

Hackney Carriage and Private Hire Vehicle Safety Camera Programme

Technical Specifications and System Requirements

Overview

Provide an in-vehicle CCTV solution for Hackney Carriage and Private Hire vehicles. Incorporating the ability to record video and audio (when triggered). Mobile and online to support remote management e.g. configuration setting changes, software uploads and footage downloads. Meeting strict specifications and compliance with legislation.

Technical Specification

In order to be considered suitable for installation in a licensed vehicle, a taxi camera system must meet the following requirements:

1. Operational:

Ref	<u>Specification</u>	<u>Details</u>
1.1	100% solid state design or a proven vibration and shock resistant system.	The system (mobile digital video recorder - MDVR) should not have any fan and the recording should be vibration and shock proof, i.e. either: Flash-based SSD (100% industrial grade), SD cards (only acceptable if stored away from the camera head, secured and have the ability to retain data for the required length of time) of Hard disk with both mechanical anti-vibration and anti-shock mechanism, self-recovery and self-check file writing system, allowing . Allowing correctional access.
1.2	8 to 36 Volts DC	Operational between 8 and 36 volts DC. Standard for a car or multi-purpose vehicle.
1.3	Reverse polarity protected	System to be protected against reverse voltage.
1.4	Short circuit prevention	System to be protected against short circuits
1.5	Over voltage protection	System to be protected against high voltage transients likely to be encountered in the vehicle electrical system.
1.6	Automotive Electromagnetic Compatibility (EMC) Requirements	The in-vehicle taxi camera system must be compliant with UNECE Reg 10 (which came into effect from 1/11/2014). This requires manufacturers to gain type approval for all vehicles, electronic sub-assemblies, components and

		<p>separate technical units. Products that have direct control of the vehicles must not emit EMC emissions above limits and must be immune to interference levels stated in the regulation. Products without direct control only must meet the emission requirements. In MDVR systems the MDVR is the only active component requiring Reg 10 approval thus an “E-mark” is required to indicate they fulfil the requirements of Reg 10.</p>
<p>1.7</p>	<p>The system default is to record video constantly at all times when the vehicle is in use and trigger has been activated (e.g. ignition).</p> <p>The equipment must allow an option to be available as a standard add-on option to include a system override switch if required, which is not accessible from inside the vehicle (i.e. located in the boot / engine compartment).</p>	<p>The system must be active at all times when the vehicle is being used as a licensed vehicle to record video footage. Audio recording is activated by means of a driver button trigger for a specified and configurable period of time.</p> <p>The optional override switch that deactivates the system must be located within the vehicles boot or engine compartment (i.e. it must only be possible to deactivate the system from outside of the vehicle) and must be time delayed for at least 30 minutes.</p>
<p>1.8</p>	<p>Audio is not recording under normal operation and will only commence recording when button trigger is activated by the driver for a specified period of time. This period is configurable + / -</p> <p>Audio recording is highlighted by means of a visual representation i.e. illuminated red LED light(s) which is visible to both customer and driver.</p> <p>With the ability to add an additional passenger button if required as a standard feature of the system and without modification (only installation).</p> <p>A driver button or switch trigger is supported as a standard system set-up specification.</p>	<p>To conform with ICO standards audio recording function is configured as off under normal operation, so no audio information is recorded.</p> <p>Driver button trigger (event / incident) causes a demand that operates a relay for a configurable amount of recording time (e.g. 5 minutes). At the same time this sends power to an audio recording LED which illuminates in order to highlight that audio recording is taking place.</p> <p>The period of audio button trigger can then be extended for further period(s) by pressing the button trigger again after the initial activation.</p>

		<p>Any triggered event can be configured for relaying to online portal or prompt an email alert(s). With the option of configuring this event to save within a permanent history file which cannot be deleted or adjusted if so required.</p> <p>System should be configurable to support changes in ICO or legislation. Live connected online system enables changes Over The Air (OTA) rather than physically connecting to MDVR. Reducing disruption and impact on Business-As-Usual for either Colchester Borough Council, Supplier or Driver(s).</p> <p>System should also allow for either a button or switch trigger. Driver can then control the start and end of a trigger for an event or requirement e.g. when a vulnerable adult is within the vehicle.</p>
1.9	First-in/first-out buffer recording principle	This should allow for a minimum rolling 500 hours of recording under a standard two camera system set-up and data first recorded will be the first wiped at the end of the time period.
1.10	<p>Security, duration and auto-clearing of triggered event files.</p> <p>Configurable to retain and protect footage from being overwritten if required.</p>	<p>This should allow for files to remain secure for the minimum duration of the 500 hours, and these should automatically clear.</p> <p>With the ability to configure the system to store any triggered footage (video and audio) in a permanent and protected history file if required.</p>
1.11	Image export formats and media	<p>Device must support export of CCTV audio-video files from the internal storage media (e.g. HDD/SDD).</p> <p>Images must be exported in standard commercial formats such as H.264 / HD1080, 720, 540, 480 / MPEG-2, AVI, etc.</p>

1.12	Image protection during power disruption	Images must be preserved in the event of loss of power. Battery back-up will not be permitted.
1.13	Image and audio data	Image and audio data shall be recorded and stored in a unit separate from the camera head.
1.14	GPS capability	GPS - (3G/4G connectivity as a standard function).
1.15	Audio and image linking	The system must be capable of recording audio time synchronized to the recorded images.
1.16	The system will bookmark that an event has been triggered. Allowing for a specific date / time period to be set (start – end of event). Meaning only the event period triggered is being accessed by system administrators.	<p>Once the trigger is activated the system must bookmark the start of the event period.</p> <p>The event will then run for a pre-determined period of time e.g. 5 mins. This period can be extended by re-pressing trigger for the further time period set e.g. an additional 5 mins if required.</p> <p>If a switch trigger is installed then the on and off activation will manually start and end the bookmarked period of time recorded (video and audio).</p>
1.17	Digital sampling of the audio signal must exceed 44.1 KHz	
1.18	Digital resolution of the audio samples must exceed 10 bits.	
1.19	Support an audio microphone integrated within the camera head or an electronically integrated separate system to allow for more control.	Integrated microphone within camera head or as a separate microphone which can be electronically integrated.
1.20	Audio data and image data must be stored together, not in separate files, and must be protected against unauthorised access or tampering.	
1.21	The system must support testing of the audio function for installation set-up and inspection purposes.	Visual indication of whether audio is recording – e.g. red flashing light on remote lighting array in the vehicle to advise driver, installer, and authorised admin that the system is recording audio or a test monitor that can be attached to the system.

1.22	Low power drain	The system reduce battery drain to a minimum through low amp draw (0.5 – 1.0A) when engine is not in use e.g. ignition on accessory setting. It must be capable of immediate reactivation or within a relatively short timescale e.g. 5 – 10 seconds.
1.23	Images recorded by the system shall not be displayed within the vehicle as a standard.	
1.24	The system must include a visual LED indicator (red) that will clearly show when audio recording is taking place. This indicator must be visible to driver and passengers within the vehicle.	This should take the form of an indicator LED.

2. Storage Capacity:

2.1	Minimum of 500 hours+ recording capacity	The camera system must be capable of recording and storing a minimum of 500 hours+ of images of D1 (704/576) or higher resolutions for 2 – 4 cameras.
2.2	Images must be clear in all lighting conditions	System to provide clear images in bright sunshine, shade, dark and total darkness. Also, when strong back light is present.

3. Camera Head:

3.1	Camera installation non-obstructive (driver view)	The camera and all system components shall be installed in a manner that does not interfere with the driver's vision or view of mirrors or otherwise normal operation of the vehicle.
3.2	Camera Installation (internal view)	Camera installation must ensure that device placement supports optimum coverage angle, allowing for the maximum available viewing angle for that device.
3.3	Special tools for adjustment/removal	To prevent inappropriate interference only tools supplied to authorised fitters should be capable of carrying out adjustments or removal.
3.4	Field of view to capture all passengers in the vehicle	The lens of the camera must be of a type that captures the driver and

		all passengers of the vehicle on the recorded image. The lens must be of a style not to create a “fishbowl” effect.
3.5	Images must be clear	System to provide clear images in all lighting conditions and allow different skin tones to be detected
3.6	Compatible for use in vehicles with a partition (shield)	The camera system must be adaptable to provide clear images when a vehicle is equipped with a shield. This may be accomplished with the use of multiple camera heads.
3.7	Multiple cameras	The unit shall be capable of supporting up to four (4) cameras. Four cameras may be required to provide adequate coverage in larger vehicles and/or certain purpose-built vehicles. Option to add external front-facing camera if required and in addition to any internal cameras fitted.

4. Storage Device:

4.1	Impact and shock resistance	The Mobile Digital Video Recorder (MDVR) shall be automotive grade in body and mounting. Being impact resistant, sufficient to withstand a typical car accident, or striking with a large, heavy object.
4.2	Controller in concealed location with physical and software / digital security.	The recording device (MDVR) shall be concealed from view. With physical security e.g. inbuilt key and digital (encryption) as ability to control unit is not possible without strict governance control under Data Controller (Colchester Borough Council) authorised access and equipment.
4.3	Ability to download remotely (not accessing physical device) and directly through port provision or removable storage device	The recorder will be equipped with a 3G/4G SIM + WIFI capability. With direct device access through a port for direct download and / or removable storage device for

		indirect download, both of which are only accessible by Data Controller (authorised Council Administrator) personnel using AES-256 end-to-end encryption as a minimum.
4.4	Mobile Digital Video Recorder (MDVR) to be securely affixed to the vehicle	MDVR fixings systems to be of automotive grade
4.5	Log to register each authorised user access to the recording software	To be stored electronically within the recording software and have ability to download a log if required by an authorised user.
4.6	Log to register camera system parameter modifications	To be stored electronically within the recording software and have the ability to download a log if required by an authorised user.
4.7	Log to register each image download session with details of all changes and actions taken	To be stored electronically within the recording software and have the ability to download a log if required by an authorised user.
4.8	Log to register modification/manipulation of changes to the configuration of system settings by client software on download device	To be stored electronically within the download device (encrypted laptop) and have the ability to download a log if required by an authorised user.
4.9	All log files protected against unauthorised access	To be password protected
4.10	Time/date stamp with the ability to expand requirements if required	All stored images must be time and date stamped with accurate metadata (GPS, triggers, etc.) embedded "baked" into the images. With in-product configuration available to expand parameters if required i.e. frame rates
4.11	Vehicle ID number stamp	All stored images must have two fields for vehicle identification (VIN & number plate). Linking CCTV unit and VIN
4.12	Controller non-modifiable ID code stamp	Each recorded image shall be automatically stamped with a unique and non-modifiable code that identifies the unique source recorder (MDVR) that was used to record the image
4.13	Controller (Storage Recorder)	Manufacturer to supply Colchester Borough Council with a supply of specialised tools to allow for removal of the controller and

		download of data when required, which is compatible with standalone computer to view recordings
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5. Video and Audio Recording Rate:

5.1	Video image and audio recording on system activation.	The system shall record images at the minimum rate of 25 frames per second. Images must be recorded in standard commercial formats allowing for D1 (704/576) or higher resolutions for 2 – 4 cameras. Audio at a minimum rate of 10 bits/44.1 KHz or higher (standard assessed at 16 bits/48 KHz.
5.2	System to continue to record images and audio when ignition or engine is off as a power-down cycle.	System must continue to record images for a minimum of 30 minutes after engine or ignition is switched off. With the ability to configure and make changes to the programme timings +/- as appropriate.

6. Activation - standard:

6.1	Power system when ignition is in the accessory, on or start position	The recorder shall record a sequence of images when the ignition is switched to the accessory, on or start.
6.2	Ability to adapt system to trigger from other means in addition to ignition, e.g. door open/close (or meter)	Ability to adapt and expand system to allow for multiple triggers where required

7. Activation via driver trigger / Bookmark buttons:

7.1	System software configuration must include the option for the activation of a trigger button to set a bookmarked period of time and / or ability to overwrite-protect this trigger period.	The system must be fitted with a trigger button that once activated will trigger the protected recording of audio and video both pre and post event. Protecting the recording from being overwritten with the option for self-clear if deemed appropriate.
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7.2	Overwrite protection capacity for at least 3 trigger event activations. With the ability to remotely clear the event log by an authorised administrator if required.	Overwrite protection capacity for at least 3 activations with the ability to clear period if overwrite protection is no longer required.
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8. Downloading / Uploading:

8.1	<p>Remote access for downloading short recording periods e.g. 12 – 15 secs over secure / encrypted endpoint connection.</p> <p>Local access for larger recording periods e.g. 24 hours to complete memory in circumstances and governance requirements dictate.</p> <p>Colchester Borough Council will be the data controller for the Taxi CCTV system and any data captured, recorded and stored through the system solution.</p>	<p>Online access using a secure online portal using AES-256 encryption (asymmetric / symmetric) with endpoint APN / VPN, port forwarding and user account security compliance.</p> <p>Local access through integrated port on MDVR or hot swappable HDD / SDD. Ability to swap existing drive with a spare formatted drive and for each drive to retain security compliance against the MDVR (embedded metadata linking drive to MDVR unit and vehicle – VIN no. / Reg)</p> <p>Where strong signal reception is present (3G / 4G) video audio snapshots should take a matter of seconds.</p> <p>If signal connectivity (3G / 4G) is low, unavailable or interrupted. System will pause any footage uploads / downloads, changes or updates.</p> <p>System will continue polling until connectivity is reinstated (signal reconnects or ignition is switched back on again) where it will then automatically re-establish from the point at which it was at prior to signal or power loss e.g. if outside of 30 minute power down cycle (picking where it left off) prior to interruption.</p> <p>When a signal or connectivity is unavailable for a prolonged</p>
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		period of time. Then polling request would effectively time out and fail. In this exception request process would then have to be re-started.
8.2	Provision of necessary software, cables, security keys to Data Controller (Colchester Borough Council) and approved administrators under their control e.g. Licensing Team and Police	
8.3	'Windows' compatible	Must be compatible with Windows software
8.4	Mobile Digital Video Recordings (MDVR) stored in non-volatile media/memory	Non-volatile memory is a type of computer memory that has the capability to hold saved data even if the power is turned off.
8.5	Recording software must support strict security governance for taking and controlling any copying of the MDVR and ensuring recordings are always in a secure and tamperproof format.	Images may only be accessed by the data controller (Colchester Borough Council) or authorised administrators as instructed by the data controller e.g. Council administrators / Police. Any exported (encrypted) and then downloaded (unencrypted) saved event data must remain secure at all times.
8.6	Verifiable image authenticity	Each image copy shall be stamped with vehicle ID and Driver ID and be tamperproof.
8.7	Provision of technical support and maintenance to Colchester Borough Council Licensing team when necessary.	To assist in accessing and maintaining system. To support Business As Usual and Major Incidents. Provision under jointly agreed Service Level Agreements (SLAs) to cover priority status levels for support requests.
8.8	Online / remote management as a standard with direct access when required.	MDVR will have 3G / 4G / WIFI hardware enabled on the physical device with supporting online management software / portal for remote management and control. No other access activated on device except for direct authorised under Data Controller

		(Colchester Borough Council) i.e. Council administrators / Police using USB 2.0 or higher and/or direct HDD/SSD access.
8.9	Filter the specific images for events and times for the approximate time of the crime committed.	Refer to 1.15

9. Requirements in relation to system information:

9.1	Handover (Driver) - Provision of installation certificate / sign-off as working verification for each unit installed.	The unit installer will provide this on handover to driver as part of the registration process.
9.2	Serial number indication on service log	The unit will be marked with a serial number
9.3	Installation date indication on service log	The provision for the installer to indicate the installation date
9.4	Clarity of operating instructions	The system shall be provided with clear and concise operation instructions which are written with due consideration to varying levels of literacy.
9.5	Installation by authorised agents	The unit shall be installed by manufacturer's / supplier's authorised agents.
9.6	Successful supplier to provide a list of authorised installers / agents to Colchester Borough Council Licensing Team.	
9.7	Fully supported online solution - Documentation and comprehensive user training for Council Authorised Users.	<p>The supplier must provide clear and concise operating instructions.</p> <p>(Details on how the system records the images, operation and processes for supporting software and how to access footage and make changes to system settings)</p> <p>Multi-channel support through face-to-face onsite training or online / telephone.</p> <p>Agreement on sign-off for go-live deployment and ongoing support & maintenance.</p>

10. Installation:

10.1	Provision of system status/health indicator	<p>The vehicle will have an LED indicator panel providing the driver with a visual indication of system operation e.g. health (power) and if a malfunction (error) occurs.</p> <p>Mounted in an agreed location as directed by the installer.</p>
10.2	Designed / installed to be testable by Colchester Borough Council Licensing Team (or persons acting on behalf of the council – such as vehicle inspectors)	The system shall be designed and installed such that the system may be easily tested to ensure that all features are operating and that images are being recorded as prescribed.
10.3	Supplier to provide assurance that installation is only completed through their network of certified installers. Meeting standards e.g. ISO9000 and holding PLI cover of a minimum of £10,000,000	
10.4	Vandal and tamper resistant	Installation within an accessible but non-obvious location (e.g. glove box would not be acceptable).
10.5	Reliability in operational and environmental conditions	The system shall provide reliable and full functionality in all operational and environmental conditions encountered in the operation of taxis and automotive use.
10.6	Remote (Online) and Direct (MDVR) configuration of standard system settings	MDVR solution – hardware and software must support ability to change settings e.g. timing and parameters within the operating system and without requirement to change hardware components.
10.7	Assessment of fit-for-purpose / Demonstration	<p>Manufacturer / supplier must provide Colchester Borough Council Licensing Team with a Training and Technical Manual for the hardware & software solution.</p> <p>Hardware</p>

		<p>Supplier to provide Colchester Borough Council with a working unit for demonstration purposes.</p> <p>Software</p> <p>Supplier to provide a test account for accessing online portal access for demonstration purposes.</p>
10.8	Supplying Software and Hardware	<p>Hardware</p> <p>Supplier to provide Colchester Borough Council Licensing Team with a supply of cables and software for managing and downloading footage and settings from the physical MDVR device locally.</p> <p>Online</p> <p>Supplier to provide Council Licensing Team with online portal access including admin accounts with secure passwords, full administration access rights, operational user guidance and support for adoption into BAU.</p>
10.9	Notification stickers to alert customers / passengers of CCTV in operation within the vehicle.	<p>Supply and fit Council approved notices for clear advisement for passengers to show that CCTV is in operation at all-times (video) and audio is activated by an event trigger. Bookmarking Video and audio recording if an incident occurs.</p> <p>Sticker mounting points support both viewing from both outside and inside the vehicle. Examples in the imagery below (appendix 01)</p>

Stickers:



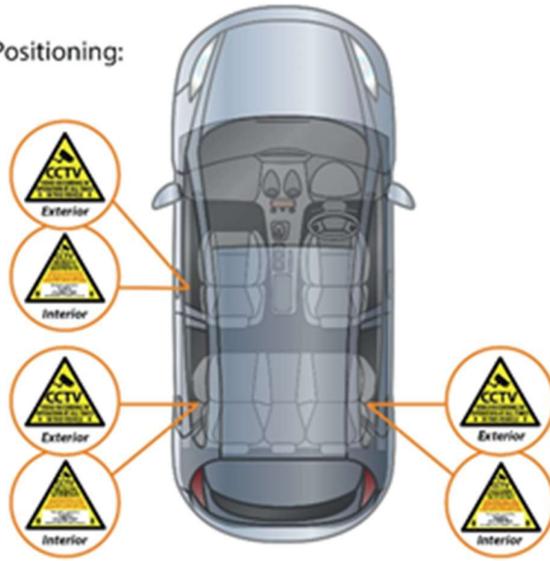
Side 1 (exterior facing)



Side 2 (interior facing)



Positioning:



Sticker position may vary per vehicle.