicate diagnostics information including: General fault, under/over temperature, under/over voltage, camera channel abnormal, and HDD fault. The NVR shall also be capable of receiving vehicle information over the J-1939 CAN-bus interface. Information shall include, but is not limited to: brake pedal position, accelerator position, turn signal status, bike rack status, and wheel chair ramp status.
- The NVR can provide its current date, time, offset, and daylight time setting in response to a date-time query from the J1939 interface.
- The NVR can be configured to set its time based on command from the J1939 interface.
- The NVR shall have internal (to the chassis) an optional upgradeable, modular wireless communication card. This wireless card shall be compatible with 802.11 AC, AN, BGN transmission bands.
- The NVR shall have a built-in GPS receiver. GPS hardware module shall be built into the main NVR assembly. GPS shall track vehicle location synchronized with the video and conform to NMEA standards. The NVR shall have the option to synchronize its time with a GPS device or a network time server (NTP).
- The system's hardware and software shall be capable of being upgraded in the field. The upgrade shall be easy and user friendly.
- The DVR may be programmed with time, date, and vehicle I.D., as well as camera input and capture rate via keypad programming or Ethernet port

21.14. Navigator Video Review Application

- Video review software shall provide basic functionality including but not limited to play forward, pause & play backwards, play with synchronized audio, move forward frame by frame, move backward frame, fast forward and reverse.
- The software shall enable the user to save a series of individual images to a sub-directory.

- The software shall support digitally scaling recorded video aspect ratio to fill the video display area or locking content to its original aspect ratio by user configuration.
- The software shall allow time and date searches of recorded information
- The software shall permit incident location via time search by direct entry into a time/date field or via drag/drop of a time line bar.
- The software shall support the following image save methods: single image frame to file, multiple frames between times to directory and video file to directory
- The player shall support and make visible GPS metadata.
- The player shall support visual tracking of the vehicle on a map during video playback.
- The software shall support writing saved video files to removable/writable media: USB, CD, DVD, and Network Location.
- Software shall be able to create a single .exe file that contains the player and evidence file. This file can be optionally password protected.

21.15. Depot Manager Application Extensions

- The NVR shall provide facilities for seamless integration with a depot management system.
- The depot manager system shall enable personnel to easily and remotely gather video evidence, monitor live situations, and configure and maintain a video surveillance system consisting of network video recorders and IP video cameras.
- Depot manager system shall provide the ability to view live video from a networked device and all of its associated cameras from within the Depot Manager GUI.
- Depot management system shall provide the ability to seamlessly manage access to partial data downloads on separate Depot Servers for the user.
- Depot Manager shall provide the ability to add, edit, and delete a case to track maintenance of devices on vehicles.
- Automated update of recorder configuration, software, and firmware from a central network location.
- Depot Manager shall provide the ability to compare a Reference Image versus the camera's Current Image to see if the camera has been tampered with or altered in anyway.

- Depot Manager System shall require entry of security credentials to log on and off the client and server management applications.
- The NVR shall, upon connection to the local or extended wireless network, support depot management video functions as outlined in Depot Manager A&E Specification.