Critical Care Ambulance Vehicle Specification and Key Considerations (Full Specification)

Background

This critical care ambulance vehicle specification has been developed to deliver a standard critical care ambulance design that can be utilised by all critical care transfer services in England. The aim is to provide a vehicle that can be flexible to meet the critical care patient requirements across all age groups from neonatal, paediatric and adult. The vehicle will be able to accommodate ECMO and Bariatric patients.

By providing a generic critical care ambulance specification nationally will introduce improved value for money when commissioning services due to improved economies of scale. It will also offer improved resilience for critical care transport teams by sharing ambulance resources across specialities.

The aim of having a consistent generic critical care ambulance is to reduce training time for staff who may in their training rotas work across various transport teams in the country.

Section 1: Conformance Requirements

1.1 All ambulances must meet “Type C critical care ambulance” standards.

1.2 The ambulances must be compliant with General Safety Regulations 2019.

1.3 When designing the ambulances, weight of all occupants must be considered as a minimum of 90kgs.

1.4 All vehicles must have a weight capacity of no less than 5 tonnes

1.5 The ambulances must be converted by an organisation approved and certified by the chassis manufacturer. It will be the service provider’s responsibility to ensure that the organisation converting the vehicles (will be commonly called ‘convertor’ from this point onwards) and making them suitable for the service that is being procured by this tender, have informed the chassis manufacturer about such conversion and all auxiliary electrics installed on the vehicles. Upon contract award, the service provider must supply a certificate of conformity relating to this subject as part of the contract document pack.

Note:

A letter of non-objection between the base vehicle manufacturer and the vehicle converter must be provided to demonstrate compliance with the standards.

1.6 Once all communication and medical equipment is fitted, the converter must certify that the completed vehicle will be compliant with the latest and any pending electromagnetic compatibility requirements.

1.7 Once the vehicle is fully constructed and loaded to its operational mass (including patient transfer trolleys), the converter must test that the vehicle is not overloaded as a whole, on an axle or on a wheel position. The following test criteria must be met:
- total operating vehicle mass <95% of the base vehicle manufacturer's gross vehicle mass
- total operating axle mass <95% of the base vehicle manufacturer's gross axle mass
- no wheel position to exceed 60% of its axle mass rating.

1.8 The converter must produce a compliance certificate for each vehicle confirming:
- gross kerbside mass
- gross vehicle mass
- operational mass
- each axle mass
- each wheel position mass

Section 2: Vehicle Design and Construct

2.1 General Requirements

2.1.1 The service provider must provide **"Box Type"** ambulances.

2.1.2 The design and layout of a fully operational vehicle must be fit for the purpose of ambulance use.

2.1.3 The vehicle design and layout should endeavour to minimise manual handling for staff and patients. It should ensure that wherever possible the risk of work-related musculoskeletal disorders for staff are negated.

2.1.4 The service provider will be required to provide an authentic certification confirming that the vehicle proposed for the service provision will achieve a minimum tilt of 38 degrees without its outside wheels losing contact with the tilt bed. Also, the vehicle must pass a tilt test in line with CEN EN 107.

2.1.5 All vehicles must be bariatric compatible and capable of transporting bariatric patients.

2.2 Quality Control and Build Standards

2.2.1 Quality and build standard control will apply to a fully converted ambulance, including the base vehicle and all components and systems identified in the specification or related requirements. The converter will provide and ensure quality control assurance throughout the build, including for all medical items, equipment and components supplied. The converter must have a current ISO quality management system that is relevant to the building of vehicles.

2.2.2 A fully controlled and documented construction process should be used that accurately documents each stage of the design and build process to

maintain quality and traceability, and to provide accurate after-sales information. This will ensure that all spare parts are correct and fit first time, every time. Suppliers should provide proof of certification to the standards EN 1789, ISO 9001 and ISO 14001.

2.3 Body Work

2.3.1 Wheels and bumpers of all vehicles must be left in a factory finish.

2.3.2 Rear bumpers of all vehicles must have underside stainless steel skid plates with 2 mm thickness fitted.

2.3.3 All vehicles must have wheel nut retention devices fitted.

2.3.4 All vehicles must have a mis-fuelling safeguarding device fitted.

2.3.5 A suitable protective rubbing strip must be fitted on each side of the vehicles, if the base vehicles are not fitted with an OE rubbing strip.

2.3.6 All cavities between the interior and exterior body mouldings (including the rear doors) of all vehicles must be filled with suitable fire-retardant thermal insulation material to ISO 3795 and fitted in accordance with the manufacturer's recommendations. The insulation must also extend into all relevant framing members.

2.3.7 Saloon area must have a Bulkhead compliant with the EN 1789:2007 standard.

2.3.8 All vehicles floor must conform with the BS EN 11378-2 standard. The floor must be of a non-slip quality and resilient enough to withstand high wear and tear.

2.3.9 The underside of the floor panel must be coated with suitable underseal protection.

2.3.10 The stretcher fastening must be tested according to EN 1789. Floor mountings must be fitted using the stretcher manufacturer's approved jig to ensure all vehicles are built to the same standard.

2.3.11 The wheel arch sections will be treated with suitable stone chip protection.

2.3.12 All vehicles must have paint finish conforming to RAL1016 Yellow standard, in line with the requirements of NHS England and NHS Improvement's national specification.

2.3.13 All vehicles must have saloon door entrances with grab rails/handles to aid entry/exit. Such devices must be strong enough to take the weight of heavy people and be finished in RAL 1016 yellow powder coating or rubber. As a minimum, there should be two at the side door and two at the rear doors.

2.3.14 All vehicles must have retractable side steps to the rear compartment.

2.3.15 All vehicles must have a tail lift or a wedge rear ramp capable of loading the trolley and any specialist equipment in a single lift/push.

2.3.16 All vehicles must have a sliding side door to the rear compartment.

2.4 Health and Safety Infrastructure

2.4.1 All vehicles must have sufficient grab rails that are appropriately positioned and finished according to RAL 1016 Yellow standard.

2.4.2 All vehicles must include sufficient head impact and bump pads and they must be positioned appropriately.

2.4.3 All vehicles must have an Engine Fire Extinguisher system.

2.4.4 All vehicles must have Fire Extinguishers available in a driver cabin at the front of vehicle and also in the patient compartment at the rear of vehicle.

2.4.5 All ambulances must have appropriate sirens installed. All vehicles must have an audible warning system comprising a wail/yelp/ piercer/bullhorn noise siren that faces out from the front of the vehicle but is recessed so as not to cause injury. The minimum output from the yelp/wail/ piercer/bullhorn tone should be 100 W and it should be wired through and operated by the vehicle road-horn control. A bullhorn button must also be installed for the driver to use. For data logging of siren activity, the siren must also provide an interdomain routing output back to the power management system.

2.4.6 The fully converted ambulances/vehicles must comply with the most current standards and must not exceed the Control of Noise at Work Regulations 2005 (Directive 86/188/EEC).

2.4.7 All vehicles must have full 360-degree emergency lighting. The lighting must be available at the front and rear lightbars. It must also provide side coverage.

2.4.8 Once fitted to the vehicles, the emergency lighting system must comply with European regulations for blue lights and meet ECE-R-65 Class 2 compliance standards. The minimum light output values must be in line with that indicated within the paragraph 7.2 of that standard. The minimum light output values measured at a vertical angle of 0 degrees and a horizontal angle of 360 degrees, are 120 cd during day and 50 cd during night.

2.4.9 The vehicles must have an audible reverse warning device operated by the gearbox-mounted reverse lamp switch, lamp feed or CAN. This device will be used to alert pedestrians that the vehicle is reversing and will be fitted with a night isolation switch. An ultrasonic reversing aid connected to a reversing proximity warning device will be provided to give the driver audible and visual (a tri-colour light-emitting diode (LED) will be located on the right of the main instrument console) warning of any obstruction at the rear. The device must not to be sensitive to emergency vehicle LED lights.

2.4.10 All vehicles must also include a rear (reversing/incident) camera, that operates when reverse gear is selected and aids reversing the vehicle. The rear image captured by such camera must be displayed on the dashboard monitor. This camera must be positioned high up under the rear light bar where it gives a wide-angle image across the rear of the vehicle that includes the ramp or tail lift and about 3 meters to the rear of the vehicle.

2.4.11 All vehicles must have additional CEN tested bracketing to secure medical devices such as volumetric infusion pumps, syringe drivers etc.

2.5 Windows

2.5.1 All Body window(s) must be tinted to 10% light transition to prevent inward vision.

2.5.2 All vehicles and their windows must provide an emergency means of escape in line with CEN regulations.

2.5.3 The nearside sliding doors of all vehicles should have one window tinted to 10% light transition and should have a top slider overlaid with a solid opaque lower section. The slider should have 10 mm opaque strips. The glass should be designed in such a way that if the door sliding mechanism fails, no part of the door will contact the glass and break it.

2.5.4 All vehicles must include hammers to break glass in emergencies.

2.6 Vehicle Markings and Livery

2.6.1 All vehicles must have markings in the universally recognised format.

2.6.2 All vehicles must use black letters on a yellow colour background for Hazard warnings.

2.6.3 All vehicles must use white letters on a blue colour background for Mandatory instructions.

2.6.4 All vehicles must use white letters on a red colour background for Prohibition signs.

2.6.5 All vehicles must use white letters on a green colour background for Exit/Safe condition signs.

2.6.6 All vehicles must use red letters on a white colour background for equipment location signs.

2.6.7 Reflective Vehicle Markings. Exterior marking specification will be as per the ATAG National Battenberg specification.
The use of reflective films and design of livery must comply with the relevant Vehicle Lighting and Safety Regulations, current Regulation 11 of The Road Vehicles Lighting Regulations 1989 and the Variation order to Section 44 of the Road Transport Act, 1988.

2.7 Seating/Stretcher and Manual Handling

2.7.1 All ambulances must be able to accommodate at least 5 people in a patient compartment at the rear of vehicle. They must have four adult seats with weight capacity of 90 kgs per seat and an additional space with weight capacity of 385 kgs to carry a patient and transfer trolley.

2.7.2 The four seats in rear compartment must have additional padding.

2.7.3 All ambulances must have appropriate stretcher fitting and release mechanism.

2.7.4 All ambulances must include stretchers capable of accommodating a range of patients including bariatric patients.

2.7.5 All vehicles must be able to carry a bariatric stretcher in the fixed floor stretcher mountings without any equipment needing to be moved.

2.7.6 All ambulances must include a Winch with capacity to pull minimum of 413 kgs along with a karabiner to ensure straight pulling.

2.8 Design of Storage Space

2.8.1 All ambulances must have storage cupboards with adequate space to store response bags.

2.8.2 All ambulances must provide appropriate storage space in cabinets and overhead “Cant” lockers.

2.8.3 The storage cupboards must be made from clear Polycarbonate.

2.8.4 The storage cupboards must contain lockers, which need to have lift-up doors. The lift-up doors must be made of a clear material with 8-mm of minimum depth and must have strong hinges and two gas struts per locker. All lockers must have contents identification labels. Each locker and cupboard door are required to have a reset device that indicates if they have been opened.

2.8.5 Upon the contract award, final design of storage cupboards, their interior and how they should be laid within a patient compartment at the rear of vehicle will need to be agreed with the joint vehicle design group – part of the contracting/commissioning authority.

2.9 Electrical Infrastructure

2.9.1 Before starting to build, the converter will carry out and provide a full and complete electrical calculation[1] and compare this to the alternator output over the entire engine rev range. The calculation must show the vehicle equipment and control systems are adequate and suitably designed to maintain the batteries.

2.9.2 All batteries must be protected against deteriorating below 11.7 Volts.

2.9.3 The converter will be ultimately responsible for ensuring that the auxiliary power system can support the auxiliary electrical demand on the ambulance, and that alternator and auxiliary battery capacities are sized accordingly. Estimates of auxiliary electrical demand should include a 2000W allowance for medical electrical equipment.

2.9.4 The converter should maximise auxiliary battery capacity, within practical constraints, as a reserve supply in the event of alternator failure and provide estimates of available reserve capacity (in terms of time to depletion should the vehicle power supply fail) for differing sized loads up to the maximum expected auxiliary electrical demand. Requirements for operational battery charging regimes should detailed.

[1] that is, the electrical drain when all equipment and vehicle and auxiliary batteries are in use

2.9.5 The vehicle shall be capable of powering a transportable patient transfer medical equipment system (see 2.9.4) via a 12V DC and a 230V AC supply (i.e.: both alternatives shall be available).

2.9.6 Upon conclusion of the procurement, at the time of contract discussion, a successful service provider must supply documents that show test data and demonstrate that the proposed vehicles are able to meet their on-board electrical power requirements.

2.9.7 All “AC” and “DC” wiring must conform to current Institution of Engineering & Technology (IET) BS 7671 Wiring Regulations, (and with particular regard to Section 717: Mobile Units). On completion, the wiring system will be inspected and tested against the IET wiring standards.

2.9.8 The successful vehicle converter must also provide a NICEIC completion certificate issued by an authorised body for each ambulance. The NICEIC certificate must show a chassis number of the ambulance. This certificate will be supplied as part of the contract documents pack on conclusion of the contract.

2.9.9 A power management system must be provided to optimise battery condition, prioritise essential loads and protect sensitive electronic equipment; power management and automatic load-shedding priorities to be agreed, and their operation described (in a form clearly understandable to vehicle users) in accompanying documentation.

2.9.10 As part of the contract documents, the successful converter will also provide electrical schematics for both “AC” and “DC” systems for the ambulance. Instructions for future lifetime inspection, test and maintenance of the installation shall also be provided.

2.9.11 Security of power supply is paramount; high-reliability practices should be adopted in choice of materials and methods, including - secure connections and robust wiring / conduiting practices for vibration and damage resistance, and coordination in selection of protective disconnection devices to avoid risk of nuisance tripping, and to achieve due discrimination (selectivity) in device activation for limitation of circuit disconnections to circuitry local to the site of any fault.

2.9.12 All wiring within the vehicles must include multistrand and flexible PVC-covered cables, which are correctly identified by colour and protected by appropriate trunking or conduit. All wiring must be protected by glands especially where they are routed through bulkheads and at points liable to chafing by grommets or rubber.

2.9.13 All wiring terminations must be adequately protected and insulated.

2.9.14 All circuits will be separately protected and installed in accessible positions, and tested for insulation, non-contact and continuity.

2.9.15 All underfloor wiring will be fitted into approved sleeving and all joints must be sealed with PVC adhesive tape and must comply with British Standard BS AU7:1963.

2.9.16 DC cables must be protected by fuses or circuit breakers at source and these must be rated for the current-carrying capability of the wire, and AC cables protected by circuit breakers for the purpose of overcurrent protection and of electric shock protection by automatic disconnection of supply (ADS) in the event of a fault. AC circuit breakers should be easily accessible and identifiable, to allow for rapid reinstatement of supply by users following fault remedy.

2.9.17 Cables must be of the correct size for the current required by the circuit they supply, to avoid overheating and excessive voltage loss.

2.9.18 Equipotential bonding to be established in patient compartment, by means of a main equipotential bonding bar (EBB) or terminal with supplementary bonding connections to neutral points of vehicle's 12V DC and internal 230V AC power supplies, to accessible exposed and extraneous conductive parts within the patient compartment, and to the conductive structure of the vehicle. EBB located to minimise length of bonding connections; radial wiring patterns adopted. Measured resistance between the EBB and any extraneous conductive parts or protective connections at AC socket outlet/s should not exceed 0.2Ω.

2.9.19 All wiring or appliances that require electrical warning or hazard identification must display clear labels, in accordance with current regulations.

2.9.20 All auxiliary electrical components will be CE and 'e-marked' for electromagnetic compatibility in accordance with current regulations. If the component is not 'e-marked', it must be supplied with an attestation with regard to annex I, 3.2.9. of 72/245/EEC as amended by 2006/28/EC.

2.9.21 Except for the isolator switch, all switches in the cab must be within easy reach of the driver and labelled appropriately. Electrical components must be mounted in identical locations and wiring must be routed uniformly in all vehicles that are to be used to provide service under the contract let out as a result of this procurement.

2.9.22 Wherever possible, electrical components will be mounted on subassemblies using 'plug and play' connectors, to facilitate easy removal and replacement if repair or maintenance is needed.

2.9.23 All vehicles must include three unswitched 230V AC - 3 pin socket outlets in the patient compartment, (which must be labelled "for medical equipment only"), at locations to be agreed, each with an illuminated indicator for confirming AC supply availability, each capable of powering the transportable electromedical system.

2.9.24 All vehicles must include at least two USB charging points in a driver cabin at the front and at least four USB charging points in a patient compartment at the rear.

2.9.25 All vehicles must also include three 12V DC sockets (1 Drivers Area and (2 in Rear Compartment), and also an Anderson connector as the 12V DC option for powering the transportable electromedical system.

2.9.26 All vehicles must have an ejector plug for shoreline charging. The shorelines with an external IP65-rated plug must be provided at a location to be decided by each NHS acute trust.

2.9.27 All vehicles must include an inverter with at least a 2000W capacity, provided for the sole purpose of powering medical and communications equipment in the patient compartment. The inverter should be designed for mobile applications and be of high-reliability construction, with 230VAC 50Hz true sine-wave output, (tolerances +10%/-6% voltage, +/-1% frequency).

2.9.28 All vehicles must include protective measures for the incoming external 230V AC charging supply – based upon isolation transformer (low inrush current) at shoreline connection, double-pole secondary RCD protection (not exceeding 30mA) and overcurrent protection, with no connection of vehicle or internal electrical circuits (including equipotential bonding provisions) to the earth of external power supply.

2.9.29 All vehicles must have a Climate Control feature available in a driver cabin at the front and in a patient compartment at the rear. Air Conditioning and Heating facilities must be included in such feature.

2.9.30 Internal lighting, including trauma lights with diming facility must be available in all vehicles. The lighting within the vehicles must comply with CEN lux requirements.

2.10 Technological Infrastructure

2.10.1 All ambulances must have provision of WIFI within the vehicle and they must be able to connect to the internet and to other devices using the internet. For these reasons all ambulances must be able to connect with available WIFI networks and with the 4G and 5G networks.

2.10.2 All ambulances must have Satellite Navigation and Vehicle Tracking systems built in.

2.10.3 All ambulances must have a cradle and a charger for mobile phones available in a driver cabin at the front of vehicle and two in the rear of vehicle, supplied from the DC system.

2.10.4 All ambulances must have a “Hands Free Mobile Phone Speaker Kit” available in a driver cabin at the front of vehicle and also in a patient compartment at the rear of vehicle.

2.10.5 All ambulances must have a digital clock with Resuscitation Timers available at in a patient compartment at the rear of vehicle.

2.10.6 All ambulances must have a docking station and a charging point for Tablet/laptop Computers available at in a patient compartment at the rear of vehicle.

Section 3: Medical Equipment/Devices

3.1 Defibrillators and Monitors (supplied by clinical provider. Fixation by converter)

3.1.1 All ambulances must have a defibrillator/monitor suitable to use with neonate, paediatric and adult patients.

3.1.2 The defibrillators must be CE-marked medical devices.

3.1.3 The defibrillators must have “pacing” capacity.

3.1.4 All ambulances must have a place to charge and mount the defibrillator/monitor within the vehicle.

3.1.5 All ambulances must have a CE-marked medical suction unit with mounting and a charger.

3.1.6 The defibrillators must also have supporting software for telemetry of data from vehicles to receiving units.

3.1.7 The defibrillators and monitors must be capable of measuring real-time CPR and provide/display feedback.

3.1.8 The defibrillators and monitors must be capable of invasive monitoring and temperature monitoring.

3.1.9 The defibrillators and monitors must have ability to capture of all vital signs, images and electronic records in an easy to use format that can be easily transmitted or shared with other devices and systems.

3.1.10 The defibrillators and monitors must have fully integrated communications capability that enables the transmission of all medical and vital signs data in real time Biphasic waveform for defibrillation and synchronized cardioversion, pacing

3.1.11 1-200 J user configurable energy levels (1-10, 15, 20, 30, 50, 70, 90, 100, 120, 150, 170 & 200 J)

3.1.12 The defibrillators and monitors must have charge time: <10 seconds to 200 J from first charge

3.1.13 Time to shock from cold start-up: <15 seconds to 200 J

3.1.14 Indicated for coarse and fine VF & VT

3.1.15 Analyse time: <10 seconds

3.1.16 AED protocol in accordance with ERC guidance SPO2 & ETCO2 neonate, paediatric and adult,

3.1.17 All vehicles must include 3 lead and 12 lead ECG, invasive and non-invasive Blood Pressure Monitoring devices suitable to use with neonates, paediatric and adults (including Bariatric)

3.2 Equipment for Medicines Management

3.2.1 All ambulances must have temperature-controlled drugs fridge.

3.2.2 All ambulances must include a “Safe” - suitable for secure storage of controlled drugs. Such safe must be lockable using either keys or digital keypads.
3.2.3 All ambulances must also have a “Fluid warmer”.
3.2.4 The ambulances must also have four “I.V Fluid Hooks”.

3.3 Facilities Relating to Medical Gases

3.3.1 The medical gas pipeline system must conform to all applicable regulations and standards.
3.3.2 All cylinder mountings and cupboard enclosures must have crash testing approval.
3.3.3 Outlets must conform to BS 5682:2015 – to accept BS 5682 probes.
3.3.4 All ambulances must have pipes and outlets for Oxygen.
3.3.5 All ambulances must have pipes and outlets for Air.
3.3.6 All ambulances must have facility to store three Oxygen cylinders with size ‘ZX’.
3.3.7 All ambulances must have facility to store two Oxygen cylinders with size ‘CD’.
3.3.8 All ambulances must have facility to store two Air cylinders with size ‘F’.
3.3.9 All ambulances must have facility to store one Nitrous Oxide cylinder with size ‘D’.

3.4 Suction Unit

3.4.1 All ambulances must have a suction unit that is charged via the ambulance electrical system and has a battery operational mode.
3.4.2 All suction units must be capable and approved for the of use with neonatal, paediatric and adult patients.
3.4.3 All suction units must be mounted on a CEN approved bracket and charger.
3.4.4 All suction units must have disposable suction canisters, tubing and catheters.
3.4.5 An adjustable pressure setting up to 500mmmHg pressure.

Section 4: Infection Prevention and Control

4.1 To minimise infection, surfaces inside the ambulance must be white, easy-to-clean, without material edging and clutter free.
4.2 The ambulance design will follow the principles of one-piece design theory with no dirt or finger traps, and have a smooth, clean and tidy appearance overall.
4.3 The converter must use materials and construction methods that can withstand deep, rigorous cleaning regimens in line with relevant IPC requirements. For example, surfaces should be manufactured from materials

that can withstand daily wear and resist surface corrosion under extreme cleaning regimes.

4.4 Materials used within vehicles must have anti-soiling properties to meet BS EN ISO 11378-2 standards, and anti-bacterial/fungicidal qualities.

4.5 All vehicles' floor covering must be made from a single piece and have antibacterial properties. Floor edges must be sealed to make washout easy and to enhance infection control.

4.6 Tailored infection control seat covers must be fitted to all of the seats in the ambulance. All seat coverings will be made from a single piece of material and have sealed seams to prevent the ingress of body fluids, for infection control purposes and to protect against damage.

4.7 Vehicles should be fitted with air exchange or air filtration systems in the patient compartment to ensure optimum air flow to manage potentially or confirmed infectious patients and ensure no cross contamination of the driver compartment.

Section 5: Security Features

5.1 All ambulances must have a Panic and/or Attack Alarm system which can be accessed from the driver cabin at the front of vehicle and from the patient compartment at rear of the vehicle. This system must be linked with the ambulance control room.

5.2 All ambulances must have an Internal Communication System so that communication can be carried out between a driver cabin at the front and patient compartment at the rear of the vehicle.

5.3 All vehicles must have a central locking facility applicable to all external door locks. An extra facility must also be available which allows vehicles to be locked while on run. If possible, this function should be controlled by the manufacturer's key fob.

5.4 All ambulances must have a Run Lock Security System.

5.5 Black Box

5.5.1 All vehicles must have a black box system. The black box system must be able to record a range of inputs from the vehicle's chassis and saloon.

5.5.2 All vehicles must have microphone associated with cameras installed in saloon area that is turned on with a switch and includes a visual warning (red LED light) to indicate that recording is active. The crew should also be able to use this function. For example, they must be able to leave this system in continuous record mode during a city centre nightshift. When activated in this mode, no voice warning in the saloon is required – that is, it will operate in covert mode.

5.6 Camera Features

5.6.1 All vehicles must have driver recording cameras.

5.6.2 All ambulances must have internal and external CCTV camera system and recording facility. The CCTV system must be a 7-way camera system and include full A&E kit in line with the NHS Improvements National Specification.

5.6.3 All vehicles must include a CCTV system for ensuring staff protection and also to provide evidence in unfortunate circumstances such as accidents, incidents or collisions.

5.6.4 When vehicles are in operation, all cameras installed within the vehicles must operate and record film/pictures.

5.6.5 All cameras installed within the vehicles must also start operating and carry on recording for a predetermined time when ignition is turn on, but the vehicle is not in operation. NHS acute trusts will discuss and agree such predetermined time with the successful service provider.

5.6.6 All cameras must start recording when the saloon panic button is pressed; passive recording function set to capture footage one minute before activation.

5.6.7 As a minimum, all vehicles must have VDRHD 8 channel recorder with following features:

- Removable 500 GB hard drive with dedicated lock
- As a minimum able to record from eight cameras at resolution 720 × 576 pixels
- Able to record vehicle G force data in three separate axes, each individually adjusted
- Able to record vehicle GPS data for integration with mapping in playback software
- Able to record vehicle GPS speed
- Able to log use of left/right indicators and brakes, with all functions individually searchable in playback software
- Able to integrate with ambulance management system outputs to record use of sirens/blues/HLF/panic alarm. The system should be able to differentiate between sirens armed and sirens emitting noise
- programmable shutdown delay
- programmable/switched video output
- lockable front cover
- Fault LED visible to engineering staff
- Fault output for third-party integration
- Front accessed monitor output for set-up and testing
- Event search function allowing operator to search and view specific recorded scenarios. For example, only those recordings when the vehicle’s blue lights are active, or the vehicle is travelling at a certain speed, or any combination of multiple events

- SD card back-up recording function
- SD card recording of driver behaviour data such as acceleration, braking and speed
- 4G/5G/Wi-Fi connection to vehicle to view live images and download recorded footage
- Ability to review footage on PC direct from the removable hard drive and remote from the vehicle
- Option to auto-convert encrypted format footage to AVI format directly from playback software
- Ability to display all external camera images simultaneously on the monitor in the saloon

5.7 Layout and Design of Cameras

5.7.1 All vehicles must have a Forward-facing/forward looking camera, mounted behind the rear-view mirror.

5.7.2 All vehicles must have nearside and offside externally mounted micro-dome cameras at the front of the vehicles.

5.7.3 All vehicles must also have facing forwards nearside and offside externally mounted micro-dome cameras at the rear of the vehicles.

5.7.4 All vehicles must have two cameras flush mounted into the ceiling, above the bulkhead cabinet and at the foot end of the stretcher

5.7.5 All vehicles must have a Rear-looking camera, mounted at the rear of the vehicle, in the centre.

5.7.6 All vehicles must be able to use the rear-looing camera as a reversing aid and to record events that occurs at the rear of the vehicle. The camera must be wired in such a way that there is no delay between selection of reverse gear and footage being displayed on the dashboard screen.

5.7.7 All external cameras on vehicles must have following features:

- They must be all saloon micro-dome cameras mounted on micro-dome base
- They must have high resolution with minimum day/night function of 600 TVL
- They must be vandal resistant with lockable rim

5.7.8 The successful service provider must provide camera extension cables as required.

5.8 Accident review service

5.8.1 The CCTV supplier/management company must offer option to recover or receive accident footage and to prepare an independent expert report on the circumstances, possible causation and liability. This must comply with relevant data protection requirements including the General Data Protection Regulation as it applies in the UK (GDPR).

5.8.2 The CCTV supplier/management company must be able to retrieve footage from trust locations within 24 hours or provide incident footage required for third-party purposes such as police request. Footage is to be prepared in a format that meets data protection requirements including GDPR and that fulfils appropriate audit trail guidelines.

Section 6: Consumables and Ancillary Materials

6.1 Infection Prevention & Control Materials

All ambulances must have following items:

6.1.1 Personal Protective Equipment (PPE) cupboard (kit to be defined between provider and Trusts)
6.1.2 Two Clinical waste bins in patient compartment of the vehicle
6.1.3 Two Sharps bins in the patient compartment of the vehicle
6.1.4 One General waste bin near a driver at the front of the vehicle and another in the patient compartment
6.1.5 A Hand Sanitiser Dispenser in the patient compartment and driver compartment
6.1.6 Glove Holders to accommodate X-small, small, medium, large, X-large gloves
6.1.7 A Paper Towel Dispenser

6.2 Health and Safety Materials

All ambulances must have following items:

6.2.1 Two rechargeable torches in a driver cabin at the front of the vehicle
6.2.2 Winter Tire Socks/Snow shovel
6.2.3 Airport Beacon Lights

6.3 Ancillary Materials

All ambulances must also have following items:

6.3.1 A White Board and pen holders at the rear of the vehicle.
6.3.2 One cupholder in a driver cabin at the front of the vehicle and another passenger compartment of the vehicle.
6.3.3 Two resuscitation digital clock/timer in the passenger compartment.

Section 7: Vehicle and Instruments Related Support

7.1 Conversion Company Support

7.1.1 A process should be in place for resolving matters urgently and priority given to both the resolution and any associated works.

7.2 Warranties

7.2.1 All vehicles must have 5 years of Driveline warranty.

7.2.2 All vehicles must have 10 years of Corrosion warranty. The corrosion warranty must also include parts vehicles that are converted by the vehicle conversion company.

7.2.3 All vehicles must have conversion warranty. The converter must provide a comprehensive seven-year parts and labour warranty for the integrity and structure of the conversion, including specified and purchased items, with a written procedure for warranty claims and carrying out work.

7.2.4 All vehicles must have a minimum 5 years of warranty for electrical installations.

7.2.5 Vehicles should be designed and built to reduce CO2 emissions in line with any current national and NHS guidance.