HOUSTON FIRE DEPARTMENT

COMMAND APPARATUS SPECIFICATION

SCOPE AND GENERAL INFORMATION

It is the intent of the HOUSTON FIRE DEPARTMENT to secure an emergency apparatus to withstand the continuous use encountered in the emergency service. The apparatus shall be of the latest type, symmetrically proportioned and constructed with due consideration of the load to be sustained.

All parts not specifically mentioned herein, but which are necessary in order to furnish a complete emergency apparatus, shall be furnished and shall conform to the best practices known to the emergency industry.

The apparatus and all major components shall be manufactured in North America. Where the following detailed specifications require specific brand names, model number, dimension or capacities of components such as: axles, brakes, spring suspension, frame, steering gear, drive line, universal joints, engine transmission, alternator, batteries, air brake system, they have been specified for the service because of their reliability/availability of replacement parts on a local basis.

All specifications herein contained are considered as minimum. No exceptions to these minimum standards shall be allowed relating to gauge, alloy, and type of metal, size of compartments, and overall design.

The delivered apparatus shall have a certified G.V.W.R. weight sticker applied to vehicle on delivery to assure the apparatus meets all laws pertaining to the weight carrying capacity of the vehicle.

GENERAL CONSTRUCTION AND DESIGN

The design of the equipment shall be in accordance with the best engineering practices. The equipment design and accessory installation shall permit accessibility for use, maintenance and service. All components and assemblies shall be free of hazardous protrusions, sharp edges, cracks or other elements which might cause injury to personnel or equipment. All components shall be designed and protected so that heavy rains or other adverse weather conditions will not interfere with normal servicing or operation.

All oil, hydraulic and air tubing lines, and electrical wiring shall be located in protective positions properly attached to the frame or body structure and shall have protective loom or grommets at each point where they pass through structural members, except where a through frame connector is necessary.

The apparatus shall be designed and the equipment mounted with due consideration to distribution of load between the front and rear axles, so that all specified equipment including personnel will be carried without injury to the apparatus. All dimensions are approximate and subject to a plus or minus 1/4" tolerance.

The following specifications describe minimum requirements for an emergency services vehicle designed for severe duty applications.

The materials specified are considered absolute minimum.

Subletting any part of the fabrication, painting, or finishing of the apparatus will not be acceptable.

ACCESSIBILITY

Parts and components shall be located or positioned for rapid and simple inspection and recognition of excessive wear or potential failure. Whenever functional layout of operating components determines that physical or visual interference between items cannot be avoided, the item predicted to require the most maintenance shall be located for best accessibility.

Cover plates which must be removed for component adjustment or part removal should be equipped with quick disconnect fasteners or hinged panels.

Drains, filler plugs, grease fittings, hydraulic lines, bleeders, and check points for all components should be located so that they are readily accessible and do not require special tools for proper servicing. Design practices should minimize the number of tools required for maintenance.

MATERIALS

The materials specifications are considered absolute minimum. Materials shall conform to the specifications listed herein. When not specifically listed, materials shall be of the best quality for purpose of commercial practice. Materials shall be free of all defects and imperfections that might affect the serviceability of finished product.

QUALITY AND WORKMANSHIP

The manufacturing process, including quality control, shall be consistent with present industry standards. All equipment, material, and articles required under these specifications are to be new or fabricated from new materials produced from recovered materials. The term "Recovered Materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this document. The term "Heavy Duty", as used to describe an item, shall mean in excess of the standard, quantity, quality, or capacity and represents the best, most durable, strongest, etc., part, component, HOUSTON FIRE DEPARTMENTsystem, etc., that is available. The HOUSTON FIRE DEPARTMENT or their designate shall be the sole judge of quality, construction and stability of the apparatus and equipment being offered.

Welding shall not be employed in the assembly of the apparatus in a manner that will prevent the ready removal of any component part for service or repair. All steel and stainless steel welding shall be done to American Welding Society D1.1-83 recommendations for structural steel welding. All aluminum welding shall be done to American Welding Society and ANSI D1.2-83 requirements for structural welding of aluminum.

Defective components shall not be furnished. Parts, equipment, and assemblies, which have been repaired or modified to overcome deficiencies, shall not be furnished without the approval of the HOUSTON FIRE DEPARTMENT. Welded, bolted, and riveted construction utilized shall be in accordance with the highest standards of the industry. Component parts and units shall be manufactured to definite standard dimensions with proper fits, clearances, and uniformity. General appearance of the vehicle shall not show any evidence of poor quality of work.

LIABILITY INSURANCE

The Body Manufacturer shall furnish with the proposal a certificate of insurance for;

Workman's Compensation and Employer's Liability Insurance covering all employees.

General Liability each occurrence of $1,000,000.00, General Aggregate of $2,000,000.00 including Products Completed / Operations Aggregate.

Personal Injury of $1,000,000.00, Fire damage of $50,000.00 and Medical expense of $10,000.00. Automobile liability of $1,000,000.00 combined single limit (each accident), including any auto, all owned autos, scheduled autos, hired autos, non-owned autos, and garage liability.

Excess Umbrella Liability coverage of $2,000,000.00 each occurrence, Aggregate of $2,000,000.00.

All insurance policies must be;

- Maintained for the life of the contract,
- Must provide ten (10) days notice before cancellation,
- Must cover all operations of the contractor, or anyone employed by them.

INTERNET IN-PROCESS SITE

The Body Manufacturer shall post and maintain a website where the HOUSTON FIRE DEPARTMENT will be able to view digital images of their apparatus as its being manufactured. The digital images shall be posted once a week starting when the body begins production or when the cab/chassis arrives and shall continue until the final completion of the apparatus.

ONSITE DEMOSTRATIONS OF COMPLETED APPARATUS

There will be two (2) of the Body Manufacturer's factory technicians sent to the HOUSTON FIRE DEPARTMENT's training location for a period of two (2) days for onsite training of the entire apparatus.

RESPONSIBILITY OF PURCHASER

It shall be the responsibility of the purchaser to specify the following details of the apparatus:

(1) Its required performance, including where operations at elevations above 2000 ft (600 m) or on grades greater than 6 percent are required
(2) The maximum number of fire fighters to ride within the apparatus
(3) Specific electrical loads that are to be part of the minimum continuous electrical load defined in 13.3.3
(4) Any hose, ground ladders, or equipment to be carried by the apparatus that exceed the minimum requirements of this standard
(5) If a trailer for the purpose of transporting fire rescue response equipment, whether it is a Type I, Type II, or Type III configuration

After acceptance of the fire apparatus, the purchaser shall be responsible for ongoing training of personnel to develop and maintain proficiency regarding the proper and safe use of the apparatus and the associated equipment.

RESPONSIBILITY OF CONTRACTOR

The contractor shall provide a detailed description of the apparatus, a list of equipment to be furnished, and other construction and performance details to which the apparatus shall conform.

The detailed description of the apparatus shall include, but shall not be limited to, estimated in-service weight, wheelbase, turning clearance radius, principal dimensions, angle of approach, angle of departure, transmission, and axle ratios.

The contractor's detailed description shall include a statement specifically describing each aspect of the delivered apparatus that will not be fully compliant with the requirements of this standard.

The purpose of these contractor specifications shall be to define what the contractor intends to furnish and deliver to the purchaser.

Responsibility for the apparatus and equipment shall remain with the contractor until they are accepted by the purchaser.

VEHICLE STABILITY SUPPLIED WITH CAB/CHASSIS

The cab/chassis shallbe is equipped with a stability control system. The system shall have, at a minimum, a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer, and individual wheel brake controls.

CONSTRUCTION DOCUMENTATION

The contractor shall supply, at the time of delivery, at least one (1) copy of the following documents:

(1) The manufacturers record of apparatus construction details, including the following information:
- (a) Owner's name and address
- (b) Apparatus manufacturer, model, and serial number
- (c) Chassis make, model, and serial number
- (d) GAWR of front and rear axles and GVWR
- (e) Front tire size and total rated capacity in pounds (kilograms)
- (f) Rear tire size and total rated capacity in pounds (kilograms)
- (g) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
- (h) Engine make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
- (i) Type of fuel and fuel tank capacity
- (j) Electrical system voltage and alternator output in amps
- (k) Battery make, model, and capacity in cold cranking amps (CCA)
- (l) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
- (m) Ratios of all driving axles
- (n) Maximum governed road speed
- (o) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- (p) Pump transmission make, model, serial number, and gear ratio
- (q) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- (r) Water and Foam tank certified capacity in gallons or liters
- (s) Paint manufacturer and paint number(s)

(t) Company name and signature of responsible company representative
(u) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)

(2) Certification of compliance of the optical warning system
(3) Siren manufacturer's certification of the siren
(4) Written load analysis and results of the electrical system performance tests
(5) Certification of slip resistance of all stepping, standing, and walking surfaces
(6) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability
(7) If the apparatus is equipped with a fire pump and special conditions are specified by the purchaser, the pump manufacturer's certification of suction capacity under the special conditions
(8) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications
(9) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
(10) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test
(11) If the apparatus has a fire pump, the certification of inspection and test for the fire pump
(12) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test
(13) When the apparatus is equipped with a water tank, the certification of water tank capacity
(14) If the apparatus has an aerial device, the certification of inspection and test for the aerial device
(15) If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy and the final installer's certification the foam proportioning system meets this standard
(16) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
(17) If the apparatus has a line voltage power source, the certification of the test for the power source
(18) If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification *(see 24.9.7)*, and the results of the testing of the air system installation
(19) Any other required manufacturer test data or reports

OPERATIONS AND SERVICE DOCUMENTATION

The contractor shall deliver with the fire apparatus at least two (2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof.

The contractor shall also deliver with the fire apparatus the following documentation for the entire apparatus and each major operating system or major component of the apparatus:

(1) Manufacturer's name and address
(2) Country of manufacture
(3) Source for service and technical information
(4) Parts replacement information
(5) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
(6) Wiring diagrams for low voltage and line voltage systems to include the following information:
  (a) Pictorial representations of circuit logic for all electrical components and wiring
  (b) Circuit identification
  (c) Connector pin identification
  (d) Zone location of electrical components
  (e) Safety interlocks
  (f) Alternator–battery power distribution circuits
  (g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
(7) Lubrication charts

(8) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
(9) Precautions related to multiple configurations of aerial devices, if applicable
(10) Instructions regarding the frequency and procedure for recommended maintenance
(11) Overall apparatus operating instructions
(12) Safety considerations
(13) Limitations of use
(14) Inspection procedures
(15) Recommended service procedures
(16) Troubleshooting guide
(17) Apparatus body, chassis, and other component manufacturer's warranties
(18) Special data required by this standard
(19) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

The contractor shall deliver with the apparatus all manufacturers' operations and service documents supplied with components and equipment that are installed or supplied by the contractor.

NFPA REQUIRED DOCUMENTATION FORMAT - CD-ROM

The vehicle construction details and the operations and service documentation as required per NFPA 1901 latest edition shall be provided on a CD-ROM. These manuals shall be divided into sections for ease of reference. There shall be two (2) copies of the CD-ROM provided with the completed vehicle.

STATEMENTOF EXCEPTIONS

The contractor shall deliver with the fire apparatus either a certification that the apparatus fully complies with all requirements of this standard or, alternatively, a Statement of Exceptions specifically describing each aspect of the completed apparatus that is not fully compliant with the requirements of this standard at the time of delivery.

The Statement of Exceptions shall contain, for each noncompliant aspect of the apparatus or missing required item, the following information:

(1) A separate specification of the section of the applicable standard for which compliance is lacking
(2) A description of the particular aspect of the apparatus that is not in compliance therewith or required equipment that is missing
(3) A description of the further changes or modifications to the delivered apparatus that must be completed to achieve full compliance
(4) Identification of the entity that will be responsible for making the necessary post delivery changes or modifications or for supplying and installing any missing required equipment to the apparatus to achieve full compliance with this standard

Prior to, or at the time of, delivery of the apparatus, the Statement of Exceptions shall be signed by an authorized agent of the entity responsible for final assembly of the apparatus and by an authorized agent of the purchasing entity, indicating mutual understanding and agreement between the parties regarding the substance thereof.

An apparatus that is delivered subject to a Statement of Exceptions other than a certification of full compliance shall not be placed in emergency service until the apparatus has been modified as necessary to accomplish full compliance with this standard.

CARRYING CAPACITY

The GAWR and the GCWR or GVWR of the chassis shall be adequate to carry the weight of the completed vehicle when loaded to its estimated in-service weight. The manufacturer shall establish the estimated in service weight during the design of the vehicle

The estimated in-service weight shall include the following:

(1) The chassis, body, and tank(s)
(2) Full fuel, lubricant, and other chassis or component fluid tanks or reservoirs
(3) Full water and other agent tanks
(4) *250 lb (114 kg) in each seating position
(5) Fixed equipment such as pumps, aerial devices, generators, reels, and air systems as installed
(6) Ground ladders, suction hose, designed hose load in their hose beds and on their reels
(7) An allowance for miscellaneous equipment that is the greatest of the values for type of vehicle per NFPA 1901, a purchaser provided list of equipment to be carried with weights, or a purchaser specified miscellaneous equipment allowance.

The manufacturer shall engineer and design the vehicle such that the completed unit, when loaded to its estimated in-service weight, with all movable weights distributed as close as is practical to their intended in-service configuration, does not exceed the GVWR.

A final manufacturer's certification of the GVWR or GCWR, along with a certification of each GAWR, shall be supplied on a label affixed to the vehicle.

			Equipment Allowance	
Apparatus Type	**Equipt. Storage Area**	**Apparatus Size**	**lb.**	**kg.**
Special Service Fire Apparatus	Minimum of 120 cu ft (3.4 cu mt) of enclosed compartmentation.	10,000 lb to 15,000 lb (4,500 kg to 7,000 kg) GVWR	2,000	910
		15,001 lb to 20,000 lb (7,001 kg to 9,000 kg) GVWR	2,500	1,135
		20,001 lb to 30,000 lb (9,001 kg to 14,000 kg) GVWR	3,000	1,350
		30,001 lb to 40,000 lb (14,001 kg to 18,000 kg) GVWR	4,000	1,800
		40,001 lb to 50,000 lb (18,001 kg to 23,000 kg) GVWR	6,000	2,700
		50,001 lb to 60,000 lb (23,001 kg to 27,000 kg) GVWR	8,000	3.600
		60,001 lb and up (27,001 kg) GVWR	10,000	4,500

TESTING

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

The vehicles low voltage electrical system shall be tested and certified by the manufacturer. The certified test results shall be delivered with the completed vehicle. Tests shall be performed when the air temperature is between 0°F and 110°F (–18°C and 43°C).

TEST SEQUENCE

The following three (3) tests shall be performed in the order in which they appear below. Before each test, the batteries shall be fully charged until the voltage stabilizes at the voltage regulator set point and the lowest charge current is maintained for 10 minutes. Failure of any of these tests shall require a repeat of the sequence.

(1) RESERVE CAPACITY TEST

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off, and the minimum continuous electrical load shall be activated for 10 minutes.

All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test failure of the battery system.

(2) ALTERNATOR PERFORMANCE TEST

TEST AT IDLE

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

TEST AT FULL LOAD

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer’s governed speed. The test duration shall be a minimum of 2 hours. Activation of the load management system shall be permitted during this test.

An alarm sounded by excessive battery discharge, as detected by the warning system required in 13.3.4, or a system voltage of less than 11.8 V dc for a 12 V nominal system, 23.6 V dc for a 24 V nominal system, or 35.4 V dc for a 42 V nominal system for more than 120 seconds shall be considered a test failure.

(3) LOW VOLTAGE ALARM TEST

The following test shall be started with the engine off and the battery voltage at or above 12 V for a 12 V nominal system, 24 V for a 24 V nominal system, or 36 V for a 42 V nominal system.

With the engine shut off, the total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals.

The test shall be considered a failure if the alarm does not sound in less than 140 seconds after the voltage drops to 11.70 V for a 12 V nominal system, 23.4 V dc for a 24 V nominal system, or 35.1 V for a 42 V nominal system.

The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

(1) Documentation of the electrical system performance tests
(2) A written electrical load analysis, including the following:
    (a) The nameplate rating of the alternator
    (b) The alternator rating
    (c) Each of the component loads specified that make up the minimum continuous electrical load
    (d) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load
    (e) Each individual intermittent electrical load.

UL 120/240 VAC CERTIFICATION

The 120/240 volt electrical system shall be tested and certified by Underwriters Laboratories, to perform as listed below;

The prime mover shall be started from a cold start condition, and the unloaded voltage and frequency shall be recorded.

The line voltage electrical system shall be loaded to at least 100 percent of the continuous rated wattage stated on the power source specification label. Testing with a resistive load bank shall be permitted.

The power source shall be operated in the manner specified by the apparatus manufacturer as documented on instruction plates or in operation manuals. The power source shall be operated at a minimum of 100 percent of the continuous rated wattage as stated on the power source specification label for a minimum of 2 hours.

The load shall be adjusted to maintain the output wattage at or above the continuous rated wattage during the entire 2-hour test.

The following conditions shall be recorded at least every 1.2 hour during the test:
(1) The power source output voltage, frequency, and amperes
(2) The prime mover's oil pressure, water temperature, and transmission temperature, if applicable
(3) The power source hydraulic fluid temperature, if applicable
(4) The ambient temperature and power source air inlet temperature

The following conditions shall be recorded once during the test for power sources driven by dedicated auxiliary internal combustion engines:
(1) Altitude
(2) Barometric pressure
(3) Relative humidity

If the generator is driven by the chassis engine and the generator allows for operation at variable speeds, the chassis engine speed shall be reduced to the lowest rpm allowed for generator operation and the voltage and frequency shall be recorded.

The load shall be removed, and the unloaded voltage and frequency shall be recorded.

Voltage shall be maintained within ±10 percent of the voltage stated on the power source specification label during the entire test. Frequency shall be maintained within ±3 Hz of the frequency stated on the power source specification label during the entire test.

The total continuous electrical loads, excluding those loads associated with the equipment defined in 22.15.7.3.11.2, shall be applied during the testing unless an auxiliary engine drives the power source.

If the apparatus is equipped with a fire pump, the 2-hour certification test of the power source shall be completed with the fire pump pumping at 100 percent capacity at 150 psi (1000 kPa) net pump pressure. The test shall be permitted to be run concurrently with the pump certification test.

The results of each test shall be recorded on an appropriate form and provided with the delivery of the fire apparatus.

DIELECTRIC VOLTAGE WITHSTAND TEST

The line voltage wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900 volts for 1 minute. The testing shall be performed after all body work has been completed.

The test shall be conducted as follows:

(1) Isolate the power source from the panel board and disconnect any solid state low voltage components.
(2) Connect one lead of the dielectric tester to all the hot and neutral buses tied together.
(3) Connect the other lead to the fire apparatus frame or body.
(4) Close any switches and circuit breakers in the circuit(s).
(5) Apply the dielectric voltage for 1 minute in accordance with the testing equipment manufacturer’s instructions.

The electrical polarity of all permanently wired equipment, cord reels, and receptacles shall be tested to verify that wiring connections have been properly made.

Electrical continuity shall be verified from the chassis or body to all line voltage electrical enclosures, light housings, motor housings, light poles, switch boxes, and receptacle ground connections that are accessible to fire fighters in normal operations.

If the apparatus is equipped with a transfer switch, it shall be tested to verify operation and that all non grounded conductors are switched.

Electrical light towers, floodlights, motors, fixed appliances, and portable generators shall be operated at their full rating or capacity for 30 minutes to ensure proper operation.

GENERAL WARRANTY - ONE (1) YEAR

The entire body and all contractor installed components shall be warranted, including parts and labor for a period of at least ***one (1) year*** commencing upon the placing of the unit in-service by the HOUSTON FIRE DEPARTMENT (except that warranty on the tires and tubes, batteries, electrical lamps, and other devices subject to deterioration is limited to the warranty of the manufacturer thereof and adjustments for same are to be made directly with the manufacturer). Extended warranties on the engine, transmission, or other major components shall be detailed by contractor in their proposal.

This warranty shall not apply to those items which are usually considered normal maintenance and repair; including but not limited to normal lubrication or proper adjustment of main functional operating components. All manufacturers' warranties (apparatus & equipment) shall be furnished and indicated in the manufacturer's bid. Any standard warranties, including, but not limited to engine, transmission, tires and axles furnished by the original equipment manufacturer (OEM) or the prime contractor will be passed on to the HOUSTON FIRE DEPARTMENT. Also include any available extended warranties that will start after the initial warranty period. Goods or property shall be as represented by these specifications as well as additional agreements as a result of discussions regarding these specifications and shall be as promised with implied liability on the manufacturer.

The contractor must be the "single source" coordinator of all warranties on the vehicle.

LOW VOLTAGE ELECTRICAL SYSTEM - FIVE (5) YEARS

Contractor shall warrant the integrity of the electrical system on this emergency vehicle for a period of ***Five (5) Years, or 60,000 Miles*** from date of delivery. To be free from defects in materials and workmanship under normal use and service. The obligation of contractor under this warranty is limited to repairing or replacing, at its option, any part or parts thereof which shall, after delivery of such vehicle to the original purchaser, be returned with transportation charges pre-paid to contractor or an authorized distributor or dealer, and which examination shall disclose to have been defective, except as herein after provided.

Items specifically covered are:

- Electrical harness and harness installation
- Printed circuit boards
- Load management system
- Warning light control panel switches that are provided and installed by bidder.

Items excluded are:

- Chassis electrical systems and components installed by chassis manufacturer including, but not limited to: printed circuit boards, switches, relays, fuses, and similar equipment.
- Separately manufactured items installed by bidder including, but not limited to: batteries, sirens, battery chargers, inverters, light bars and similar equipment. These are covered by warranties supplied by the manufacturer of the components.
- Periodic tightening and cleaning of connection terminals as this is considered routine maintenance.
- Normal wear, abuse, accident, negligence or unapproved alteration of original parts.

STRUCTURAL WARRANTY - TEN (10) YEARS

The contractor shall warrant that each new rescue body (exclusive of paint, finish, hardware, moldings, windows, and other appointments and accessories) is structurally sound and free of all structural defects of both material and workmanship and further warrants that it will maintain such structural integrity for a period of ***ten (10) years*** from the completion date listed on the Manufacturer's data plate attached to the vehicle inside the cab.

The contractor further warrants that this structural integrity warranty may be transferred to a second purchaser providing the vehicle is inspected by the original contractor or their authorized representative within thirty (30) days of ownership transfer. To maintain warranty coverage, the proper ownership transfer papers shall be kept on file at contractor's facility.

In the event of a chassis remount, this structural warranty shall remain in effect providing that the re-chassis work is completed by the contractor or a facility which obtains written authorization from the contractor.

Should repairs become necessary under the terms of this warranty, the extent of the repair shall be determined solely by the Manufacturer and shall be repaired by the contractor or an Authorized Service Center designated by the contractor. The expense of any transportation to or from the ASC shall be the responsibility of the HOUSTON FIRE DEPARTMENT and is not an item covered by this warranty.

There shall be a Warranty Certificate supplied with the completed apparatus to detail the warranty configuration.

PAINT WARRANTY - TEN (10) YEARS

The exterior paint and finish on the portion of the unit painted by the contractor shall be warranted against cracking, checking, hazing, chalking, or fading or peeling of the topcoat or any layers from the substrate due to defects in manufacturing or improper preparation for a period of ***Ten (10) Years*** from acceptance.

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within three hundred seventy five (375) days after receipt of a purchase order, or contract.

Contractor shall not be held liable for delays of chassis delivery due to accidents, strikes, floods or other events not subject to their control. Contractor shall provide immediate written notice to HOUSTON FIRE DEPARTMENT as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

OVERALL HEIGHT

The overall height (OAH) of the vehicle shall be approximately 144" (12') from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

OVERALL LENGTH

The overall length (OAL) of the vehicle shall be approximately 501" (41' - 8").

INSPECTION TRIPS

There will be a pre-construction meeting, a pre-paint meeting and a final inspection meeting of the specified apparatus at the Body Manufacturer's factory. The HOUSTON FIRE DEPARTMENT will decide on the number of Fire Department representatives will attend each meeting. The HOUSTON FIRE DEPARTMENT will be responsible for all expenses incurred including transportation, lodging and food of all HOUSTON FIRE DEPARTMENT repesentatives.

DELIVERY AND DEMONSTRATION

The contractor shall be responsible for the delivery of the completed unit to the HOUSTON FIRE DEPARTMENTs location. On initial delivery of the apparatus, the contractor shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the HOUSTON FIRE DEPARTMENT regarding the operation, care, and maintenance of the apparatus and equipment supplied at the HOUSTON FIRE DEPARTMENTs location.

The delivery engineer shall set delivery and instruction schedule with the person appointed by HOUSTON FIRE DEPARTMENT.

After delivery of the apparatus, the HOUSTON FIRE DEPARTMENT shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment as defined in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

SPARTAN GLADIATOR LTD CHASSIS WITH 10" RAISED ROOF

The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit and maneuverability. This chassis shall be manufactured for heavy duty service with strength and capacity for a duty rating of one hundred (100) percent loaded full time.

MODEL YEAR

The chassis shall have a vehicle identification number that reflects a 2009 model year.

COUNTRY OF SERVICE

The chassis shall be put in service in the country of United States of America (USA).

APPARATUS TYPE

The apparatus shall be created for the Emergency Services Industry and include the functions of a Rescue which shall include the functions of a multipurpose vehicle which primarily provides support services at emergency scenes.

TRUCK TYPE

The chassis shall be manufactured as a truck style and designed to include permanently mounted compartments behind the cab, known as the body. The body of the truck shall be supplied and installed by the apparatus manufacturer.

AXLE CONFIGURATION

The axle configuration shall offer a tandem rear drive axle with a front steer axle configuration (6 X 4).

GROSS AXLE WEIGHT RATINGS FRONT

The gross apparatus weight rating and the gross capacity weight rating shall be adequate to carry the weight of equipment and the apparatus, with water tanks full and other tanks at full capacity, miscellaneous equipment and all personnel weights considered as recommended by the most current edition of NFPA 1901.

The chassis front gross axle weight rating (GAWR) shall be 23,000 pounds. This rating shall require special approval from the wheel manufacturer.

GROSS AXLE WEIGHT RATINGS REAR

The chassis rear gross axle weight rating (GAWR) shall be 40,000 pounds.

CAB STYLE

The cab shall be a custom, enclosed model, built specifically for the fire service by a company specializing in cab and chassis design for all fire service applications.

The cab shall be manufactured for heavy-duty service utilizing adequate strength and capacity for the application of protecting firefighters. The cab shall be of a modular design offering improved strength, durability and reduced weight. The modular design shall allow for faster, less costly replacement of components. Per pound, sheet panel aluminum extrusions offer a higher tensile strength, 45,000 PSI, and yield strength, 40,000 PSI, than that of lower grade sheet such as 3003-H13. For this reason, the cab shall be of aluminum extrusion construction, which shall offer superior strength and the truest, flattest surface ensuring less expensive paint repairs if needed.

The method of cab construction shall use a process incorporating techniques outlined in accordance with the American Welding Society D1.1-96 requirements for structural steel welding. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side panels shall be assembled using proven industrial adhesives, designed specifically for aluminum fabrication, which exceed the strength of a weld, for construction.

All interior and exterior seams shall be sealed for optimum noise reduction in addition to the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 Marine Grade, one hundred percent primary aluminum plate. A single formed, one (1) piece extrusion, manufactured from 6061-T6 100 percent primary one- quarter inch thick aluminum shall be used for the “A” pillar adding strength and rigidity to the cab as well as additional roll-over protection. The cab side wall skins and shall be 0.125 inch thick, the rear wall and roof skin shall be 0.19 inch thick, the front skin shall be 0.125 inch thick.

The cab shall incorporate tongue and groove fitted 6061-T6 0.25 inch thick aluminum extrusions for extreme duty situations. The cab shall include multi-layer composite insulation for improved cab heating and cooling in addition to noise reduction.

Proposals offering products built with anything less than the alloy-temper mentioned or from any other material, other than aluminum, shall not be considered. Additionally, any cabs utilizing recycled or recovered aluminum plate or extrusion products shall not be considered due impurities in the composition leading to a lack of strength.

The cab shall incorporate a fully enclosed design, allowing for a spacious cab area with no partition between the front and rear sections of the cab. The walls of the vehicle shall include roof supports allowing for an open design. The outside dimension of the cab shall be 96 inches wide with a minimum interior width of 90 inches.

The cab overall length shall be 109.38 inches in length with 33.00 inches from the centerline of the front of the axle to the back of the cab. The cab shall offer an interior height of 58.00 inches from the front floor to the headliner, at a minimum. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

In order to offer the optimum amount of cab space to occupants, there shall be no consideration given for any cab unable to comply with the minimum measurements for interior cab space as listed.

The cab shall include a driver and officer area with two (2) cab door openings. The front door opening shall offer a clear door opening of 43.00 inches wide X 56.00 inches high. This style shall not include any crew area.

The cab shall incorporate a (2) step configuration from the ground to the cab floor for each door opening. The lower step shall be constructed of heavy duty safety grating which meets or exceeds Federal Specification RRG-1602-latest revision and performs under dry, greasy, muddy, soapy and icy conditions and offers open drainage.

The first step for the driver and officer area shall measure 11.44 inches deep X 31.13 inches wide. The intermediate step shall measure 8.75 inches deep X 33.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

CAB FRONT FASCIA

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.090 of an inch thick, one hundred percent primary aluminum plate which shall be an integral part of the cab.

The cab fascia will encompass the entire front of the aluminum cab structure from the bottom of the windshield to the bottom of the cab and shall be the “Classic” design.

The front cab fascia shall include two (2) molded plastic modules on each side accommodating a total of up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights. A chrome plated molded plastic bezel shall be provided on each side around each set of four lamps.

FRONT GRILLE

The front cab fascia shall include a classic box style, 304 stainless steel front grille with a Spartan logo. The grille shall measure 44.45 inches wide at the top of tapering to 39.30 inches wide at the bottom X 33.50 inches high X 1.50 inches deep.

The grille shall include a minimum free air intake of 632.90 square inches shall be installed on the front of the cab.

The upper portion of the grille shall be hinged at the bottom so it can be opened to allow easy access for examination of the windshield wiper motor, linkage and other options mounted within that area. The upper portion of the grille shall be secured with two (2) flush push button latches.

CAB ENGINE TUNNEL

The cab interior shall include a fixed type engine tunnel cover sized to accommodate an engine with a smaller block or an engine which has a large block. The engine tunnel shall be an integral part of the cab constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred percent primary aluminum plate. The tunnel shall be a maximum of 41.50 inches wide X 29.00 inches high.

The engine tunnel shall be insulated with multi-layer insulating material, consisting of foam, a sound barrier of 1.0 pounds per square foot with a facing which resists heat transfer. This insulation shall be held in place by adhesive, aluminum stick pins and retention caps. Any exposed insulation seams and edges shall be sealed reducing moisture and debris.

CAB ENTRY DOORS

The cab shall include a driver and officer area with two cab door openings which offer a clear door opening of 40.75 inches wide. The doors shall be constructed of extruded aluminum with a nominal thickness of .125 inch. The exterior skins shall be constructed of .125 inch aluminum plate.

The cab doors shall be of substantial weight for the optimum strength and rigidity for the best performance in all cab crash testing. Any cab with doors manufactured of less than the material thickness of .125 inch in both the extrusion and exterior skin shall not be considered.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each hinge shall be .375 inch piano style and be constructed of stainless steel.

The hidden piano style hinge and flush mounted door is the most favorable construction keeping dirt and debris out of the hinge allowing for optimum operation throughout the lifetime of the door.

Proposals offering door hinge thickness any less than stated shall not be considered.

Proposals including doors that do not comply with the flush mounting as described or those including exposed hinges shall not be considered.

CAB ENTRY DOOR TYPE

All entry doors shall be of a flush, full height design and shall be located on the sides of the cab.

LH EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the left side of the cab behind the door. The compartment interior dimensions shall be 30.00 inches wide X 51.88 inches high and shall be transverse from side to side of the cab. The compartment shall include a locking ROM roll up door. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

LH EXTERIOR REAR COMPARTMENT LIGHTING

There shall be two (2) SoundOff Signal brand LED strip lights installed to illuminate the exterior rear compartment on the left side of the cab. Each strip light shall be 32.00 inches long and shall include nine (9) bright white Gen3 LEDs for long life and low amp draw. The lights shall be installed one on top of the other for a total length of 64.00 inches.

RH EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the right side of the cab behind the door. The compartment interior dimensions shall be 30.00 inches wide X 51.88 inches high and shall be transverse from side to side of the cab. The compartment shall include a locking ROM roll up door. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

RH EXTERIOR REAR COMPARTMENT LIGHTING

There shall be one (1) SoundOff Signal brand LED strip light installed to illuminate the exterior rear compartment on the right side of the cab. The strip light shall be 43” long and shall include twelve (12) bright white Gen3 LEDs for long life and low amp draw.

CAB STRUCTURAL WARRANTY

The cab structure shall be warranted for a period of ten (10) years. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.

CAB TEST INFORMATION

The cab shall have successfully achieved survival of the International crash test ECE-29, Addendum 28, Revision 1 as indicated below.

As part of the ECE regulation 29 test, the frontal area of the cab is struck by a 3,700 pound pendulum weight. The weight is brought back to a sixty degree angle and then the weight is released and allowed to swing forward, imparting some 32,600 pounds foot of force to the cab front face. The cab shall be so constructed that after the test, there will be minimal intrusion of the cab structure into the passenger area. The doors shall remain usable for both entry and exit. Also, as part of the test the cab roof must withstand a static load bearing test. The cab shall withstand a weight of over 60,000 pounds without permanent damage or collapse. The above tests shall be witnessed by and attested to by an independent third party. The test results shall be recorded on/by cameras, high speed imagers, accelerometers and strain gauges, with notarized copies of the letters verifying the test results and videos of said test shall be available upon request.

CAB PAINT EXTERIOR

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper, the seams shall be sealed with SEM brand seam sealer and painted with two (2) to four (4) coats of an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene.

The cab shall then be painted with the upper and lower colors specifically designated by the customer with a minimum thickness of two 2.00 mils of paint, followed by a clear top coat not to exceed 2.00 mils.

CAB PAINT MANUFACTURER

The cab shall be painted with PPG Industries paint.

CAB PAINT PRIMARY/LOWER COLOR

The primary/lower paint color shall be PPG FBCH 77723 Red.

CAB PAINT SECONDARY/UPPER CAB COLOR

The upper paint color shall be PPG FBCH 911645 White.

CAB PAINT EXTERIOR BREAKLINE

The upper and lower paint shall meet at a break line on the cab which shall fall approximately 1.00 inch under the door windows and above the door handles. The break line shall extend in a straight line and fall approximately 3.50 inches under the windshield and above the windshield wipers on the front of the cab.

CAB PAINT PINSTRIPE

A 0.50 inch gold leaf tape with black borders shall be applied on the break line between the two different colored surfaces.

CAB PAINT EXTERIOR ROLL-UP DOORS

The roll up doors shall be painted the same as the primary and secondary color of the cab. The painting shall be accomplished by the roll up door manufacturer and shall be complete prior to the doors being installed into the compartment.

CAB PAINT WARRANTY

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for 10 years from the first owners date of purchase or in service or the first 100,000 actual miles, whichever occurs first.

ELECTRICAL SYSTEM

The chassis shall include a single starting electrical system which shall include a 12 volt direct current Weldon brand of multiplexing system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275 degree Fahrenheit minimum high temperature flame retardant loom. All nodes and sealed Deutsch connectors shall be waterproof.

APPARATUS WIRING PROVISION

An apparatus wiring panel shall be installed on the officer side bulkhead below the dash which shall include eight (8) open circuits consisting of three (3) 20 amp, one (1) 30 amp, three (3) 10 amp, and one (1) 15 amp circuit, with relays and breakers with trigger wires which shall be routed to the rocker switch panel.

MULTIPLEX DISPLAY

The multiplex electrical system shall include a Weldon Vista III display which shall be located on the left side of the dash in the switch panel. The Vista III shall feature a full color LCD display screen which includes a message bar displaying the time of day, the current ambient outside temperature and important messages requiring acknowledgement by the user which shall all be displayed on the top of the screen in the order they are received. There shall be virtual controls for the auto climate control and on-board diagnostics. The display screen shall be video ready for back- up cameras, thermal cameras, and DVD.

The Vista III display shall measure approximately 10.38 inches wide X 7.50 inches overall. The display shall offer varying fonts and background colors. The display shall be fully programmable to the needs of the customer and shall offer virtually infinite flexibility for screen configuration options.

VEHICLE DATA RECORDER

The chassis shall have a Weldon Vehicle Data Recorder system installed. The system shall be designed to meet NFPA 1901 and shall be integrated with the Weldon Multiplex electrical system. The following information shall be recorded:

- Vehicle Speed
- Acceleration
- Deceleration
- Engine Speed
- Engine Throttle Position
- ABS Event
- Seat Occupied Status
- Seat Belt Status
- Master Optical Warning Device Switch Position
- Time
- Date

Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.

POWER & GROUND STUD

A 40 amp battery direct power and ground stud shall be provided and installed in the electrical distribution panel. The stud shall be size #10 and protected with a 40 amp circuit breaker.

AUXILIARY POWER & GROUND STUD

An auxiliary set of power and ground studs shall be provided and installed behind the electrical center cover with a 40 amp breaker. The studs shall be .375 inch diameter and capable of carrying up to a 40 amp load switched with the master power switch.

EXTERIOR ELECTRICAL TERMINAL COATING

All terminals exposed to the elements will be sprayed with a yellow protective rubberized coating to prevent corrosion.

ENGINE

The power plant for the vehicle shall offer a high pressure performance, turbo charged engine which shall feature a high pressure common rail fuel system. This system shall be coupled with a proven Holset turbo which delivers outstanding performance at ratings up to 500 HP. The Cummins ISM engine shall include replaceable mid-stop cylinder liners plus heavy duty roller followers, targeted piston cooling and 30% more efficient oil cooling for improved durability and reliability. The heavy duty design shall also feature stronger braking capacity.

The engine shall be EPA certified to meet the very latest emissions standards without compromising performance, reliability or durability. The Cummins ISM 500 engine shall feature an air charge cooled engine which consists of an in line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 500 horse power at 2000 RPM which shall be governed at 2100 RPM. The torque rating shall feature 1550 foot pounds of torque at 1200 RPM with 661 cubic inches of displacement. The Cummins ISM 500 engine shall feature an electronic governor.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

ENGINE CONFIGURATION

The engine shall be located in the front of the chassis in cab-over configuration.

ENGINE PROGRAMMING HIGH IDLE SPEED

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

ENGINE HIGH IDLE CONTROL

The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral. There shall be an indication on the Vista screen for the high idle speed control.

ENGINE PROGRAMMING ROAD SPEED GOVERNOR

The engine shall include programming which will govern the top speed of the vehicle.

AUXILIARY ENGINE BRAKE

A Jacobs engine compression brake, for the six (6) cylinder engine, with brake light actuation and cutout relay for when in pump mode or when an ABS event occurs shall be installed. The engine brake shall activate upon 0% accelerator when in operation mode.

AUXILIARY ENGINE BRAKE CONTROL

An engine compression brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected: a valid gear ratio is detected; the driver has requested or enabled engine compression brake operation; the throttle is at a minimum engine speed position; and the electronic controller is not presently attempting to execute an electronically controlled final drive gear shift. The compression brake shall be controlled via an off/low/high virtual button through the Vista display.

FLUID FILLS

The front of the chassis shall accommodate fluid fills for the engine oil and the windshield washer fluid though the grille. This area shall also accommodate checks for the engine oil.

ELECTRONIC ENGINE OIL LEVEL INDICATOR

The engine oil shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal. The light shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

ENGINE WARRANTY

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

ENGINE PROGRAMMING REMOTE THROTTLE

The engine ECM (Electronic Control Module) discreet wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discreet wire remote throttle controls are not required.

ENGINE PROGRAMMING IDLE SPEED

The engine low idle speed will be programmed at 700 rpm.

ENGINE FAN DRIVE

The engine cooling system fan shall be direct drive belt driven on the engine.

ENGINE COOLING SYSTEM

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the fire industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall utilize heavy-duty welds and be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall be comprised of a stacked, single depth package that provides the maximum cooling capacity for the specified engine as well as offers excellent serviceability. The main components shall include a surge tank, a charge air cooler, a recirculation shield, and a radiator.

There shall be a single depth core that allows greater efficiency, enhanced serviceability, and lighter weight with a higher ambient capability.

The cooling package core shall be protected by a radiator skid plate and not protrude below the frame of the vehicle by more that 3.5 inches. This feature shall provide an improved angle of approach thereby reducing possible damage.

The radiator shall be a cross-flow design constructed completely of aluminum with welded side tanks. The radiator shall include a minimum of a 910 square inch core and shall be bolted to the bottom of the charge air cooler to allow a single depth core, thus allowing a more efficient and serviceable cooling system. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injected molded Polymer fan blade designed to provide long life in harsh environments. Polymer fans provide a significant weight reduction over metal fans providing longer life for fan clutch linings and bearings along with increased fan belt life.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a cap that meets the engine manufactures pressure requirements as well as the system design requirements.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance. When a center bumper compartment is installed an additional shield may be required to redirect the airflow into the coolers.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with welded side tanks. The charge air cooler shall have a minimum of a 473 square inch core and be bolted to the top of the radiator to allow a single depth core, thus allowing a more efficient and serviceable cooling system.

All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel “constant torque” style clamps meeting the engine manufactures requirements.

ENGINE COOLANT

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees F.

Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

ENGINE COOLANT FILTER

An engine coolant filter with a shut-off valve for the inlet and outlet shall be installed on the chassis. The location of the filter shall allow for easy maintenance.

Proposals offering engines equipped with coolant filters shall be supplied with standard non-chemical type particulate filters.

ELECTRONIC COOLANT LEVEL INDICATOR

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

COOLANT HOSES

The cooling systems hose shall be formed silicone hose and formed aluminized steel tubing and include stainless steel constant torque band clamps.

ENGINE AIR INTAKE

The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the officer side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a galvanized steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

The engine shall also include an air intake filter which shall be bolted to the frame and located under the front of the cab on the officer side. The completely disposable dry type filter shall ensure containment of dust and debris safely contained inside the disposable housing, eliminating the chance of contaminating the air intake system during air filter service via a leak-tight seal.

The air flow distribution and dust loading shall be uniform throughout the high-performance filter cone pack, which shall result in increased capacity and lower pressure differential for improved horsepower and fuel economy. The air intake shall be mounted within easy access via a hinged panel behind the headlight module. The air intake system shall include a restriction indicator light in the warning light cluster which shall activate when the air cleaner element requires replacement.

The charge air cooler hose shall be formed from aluminized steel tubing and include silicone hump hose with stainless expansion rings and stainless steel “constant torque” style clamps meeting the engine manufactures requirements.

Proposals shall include an indication light representative of the need for replacement of the air intake filter and shall be located at the front of the vehicle.

AIR INTAKE SKIDPLATE

A skid plate shall be supplied for the engine air intake system below the right front side of the cab. The skid plate shall be bolted to the bottom flange of the right side frame rail to provide additional protection for the air intake system.

ENIGINE EXHAUST SYSTEM

The exhaust system shall be installed under the frame and shall terminate horizontally on the officer side of the vehicle ahead of the rear tires. A muffler and 0.065 wall aluminized steel exhaust tubing shall be installed. The tubing shall be supported by brackets which are bolted to the frame for strength and rigidity. Stainless steel flex tubing shall be installed between exhaust pipe and the muffler system. Any joints throughout the system shall be connected with overlapping band style clamps.

ENGINE EXHAUST ACCESSORIES

A radiused chrome exhaust tail pipe extension shall be shipped loose with the chassis for installation by the apparatus builder.

TRANSMISSION

The drive train shall include an Allison Gen IV-E model EVS 4000 torque converting, automatic transmission which shall include electronic controls and an output retarder. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters which shall offer Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The Gen IV-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

The transmission gear ratios shall be:
1st - 3.51:1
2nd - 1.91:1
3rd - 1.43:1
4th - 1.00:1
5th - 0.74:1
6th - 0.64:1 (if applicable)
Rev- 4.80:1

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select the fifth speed operation without the need to press the mode button.

TRANSMISSION FEATURE PROGRAMMING

The EVS group package number 127 shall contain the 199 vocational package in consideration of the duty of this apparatus for rescue. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.
An 8 pin Delphi connector will be provided next to the steering column connector. This will contain the following input/output circuits to the transmission tcm.

Function ID	Description	Wire assignment
C	PTO Request	143
F	Aux. Function Range Inhibit (Special)	101/142
G	PTO Enable Output (See Input Function C)	130
S	Neutral Indicator for PTO	145
	Signal Return	103

TRANSMISSION SHIFT SELECTOR

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector will provide a prognostic indicator (wrench symbol) between the selected and attained indicators.

ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR

The transmission fluid shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

TRANSMISSION RETARDER CONTROL

The Allison transmission retarder control shall be modulated by a one-third at 0% throttle and two- thirds brake pedal actuation and shall include a virtual button on the multiplex display. The activation of the retarder shall activate the brake lights and shall be inactive during pump mode.

TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE

When the auxiliary brake is engaged, the transmission shall automatically seek shifting to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle speed.

TRANSMISSION WARRANTY

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.

TRANSMISSION COOLING SYSTEM

The transmission shall include an air to oil cooler integrated into the lower portion of cooling package. The transmission cooling system shall meet all transmission manufacturer requirements.

The transmission retarder application shall feature a separate water to oil cooling system. The cooler will be installed into the transmission hydraulic circuit providing cooling for the retarder. The tube bundle cooler shall be mounted to the chassis, connected to the engine cooling system plumbing.

LH PTO

A Spartan supplied ten (10) bolt standard duty clutched drive PTO shall be installed on the transmission. Installation shall include mounting of the PTO and wiring the unit with a control switch.

LH PTO MODEL

A ten (10) bolt Chelsea model 277-XGFJP-B5XD heavy duty transmission driven PTO shall be installed. The clutched shifted PTO is designed specifically for the Allison world transmission and provides torque ranges from 250 to 335 lb. ft.

PTO LOCATION

The transmission driven power take off (PTO) shall be mounted in the 8:00 oclock position.

PTO CONTROL

The left hand power take off shall be controlled by the transmission. It will use a virtual switch on vista with text messages. Disable is displayed when switch is off. Enable is displayed when the switch is turned on. Active is displayed when the switch is on with positive engagement of the power take off.

Required operating conditions for enabling this function are:

- Throttle position is low
- Engine speed is within customer modifiable constant limits
- Output speed is within customer modifiable constant limits
- Park brake set

DRIVELINE

All drivelines shall be heavy duty metal tube and equipped with Spicer 1810 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. A splined slip joint shall be provided in each driveshaft and shall be coated with Glide coat®.

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Racor B32001 fuel filter/water separator as a primary filter. The fuel filter shall have a see through cover to allow visual inspection of fuel and filter condition and a drain valve.

An instrument panel lamp and audible alarm which indicates when water is present in the fuel-water separator shall also be included.

FUEL LINES

The fuel system lines shall be black textile braid covered high tensile steel reinforced wire braided supply and return hoses with steel reusable fittings installed from the tank to engine.

FUEL SHUTOFF VALVE

A fuel shutoff valve shall be installed in the fuel draw line at the primary fuel filter to allow the fuel filter to be changed without loss of fuel to the fuel pump.

ELECTRIC FUEL PRIMER

A Facet brand electric fuel primer pump shall be provided and include a fuel primer momentary switch located on a panel under the dash to activate the primer pump. A check valve and by-pass system shall be installed for normal draw of fuel for the engine fuel pump.

FUEL TANK

The fuel tank shall have a minimum capacity of one hundred (100) gallons and measure 35.00 inches wide X 15.00 inches high X 48.00 inches long. The baffled tank shall be made of 14 gauge aluminized steel. The tank exterior is painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

The fuel tank shall be mounted 2.00 inch below the frame, behind the rear axle. The tank can be easily lowered and removed for service purposes.

The tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

Dual draw tubes and dual sender ports shall be installed. A 2.00 inch NPT fill ports shall be available for right or left hand fill. A 0.5 inch NPT drain plug shall be centered in the bottom of the tank.

FUEL TANK FILL PORT

The fuel tank fill ports shall be provided with the right fill port located in the rearward position and the left fill ports located one (1) in the forward position and one (1) in the middle position of the fuel tank.

FUEL TANK MAGNETIC DRAIN PLUG

A 0.5 inch NPT magnetic drain plug shall be centered in the bottom of the tank.

FUEL TANK SERVICEABILTY PROVISIONS

The chassis fuel lines shall have additional length provided so the tank can be easily lowered and removed for service purposes. The additional 8 ft. of length shall be located above the fuel tank and shall be coiled and secured. The fuel line fittings shall be pointed towards the right side (curbside) of the chassis.

FRONT AXLE

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-23. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to 23,000 pounds. This rating shall require special approvals from the wheel manufacturers.

FRONT WHEEL BEARING LUBRICATION

The front axle wheel bearings shall be lubricated with clear oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

FRONT SHOCK ABSORBERS

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and “road sensing” shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or “road sensing” designed shocks shall not be considered.

FRONT SUSPENSION

The front suspension shall include nine (9) leaf, 53.38 inch long and 4.00 inches wide taper leaf springs with a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 23,000 pounds.

STEERING COLUMN/ WHEEL

The cab shall include a Douglas Autotech steering column shall be a seven (7) position tilt and 2.25 inch telescopic type with an 18.00 inch steering wheel located on the left side of the cab designating the drivers position. The steering wheel shall be covered with black absorbite padding.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

POWER STEERING PUMP

The hydraulic power steering pump shall be a Vickers 20V and shall be gear driven from the engine. The pump shall be a fixed displacement vane type.

ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR

The power steering fluid shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

FRONT AXLE CRAMP ANGLE

The chassis shall have a front axle cramp angle of 48 degrees to the left and 44 degrees to the right.

POWER STEERING GEAR

The power steering gear shall be a TRW model TAS 85 with an assist cylinder.

CHASSIS ALIGNMENT

The chassis frame rails shall be cross checked to insure the length and to make sure each is square. The front and rear axles shall be laser aligned, additionally the tires and wheels shall be aligned and toe-in set on the front tires. The completed apparatus shall be rechecked for proper alignment once the chassis has been fully loaded.

REAR AXLE

The rear axle shall be a Meritor model number RT-40-145 tandem drive axle. The axle shall offer the widest range of ratios available in an efficient single reduction axle design. The axle shall feature a robust housing design with a standard 0.5 inch wall thickness, a shot-peened hypoid Generoid gearing with bolted ring gear to differential case attachment backed by a thrust screw. The axle shall feature precision forged differential gears, one-piece forward carrier design, large diameter input shaft and a rigid differential case.

The axle shall feature precision forged differential gears and shall have a rated capacity of 40,000 pounds.

REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

REAR AXLE DIFFERENTIAL CONTROL

The tandem axle chassis shall include an inter-axle differential lock, which will allow both axles to be engaged as drive axles. The inter-axle differential lock shall be controlled by a locking rocker switch on the switch panel. The light on the switch shall illuminate with positive engagement of the inter-axle differential control.

VEHICLE TOP SPEED

The top speed of the vehicle shall be approximately 65 MPH +/-2 MPH at governed engine RPM.

REAR SUSPENSION

The tandem rear axle shall feature a Neway AD-248 air suspension. Each axle shall be independently suspended for optimum performance. The suspension shall include optimized air springs mounted to the equalizing beams and integral transverse beams. Adjustable torque rods and adjustable track bars shall also be included. The rear tandem suspension shall include 54.00 inch axle centers.

Dual air height control valves shall be installed to ensure equal frame height on both sides of the vehicle regardless of the load.

The rear suspension is run flat compatible at reduced speeds.

The rear suspension capacity shall be rated at 40,000 to 44,000 pounds.

REAR SHOCK ABSORBERS

Shock absorbers shall be supplied by the suspension manufacturer and installed on the rear axle suspension.

FRONT TIRE

The front tires shall be Goodyear 425/65R-22.5 20PR "L" tubeless radial G286A SS mixed service tread.

The front tire stamped load capacity shall be 22,800 pounds per axle with a speed capacity of 68 miles per hour when properly inflated to 120 pounds per square inch.

The front tire US Fire Service Intermittent Usage load capacity shall be 22,800 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

REAR TIRE

The rear tires shall be Goodyear 11R-22.5 16PR "H" tubeless radial G149 RSA regional tread.

The rear tire stamped load capacity shall be 24,020 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

The rear tire US Fire Service Intermittent Usage load capacity shall be 25,700 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

TIRE PRESSURE EQUALIZATION SYSTEM

The rear dual tires shall include the Crossfire dual tire equalization system provided on both sets of dual tires on the rear axle. The Crossfire pressure system shall equalize and monitor the valve which is mounted between the dual tires. This shall bolt easily to the drive axle end allowing air to flow freely from one tire to the other, maintaining equal tire pressure and load distribution. The Crossfire system shall maximize tire life, decrease rolling resistance for increased fuel mileage and improve stability braking and overall safety.

TIRE PRESSURE INDICATOR

There shall be a tire pressure indicator at each tires valve stem on the vehicle that shall indicate if there is insufficient pressure in the specific tire.

FRONT WHEEL

The front wheels shall be Alcoa hub piloted, 12.25 inch X 22.50 inch aluminum wheels with the Alcoa XBR Dura-Bright® wheel treatment as an integral part of the wheel. Alcoa XBR Dura-Bright® wheels keep their shine without polishing; the wheels shall come clean simply by spraying with soap and water. Brake dust, grime and dulling oxidation shall wash off with no scrubbing and no special chemicals required.

REAR WHEEL

The rear wheels shall be Alcoa hub piloted, 8.25 inch X 22.50 inch aluminum wheels with the Alcoa XBR Dura-Bright® wheel treatment as an integral part of the wheel. Alcoa XBR Dura-Bright® wheels keep their shine without polishing; the wheels shall come clean simply by spraying with soap and water. Brake dust, grime and dulling oxidation shall wash off with no scrubbing and no special chemicals required.

BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brakes shall include a three (3) air tank, four (4) reservoir system with a total of 6220 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss.

The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A six (6) sensor, four (4) modulator anti-lock braking system (ABS) shall be installed on the front and tandem rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

Automatic traction control which shall be installed on the tandem rear axle. The automatic traction control system shall apply the anti-lock braking system when the drive wheels loose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

Additional handling capabilities shall include roll stability control which shall monitor the vehicles rollover threshold based on the lateral acceleration. The system shall activate a computerized device which shall slow the vehicle when the threshold is exceeded in either direction. Normal vehicle operation shall resume once the problematic conditions cease. Roll stability control shall be integral with the ABS and ATC systems.

A virtual style switch shall be provided and properly labeled “mud/snow”. When the switch is pressed once, the system shall allow a momentary wheel slip to obtain traction under extreme mud and snow conditions. During this condition the ATC light shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.

The electronic stability control unit (ESC) is a functional extension of the electronic braking system. It is able to detect any skidding of the vehicle about its vertical axis as well as any rollover tendency. The control unit comprises an angular-speed sensor that measures the vehicles motion about the vertical axis, caused, for instance, by cornering or by skidding on a slippery road surface. An acceleration sensor measures the vehicles lateral acceleration. The CAN bus provides information on the steering angle. On the basis of lateral acceleration and steering angle, an integrated microcontroller calculates a theoretical angular speed for the stable vehicle condition.

FRONT BRAKES

The front brakes shall be Meritor EX225 Disc Plus disc brakes with 17" vented rotors.

REAR BRAKES

The rear brakes shall be Meritor EX225 Disc Plus disc brakes with 17.00 inch vented rotors.

PARK BRAKE

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

PARK BRAKE CONTROL

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake system. The control shall be yellow in color.

The parking brake actuation valve shall be mounted on the drivers dash within easy access.

AIR DRYER

The brake system shall include a Wabco System Saver 1200 air dryer with an integral heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right frame rail behind the officer step.

FRONT BRAKE CHAMBERS

The front brakes shall be provided with MGM type 24 long stroke brake chambers.

REAR BRAKE CHAMBERS

The rear axle shall include TSE 24/30 H.O.T. (High Output Technology) brake chambers shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake pads against the brake rotor.

AIR COMPRESSOR

The air compressor provided for the engine shall be a Wabco® SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be mounted to the right frame rail.

MOISTURE EJECTORS

Manual drain valves shall be installed on all reservoirs of the air supply system. The drain valves shall have pull cables attached. The actuation pull cable shall be coiled and tied at the drain valve on the tank. The supplied lengths shall be sufficient to be extended to the frame rail to allow drains to be activated from the side of the chassis.

AIR SUPPLY LINES

The air system lines shall include black textile braid covered high tensile steel reinforced wire braided hose with steel reusable fittings. All drop hoses shall be fiber reinforced neoprene covered hose.

WHEELBASE

The chassis wheelbase shall be 267.00 inches.

REAR OVERHANG

The chassis rear overhang shall be 124.00 inches.

FRAME

The frame shall consist of double channel side rails and cross members forming a ladder style frame. The sides of the rails shall be constructed of "C" channel, 10.25 inches high X 3.5 inches deep X .38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and .38 inches thick, 110,000 psi minimum yield high strength low alloy steel. Each rail shall be considered on the following key items: Each rail shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches calculated by the radius method. The frame shall measure 35.00 inches in width.

RBM refers to the measure of stiffness of a cross section relative to the yield stress of the material the frame is manufactured from.

Every cross sectional profile of an object has a measure of its mechanical properties based on its shape. These properties of its shape can be broken down relative to the horizontal and vertical direction, represented as Ixx and Iyy. These act as a measure of the shapes resistance to bending.

The section modulus of mass of this profile takes into consideration the stresses imposed on this profile when a load is applied, by considering the maximum distance from the center of the profile to its outer most extremity. Section modulus is a method of measurement for the relative stiffness of a beam section and is based on the horizontal and vertical directional value plus the distance from the center of mass to the extremities of the cross section from the coordinate axis, such that Zyy = Iyy/Y and Zxx = Ixx/X.

Proposals calculating the frame strength using the “box method” shall not be considered.

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the engine mounting, body mounting, pump mounting or bumpers shall not be considered as a cross member. The cross members shall be attached using grade 8 flanged head bolts and flanged lock nuts. Each cross member shall be mounted to the frame rails a minimum of utilizing 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

Any proposals not including additional reinforcement for each cross member shall not be considered.

All holes for bolts shall be drilled into the frame rails, preventing fracture or fatigue. Each hole shall be custom placed relative to its component preventing unnecessary holes that present fatigue along each frame rail.

The frames proposed shall be custom drilled for each component and shall not include any unnecessary holes.

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall accompany the bid.

Proposals offering warranties for frames not including cross members shall not be considered.

FRAME WARRANTY

The frame and cross members shall carry a lifetime warranty to the original purchaser.

REAR TOW DEVICE

Two (2) heavy duty painted tow eyes shall be installed below the frame at the rear of the chassis. The tow eyes shall be fabricated from 0.75 inch thick #1020 ASTM-36 hot rolled steel. The inside diameter of the tow eye shall be 2.00 inches and shall have a chamfered edge. The tow eyes shall be bolted directly to the chassis frame with grade 8 bolts.

FRAME CLEAR AREA

The chassis frame shall be left clear of chassis mounted components inside or outside the frame rails within the first 30.00 inches behind the cab to allow space for OEM installed components. Cross members may be installed in the clear area if required for proper frame or driveline configuration.

FRAME PAINT

The chassis under carriage consisting of frame, axles, driveline running gear, battery boxes, air tanks and other assorted chassis mounted components shall be painted the primary/lower cab color. Paint shall be applied prior to airline and electrical wiring installation.

FRONT BUMPER

The cab shall include a five (5) piece, structural channel front bumper. The bumper shall be constructed of ASTM A-36 steel; the bumper shall then be painted. The bumper shall include a .38 thick structural steel channel which shall be 12.00 inches high and 101.00 inch wide, with angled front corners.

FRONT BUMPER EXTENSION LENGTH

The front bumper shall be extended 6.00 inches ahead of the cab.

FRONT BUMPER EXTENSION WIDTH

The front bumper extension splayed frame rails shall include an overall width of 44.75 inches.

FRONT BUMPER PAINT

The front bumper shall include a finish topcoat painted the same as the lower cab color.

FRONT BUMPER APRON

The bumper extension shall include a bumper apron which consists of 0.19 inch thick aluminum tread plate constructed for an exact fit within the 6.00 inch bumper extension. The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the bumper flange.

AIR HORN

The front bumper shall include two (2) Grover brand air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horn shall be a trumpet style and shall include a chrome finish.

AIR HORN LOCATION

The air horns shall be recess mounted in the front bumper face, one (1) on the driver side of the bumper in the inboard position relative to the left hand frame rail and one (1) on the officer side of the bumper in the inboard position relative to the right hand frame rail.

AIR HORN RESERVOIR

One (1) air tank, with a 2084 cubic inch reservoir, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

ELECTRONIC SIREN SPEAKER

The bumper shall include two (2) Whelen Engineering Inc. model SA314A natural cast aluminum speaker which shall be recess mounted within the bumper fascia. The speakers shall feature 100 watts of power and comply with OSHA 1910.95 regarding “Permissible Noise Exposure”. Both speakers shall measure approximately 7.30 inches high X 8.80 inches long X 3.00 inches deep.

ELECTRONIC SIREN SPEAKER LOCATION

The speakers shall be located one (1) on the drivers side and one (1) on the officers side of the bumper fascia, outboard of the frame rails.

AUXILIARY ELECTRONIC SIREN SPEAKER

The bumper shall include one (1) Federal Signal model BP200-EF auxiliary speaker which shall be recess mounted within the bumper fascia and include the “Electric F” grille. The speaker shall feature 200 watts of power. The speaker shall measure approximately 5.50 inches high X 7.70 inches long X 7.80 inches deep.

AUXILIARY SIREN SPEAKER LOCATION

The auxiliary siren speaker shall be located in the bumper fascia centered between the frame rails.

FRONT BUMPER TOW HOOKS

Two (2) heavy duty tow hooks, painted black shall be installed below the front bumper, rearward position and bolted directly to the side of the chassis frame with grade 8.00 bolts.

CAB TILT SYSTEM

The entire cab shall be capable of tilting 45 degrees to allow for easy maintenance of the engine and transmission.

The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the “Down” button to indicate safe road operation.

It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90" ball and be anchored to frame brackets with 1.25" diameter studs.

A steel safety channel assembly shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.

CAB TILT CONTROL RECEPTACLE

The cab tilt shall include a receptacle which shall be temporarily located on the right hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant. The tilt pump shall include 8.00 feet of cable with a 6-pin Deutsch connector that includes a cap. The remote control pendant shall also include 20.00 feet of cable which also includes a mating connector.

CAB WINDSHIELD

The cab windshield shall have a surface area of 2884.00 square inches and be of a two (2) piece wraparound design for maximum visibility.

The distance from the driver and officer to the windshield shall be a minimum of 42.00 inches at the furthest seated position. This distance shall ensure the safety of the driver and officer from intruding objects in the unlikely event of a head on collision.

The glass utilized for the windshield a standard automotive tint. The left and right windshield shall be fully interchangeable thereby minimizing stocking and maintenance costs. All proposals offering windshields not in compliance with the minimum measurement of surface area stated above and are not fully interchangeable shall not be considered.

GLASS FRONT DOOR

The cab glass within the front doors shall each include a window which is 31.00 inches wide X 26.00 inches high. Both the driver and officer windows shall have the capability to roll down into the door housing via electric actuation. The power windows shall be controlled via switching on the driver door and by a switch on each respective door. There shall also be a fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches high, more commonly known as “cozy glass” ahead of the front cab door windows.

The glass utilized for these windows shall include a standard green automotive tint unless otherwise noted.

GLASS TINT FRONT DOOR

The windows located in the left and right front doors shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

CLIMATE CONTROL

The cab shall be equipped with a ceiling mounted combination defrost / heating and air-conditioning system mounted above the engine tunnel in a central location.

The system shall offer sixteen (16) adjustable louvers. Six (6) of the louvers shall face forward towards the windshield, offering 45,000 BTU of heat at 320 CFM for defrosting. The system shall include six (6) rearward facing louvers to direct air for the crew area and four (4) for driver and officer comfort. When in "Cabin Mode" the system shall be designed to produce 60,000 BTU of heat and 32,000 BTU of cooling. The HVAC cover shall be made of ABS plastic.

All auxiliary heating units (if optionally equipped) shall be plumbed in series independent of the heater/defroster system with one (1) seasonal shut-off valve at the front corner on the officer side of the cab.

The air conditioning system shall be capable of lowering the cab interior temperature from 100 degrees to 70 degrees within thirty minutes, with a relative humidity of sixty percent.

The air conditioner lines shall be a mixture of custom bent zinc coated steel fittings and Aero-quip GH 134 flexible hose with Aero-Quip EZ-Clip fittings.

CLIMATE CONTROL ACTIVATION

The heating controls, and air conditioning if included, shall be located on the Vista screen.

A/C CONDENSER LOCATION

A roof mounted A/C condenser shall be installed centered on cab forward of raised roof against the slope rise.

A/C COMPRESSOR

The air-conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.

CAB CIRCULATION FANS FRONT

The cab shall include two (2) all metal construction 6.00 inch windshield defogger fans which shall be installed in the front cab corners. The fans shall be individually controlled via a virtual button on the Vista.

CAB INSULATION

The cab ceiling and walls shall include 1.00 inch thick foam insulation. The insulation shall include a foil facing which includes grid reinforcement. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

UNDER CAB INSULATION

The exterior of the cab tunnel surrounding the engine shall include reinforced closed cell foam insulation. The insulation shall measure 1.00 inch thick and shall include a foil backing and grid reinforcement. The foam shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation under the tunnel shall act as a noise barrier absorbing noise from the engine as well as assisting in sustaining the desired climate within the cab interior. A removable aluminum overlay shall be installed over the insulation for protection.

Additionally, the entire underside of the cab shall include reinforced closed cell foam insulation. The insulation shall measure 1.00 inch thick and shall include a foil backing and grid reinforcement. The foam shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation under the cab floor shall act as a noise barrier absorbing noise from the road as well as assisting in sustaining the desired climate within the cab interior. An expanded aluminum overlay shall be installed to hold the insulation tight against the underside of the cab.

INTERIOR TRIM FLOOR MAT

The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch sound absorbing closed cell foam and a 0.06 inch non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive with aluminum corner trim. All exposed seams shall be sealed with a silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

INTERIOR TRIM VINYL

The cab interior shall include trim on the front and rear crew ceiling and the cab walls. The trim shall be constructed of insulated vinyl over a hard board backing. The material shall be securely fastened to the interior of the cab utilizing snap style fasteners with a decorative fastener for a more appealing appearance.

HEADER TRIM

The cab interior shall include a header over the driver and officer dash which shall be vacuum formed ABS composite panel with robust styling grooves providing structural integrity. The header shall include (2) vents within the header which are directed at the windshield. Also included will be a drop down panel for access behind the header for service of electronic components, if necessary. The header shall include (2) cut outs, (1) over the driver and (1) over the officer to accommodate speakers and molded areas to accommodate the sun visors.

INTERIOR TRIM SUNVISOR

The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded vinyl trim.

TRIM LH DASH

The left hand dash shall be a one (1) piece durable vacuum formed ABS composite housing which shall be custom molded for a perfect fit around the instrument panel and the lower control panels to the left and right of the steering column.

TRIM CENTER DASH

The main center dash area shall be constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred percent primary aluminum plate.

TRIM RH DASH

The right hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick, one hundred percent primary aluminum plate and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure 14.00 inches wide X 6.63 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment, recessed 3.00 inches below the surface of the dash and measure 16.00 inches wide X 14.00 inches deep.

ENGINE TUNNEL TRIM

The cab engine tunnel shall be covered with .44 of an inch thick multi-layer mat consisting of .25 inch closed cell foam, .13 of an inch thick rubber and .06 inch thick non-slip pebble grain.

POWER POINT DASH MOUNT

The cab dash panel shall include two (2) 12 volt cigarette lighter type receptacles as a power source for additional portable or mobile items. The receptacles shall be wired to be hot when the battery master switch is on.

STEP TRIM

The cab steps shall include a 14 gauge 304 perforated stainless steel construction on the first step, the step closest to the ground. The stainless steel finish shall be a number 7 mirror. The step shall include a frame which is integral with the construction of the cab for rigidity and strength. The perforation shall allow water and other debris to flow through rather than becoming packed under the step. The middle step shall be integral with the cab in construction and shall be trimmed in 3003-H22 embossed aluminum tread plate which is 0.084 inches thick.

INTERIOR DOOR TRIM

The doors of the cab shall include an aluminum plate the same weight and grade as the cab on the interior of the door. The aluminum shall be then painted.

DOOR TRIM CUSTOMER NAMEPLATE

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

CAB DOOR TRIM REFLECTIVE

In accordance with the current standards of NFPA, the body builder shall provide 96.00 square inches of reflective material on the interior of each cab door.

INTERIOR GRAB HANDLE "A" PILLAR

A rubber covered 11.00 inch grab handle shall be provided on the inside of the cab on the hinge post at the driver and officer doors. The handle shall assist personnel in exiting and entering the cab.

INTERIOR GRAB HANDLE FRONT DOOR

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish and provide ease of access and exiting the cab.

INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be black in color.

INTERIOR TRIM VINYL COLOR

The cab interior vinyl trim surfaces shall be gray in color.

INTERIOR ABS TRIM COLOR

The cab interior vacuum formed ABS composite trim surfaces shall be gray in color.

CAB PAINT INTERIOR

The interior metal surfaces of the cab shall be finished with Line-X® spray on bed liner product which shall mold to each surface of the cab interior. The Line-X® shall be environmentally friendly and chemically resistant. The color of the interior shall be red.

CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with a high durability pebble grain Linex® spray on liner. The color of the spray on liner shall be dark red.

DASH PANEL GROUP

The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.

SWITCHES CENTER PANEL

The center dash panel shall include two (2) rocker switch positions in a single row configuration in the upper left portion of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

SWITCHES LEFT PANEL

The left dash panel shall include one (1) wiper switch which shall be located in the left hand side of the panel.

SWITCHES RIGHT PANEL

The right dash panel shall include no rocker switches or legends.

SWITCH PANEL IGNITION

The vehicle shall be equipped with a keyless ignition and master, with an “Off/ On” and a two switch for “Off/ Start”.

SEAT BELT WARNING

A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the chassis. The system shall provide visual and audible warning when any seat is occupied (sixty pounds minimum), the corresponding seat belt remains unfastened, and the park brake is released.

Once activated, the visual and audible indicators shall remain active until all occupied seats have the seat belts fastened. The dash shall include a display on the Weldon Vista screen(s) indicating the occupancy of each seat.

SEAT MATERIAL

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids.

SEAT COLOR

All seats supplied on the chassis shall be black in color. This material shall be semi- resistant to UV rays and from being saturated or contaminated by fluids.

SEAT BACK LOGO

The seat back shall include a Houston, TX Fire Department logo. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

SEAT DRIVER

The driver's seat shall be an H.O. Bostrom Firefighter Sierra model seat. The seat shall feature eight (8) way electric positioning. The eight (8) positions shall include up and down, fore and aft and front and rear tilt. The seat shall also feature integral springs to isolate shock.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a red, three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 37.00 inches measured with the seat height adjustment raised to the upper limit of its travel.

This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK DRIVER

The drivers seat shall include a standard seat back incorporating the all belts to seat feature (ABTS). The seat back shall feature a contoured, adjustable head rest.

SEAT OFFICER

The officer's seat shall be an H.O. Bostrom Firefighter model seat. The seat shall feature two-way manual adjustment and shall include a tapered and padded seat cushion. The seat shall also feature integral springs to isolate shock.

There shall be a red, three-point shoulder harness with lap belt and an automatic retractor attached to the cab and available to the seat. The buckle portion of the seat belt shall be mounted on a rigid or semi-rigid stalk such that the buckle remains positioned in an accessible location. The seat belt assembly anchorages shall conform to the Federal Safety Standard (FMVSS) No. 210, “Seat belt assembly anchorages”.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 37.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK OFFICER

The officers seat shall include a standard seat back incorporating the all belts to seat feature (ABTS). The seat back shall feature a contoured, adjustable head rest.

POWER SEAT WIRING

The power seat or seats installed in the cab shall be wired directly to battery power.

CAB FRONT UNDERSEAT STORAGE ACCESS

The driver and officer under seat storage area shall have a solid aluminum painted, hinged door with latch.

WINDSHIELD WIPER SYSTEM

The cab shall include a parallel arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers, one (1) for the driver and one (1) for the officer, which shall be affixed to a rod style arm. The system shall include a single motor which shall initiate the arm in which both the driver and officer windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the drivers position.

ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

The windshield washer fluid level shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

CAB DOOR HARDWARE

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be aluminum with a polished chrome plated finish. All doors shall include keyed alike locks that are designed to prevent accidental lockout.

The interior latches shall be black flush paddle type, which are incorporated into an upper door panel.

DOOR LOCKS

The doors shall include a CAN based electronic door lock system which shall include two (2) keypads, one (1) located on the drivers side next to the front grab handle and one (1) on the officers side next to the front grab handle. The electronic door locks shall feature four (4) key fobs for activation with buttons for entry door lock and unlock, compartment door lock and unlock shall be provided. There shall be two (2) rocker switches provided, one (1) located on the inside of the drivers side front door and one (1) located on the officers side front door. The power door locks shall control the front two (2) entry doors of the cab.

POWER DOOR LOCK COMPARTMENT PROVISION

The power door lock feature shall include up to eight (8) compartment doors featuring controls through the key fob and through a virtual switch on the multiplex display.

DOOR LOCK LH REAR CAB COMPARTMENT

The driver side rear compartment shall feature a power door lock actuator.

DOOR LOCK RH REAR CAB COMPARTMENT

The officer side rear compartment shall feature a power door lock on the ROM roll up door

GRAB HANDLES

The cab shall include one (1) each 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The assist handle shall be made of 14 gauge 304- stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.

REARVIEW MIRRORS

The cab exterior shall include Ramco die cast aluminum mirror heads, one (1) each on the right and left side front corner radius of the cab. The mirrors shall be mounted to the cab via a die cast aluminum arm and shall measure 9.75 inches wide X 13.00 inches high. The model 6015-FFHR-CAS750R mirrors shall have a remote controlled heated flat mirror with horizontal and vertical actuation in the main mirror head with a top mounted remote controlled convex mirror for increased visibility. The mirrors shall include the finest quality non-glare glass and shall include a rigid mounting thereby reducing vibration. The mirrors shall be corrosion free under all weather conditions. The mirror control switches shall be located in the cab within easy reach of the driver.

REARVIEW MIRROR HEAT SWITCH

The heated rearview mirrors shall be controlled through a virtual button on the multiplex display.

CAB FENDER

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. The two-piece liners shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 3.50 inches wide made of 14 gauge 304 polished stainless steel.

MUD FLAPS FRONT

The front wheel wells shall have mud flaps installed on them.

CAB EXTERIOR MODEL NAMEPLATE

The cab shall include custom “Gladiator” nameplates on the front driver and officer side doors.

CAB EXTERIOR FRONT & SIDE EMBLEMS

The chassis shall include three (3) chassis manufacturers emblems. There shall be one (1) installed on the front air intake grille and one (1) installed on each side of the cab above the wheel well.

IGNITION

The master starting system, ignition system shall include chrome thumb turn switch which shall be mounted on the driver side of the cab to the left of the steering wheel on the dash. Each switch will be accompanied by (1) green LED indication light which shall light when the ignition is in the “ON” position and (1) for the master battery switch when in the “ON” position. The thumb turn switches shall also be accompanied by a chrome push button which shall only operate when both the master battery and ignition thumb switches are in the “ON” position.

BATTERY

The single start electrical system shall include six (6) Odyssey 1090 CCA batteries with a 200 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541. The cables shall have encapsulated ends with heat shrink and sealant.

BATTERY BOX

The batteries shall be contained within two (2) black powder coated stainless steel battery boxes which shall be located on the driver and officer side of the chassis, securely bolted to the frame rails. The boxes shall include drain holes in the bottom for sufficient drainage of water and shall include phenolic board battery hold downs and a durable, Dry-Deck in the bottom of the tray under each battery to allow for air flow and drainage.

BATTERY BOX COVER

The battery box enclosures shall include a stainless steel cover which protects the top of the batteries. The cover shall include flush latches which shall keep the cover secure as well as a handle for convenience when opening. The battery box covers shall be un-painted.

BATTERY CABLE

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed and encapsulated at the ends with heat shrink and sealant.

BATTERY JUMPER STUD

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

ALTERNATOR

The starting system shall include a 320 amp Leece-Neville 12 volt alternator. The alternator shall include a self-exciting integral regulator.

AUXILIARY AIR COMPRESSOR

A Kussmaul Auto Pump 120V air compressor shall be supplied. The air compressor shall be installed behind the officer's seat. The air compressor shall be plumbed to the air brake system to maintain air pressure.

ELECTRICAL INLET

A Kussmaul 20 amp super auto-eject electrical receptacle shall be installed on the drivers side of the cab ahead of the front door. It shall automatically eject the plug when the starter button is depressed.

The U.L. maximum allowable amperage draw on receptacles is generally 80% of their listed rating, for example, the 20 amp receptacle should not carry more than 16 amp continuous load. When adding the different amperage draws of the components being installed on the chassis be sure to factor in whether the components will draw a continuous load or intermittent load.

Amp Draw Reference List:
Kussmaul 1000 Charger - 3.5 Amps
Kussmaul 1200 Charger - 10 Amps
Kussmaul 35/10 Charger - 10 Amps
1000W Engine Heater - 8.33 Amps
1500W Engine Heater - 12.5 Amps
120V Air Compressor - 4.2 Amps

ELECTRICAL INLET COLOR

The Kussmaul Auto- Eject electrical inlet connection shall include a yellow cover.

HEADLIGHTS

The cab front shall include (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the ignition switch is in the "On" position and the parking brake is released.

The headlights shall be controlled via a virtual button on the Vista display.

HEADLIGHT LOCATION

The headlights shall be located on the front fascia of the cab directly below the front warning lights.

FRONT TURN SIGNALS

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch LED programmable amber turn signals which shall be installed in the outboard position.

SIDE MARKER/TURN SIGNALS

The sides of the cab shall include (2) LED round side marker lights which shall be provided just behind the front cab radius corners.

MARKER AND ICC LIGHTS

In accordance with FMVSS, there shall be five (5) cab LED marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

GROUND LIGHTS

Each door shall include LED NFPA compliant light heads mounted to the under side of the cab. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life. The ground lighting shall be activated through the Vista screen and by the opening of either door on the respective side of the cab.

STEP LIGHTS

The middle step located at each door shall include a recess mounted LED light which shall activate with the opening of the respective door.

ENGINE COMPARTMENT LIGHTS

There shall be an incandescent NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life.

FRONT SCENE LIGHTS

The front of the cab shall include two (2) Whelen model Pioneer PFA2 contour roof mount lights mounted to the brow of the cab.

Each lamp head shall have two (2) 12 volt high intensity LED banks at 75 watts total. Each light will draw 6.0 amps and generate 5000 lumens. Each lamp head shall be adjustable up to 20 degrees. Each lamp head shall be no more than 4.65" high by 16" wide. The lamp heads and mounting brackets shall be powder coated white.

FRONT SCENE LIGHTS ACTIVATION

The front scene lights shall be activated by a virtual button on the MUX display.

FRONT SCENE LIGHT LOCATION

There shall be two (2) scene lights mounted to the front brow of the cab in the outboard position centered over the outer front marker lights.

SIDE SCENE LIGHT MODEL

The side of the cab shall include two (2) Whelen model 810 scene lights, one (1) each side which shall be surface mounted. The Whelen lights shall offer halogen lighting with 8 to 32 degree internal optics.

SIDE SCENE LIGHT LOCATION

The scene lighting located on the driver and officer sides of the cab shall be mounted in the upper front raised roof portion of the cab above of the front doors.

SIDE SCENE ACTIVATION

The scene lighting shall be activated via two (2) virtual buttons on the MUX display located inside the cab.

INTERIOR OVERHEAD LIGHTING

The cab shall include an incandescent dome lamp with a red and white lens located over each door. The dome lamps shall be rectangular in shape and shall measure 9.50 inches in length and approximately 5.00 inches wide including a black colored bezel. The white lamp shall be activated by its respective door when opened and via the multiplex display and both the red and white lamp shall be activated by an individual switch on the light.

A fifth red and clear lamp shall be located in the headliner, over the engine tunnel.

DO NOT MOVE APPARATUS LIGHT

The front headliner of the cab shall include a red flashing light, located in the center for greatest visibility. The light shall be 6.00 inches long X 2.50 inches wide X 1.75 inches high and shall be clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound when a door is open and the parking brake is released.

The light and alarm shall be interlocked for activation when a cab door is not firmly closed, an apparatus cabinet door is not closed and the parking brake is released.

MASTER WARNING SWITCH

The optical warning system shall be controlled by a master switch which shall include all “ON” and all “OFF” capability via a virtual button within the MUX display. All warning lights which are “ON” when the master switch is activated shall also activate. This switch shall be clearly labeled for identification.

HEADLIGHT FLASHER

An alternating high beam headlamp flashing system shall be installed into the high beam headlamp circuit which shall allow the high beams to flash alternately from left to right.

Deliberate operator selection of high beams will override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights will also be disabled “On Scene” when the park brake is applied.

ALTERNATING HEADLIGHT SWITCH

The flashing headlights shall be activated through a virtual button on the MUX display.

INBOARD FRONT WARNING LIGHTS MODEL

The cab front fascia shall include dual Whelen series 600 Super LED warning lights which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in the inboard position.

INBOARD FRONT WARNING LIGHTS COLOR

The front warning lights mounted on the fascia for the inboard position shall be red with a clear lens.

FRONT WARNING SWITCH

The front warning lights shall be controlled through a virtual control on the MUX display. This switch shall be clearly labeled for identification.

INTERSECTION WARNING LIGHTS MODEL

The chassis shall include two (2) Whelen series 600 Super LED intersection warning lights, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

INTERSECTOR WARNING LIGHTS COLOR

The intersection lights shall be red with a clear lens.

INTERSECTION WARNING LIGHTS LOCATION

The intersection lights shall be mounted on the side of the cab on the front radius.

SIDE WARNING LIGHTS MODEL

The cab sides shall include a Whelen series 600 Super LED 4”x6” warning light, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

SIDE WARNING LIGHTS COLOR

The warning lights located on the side of the chassis shall be red with clear lens.

SIDE WARNING LIGHTS LOCATION

The warning lights on the side of the cab shall be mounted over the front wheel well directly over the center of the front axle.

SIDE AND INTERSECTION WARNING SWITCH

The side warning lights shall be controlled through a virtual control on the MUX display. This switch shall be clearly labeled for identification.

INTERIOR DOOR WARNING LIGHTS

The interior panels of each door shall include one (1) amber 4.00 inch diameter LED Truck-Lite warning light which shall be provided on the inner surface of each cab door. Each light shall activate with a flashing pattern when the door is in the open position to serve as an indicator to oncoming traffic.

SIREN CONTROL HEAD

A Whelen 295HFS2 200 watt “hands free” remote siren amplifier control head shall be provided and flush mounted in the switch panel with a location specific to the customers needs. The siren shall feature hands free mode and will be in “standby” mode awaiting instruction. The siren shall offer radio broadcast, public address, wail, yelp, or piercer tones and hands free operation which shall allow the operator to turn the siren on and off from the horn ring if a horn/siren selector switch option is also selected.

HORN RING SELECTOR SWITCH

A virtual button on the MUX display shall allow control to either the air horn or the electric horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position which is in accordance with FMVSS requirements.

AIR HORN ACTIVATION

The air horn actuation shall be accomplished by the steering wheel horn button. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

BACK-UP ALARM

An Preco-Matic model 1059 dual function, dual sound backup alarm shall be installed at the rear of the chassis with an auto-adjusting output level of not less than 87 dB and up to 107 dB. The alarm will automatically activate when the transmission is placed in reverse.

AUXILIARY ELECTRONIC SIREN CONTROL HEAD

An additional Federal EQ2B 200 watt electronic siren head shall be provided and installed in the switch panel with a location specific to the customers needs. The siren shall feature “Q” wail, yelp, air horn, PA, radio broadcast and “Q” brake. The siren shall produce 122 decibels at 10 feet away and shall include a noise cancelling microphone.

INSTRUMENTATION

An ergonomically designed instrument panel shall be provided. The gauges shall be backlit with red LED lamps. All gauges shall be driven by stepper motor movements. The instrumentation system shall be multiplexed and shall receive engine and transmission information over the J1939 data bus to reduce redundant sensors.

The instrument panel shall contain the following gauges:

One (1) electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM.

One (1) electronic speedometer with an integral LCD odometer/ trip odometer and hour meter shall be included. The speedometer shall have a dual scale with miles per hour (MPH) as the dominant scale and kilometers per hour (KPH) on the minor scale. The speedometer scale shall read from 0 to 90 MPH (0 to 140 KPH). The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display up to 9,999.9 miles. The LCD screen shall also be capable of displaying certain diagnostic functions. The hour meter shall display engine hours of operation.

One (1) three function gauge with primary system, secondary system and fuel level shall be included. The scale on the air pressure gauges shall read from 0 to 140 pounds per square inch (PSI). The air pressure scales shall be non-linear to expand the scales in the region of normal operation. A red indictor light in the gauge shall indicate a low air pressure. The scale on the fuel level gauge shall read from empty to full. A yellow indicator light shall indicate low fuel at the quarter tank level.

One (1) four function gauge with engine oil pressure, coolant temperature, transmission oil temperature and a voltmeter shall be included. The scale on the engine oil pressure gauge shall read from 0 to 140 pounds per square inch (PSI). The engine oil pressure scale shall be non-linear to expand the scale in the region of normal operation. A red indicator light in the gauge shall indicate low engine oil pressure. The scale on the coolant temperature gauge shall read from 160 to 250 degrees Fahrenheit (F). A red indicator light in the gauge shall indicate high coolant temperature. The scale on the transmission oil temperature gauge shall read from 100 to 300 degrees Fahrenheit (F). A red indicator light in the gauge shall indicate high transmission oil temperature. The scale on the voltmeter shall read from 8 to 16 volts. A red indicator light shall indicate high or low system voltage.

The instrument panel shall contain an Enunciator Module that contains the following indicator lights. All indicator lights shall contain LED lamps.

RED LAMPS
Stop Engine - indicates critical engine fault. *(5)*
Park Brake - indicates park brake is set.
Volts - indicates high or low system voltage. *(4)*
Low Oil Press - indicates low engine oil pressure. *(4)*
High Coolant Temp - indicates excessive engine coolant temperature. *(4)*
High Trans Temp - indicates excessive transmission oil temperature. *(4)*
Low Air - indicates low air pressure in either system one or system two. *(4)*
Low Coolant Level - indicates low engine coolant level. *(1) (5)*
Air Filter - indicates excessive engine air intake restriction. *(5)*
Brake System Fault indicates a failure in the brake system (hydraulic brake systems only). *(5)*
Seat Belt Indicator indicates when a seat is occupied and corresponding seat belt remains unfastened.

YELLOW LAMPS
Check Engine - indicates engine fault. *(5)*
Check Trans - indicates transmission fault. *(5)*
Wait to Start - indicates active engine air preheat cycle. *(2) (5)*
ABS - indicates anti-lock brake system fault. *(5)*
Water in Fuel - indicates presence of water in fuel filter. *(1) (5)*
Check Message Center indicates there is a fault message present in the LCD digital display.
SRS indicates a problem in the RollTek supplemental restraint system. *(1) (5)*
DPF indicates a restriction of the diesel particulate filter. *(3) (5)*
HEST indicates a high exhaust system temperature. *(3) (5)*
MIL indicates an engine emission control system fault. *(3) (5)*
Low Fuel indicates low fuel. *(4)*

GREEN LAMPS
Left and Right turn signal indicators.
Aux Brake Active - indicates secondary braking device is active. *(1)*
High Idle - indicates engine high idle is active. *(1)*
ATC indicates low wheel traction for automatic tractions control equipped vehicles, also indicates mud/snow mode is active for ATC system. *(1) (5)*
OK to Pump indicates the pump engage conditions have been met. *(1)*
Pump Engaged indicates the pump is currently in use. *(1)*

BLUE LAMPS
High beam indicator.

The instrumentation system shall provide a constant audible alarm for the following situations:
Low air pressure.
Low engine oil pressure.
High engine coolant temperature.
High transmission oil temperature.
Low coolant level. *(1)*
High or low system voltage
Critical engine fault (Stop Engine).

The Check Message Center icon will illuminate and a message will be displayed in the LCD screen for the following situations:

Cab Ajar
Low Oil Level
Door Ajar
Engine Communication Error
Transmission Communication Error
ABS Communication Error
High Coolant Temp
Turn Signal Reminder (turn signal left on for more than one (1) mile)
Low Fuel
Low Oil Pressure
Low Coolant Level
Low Battery Voltage
High Battery Voltage
Low Primary Air Pressure
Low Secondary Air Pressure
High Trans Temp

The instrumentation system will provide a continuous alarm for the following situations:

Stop Engine
Low Coolant Level *(1)*
Brake System Fault
Check Trans
Check Engine
ABS
Engine Communications Error
Transmission Communications Error
ABS Communications Error
Low Fuel
Low Primary Air Pressure
Low Secondary Air Pressure
Low or High Battery Voltage
High Trans Temp
Low Oil Pressure
High Coolant Temp

The instrumentation system will provide a 160 millisecond second alarm every 880 milliseconds for the following situations:

Seat Belt
Air Filter
Water in Fuel *(1)*
Cab Ajar
Low Oil Level
Door Ajar

The instrumentation system will provide a 160 millisecond second alarm every 5 seconds for the following situation:
Turn Signal Reminder (turn signal left on for more than one (1) mile)

(1) Feature only available when optionally equipped.
(2) Feature only available on engines with pre-heat capability.
(3) Feature only on vehicles with diesel particulate filter (DPF).
(4) Warning light is present in gauge.
(5) A message in the LCD screen will also be displayed.

RADIO

A Panasonic compact disc player with AM/FM stereo receiver, weather band and four (4) speakers shall be installed in the cab. The receiver shall be installed above the driver position. The speakers shall also be installed inside the cab with two (2) speakers recessed within the headliner of the front of the cab just behind the windshield and two (2) speakers in the upper rear corners of the cab.

RADIO ANTENNA

A small antenna shall be located on the driver side of the cab roof for AM/FM and weather band reception.

CAMERA

An Audiovox Voyager heavy duty rearview camera system shall be supplied. One (1) camera with a teardrop shaped chrome plated housing shall be shipped loose for OEM installation in the body to afford the driver a clear view of the rear of the vehicle and one (1) shall be mounted on the officer side of the cab below windshield ahead of the front door at approximately the same level as the cab door handle. The cameras shall be wired to a single Weldon Vista display located on the drivers side dash. The rear camera shall activate when the transmission is placed in reverse and the right camera shall activate with the right side turn signal. Each camera shall also be activated by a button on the Vista display.

CAB EXTERIOR PROTECTION

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

FIRE EXTINGUISHER

A 2.50 pound BC D.O.T approved fire extinguisher shall be shipped loose with the cab.

ROAD SAFETY KIT

The cab and chassis shall include one (1) emergency road side triangle kit.

DOOR KEYS

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

DIAGNOSTIC SOFTWARE WELDON V-MUX

The cab and chassis shall include diagnostic software for the Weldon VMUX system shipped loose with the vehicle. The software kit shall include a carrying case, a USB transceiver, one (1) on one (1) cable for 4 X 12, a one (1) on one (1) cable for Hercules, a Deutsch wire removal tool, 14.00 to 16.00 gauge wire for the Deutsch wire removal tool, 18.00 to 20.00 gauge wire, cable RS232 9 pin serial PC to trans, cable RS485 trans to VMUX, a cable which shall troubleshoot Hercules outputs, a cable which shall trouble shoot mini node outputs, a downloader manual, and a diagnostics manual.

The system shall support PDF and USB diagnostic kits for Windows 2000 and XP.

AS BUILT WIRING DIAGRAMS

The cab and chassis shall include two (2) complete set of wiring schematics and option wiring diagrams.

WARRANTY - CAB AND CHASSIS

The chassis manufacturer shall warrant to the original purchaser the custom fire truck chassis for a period of twelve (12) months, or the first 24,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document which may be provided upon request.

OPERATORS AND PARTS LIST MANUAL

There shall be three (3) chassis operator's manual which includes a parts list including wiring and air plumbing diagrams provided and shipped loose with the vehicle. All standard wiring and plumbing diagrams shall be created specifically to the chassis model.

ENGINE AND TRANSMISSION OPERATION MANUALS

There shall be two (2) sets of engine operation and maintenance manuals and two (2) sets of transmission operation manuals specific to the models ordered included with the final vehicle in the ship loose items.

ENGINE SERVICE MANUALS

There shall be one (1) set of the following Cummins ISM engine service reference manuals which shall be provided with the final vehicle.

Engine Troubleshooting and Repair Manual, part number 3666322
Fuel System Troubleshooting and Repair Manual, part number 4021461
Shop Manual M11 Series Engine, part number 3666075
Wiring Diagram, part number 3666269
Parts Catalog, part number 4056523
Operation and Maintenance Manual, part number 4021342

TRANSMISSION SERVICE MANUALS

There shall be one (1) set of the following manuals included with the chassis relative to the Allison 4000 transmission:

Allison Parts Catalog, part number PC2809EN
Allison Service Manual, part number SM2457EN
Allison Technician Manual, part number GN2055EN
Electronic Controls Troubleshooting Manual, part number TS2973EN
Mechanics Tips, part number MT3004EN

CHASSIS MODIFICATIONS

LUBRICATION AND TIRE DATA PLATE

A permanent label in the driving compartment shall specify the quantity and type of the following fluids used in the vehicle and tire information:

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Pump transmission lubrication fluid . . (if applicable)
- Pump priming system fluid, if applicable . . (if applicable)
- Drive axle(s) lubrication fluid
- Air conditioning refrigerant . . (if applicable)
- Air conditioning lubrication oil . . (if applicable)
- Power steering fluid
- Cab tilt mechanism fluid . . (if applicable)
- Transfer case fluid . . (if applicable)
- Equipment rack fluid (if applicable)
- CAFS air compressor system lubricant . . (if applicable)
- Generator system lubricant . . (if applicable)
- Front tire cold pressure
- Rear tire cold pressure
- Maximum tire speed ratings

VEHICLE DATA PLATE

A permanent label in the driving compartment which indicates the following:

- Filter part numbers for the
  - Engine
  - Transmission
  - Air
  - Fuel
- Serial numbers for the
  - Engine
  - Transmission
- Delivered Weights of the Front and Rear Axles
- Paint Brand and Code(s)
- Sales Order Number

OVERALL HEIGHT, LENGTH DATA PLATE

The fire apparatus manufacturer shall permanently affix a high-visibility label in a location visible to the driver while seated.

The label shall show the height of the completed fire apparatus in feet and inches or in meters, the length of the completed fire apparatus in feet and inches or in meters, and the GVWR in tons or metric tons.

Wording on the label shall indicate that the information shown was current when the apparatus was manufactured and that, if the overall height changes while the vehicle is in service, the fire department must revise that dimension on the plate.

ACCIDENT PREVENTION

There shall be a placard in the cab seating area which reads, "ALL OCCUPANTS MUST BE SEATED AND BELTED WHEN THE APPARATUS IS IN MOTION".

PERSONNEL CAPACITY

A label that states the number of personnel the vehicle is designed to carry shall be located in an area visible to the driver.

ACCIDENT PREVENTION

If the rear bumper is 8" deep or more, there shall be a placard on the rear face of the body, in clear sight from the ground, which reads, "WARNING - DO NOT RIDE ON STEPS OR DECK AREAS WHILE THE APPARATUS IS IN MOTION. DEATH OR SERIOUS INJURY MAY RESULT".

WEARING HELMET WARNING

A label stating “DO NOT WEAR HELMET WHILE SEATED” shall be visible from each seating location.

BUMPER GRAVELSHIELD

The bumper extension gravel shield shall be provided by the cab/chassis manufacturer.

AIR HORN(S)

The air horn(s) shall be supplied and installed by the cab/chassis manufacturer.

FRONT TOW PROVISIONS

The front tow provisions shall be supplied and installed by the cab/chassis manufacturer.

EXHAUST

The existing exhaust tailpipe shall be extended to ahead of the rear axle on the streetside.

The exhaust piping and discharge outlet shall be located or shielded so as not to expose any portion of the apparatus or equipment to excessive heating.

Exhaust pipe discharge shall be directed away from any operator’s position.

Where parts of the exhaust system are exposed so that they are likely to cause injury to operating personnel, protective guards shall be provided.

HUB AND NUT COVERS

Front and rear wheels shall be provided with stainless steel hub caps and wheel nut covers.

MUDFLAPS

There shall be rubber mudflaps furnished and installed behind each set of tires.

EMS COMPARTMENT ADJUSTABLE SHELF TRAC

There shall be vertically mounted shelf trac for shelving installation provided in the chassis cab's EMS compartments.

CAB EMS COMPARTMENT ADJUSTABLE SHELVES

There will be two (2) adjustable shelves approximately 46" deep provided, one (1) per side in the chassis cabs' EMS compartments

CAB EMS COMPARTMENT SLIDE-OUT TRAYS

There will be two (2)1,000 lbs. slide-out trays with a OnScene Solutions bases mounted on the floor of the cab's EMS compartments, one (1) per side. The trays will be approximately 46" deep and as wide as the compartment layout or door opening permits.

- 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face and sides of the trays. The striping shall be 2" wide and red/white in color.

AUTOMATIC VEHICLE LEVELING SYSTEM

A HWH Corparation automatic leveling system shall be installed on the unit designed for large heavy duty vehicles with a GVWR over 23,000 pounds. The system shall have four (4) mounting brackets bolted to the chassis frame rails, two (2) front and two (2) rear. Each jack shall bolt to the bracket attached to the chassis frame.

Each jack will be plumbed to a central 12-volt hydraulic pump which is wired the the chassis 12-volt system. Jack pads shall be provided to prevent sinking in soft ground. Jacks shall be rated for lifting 16,000 pounds minimum (each).

The system shall have a drive-off safety feature. If the vehicle ignition switch is on and any legs are not fully retracted, a warning alarm shall sound with the Deluxe-Touch Pad, fully automatic panel with sensor.

The system shall be provided with a *One (1) Year* limited warranty.

FIRE DEPARTMENT MDT INSTALLATION

A Houston Fire Department supplied MDT will be installed in the chassis cab at the Officer's position by the Body Manufacturer. The Houston Fire Department will provide the make and model of the MDT at pre-construction meeting.

FUEL FILL

There shall be one (1) Cast Products fuel fill door located on the rear of the body, streetside. The fill door shall have a spring-loaded hinged door and a permanent label with the text "DIESEL FUEL ONLY".

BODY DESIGN

The importance of public safety associated with emergency vehicles requires that the construction of this vehicle meet the following specifications. These specifications are written to establish the minimum level of quality and design.

It is the intent of these specifications to fully describe the requirements for a custom built emergency type vehicle. In order to extend the expected service life of this vehicle, the body module shall be removable from the chassis frame and be capable of being installed on a new chassis.

The sheet metal material requirements, including alloy and material thickness, throughout the specifications are considered to be a minimum.

The fabrication of the body shall be formed sheet metal. Formed components shall allow the HOUSTON FIRE DEPARTMENT to have the body repaired locally in the case where any object has struck the body and caused damage. The use of proprietary extrusions will prevent the HOUSTON FIRE DEPARTMENT from such repair and shall NOT be used.

Following construction of the subframe, which supports the apparatus body, the sheet metal portion of the body shall be built directly on the subframe. The joining of the subframe and body shall be of a welded integral construction.

The sheet metal fabrication of the body shall be performed using inert gas continuous feed welders only. The entire body shall be welded construction. The use of pop rivets in any portion of structural construction may allow premature failure of the body structure. Therefore, pop rivets shall NOT be used in the construction of the structural portions of the body. This includes side body sheets, inner panels of compartment doors, and any other structural portions of the body.

EXTERIOR ALUMINUM BODY

The fabrication of the body shall be constructed from aluminum 3003H-14 alloy smooth plate. This shall include compartment front panel, vertical side sheets, side upper rollover panels, rear panels and compartment door frames.

The body compartment floors and exterior panels shall be constructed with not less than 3/16" (.187) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas.

The door side frame openings shall be formed "C" channel design. An electrical wiring conduit raceway running the full length of exterior compartments shall be provided. This raceway shall contain all 12 volt wiring running to the rear of the apparatus, permitting easy accessibility to wiring.

Individual compartment modules, with dead air space voids between compartments, shall not be an acceptable method of compartment construction.

The compartments shall be an integral part of the body construction. Compartment floors from front of body to ahead of rear axle, also from rear axle to rear of body shall be single one-piece sections. Compartment floors shall be preformed, then positioned in body and welded into final position.

Compartment floors shall have a "sweep-out" design with door opening threshold positioned lower than compartment floor, permitting easy cleaning of compartments. Angles, lips, or door moldings are not acceptable in the base of compartment door opening. One-way rubber drain valves shall be provided in compartment floors so that a water hose may be used to flush-out compartment area.

All exterior seams in sheet metal below frame, and around the rear wheel well area shall be welded continuous to prevent moisture from entering compartments. All other interior seams and corners shall be sealed with silicone based caulk prior to painting.

Only stainless steel bolts, nuts, sheet metal screws and/or aluminum screws shall be used in mounting exterior trim, hardware and equipment.

Exterior compartments shall have louvers in lower back wall of compartment for ventilation.

ROOF CONSTRUCTION

The roof shall be integral with the body and shall be all welded construction. The roof of the body shall not be less than 3/16" aluminum 3003H-14 alloy NFPA nonskid compliant tread plate, fully and continuously welded. The roof shall be reinforced with 2" x 2" x 1/4" aluminum tubing running the full width of the body. A 2" rounded radius shall be provided along the body sides.

BODY SUBFRAME

To assure proper body alignment and clearance, the body subframe shall be constructed directly on the chassis.

The chassis frame rails shall be fitted with 1/4" custom extruded UHMW polyethylene rail cap to isolate the body frame members from direct contact with chassis frame rails.

The body subframe shall be constructed from 6061T6 aluminum alloy tubing. Subframe shall consist of two (2) 2" x 6" x 1/4" aluminum tubes, the same width as the chassis frame rails, NO EXCEPTION. Welded to this tubing shall be crossmembers of 2" x 6" x 1/4" aluminum. These crossmembers shall extend the full width of the body to support the compartments. Crossmembers shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum crossmembers shall be located as necessary to support walkway or heavy equipment.

To form the frame, the tubing shall be beveled and welded at each joint using 5356 aluminum alloy welding wire.

BODY MOUNTING

The body subframe shall be fastened to the chassis frame with a minimum of ten (10) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to prevent any corrosion. Each mounting assembly shall utilizing two (2) 3/4" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design shall allow the body and subframe to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall eliminate any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

Body mountings that do not allow relief from chassis movement will not be acceptable.

17" REAR STEP BUMPER

The full width rear bumper shall be constructed from 2" x 2" x 1/4" aluminum tubing frame and covered with 3/16" NFPA compliant aluminum tread plate. The bumper shall extend from the rear vertical body panel 17" and provide a rear step with a minimum of 1/2" space at body for water drainage.

REAR TOW EYES

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below the apparatus body. The tow eyes shall be fabricated from steel plate and shall have a black powder coat finish.

GROUND LIGHTS

Two (2) OnScene Solutions 9" LED Nightstik ground lights shall be mounted below the rear bumper.

WHEEL WELL EXTERIOR PANEL

The exterior panel of the body wheel well enclosure shall be constructed from 1/8" aluminum smooth plate.

DIEFORMED BEADED EDGE BODY FENDERS

A die formed beaded edge shall be provided along the radius of the wheel well opening for a finished appearance.

WHEEL WELL LINERS

The wheel wells shall be provided with an easily removable polymer,circular inner fender liner. The inner liner shall be bolted to the wheel well with stainless steel bolts and spaced away from the wheel well so the liner will not accumulate dirt or water.

PAINT FINISH - TWO COLOR

The apparatus body shall be painted two-tone with PPG Delfleet paint with clear coat for a high gloss, hard finish.

- Paint Color: Match cab/chassis supplied paint color.

The painted body shall be finished with a clear coat of acrylic urethane for paint protection and maximum quality finish.

PAINT WARRANTY

The apparatus shall be provided with a ten (10) year non-prorated warranty to the original Owner. Warranty is provided by PPG Inc. A "PPG Warranty" sheet with all conditions shall be provided with the delivered apparatus.

BODY UNDERCOATING

The entire underside of apparatus body shall be sprayed with black automotive undercoating. Undercoating shall cover all areas to retard corrosion under the apparatus.

UNDERCOAT WARRANTY

The undercoating shall be provided with a warranty by its manufacturer for the lifetime of the vehicle. The re-spray warranty shall be transferable between vehicle owners. Should the coating applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

COMPARTMENT INTERIOR FINISH

The interior of all exterior body compartments shall be a "Maintenance Free" smooth unpainted finish. All body seams shall be finished with a caulk sealant for both appearance and moisture protection.

NFPA REQUIRED REFLECTIVE STRIPE AND LETTERING

The apparatus will be striped and lettered as per the HOUSTON FIRE DEPARTMENT's instructions.

The NFPA required reflective striping on all four sides including the rear chevrons shall be furnished and installed by the Body Manufacturer prior to the unit being entered into emergency service.

The final design and layout of the striping and lettering will be determined at the pre-construction meeting.

EXTERIOR COMPARTMENT DOORS

HINGED DOOR CONSTRUCTION

The exterior compartment doors shall be custom manufactured and built for each compartment. The compartment doors must be able to withstand years of rugged service and wear. For this reason, the compartment door design, metal thickness, and attachments must be strictly adhered to.

The compartment doors shall be all aluminum 3003H-14 alloy construction. The exterior panel shall be of 1/8" thickness smooth plate aluminum and the interior panel shall be of 1/8" thickness smooth plate aluminum. Lighter gauge material will NOT BE ACCEPTABLE in these areas. The double panel doors shall be 1-3/4" thick to completely enclose the door latching assembly. Doors shall have drain hole openings for drainage and ventilation.

The doors shall be flush mounted so that the outer surface is in line with the side body surface. Lap or bevel type constructed doors, doors framed with extrusions, or doors requiring rubber bumpers to prevent unnecessary contact are NOT ACCEPTABLE.

Compartment door openings shall be sealed with closed cell automotive type rubber molding to provide a weather resistant seal around door. In addition, rubber molding shall be provided along hinge to prevent moisture entry. Open cell foam type rubber moldings are NOT ACCEPTABLE.

Hinged compartment doors shall have 14 gauge stainless steel hinge, with 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary.

Drip rails shall be installed above all compartment door openings. Drip rails shall be completely removable for easy replacement if necessary.

The latching mechanism of hinged compartment doors shall include stainless steel 6" Hansen offset bent D-ring keyed handles. A gasket shall be placed between stainless steel handle and door. Door latches shall be a double catching two-point rotary slam latch, recessed inside the double panel door with striker plate.

All vertically hinged compartment doors shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the upper compartment door header and the box pan of the door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE. All horizontally hinged compartment door shall have a door check as specified with each door.

BODY WIDTH DIMENSIONS

The body shall be 100.0" wide, not including drip rail or non-permanent fixtures. Interior compartment depth dimensions shall be:

Area Description	Dimension
Transverse Area:	95.5"
- Above Top of Subframe	
Compartment Depth:	24.5"
- Below Top of Subframe	
- Ahead of Rear Axle	
Compartment Depth:	23.5"
- Below Top of Subframe	(Eng. Note)
- Behind the Rear Axle	

(Dimensions are generic and subject to change during the actual design process)

STREETSIDE COMPARTMENT - FRONT (S1)

The interior useable compartment space shall be approximately 43" wide.

The compartment door opening shall be approximately 14.5" high.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT COMPONENTS

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vent shall be provided in lower compartment.
- The 12 volt electrical distribution panel shall be located in the streetside front lower compartment.
- Three (3) chassis batteries will be located in front of Compartment S1. Batteries will be accessed through the compartment door.

STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S2)

The interior useable compartment space shall be approximately 43" wide.

The compartment door opening shall be approximately 14.5" high.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT COMPONENTS

- One (1) Prosine Inverter with a six (6) battery bank.
- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S3)

The interior useable compartment space shall be approximately 43" wide.

The compartment door opening shall be approximately 14.5" high.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT COMPONENTS

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

STREETSIDE COMPARTMENT - REAR (S3)

The interior useable compartment width shall be approximately 64" wide.

The compartment door opening shall be approximately 13.5" wide.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT COMPONENTS

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

CURBSIDE COMPARTMENT - FRONT (C1)

The interior useable compartment space shall be approximately 39" wide.

The compartment door opening shall be approximately 14.5" high.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT COMPONENTS

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.
- One (1) 120/240 VAC load center.
- The FRC FROG-D generator gauge panel.
- A 100 ampere, 240 VAC, single phase shore power receptacle shall be located in this compartment.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vent shall be provided in lower compartment.
- Three (3) chassis batteries will be located in front of Compartment C1. Batteries will be accessed through the compartment door.

CURBSIDE COMPARTMENT - AHEAD OF REAR WHEEL (C2)

The interior useable compartment space shall be approximately 59" wide.

The compartment door opening shall be approximately 14.5" high.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT COMPONENTS

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

CURBSIDE BODY ENTRY DOOR

Access to the interior body compartment shall be provided through a curbside entry door, directly in front of the rear axle. The door opening shall be approximately 31" wide x 94" high.

Construction of the side entry door shall be with 1/8" aluminum exterior smooth plate, the interior door pan being constructed from 1/8" aluminum tread plate.

The door shall be hung on full height 14 gauge stainless steel hinge, with a 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws at offset 5" centers. The hinge shall be slotted horizontally and vertically for ease of adjustment. A polyester barrier film gasket shall be placed between the stainless steel hinge and door.

The latch mechanism shall include a paddle handle on inside and a locking Hansen offset bent "D"-ring handle on exterior. A polyester barrier film gasket shall be placed between the stainless steel handles and the aluminum door panels. The door latch shall be a double catch two-point safety slam latch recessed inside the double panel door with strike plate mounted top and bottom of door frame.

ENTRY HANDRAILS

There shall be two (2) handrails provided at entry door, one (1) vertical on exterior of body on door handle side, and one (1) on inside of door. The interior handrail shall be angled for optimum use when entering or exiting the walk-in portion of the body.

Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

ELECTRIC STEP

One (1) heavy duty, Ziamatic Quik-Step, 12 volt electric folding step shall be located under the command area access door. The step shall be 24" wide and fold up under body to reduce ground clearance. The step shall fold out and down to reduce the ground to step distance.

WINDOW(S)

There shall be one (1) 18" wide x 22" high non-sliding window(s) installed in the entrance door. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

WINDOW(S)

There shall be one (1) 18" wide x 22" vertical sliding window(s) installed in the entrance door. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

BODY ENTRANCE STEP COVER

A swing down type step cover fabricated from 3/16" NFPA approved treadplate will be provided at the side entrance to the apparatus body. The hinged step cover will be securely fasten up to allow access to the body and when manually swung down, provide a flush cover over the body entrance steps to provide a safe walking surface when the entrance door is close.

ELECTRIC COMBINATION SIDE ENTRANCE DOOR LOCK

The side entrance door will be provided with a key pad electric lock for coded entrance.

CURBSIDE COMPARTMENT - REAR (C3)

The interior useable compartment width shall be approximately 64" wide.

The compartment door opening shall be approximately 13.5" high.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT COMPONENTS

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

PLASTIC FLOOR AND SHELF TILE

All compartment floors, shelves, and trays shall be covered with Turtle Tile plastic interlocking grating.

- The plastic floor tile shall be red
- The plastic edge trim shall be yellow.

SIDE BODY PROTECTION - RUB RAIL

There shall be side rub rails provided below the compartment door openings on both the streetside and curbside. The rub rail shall be fabricated from 6063 extruded aluminum, measuring approximately 2-3/4" high x 1-3/8" thick with tapered aluminum end caps. The rub rail shall be bolted to the body using stainless steel bolts and 1-1/2" diameter x 5/8" thick rubber mount isolators to prevent damage to the body. The rails shall incorporate LED clearance marker lighting recessed into the rail fascia to avoid damage to the light in case of impact. The rub rail shall have an accessory mounting track integrated into the backside of the rail to allow mounting of accessories such as ground lighting.

- 3M™ Diamond Grade™ Conspicuity striping shall be provided in the rub rail. The striping shall be red/white in color.

ROLL-OUT AWNING CURBSIDE

A Carefree Mirage, 110 Volt AC powered, Lateral Arm Acrylic Patio Awning with Direct Response Electronics shall be installed on the apparatus body. The Direct Response Electronics includes easy-to-use controls and a Motion Detection System. The awning shall have a system to detect canopy motion, the most important element to prevent wind/weather damage. The awning shall automatically retract when the canopy reaches a certain level of movement - you determine the movement level on the control panel.

The awning shall activate the door ajar warning system in the cab when not in the stowed position.

The 110V motor shall be completely sealed and UL approved. The awning pitch shall be adjusted to up to 30"

The awning shall match the width of the streetside slide-out in wide with a 10' projection. (Size refers to box length, actual fabric length will be 8" shorter.)

The Mirage shall be covered by a "Two and Four" Limited Warranty - Two years 100% parts, labor, & freight on canopy, four years 100% parts, labor, and freight on motor, electronics, roller & hardware. Warranty covers manufacturer's defects only. Wind and rain damage are not covered.

AWNING HOUSING

The case color will be the standard, Polar White and re-painted to match body color.

- The awning fabric shall be Firesist HUV, Crimson Red (88003).

ROOF ACCESS LADDER

The ladder shall be weld constructed of vertical aluminum extrusion tubing and aluminum grip surface ladder rungs with slip resistant tread grip pattern. It shall be set off from body 8 inches and mounted to body with chrome plated end stanchions bolted to the body with stainless steel bolts. The ladder shall NOT extend above the body roof. The location shall be on the rear curbside of the apparatus body.

ROOF ACCESS HANDRAIL

There shall be two (2) handrails mounted on top of body to assist in roof access. Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

COMPARTMENT COMPONENTS DESCRIPTIONS

All interior compartment components shall be fabricated as follows:

ADJUSTABLE SHELVING HARDWARE

Adjustable shelving hardware shall be provided indicated in the numbered compartment list.

The shelving hardware shall include a minimum of four (4) aluminum shelf tracs mounted vertically on compartment side walls or vertical partitions. There shall be one (1) cast aluminum shelf bracket per vertical shelf trac to mount each shelf, tray, or adjustable storage module. Shelving hardware shall be of heavy duty quality with unlimited vertical adjustment settings.

ADJUSTABLE SHELF/SHELVES

Adjustable shelf/shelves shall be provided in exterior compartment as indicated in the numbered compartment list.

Shelves shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate with a 2" vertical flange along the front and rear edges. Shelves shall be designed to be used with flanges either in the upward position to hold various equipment on shelf, or in the downward position for sweep-out shelf surface.

All shelves shall be fully adjustable, from top to bottom of the compartment. There shall be at least four (4) vertical mounting channels and shelving hardware, two (2) each side of compartment. Shelving hardware shall be of heavy duty quality with unlimited vertical adjustment settings.

HEAVY DUTY 100% EXTENSION EQUIPMENT SLIDE - (1,000 LB. CAPACITY)

Heavy duty slide-out equipment tray(s) shall be provided in exterior compartment as indicated in the numbered compartment list.

Trays shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate. Trays shall be built with a 4" high vertical lip with welded corners to form a box type tray surface. The tray shall be mounted on a slide frame constructed of anodized aluminum extrusion(s). The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a three extrusion rail design utilizing twelve to sixteen (12 - 16) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The rollers shall not lose contact with the rail extrusion during operation of the slide unit. Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions. The slide shall be rated for a maximum evenly distributed load of 1,000 lbs.

REFRIGERATOR

A Norcold DE-0041R 120VAC/12VDC refrigerator/freezer shall be provided in the body interior as indicated in the numbered compartment list. Unit shall be a flush mount style with a custom enclosure. Refrigerator shall operate from both 12 VDC and 120 VAC power. The built-in dimensions are 30-7/8" high x 23-1/4" wide x 23-1/2" deep.

COMPARTMENT LIGHTING

Each enclosed equipment compartment greater than 4 ft3 (0.1 m3) in volume and having an opening greater than 144 in.2 (92,900 mm2) shallhave sufficient compartment lighting to provide a minimum of 2 fc (20 lx) at any location on the floor of the compartment without any shelves, dividers, or equipment in the compartment.

Compartments such as ladder tunnels, pike pole storage tubes, or underbody compartments designed around the volumetric requirements of specific equipment that can be removed without the use of article illumination shall not be required to have compartment lighting.

All compartments shallbe equipped with OnScene Nightstik LED lights with the following minimum light requirements;

- Full Height Compartments, 54” Section (36 LED's)
- Wheel well Compartments, 36” Section (24 LED's)
- Rear Rescue Compartment, 54” Section (36 LED's)
- Low Compartments, 18" Section (12 LED's), Vertical
- Low Compartments, 36" Section (24 LED's), Horizontal

The OnScene Nightstik lights shall be rated at 100,000 hours of service and shall be provided with a 5 year free replacement warranty.

POWER DISTRIBUTION BOX

Where a power distribution box is hardwired to the end of a cord that is stored on a fixed cord reel or other fixed storage means, the following requirements shall apply;

The remote power distribution box shall be listed for use in a wet location.

The distribution box shall be as follows:

(1) Protected from corrosion
(2) capable of being carried with a gloved hand
(3) Designed to keep the exterior electrical components above 2 in. (51 mm) of standing water

Inlets, receptacles, circuit breakers, or GFCI devices shall not be mounted on the top surface of the horizontal plane.

Branch circuit breakers shall be installed in the remote power distribution box if the overcurrent device protecting the feed cord to the box is too large to protect the wiring supplying the devices plugged onto the distribution box.

Remote power distribution boxes shall have a light on the box to indicate the power is on. The light shall be visible in a 360 degree plane from a minimum of 200 ft (60 m) in complete darkness. The light shall be mechanically protected to prevent damage.

The hardwired portable cord connection to the box shall have strain relief and meet the intended usage requirements.

UNDERBODY SLIDE-OUT STEP

There shall be underbody slide-out step(s) furnished and installed. Each platform shall be constructed from 9" deep "Diamond Back" non-slip vented aluminum stair treads. Step slide shall be securely held in both out and stored position, utilizing a heavy duty pneumatic cylinder. Each pneumatic cylinder shall be designed to have an over center location which will assist the step in both extension and retraction. Each step shall be designed to hold 500 lbs., and reinforced to prevent flexing or damage.

STEP / GROUND LIGHTS

Step and ground lights shall be OnScene Solutions 9" LED Nightstik and be placed at any entry door and step where personnel climb on or descend from the apparatus to ground level. OnScene LED lights shall have 6 LED lights per 9” light, and shall be rated at 100,000 hours of service. On Scene Solutions LED lights shall be have a 5 year free replacement warranty.

All of the required step and ground lights shall be activated when the parking brake is set.

WALK-IN INTERIOR FINISH DETAILS

INTERIOR INSULATION

Following the sheet metal fabrication the roof area, upper exterior walls and the entry door of the apparatus body shall be insulated with 1-1/2" rigid polyurethane foam insulation. This insulation shall be the type that will not absorb moisture, move once in place or deteriorate. Mat type fiberglass or spray in foam insulation are not acceptable.

INTERIOR FINISH

The interior of the apparatus body shall have a fully maintenance free and durable finish. The interior finish shall be installed on the ceiling, front wall, and interior side walls from top of exterior compartments to ceiling height.

The interior panels shall be installed with sheet metal screws with white plastic plugs covering the screws. The seams between FRP panels, interior corners, and exterior corners shall be trimmed with white plastic molding.

The interior finish shall be bright white pebble grain FRP.

INTERIOR WALKWAY FLOOR

There shall be Lonseal, Loncoin-II Flecks installed on the floor substrate. Loncoin II Flecks is a heterogeneous resilient sheet vinyl with a decorative raised coin texture, breathtaking color, and intriguing style. The fleck coloration provides camouflage for simpler maintenance while the raised coin embossing provides enhanced traction. Excellent for interior, retail, commercial, or institutional use where design parameters call for a high performance, sophisticated flooring solution.

Loncoin II Flecks is composed of polyvinyl chloride (PVC) resin, plasticizers, fillers, and pigments. The co-calendared wear layer is formulated to provide maximum resistance to foot traffic and most commercial and healthcare chemicals.

The middle layer provides dimensional stability, sound-absorbing properties, and resiliency under foot. The backing layer provides strength and stability of the flooring and enhances the bonding strength of the adhesive.

The material shall be black in color (Loncoin-II Flecks - Onyx).

Lonseal, Inc. warrants that Lonseal flooring products shall be free from manufacturing defects for a period of one (1) year from the date of purchase and that, when properly installed and maintained, shall not wear through as a result of normal foot traffic for a period of 7 years from the date of installation.

INTERIOR SUB-FLOOR

Above the body subframe shall be an isolation sheet that shall prevent outside elements from permeating the full length sound and thermal barrier of 3/4" thick grade plywood. The sheet shall be fabricated from the same type of material as is used in the subframe. The isolation sheet shall be flanged on both sides with a 1" high vertical break.

FRONT WALL INTERIOR AREA

SMART BOARD

A specified Smart Board will be mounted the front interior wall of the interior of the body.

120 VOLT FRONT WALL INTERIOR OUTLETS

There shall be two (2) 120 volt outlet(s) located on the front wall of the walk-in area of the body.

- The receptacle shall be 20 amp, straight-blade (NEMA 5-20R).

MAGNETIC WHITEBOARDS

There shall be two (2) magnetic whiteboard surfaces mounted on the front wall of the walk-in interior. Location and size to be determined at the preconstruction meeting.

STREETSIDE INTERIOR AREA (IS1/IS2)

FLAT FLOOR SLIDE-OUT EXTENSION

There shall be one (1) "slide-out" section(s) which shall extend approximately 32" as measured from the outside of the body. The extendable module shall be approximately 140" in length and 81" high. The interior height shall be approximately 9" less that the interior height of the body walkway. The installed module shall provide a water tight seal in both the fully extended and the retracted positions.

The slide-out section shall utilize smooth operating hydraulic system. The slide-out will be flat floor design. A 3-position, momentary type rocker switch shall be used to operate the slide-out wall system.

The slide-out section shall be framed with 2" x 2" x 1/4" 6061-T6 alloy aluminum. The frame structure shall be covered with no less than 1/8" thick 3003-H14 smooth aluminum.

Full width padded foam cushion head bumpers shall be provided in the slideout. Head bumpers shall be covered with matching interior vinyl.

There shall be two (2) flashing LED warning lights with red lenses, one at each end of the slide-out section. The lights shall activate and be visible when the unit is extended.

All electrical wiring installed in the slide-out wall shall run through a boxed type conduit at the lower corner of the system. All wiring shall be enclosed in a flexible, moisture resistant, reinforced conduit, with proper seal tight connectors and hardware. Access shall be provided for inspection of all wiring and the gear and rack mechanism.

The Command Center "Slide-out" must be able to withstand years of rugged service and wear. For this reason, this design, metal thickness and attachments must be strictly adhered to. RV type slide-outs or slide-outs using light weight metal or fiberglass shall not be acceptable.

SLIDE-OUT SIDE WINDOWS

There shall be two (2) 18" wide x 22" high non-sliding window(s) installed one (1) on each side of the specified slide-out wall. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

INTERIOR SLIDE-OUT WINDOW COVERS

An interior window cover shall be provided on the two (2) windows in the slide-out wall.

The window covers shall be of Cover Lite Select, 22 oz material. Snap type fasteners shall be installed around each window in the body to allow each window to be covered.

INTERIOR CABINET - OVERHEAD

There shall be four (4) overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray . Each cabinet shall be approximately (insert actual dimensions).

The above cabinet(s) shall have lift-up type door(s) with dry-erase outer surface.

UNDER CABINET, RADIO MOUNTING CONSOLE

There shall be four (4) under cabinet mounted radio/communication consoles provided in the interior. The radio cabinet shall provide mounting area for the radios specified.

The radio cabinet shall be constructed of 1/8" smooth finish aluminum and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray or black. The front of the cabinet shall have standard bolt-on 8-1/2" x 3" black radio trim mounting plates. A hinged 3/16" aluminum drop down access cover shall be provided on the bottom to access equipment mounting and wiring with 1/4 turn knobs to secure cover closed. Ventilation louvers shall be provided for proper ventilation of radio equipment.

Each cabinet shall be a minimum of 4" high x 14" deep. The width of each cabinet shall be (insert actual dimensions) and located under overhead cabinets.

INTERIOR ABOVE COUNTER LIGHT FIXTURES

There shall be four (4) OnScene 12 volt, LED interior, over counter, light fixture(s) installed above the desk/deck area. Fixture shall be provided with red and clear bulbs with switch on fixture.

SLIDE-OUT AREA - FULL WIDTH CORIAN DESK TOP

The slide-out area shall be provided with a full width desk which shall be 24" deep and located approximately 30" from floor. The front edge of the desk top shall be reinforced with 2" x 2" tubing in order to support a person sitting on the edge of the desk.

The desk top surface shall be fabricated of Corain. It shall have a 2" vertical downward edge along front to cover the 2" x 2" reinforcement. There shall be 2-1/2" diameter holes with plastic edge grommet provided at each rear corner for wiring of future equipment located on the desk top. The desk shall color will be light gray with the exact color determined at the pre-construction meeting.

DESKTOP COMPONENT CONSOLE

There shall be a console at top rear of the desk for optional component mounting. The console shall be fabricated from 1/8" aluminum approximately 6" high x 9" deep with a 6" sloping component mounting face. The console shall be painted dark gray with a hammer tone powder coat paint finish for a hard and durable surface.

The sloped component mounting surface shall be a one-piece hinged cover to allow access to optional components, and wiring and held closed with knurled thumb type latch in each corner.

- There shall be four (4) phones mounted in the front face of the component console
- There shall be three (3) data port(s) provided in the front face of the component console.
- There shall be two (2) 12V outlet(s) provided in the front face of the component console.
- There shall be two (2) 120 volt, 20 amp, duplex straight-blade receptacle (NEMA 5-20R) outlet(s) provided in the front face of the component console.

INTERIOR SEATS

Four (4) Herman Miller, highly adjustable Aeron Roll-Around Chairs furnished and installed in the body command area slide out.

Each chair shall have a Kinemat tilt mechanism that allows the body to pivot naturally and simultaneously at the ankles, knees, and hips providing a smooth ride and proper support from forward-leaning to reclining postures.

There shall be lumbar adjustment vertically through 4 1/2-inch height range. Its depth can be set at 3/4 inch or 1 1/4 inches.

There shall be a suspension system fabricated from unique Pellicle material; the Aeron chair distributes weight evenly over the seat and back, conforming to each person's shape. The material also lets air pass through, adding to long-term comfort by preventing body-heat build-up.

The armrests shall be independently adjustable with settings that pivot inward 17.5 degrees for keying and outward 15 degrees. Arm height adjusts independently within a four-inch vertical range.

120 VOLT UNDER DESK OUTLET (PC POWER)

The receptacle shall be 20 amp, straight-blade (NEMA 5-20R) will be powered by the specified inverter.

CORIAN CONFERENCE TABLE

A confernce table will be provided in the Forward Conference Area of the body. The table will be fabricated with a Corian top matching the specified Corian desktops.

STREETSIDE INTERIOR AREA (IS4)

GALLEY MICROWAVE

There shall be one (1) commercial grade microwave oven furnished and installed in the upper storage compartment. The unit shall be a 1000-watt minimum with stainless steel cabinet. The built-in dimensions shall be 12" high x 20-1/2" wide x 16" deep.

GALLEY REFRIGERATOR

There shall be one (1) Norcold DE-0041R 120VAC/12VDC refrigerator/freezer(s) furnished and installed in the galley. The unit shall be a flush mount style box with Body Manufacturer fabricated custom enclosure. Each refrigerator shall operate from 12 volt or 120 volt power. The built-in dimensions are 30-7/8" high x 23-1/4" wide x 23-1/2" deep.

- One (1) 120 volt, 20 amp, straight blade outlet behind the microwave.
- One (1) 120 volt, 20 amp, straight blade outlet behind the refrigerator.
- One (1) 120 volt, 20 amp, GFI straight blade outlet in the overhead cabinet.

GALLEY INTERIOR LIGHT FIXTURE

There shall be one (1) 120 volt interior, over counter, light fixture(s) installed above the galley countertop and below the overhead cabinet. Fixture shall be provided with single bulb and switch on fixture.

AIR CONDITIONER - HEATER

The apparatus body shall be supplied with one (1) air conditioning/heater unit(s). Each unit shall be mounted in a manner to allow ducting of the air flow with a Hoseline brand evaporator.

Unit shall have a rating of 24,000 btu cooling capacity with a heating element rated at 36,000 btu heating. A 12 volt 3 speed fan shall supply a minimum of 650 cfm air flow.

MIDDLE ATLANTIC 40U DATA RACK

There shall be an EIA compliant 19” gangable equipment rack, Middle Atlantic Products model # MRK-4026.

Overall dimensions shall be 76.125”H x 22.0”W x 26.4”D. Useable height shall be 40 rack spaces, useable depth shall be 24”. Fully welded construction shall provide a static capacity of 10,000 lbs. and a UL Listed load capacity of 2,500 lbs.

Rack shall be constructed of the following materials: top and bottom shall be 14-gauge steel, horizontal braces shall be 16-gauge steel, rear door shall be 18-gauge steel and all structural elements shall be finished in a durable black powder coat.

Rack shall come equipped with two pairs of 11-gauge steel rack rail with tapped 10-32 mounting holes in universal EIA spacing, black e-coat finish and numbered rack spaces.

Rack shall have removable split rear knockout panels with 1/2”, 3/4”, 1” and 1-1/2” electrical knockouts and top BNC knockouts for UHF/VHF antennae.

Solid front door with black textured powder coat finish and keylock. The door is capable of hinging on either the left or the right of the rack.

Integrated fan top includes 4.5" fans, fan guards and proportional speed thermostatic fan controller.

The PD-920R-NS rackmount power distribution unit is equipped with 8 circuit breaker protected rear outlets (NEMA 5-20R), and one front outlet (NEMA 5-15R). An illuminated combination power switch/circuit breaker is located on the front panel. UL listed in the US and Canada. Occupies one rackspace.

The APC Uninterruptible Power Supply (UPS) provides protection for electronic equipment from utility power blackouts, brownouts, sags and surges. The UPS filters small utility line fluctuations and isolates electronic equipment from large disturbances by internally disconnecting from utility line power. The UPS provides continuous power from the batteries until utility power returns to safe levels or the batteries are fully discharged.

STREETSIDE INTERIOR AREA (IS5)

FLAT FLOOR SLIDE-OUT EXTENSION

There shall be one (1) "slide-out" section(s) which shall extend approximately 32" as measured from the outside of the body. The extendable module shall be approximately 118" in length and 75" high. The interior height shall be approximately 9" less that the interior height of the body walkway. The installed module shall provide a water tight seal in both the fully extended and the retracted positions.

The slide-out section shall utilize smooth operating hydraulic system. The slide-out will be flat floor design. A 3-position, momentary type rocker switch shall be used to operate the slide-out wall system.

The slide-out section shall be framed with 2" x 2" x 1/4" 6061-T6 alloy aluminum. The frame structure shall be covered with no less than 1/8" thick 3003-H14 smooth aluminum.

Full width padded foam cushion head bumpers shall be provided in the slideout. Head bumpers shall be covered with matching interior vinyl.

There shall be two (2) flashing LED warning lights with red lenses, one at each end of the slide-out section. The lights shall activate and be visible when the unit is extended.

All electrical wiring installed in the slide-out wall shall run through a boxed type conduit at the lower corner of the system. All wiring shall be enclosed in a flexible, moisture resistant, reinforced conduit, with proper seal tight connectors and hardware. Access shall be provided for inspection of all wiring and the gear and rack mechanism.

The Command Center "Slide-out" must be able to withstand years of rugged service and wear. For this reason, this design, metal thickness and attachments must be strictly adhered to. RV type slide-outs or slide-outs using light weight metal or fiberglass shall not be acceptable.

SLIDE-OUT SIDE WINDOWS

There shall be two (2) 18" wide x 22" high non-sliding window(s) installed one (1) on each side of the specified slide-out wall. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

INTERIOR SLIDE-OUT WINDOW COVERS

An interior window cover shall be provided on the two (2) windows in the slide-out wall.

The window covers shall be of Cover Lite Select, 22 oz material. Snap type fasteners shall be installed around each window in the body to allow each window to be covered.

INTERIOR CABINET - OVERHEAD

There shall be three (3) overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray . Each cabinet shall be approximately (insert actual dimensions).

The above cabinet(s) shall have lift-up type door(s) with dry-erase outer surface.

UNDER CABINET, RADIO MOUNTING CONSOLE

There shall be three (3) under cabinet mounted radio/communication consoles provided in the interior. The radio cabinet shall provide mounting area for the radios specified.

The radio cabinet shall be constructed of 1/8" smooth finish aluminum and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray or black. The front of the cabinet shall have standard bolt-on 8-1/2" x 3" black radio trim mounting plates. A hinged 3/16" aluminum drop down access cover shall be provided on the bottom to access equipment mounting and wiring with 1/4 turn knobs to secure cover closed. Ventilation louvers shall be provided for proper ventilation of radio equipment.

Each cabinet shall be a minimum of 4" high x 14" deep. The width of each cabinet shall be (insert actual dimensions) and located under overhead cabinets.

INTERIOR ABOVE COUNTER LIGHT FIXTURES

There shall be three (3) OnScene 12 volt, LED interior, over counter, light fixture(s) installed above the desk/deck area. Fixture shall be provided with red and clear bulbs with switch on fixture.

SLIDE-OUT AREA - FULL WIDTH CORIAN DESK TOP

The slide-out area shall be provided with a full width desk which shall be 24" deep and located approximately 30" from floor. The front edge of the desk top shall be reinforced with 2" x 2" tubing in order to support a person sitting on the edge of the desk.

The desk top surface shall be fabricated of Corain. It shall have a 2" vertical downward edge along front to cover the 2" x 2" reinforcement. There shall be 2-1/2" diameter holes with plastic edge grommet provided at each rear corner for wiring of future equipment located on the desk top. The desk shall color will be light gray with the exact color determined at the pre-construction meeting.

WALL OUTLETS

- There shall be two (2) phones mounted in the wall service.
- There shall be three (3) radio(s) mounted in the wall surface.
- There shall be three (3) data port(s) provided in the wall surface.
- There shall be two (2) 12V outlet(s) provided in the wall surface.
- There shall be two (2) 120 volt, 20 amp, duplex straight-blade receptacle (NEMA 5-20R) outlet(s) provided in the wall surface.

INTERIOR SEATS

Three (3) Herman Miller, highly adjustable Aeron Roll-Around Chairs furnished and installed in the body command area slide out.

Each chair shall have a Kinemat tilt mechanism that allows the body to pivot naturally and simultaneously at the ankles, knees, and hips providing a smooth ride and proper support from forward-leaning to reclining postures.

There shall be lumbar adjustment vertically through 4 1/2-inch height range. Its depth can be set at 3/4 inch or 1 1/4 inches.

There shall be a suspension system fabricated from unique Pellicle material; the Aeron chair distributes weight evenly over the seat and back, conforming to each person's shape. The material also lets air pass through, adding to long-term comfort by preventing body-heat build-up.

The armrests shall be independently adjustable with settings that pivot inward 17.5 degrees for keying and outward 15 degrees. Arm height adjusts independently within a four-inch vertical range.

CURBSIDE INTERIOR AREA (IC1/IC2)

FLAT FLOOR SLIDE-OUT EXTENSION

There shall be one (1) "slide-out" section(s) which shall extend approximately 32" as measured from the outside of the body. The extendable module shall be approximately 106" in length and 81" high. The interior height shall be approximately 9" less that the interior height of the body walkway. The installed module shall provide a water tight seal in both the fully extended and the retracted positions.

The slide-out section shall utilize smooth operating hydraulic system. The slide-out will be flat floor design. A 3-position, momentary type rocker switch shall be used to operate the slide-out wall system.

The slide-out section shall be framed with 2" x 2" x 1/4" 6061-T6 alloy aluminum. The frame structure shall be covered with no less than 1/8" thick 3003-H14 smooth aluminum.

Full width padded foam cushion head bumpers shall be provided in the slideout. Head bumpers shall be covered with matching interior vinyl.

There shall be two (2) flashing LED warning lights with red lenses, one at each end of the slide-out section. The lights shall activate and be visible when the unit is extended.

All electrical wiring installed in the slide-out wall shall run through a boxed type conduit at the lower corner of the system. All wiring shall be enclosed in a flexible, moisture resistant, reinforced conduit, with proper seal tight connectors and hardware. Access shall be provided for inspection of all wiring and the gear and rack mechanism.

The Command Center "Slide-out" must be able to withstand years of rugged service and wear. For this reason, this design, metal thickness and attachments must be strictly adhered to. RV type slide-outs or slide-outs using light weight metal or fiberglass shall not be acceptable.

SLIDE-OUT SIDE WINDOWS

There shall be two (2) 18" wide x 22" high non-sliding window(s) installed one (1) on each side of the specified slide-out wall. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

INTERIOR SLIDE-OUT WINDOW COVERS

An interior window cover shall be provided on the two (2) windows in the slide-out wall.

The window covers shall be of Cover Lite Select, 22 oz material. Snap type fasteners shall be installed around each window in the body to allow each window to be covered.

INTERIOR CABINET - OVERHEAD

There shall be three (3) overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray . Each cabinet shall be approximately (insert actual dimensions).

The above cabinet(s) shall have lift-up type door(s) with dry-erase outer surface.

UNDER CABINET, RADIO MOUNTING CONSOLE

There shall be three (3) under cabinet mounted radio/communication consoles provided in the interior. The radio cabinet shall provide mounting area for the radios specified.

The radio cabinet shall be constructed of 1/8" smooth finish aluminum and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray or black. The front of the cabinet shall have standard bolt-on 8-1/2" x 3" black radio trim mounting plates. A hinged 3/16" aluminum drop down access cover shall be provided on the bottom to access equipment mounting and wiring with 1/4 turn knobs to secure cover closed. Ventilation louvers shall be provided for proper ventilation of radio equipment.

Each cabinet shall be a minimum of 4" high x 14" deep. The width of each cabinet shall be (insert actual dimensions) and located under overhead cabinets.

There shall be three (3) OnScene 12 volt, LED interior, over counter, light fixture(s) installed above the desk/deck area. Fixture shall be provided with red and clear bulbs with switch on fixture.

SLIDE-OUT AREA - FULL WIDTH CORIAN DESK TOP

The slide-out area shall be provided with a full width desk which shall be 24" deep and located approximately 30" from floor. The front edge of the desk top shall be reinforced with 2" x 2" tubing in order to support a person sitting on the edge of the desk.

The desk top surface shall be fabricated of Corain. It shall have a 2" vertical downward edge along front to cover the 2" x 2" reinforcement. There shall be 2-1/2" diameter holes with plastic edge grommet provided at each rear corner for wiring of future equipment located on the desk top. The desk shall color will be light gray with the exact color determined at the pre-construction meeting.

DESKTOP COMPONENT CONSOLE

There shall be a console at top rear of the desk for optional component mounting. The console shall be fabricated from 1/8" aluminum approximately 6" high x 9" deep with a 6" sloping component mounting face. The console shall be painted dark gray with a hammer tone powder coat paint finish for a hard and durable surface.

The sloped component mounting surface shall be a one-piece hinged cover to allow access to optional components, and wiring and held closed with knurled thumb type latch in each corner.

- There shall be three (3) phones mounted in the front face of the component console
- There shall be two (2) data port(s) provided in the front face of the component console.
- There shall be two (2) 12V outlet(s) provided in the front face of the component console.
- There shall be two (2) 120 volt, 20 amp, duplex straight-blade receptacle (NEMA 5-20R) outlet(s) provided in the front face of the component console.

INTERIOR SEATS

Three (3) Herman Miller, highly adjustable Aeron Chairs furnished and installed in the body command area slide out.

Each chair shall have a Kinemat tilt mechanism that allows the body to pivot naturally and simultaneously at the ankles, knees, and hips providing a smooth ride and proper support from forward-leaning to reclining postures.

There shall be lumbar adjustment vertically through 4 1/2-inch height range. Its depth can be set at 3/4 inch or 1 1/4 inches.

There shall be a suspension system fabricated from unique Pellicle material; the Aeron chair distributes weight evenly over the seat and back, conforming to each person's shape. The material also lets air pass through, adding to long-term comfort by preventing body-heat build-up.

The armrests shall be independently adjustable with settings that pivot inward 17.5 degrees for keying and outward 15 degrees. Arm height adjusts independently within a four-inch vertical range.

120 VOLT UNDER DESK OUTLET (PC POWER)

The receptacle shall be 20 amp, straight-blade (NEMA 5-20R) will be powered by the inverter.

CURBSIDE INTERIOR AREA (IC4)

ROOF HATCH WITH SKYLIGHT

The apparatus roof area shall be specially reinforced for the installation of a hatch with skylight. The opening shall be approximately 24" x 24" in size, suitable for use as an escape hatch, for ventilation, and supplemental light in the interior of the apparatus. The skylight shall have tinted glass. Two (2) compression type door checks are used to hold door in open position.

SLIDING POCKET DOOR

There shall be one (1) sliding pocket door(s) provided on interior of walk-in body area. Pocket door shall be fabricated from 1/8" smooth aluminum and be approximately 1-1/2" thick and hang on adjustable pocket door hardware. The door shall be painted to match the interior wall color. A stainless steel handle shall be provided on each side of door. The door shall be equipped with a pneumatic cylinder which will "over-center" to hold the door in open and closed positions.

MIDDLE ATLANTIC 40U DATA RACK

There shall be an EIA compliant 19” gangable equipment rack, Middle Atlantic Products model # MRK-4026.

Overall dimensions shall be 76.125”H x 22.0”W x 26.4”D. Useable height shall be 40 rack spaces, useable depth shall be 24”. Fully welded construction shall provide a static capacity of 10,000 lbs. and a UL Listed load capacity of 2,500 lbs.

Rack shall be constructed of the following materials: top and bottom shall be 14-gauge steel, horizontal braces shall be 16-gauge steel, rear door shall be 18-gauge steel and all structural elements shall be finished in a durable black powder coat.

Rack shall come equipped with two pairs of 11-gauge steel rack rail with tapped 10-32 mounting holes in universal EIA spacing, black e-coat finish and numbered rack spaces.

Rack shall have removable split rear knockout panels with 1/2”, 3/4”, 1” and 1-1/2” electrical knockouts and top BNC knockouts for UHF/VHF antennae.

Solid front door with black textured powder coat finish and keylock. The door is capable of hinging on either the left or the right of the rack.

Integrated fan top includes 4.5" fans, fan guards and proportional speed thermostatic fan controller.

The PD-920R-NS rackmount power distribution unit is equipped with 8 circuit breaker protected rear outlets (NEMA 5-20R), and one front outlet (NEMA 5-15R). An illuminated combination power switch/circuit breaker is located on the front panel. UL listed in the US and Canada. Occupies one rackspace.

The APC Uninterruptible Power Supply (UPS) provides protection for electronic equipment from utility power blackouts, brownouts, sags and surges. The UPS filters small utility line fluctuations and isolates electronic equipment from large disturbances by internally disconnecting from utility line power. The UPS provides continuous power from the batteries until utility power returns to safe levels or the batteries are fully discharged.

AIR CONDITIONER - HEATER

The apparatus body shall be supplied with one (1) air conditioning/heater unit(s). Each unit shall be mounted in a manner to allow ducting of the air flow with a Hoseline brand evaporator.

Unit shall have a rating of 24,000 btu cooling capacity with a heating element rated at 36,000 btu heating. A 12 volt 3 speed fan shall supply a minimum of 650 cfm air flow.

CURBSIDE INTERIOR AREA (IC5)

FLAT FLOOR SLIDE-OUT EXTENSION

There shall be one (1) "slide-out" section(s) which shall extend approximately 32" as measured from the outside of the body. The extendable module shall be approximately 118" in length and 75" high. The interior height shall be approximately 9" less that the interior height of the body walkway. The installed module shall provide a water tight seal in both the fully extended and the retracted positions.

The slide-out section shall utilize smooth operating hydraulic system. The slide-out will be flat floor design. A 3-position, momentary type rocker switch shall be used to operate the slide-out wall system.

The slide-out section shall be framed with 2" x 2" x 1/4" 6061-T6 alloy aluminum. The frame structure shall be covered with no less than 1/8" thick 3003-H14 smooth aluminum.

Full width padded foam cushion head bumpers shall be provided in the slideout. Head bumpers shall be covered with matching interior vinyl.

There shall be two (2) flashing LED warning lights with red lenses, one at each end of the slide-out section. The lights shall activate and be visible when the unit is extended.

All electrical wiring installed in the slide-out wall shall run through a boxed type conduit at the lower corner of the system. All wiring shall be enclosed in a flexible, moisture resistant, reinforced conduit, with proper seal tight connectors and hardware. Access shall be provided for inspection of all wiring and the gear and rack mechanism.

The Command Center "Slide-out" must be able to withstand years of rugged service and wear. For this reason, this design, metal thickness and attachments must be strictly adhered to. RV type slide-outs or slide-outs using light weight metal or fiberglass shall not be acceptable.

SLIDE-OUT SIDE WINDOWS

There shall be two (2) 18" wide x 22" high non-sliding window(s) installed one (1) on each side of the specified slide-out wall. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

INTERIOR SLIDE-OUT WINDOW COVERS

An interior window cover shall be provided on the two (2) windows in the slide-out wall.

The window covers shall be of Cover Lite Select, 22 oz material. Snap type fasteners shall be installed around each window in the body to allow each window to be covered.

FLIP-UP SEAT

There shall be a flip-up seat sized for two (2) person/people. The seat bottom cushion shall be mounted to a spring loaded bracket system which shall return the cushion to vertical when not in use. The cushion shall be approximately 3" thick with a wood platform for stability. The cushion shall be covered with Duraware heavy duty fabric material. This seat shall not include seat belts and therefore will not be considered a riding position.

INTERIOR SEATS

Four (4) Herman Miller, highly adjustable Aeron Roll-Around Chairs furnished and installed in the body command area slide out.

Each chair shall have a Kinemat tilt mechanism that allows the body to pivot naturally and simultaneously at the ankles, knees, and hips providing a smooth ride and proper support from forward-leaning to reclining postures.

There shall be lumbar adjustment vertically through 4 1/2-inch height range. Its depth can be set at 3/4 inch or 1 1/4 inches.

There shall be a suspension system fabricated from unique Pellicle material; the Aeron chair distributes weight evenly over the seat and back, conforming to each person's shape. The material also lets air pass through, adding to long-term comfort by preventing body-heat build-up.

The armrests shall be independently adjustable with settings that pivot inward 17.5 degrees for keying and outward 15 degrees. Arm height adjusts independently within a four-inch vertical range.

SMART BOARD

A specified Smart Board will be mounted the curbside interior wall of rear curbside slide-out.

120 VOLT SLIDE-OUT OUTLETS

There shall be three (3) 120 volt outlet(s) located in the slide-out area of the body.

- Two (2) receptacles shall be 20 amp, straight-blade (NEMA 5-20R).
- One (1) receptacle shall be 20 amp, straight-blade (NEMA 5-20R) and powered by the inverter.

CONFERENCE TABLE POP-UP TECHNICAL PORTS

The rear conference table will have a pop-up style technical port and 120 volt electrical outlet system mounted in the center of table.

CORIAN CONFERENCE TABLE

A confernce table will be provided in the Rear Conference Area of the body. The table will be fabricated with a Corian top matching the specified Corian desktops.

REAR INTERIOR WALL AREA

120 VOLT REAR WALL INTERIOR OUTLETS

There shall be two (2) 120 volt outlet(s) located on the rear wall of the walk-in area of the body.

- The receptacle shall be 20 amp, straight-blade (NEMA 5-20R).

MAGNETIC WHITEBOARDS

There shall be two (2) magnetic whiteboard surfaces mounted on the rear wall of the walk-in interior. Location and size to be determined at the preconstruction meeting.

LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC

General

Any low voltage electrical systems or warning devices installed on the fire apparatus shall be appropriate for the mounting location and intended electrical load.

Where wire passes through sheet metal, grommets shall be used to protect wire and wire looms. Electrical connections shall be with double crimp water-tight heat shrink connectors.

All 12 VDC wiring running from front to back of vehicle body shall be run in full length electrical wiring raceway down each side of body.

Wiring

All electrical circuit feeder wiring supplied and installed by the fire apparatus manufacturer shall meet the requirements of NFPA Chapter 13.

The circuit feeder wire shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 % of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10 %. The use of star washers for circuit ground connections shall not be permitted.

All circuits shall otherwise be wired in conformance with SAE J1292, *Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring.*

Wiring and Wire Harness Construction

All insulated wire and cable shall conform to SAE J1127, *Low Voltage Battery Cable,* or SAE J1128, *Low Voltage Primary Cable,* type SXL, GXL, or TXL.

All conductors shall be constructed in accordance with SAE J1127 or SAE J1128, except where good engineering practice dictates special strand construction. Conductor materials and stranding, other than copper, shall be permitted if all applicable requirements for physical, electrical, and environmental conditions are met as dictated by the end application. Physical and dimensional values of conductor insulation shall be in conformance with the requirements of SAE J1127 or SAE J1128, except where good engineering practice dictates special conductor insulation. The overall covering of conductors shall be moisture-resistant loom or braid that has a minimum continuous rating of 194°F (90°C) except where good engineering practice dictates special consideration for loom installations exposed to higher temperatures. The overall covering of jacketed cables shall be moisture resistant and have a minimum continuous temperature rating of 194°F (90°C), except where good engineering practice dictates special consideration for cable installations exposed to higher temperatures.

All wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection. The wiring connections and terminations shall be installed in accordance with the device manufacturer's instructions. All ungrounded electrical terminals shall have protective covers or be in enclosures. Wire nut, insulation displacement, and insulation piercing connections shall not be used.

Wiring shall be restrained to prevent damage caused by chafing or ice buildup and protected against heat, liquid contaminants, or other environmental factors.

Wiring shall be uniquely identified at least every 2 ft (0.6 m) by color coding or permanent marking with a circuit function code. The identification shall reference a wiring diagram.

Circuits shall be provided with properly rated low voltage overcurrent protective devices. Such devices shall be readily accessible and protected against heat in excess of the overcurrent device's design range, mechanical damage, and water spray. Circuit protection shall be accomplished by utilizing fuses, circuit breakers, fusible links, or solid state equivalent devices.

If a mechanical-type device is used, it shall conform to one of the following SAE standards:
(1) SAE J156, *Fusible Links*
(2) SAE J553, *Circuit Breakers*
(3) SAE J554, *Electric Fuses (Cartridge Type)*
(4) SAE J1888, *High Current Time Lag Electric Fuses*
(5) SAE J2077, *Miniature Blade Type Electrical Fuses*

Switches, relays, terminals, and connectors shall have a direct current (dc) rating of 125 % of maximum current for which the circuit is protected.

Power Supply

A 12 V or greater electrical alternator shall be provided. The alternator shall have a minimum output at idle to meet the minimum continuous electrical load of the vehicle, at 200°F (93°C) ambient temperature within the engine compartment, and shall be provided with full automatic regulation.

Minimum Continuous Electrical Load

The minimum continuous electrical load shall consist of the total amperage required to simultaneously operate the following in a stationary mode during emergency operations:

(1) The propulsion engine and transmission
(2) All legally required clearance and marker lights, headlights, and other electrical devices except windshield wipers and four-way hazard flashers
(3) The radio(s) at a duty cycle of 10 percent transmit and 90 % receive (for calculation and testing purposes, a default value of 5 A continuous)
(4) The lighting necessary to produce 2 fc (20 lx) of illumination on all walking surfaces on the apparatus and on the ground at all egress points onto and off the apparatus, 5 fc (50 lx) of illumination on all control and instrument panels, and 50 percent of the total compartment lighting loads
(5) The minimum optical warning system, where the apparatus is blocking the right-of way
(6) The continuous electrical current required to simultaneously operate any fire pumps, aerial devices, and hydraulic pumps
(7) Other warning devices and electrical loads defined by the purchaser as critical to the mission of the apparatus

If the apparatus is equipped to tow a trailer, an additional 45 A shall be added to the minimum continuous electrical load to provide electrical power for the federally required clearance and marker lighting and the optical warning devices mounted on the trailer.

The condition of the low voltage electrical system shall be monitored by a warning system that provides both an audible and a visual signal to persons on, in, or near the apparatus of an impending electrical system failure caused by the excessive discharge of the battery set.

The charge status of the battery shall be determined either by direct measurement of the battery charge or indirectly by monitoring the electrical system voltage.

If electrical system voltage is monitored, the alarm shall sound if the system voltage at the battery or at the master load disconnect switch drops below 11.8 V for 12 V nominal systems, 23.6 V for 24 V nominal systems, or 35.4 V for 42 V nominal systems for more than 120 seconds.

A voltmeter shall be mounted on the driver's instrument panel to allow direct observation of the system voltage.

Electromagnetic Interference

Electromagnetic interference suppression shall be provided, as required, to satisfy the radiation limits specified in SAE J551/1, *Performance Levels and Methods of Measurement of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz)*.

Wiring Diagram

A complete electrical wiring schematic of actual system shall be provided with finished apparatus. Similar or generic type electrical schematics shall NOT BE ACCEPTABLE.

Low Voltage Electrical System Performance Test

A low voltage electrical system test certification shall be provided with delivered apparatus.

12 VOLT MULTIPLEX CONTROL CENTER

The apparatus shall have a multiplexed 12 volt electrical system that will provide complete diagnostic capability. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The system shall be node based to maximize stability so that failure of one node does not affect the operation of the other nodes. The system shall use shielded twisted-pair wire for transmission of system function signals. The shielded wire shall provide protection against EMI and RFI noise interruptions.

The multiplex system shall be responsible for providing power management functions as well as load shedding. The warning light system shall be controlled by the multiplex system. The system shall be capable of displaying text and/or graphic messages on a display module. The system shall be based on solid-state technology and shall include self-contained diagnostic indicators.

BATTERY SYSTEM

The battery connectors shall be heavy duty type with cables terminating in heat shrink loom. Heavy duty battery cables shall provide maximum power to the electrical system. Where required, the cables shall be shielded from exhaust tubing and the muffler. Large rubber grommets shall be provided where cables enter the battery compartment.

Batteries shall be of the high-cycle type. With the engine off, the battery system shall be able to provide the minimum continuous electrical load for 10 minutes without discharging more than 50 percent of the reserve capacity and then to restart the engine. The battery system cold cranking amps (CCA) rating shall meet or exceed the minimum CCA recommendations of the engine manufacturer. The batteries shall be mounted to prevent movement during fire apparatus operation and shall be protected against accumulations of road spray, snow, and road debris. The batteries shall be readily accessible for examination, testing, and maintenance.

A means shall be provided for jump-starting the engine if the batteries are not accessible without lifting the cab of a tilt-cab apparatus.

Where an enclosed battery compartment is provided, it shall be ventilated to the exterior to prevent the buildup of heat and explosive fumes. The batteries shall be protected against vibration and temperatures that exceed the battery manufacturer’s recommendation.

A master load disconnect switch shall be provided between the starter solenoid(s) and the remainder of the electrical loads on the apparatus. The starter solenoids shall be connected directly to the batteries.

Electronic control systems and similar devices shall be permitted to be otherwise connected if so specified by their manufacturer.

The alternator shall be wired directly to the batteries through the ammeter shunt(s), if one is provided, and not through the master load disconnect switch.

A green “battery on” pilot light that is visible from the driver’s position shall be provided.

A sequential switching device shall be permitted to energize the optical warning devices and other high current devices required in minimum continuous electrical load, provided the switching device shall first energize the electrical devices required in minimum continuous electrical load within five (5) seconds.

BATTERY SWITCH

One (1) battery "On/Off" switch in cab located within easy reach of Driver with green "BATTERY ON" pilot light that is visible from the driver’s position shallbe provided. The switch and pilot light shall be supplied and installed by the cab/chassis manufacturer.

BATTERY SOLENOID

Battery switch shall consist of a minimum 200 ampere, constant duty solenoid to feed from positive side of battery.

BATTERY CONDITIONER

One (1) Xantrex model XC5012 battery conditioner, with 120 VAC input, and 50 amp 12 VDC output shall be provided. This system shall have a multiplex charging mode which employs the 3-stage charging algorithm: Bulk, Absorption, and Float. During the Bulk stage the battery is accepting high current. In the Absorption stage the battery voltage is held constant and the current declines. Finally, in the Float stage, the charger continues to provide voltage at a lower level to maintain the battery in a fully charged state. If there is no load on the battery, it will typically draw very little current. The charger, however, is able to provide current to its full rating to power DC loads on the battery. In float, if batteries are very new or a battery is on the low end of the size range and if it is fully charged to the point where it will not accept any more current, then the charger will enter an adaptive float/no float behavior where it shall alternate between float charging (flo) and resting the battery (rdy).

A remote bar graph type indicator panel shall be provided for showing status of battery charger.

The charger shall have a EMC FCC Class B Approval, **NO EXCEPTIONS**.

BATTERY CHARGE INDICATOR

A Kussmaul 091-94-12E charge indicator display shall be provided and located near drivers door area. This single battery system indicator is a suppressed zero bar graph voltage display which may be installed in any 12 volt system.

SHORE POWER INLET

The shore power inlet for battery conditioner shall be supplied and installed by the cab chassis manufacturer.

FIVE (5) ANTENNAS - RAIL MOUNTED BODY ROOF

There shall be two (2), radio antenna rail(s) provided and installed on the roof of the body. The rails shall be constructed of aluminum, forming a 2-piece box design. The top section shall be removable for easy access to the individual antenna wiring. Total of five (5) antenna bases shall be provided and installed in each rail. The bases shall include a minimum of 20' of LMR195 cable. The antenna wiring shall enter the body roof at a single point under the end of the rail. The end of each radio antenna shall be routed to a location determined by the HOUSTON FIRE DEPARTMENT.

Due to multiple configurations of antenna whips, the Body Manufacturer shall provide the antenna base, and HOUSTON FIRE DEPARTMENT shall provide the whip for each radio.

SEVEN (7) ANTENNAS - RAIL MOUNTED BODY ROOF

There shall be four (4), radio antenna rail(s) provided and installed on the roof of the body. The rails shall be constructed of aluminum, forming a 2-piece box design. The top section shall be removable for easy access to the individual antenna wiring. Total of seven (7), antenna bases shall be provided and installed in each rail. The bases shall include a minimum of 20' of LMR195 cable. The antenna wiring shall enter the cab roof at a single point under the end of the rail. The end of each radio antenna shall be routed to a location determined by the HOUSTON FIRE DEPARTMENT.

Due to multiple configurations of antenna whips, the Manufacturer shall provide the antenna base, and HOUSTON FIRE DEPARTMENT shall provide the whip for each.

ENGINE COMPARTMENT LIGHT

Engine compartment light(s) shall be supplied and installed by the cab chassis manufacturer.

CAB HAZARD WARNING LIGHT

A red "HAZARD" warning light shall be supplied and installed by the cab/chassis manufacturer. Light shall illuminate automatically to warn the Driver of the following when the apparatus parking brake is not fully engaged:

- Any passenger or compartment door is open
- Equipment rack is not in stowed position
- Light tower is extended

The light shall be labeled "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

BACK-UP ALARM

An electronic back-up alarm shall be supplied and installed by the cab/chassis manufacturer. The back-up alarm shall actuate automatically when the transmission gear selector is placed in reverse.

REAR VIEW CAMERA

The cab chassis provided rear view camera shall be installed on the rear of the body.

WALK-IN INTERIOR 12 VOLT LED (CLEAR) LIGHTING

There shall be six (6) LED interior dome light(s) with clear lens provided with a switch at the entry door for body 12 volt interior lighting. Location to be determined at the preconstruction meeting.

WALK-IN INTERIOR 12 VOLT LED (RED) LIGHTING

There shall be six (6) LED interior dome light(s) with red bulbs provided with a switch at the entry door for body 12 volt interior lighting. Location to be determined at the preconstruction meeting.

TAIL LIGHTS

Rear body tail lights shall be vertically mounted per Federal Motor Vehicle Safety Standards. The following lights shall be furnished:

- Two (2) Whelen 900 Series 90A00TAR amber LED turn signal lights
- Two (2) Whelen 900 Series 90R00XRR red LED stop/tail lights
- Two (2) Whelen 900 Series 90J000CR halogen back-up lights with clear lens

Each of the lights above shall be mounted in a 9EFLANGE, chrome finish bezel.

MIDSHIP MARKER/TURN SIGNAL

Two (2) Whelen LED midship body clearance marker/turn signal lights (T0A00MAR) shall be installed. There shall be one (1) light on each side of the body, in the wheel well, ahead of the rear axle. Both lights shall have an amber lens and operate with the chassis clearance marker and turn signals.

MARKER LIGHTS

The apparatus body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) regulations. All body clearance lights shall be LED to reduce the need for maintenance and lower the amp draw. Clearance lights shall be wired to the headlight circuit of the chassis.

REAR BUMPER MARKER LIGHTS

Two (2) Britax L427 dual face flexible mounted rear bumper markers shall be located, one (1) each side lower rear corner of body visible from driver mirrors.

FOLDING STEP GROUND LIGHT

There shall be one (1) OnScene Solutions 9" LED Nightstik light(s) installed on the apparatus capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting designed to provide illumination under the body's side entrance door and shall be switchable but activated automatically when the exit doors are opened.

LICENSE PLATE MOUNTING BRACKET

There shall be one (1) Cast Products aluminum license plate mounting with chrome shielded license plate light mounted on the rear of the body.

ELECTRONIC SIREN

The siren control head shall be supplied and installed by the cab/chassis manufacturer.

SIREN SPEAKER

The siren speaker(s) shall be supplied and installed by the cab/chassis manufacturer.

SIDE SCENE LIGHTS

There shall be six (6) Whelen 810 series (10" x 8") surface mounted Opti-Scene lights (810CA0ZR) provided on the upper body. Each light will have a 8-32 degree lens and chrome flange. They will be equally divided between the curbside and streetside.

Two (2) switches shall be provided, one (1) for the streetside scene lights, and one (1) for the curbside scene lights.

The lights shall be switched at the Vista display in the cab.

REAR SCENE LIGHTS

Two (2) Whelen 810 series (10" x 8") surface mounted Opti-Scene lights (810CA0ZR) shall be provided on the upper rear body to light the work area immediately behind the vehicle to a level of at least 3 fc (30 lx) within a 10 ft × 10 ft (3 m × 3 m) square. Each light will have a 8-32 degree lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

The rear scene lights shall also be activated when the apparatus is in reverse.

WARNING LIGHT PACKAGE

Each apparatus shall have a system of optical warning devices that meets or exceeds the requirements of this section.

The optical warning system shall consist of an upper and a lower warning level. The requirements for each level shall be met by the warning devices in that particular level without consideration of the warning devices in the other level.

For the purposes of defining and measuring the required optical performance, the upper and lower warning levels shall be divided into four warning zones. The four zones shall be determined by lines drawn through the geometric center of the apparatus at 45 degrees to a line drawn lengthwise through the geometric center of the apparatus. The four zones shall be designated A, B, C, and D in a clockwise direction, with zone A to the front of the apparatus.

Each optical warning device shall be installed on the apparatus and connected to the apparatus's electrical system in accordance with the requirements of this standard and the requirements of the manufacturer of the device.

A master optical warning system switch that energizes all the optical warning devices shall be provided.

The optical warning system on the fire apparatus shall be capable of two separate signaling modes during emergency operations. One mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One mode shall signal that the apparatus is stopped and is blocking the right-of-way. The use of some or all of the same warning lights shall be permitted for both modes provided the other requirements of this chapter are met.

A switching system shall be provided that senses the position of the parking brake or the park position of an automatic transmission. When the master optical warning system switch is closed and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for the right-of-way shall be energized. When the master optical warning system switch is closed and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized. The system shall be permitted to have a method of modifying the two signaling modes.

The optical warning devices shall be constructed or arranged so as to avoid the projection of light, either directly or through mirrors, into any driving or crew compartment(s). The front optical warning devices shall be placed so as to maintain the maximum possible separation from the headlights.

UPPER LEVEL OPTICAL WARNING DEVICES

The upper-level optical warning devices shall be mounted as high and as close to the corner points of the apparatus as is practical to define the clearance lines of the apparatus. The upper-level optical warning devices shall not be mounted above the maximum height, specified by the device manufacturer.

ZONE A - FRONT WARNING LIGHTS

There shall be one (1) Whelen Delta DIHFD70 LED 73" lightbar permanently mounted to the cab roof.

The lightbar configuration (streetside to curbside) shall be:

QUANTITY	PART NUMBER	DESCRIPTION
1	DI2S700	73" Delta Light Bar
2	DDUMFRR	Two (2) 400 Red Linear
1	DDUMFCC	Two (2) 400 White Linear
2	02-0364782-55	Delta Red LED Corner Module Assembly
1	DD7CCCCC	Delta Dome Set
8	01-0264077250	500 Red Linear LED
6	01-0264077230	500 White Linear LED
16	02-0364086-00	Lower Level Lighthead Retainer Assembly
2	09-1363542-00	500 Series Filler Panel
3	01-026A167-00	Four (4) Channel Flasher (ULF44)
1	MKE8H	Permanent Mount Kit
1	OPTIDELT	Opticom Pre-Wire
1	792H	Opticom Emitter

Note: The Opticom will be furnished with a "HIGH PRIORITY FREQUENCY" at 001 code.

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in NFPA 1901.

The lightbar shall be separately switched at the vista display in the cab.

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") red/clear linear Super-LED lights provided, one (1) each side.

The lights shall be switched at the Vista display in the cab.

Each light shall have a clear lens (90CC5FCR) and chrome flange.

UPPER FORWARD CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") red/clear linear Super-LED lights provided, one (1) each side.

The lights shall be switched at the Vista display in the cab.

Each light shall have a clear lens (90CC5FCR) and chrome flange.

UPPER CENTER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") red/clear linear Super-LED lights provided, one (1) each side.

The lights shall be switched at the Vista display in the cab.

Each light shall have a clear lens (90CC5FCR) and chrome flange.

ZONE C - REAR WARNING LIGHTS

There shall be four (4) Whelen 900 series (9" x 7") amber linear Super-LED lights provided, two (2) each side.

The lights shall be switched at the Vista display in the cab.

Each light shall have a clear lens (90AA5FCR) and chrome flange.

There shall be two (2) Whelen 900 series (9" x 7") red/clear linear Super-LED lights provided, one (1) each side.

The lights shall be switched at the Vista display in the cab.

Each light shall have a clear lens (90RR5FCR) and chrome flange.

LOWER LEVEL OPTICAL WARNING DEVICES

To define the clearance lines of the apparatus, the optical center of the lower-level optical warning devices in the front of the vehicle shall be mounted on or forward of the front axle centerline and as close to the front corner points of the apparatus as is practical.

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 1220 mm) above level ground for small apparatus.

A midship optical warning device shall be mounted right and the left sides of the apparatus if the distance between the front and rear lower-level optical devices exceeds 25 ft (7.6 m) at the optical center. Additional midship optical warning devices shall be required, where necessary, to maintain a horizontal distance between the centers of adjacent lower-level optical warning devices of 25 ft (7.6 m) or less. The optical center of any midship mounted optical warning device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground.

ZONE A - FRONT WARNING LIGHTS

There shall be two (2) Whelen 600 series (6" x 4") red linear Super-LED lights provided, one (1) each side.

The lights shall be switched at the Vista display in the cab.

Each light (60R02FRR) shall have a red lens and chrome finished flange.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT CORNERS)

The warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Whelen lights to complete an NFPA compliant lower level warning light system.

The lights shall be switched at the Vista display in the cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY WHEELWELL AREA)

There shall be two (2) Whelen 600 series (6" x 4") red linear Super-LED lights provided, one (1) each side.

The lights shall be switched at the Vista display in the cab.

Each light shall have a clear lens (60R02FCR) and chrome finished flange.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY REAR CORNERS)

There shall be two (2) Whelen 600 series (6" x 4") red linear Super-LED lights provided, one (1) each side.

The lights shall be switched at the Vista display in the cab.

Each light shall have a clear lens (60R02FCR) and chrome finished flange.

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen 900 series (9" x 7") red linear Super-LED lights provided, one (1) each side.

The lights shall be switched at the Vista display in the cab.

Each light shall have a clear lens (90RR5FCR) and chrome flange.

There shall be two (2) Whelen 900 series (9" x 7") amber linear Super-LED lights provided, one (1) each side.

The lights shall be switched at the Vista display in the cab.

Each light shall have a clear lens (90AA5FCR) and chrome flange.

LINE VOLTAGE ELECTRICAL SYSTEM

ONAN PTO GENERATOR

The apparatus shall be equipped with an Onan Protec PTO generator system with a capacity of 35,000 watts at 120/240 VAC, 291/145 amps., single phase. Current frequency shall be stable at 60 hertz.

The transmission's PTO port and PTO, or the split shaft PTO, and all associated drive shaft components shall be rated to support the continuous duty torque requirements of the generator's continuous duty rating as stated on the power source nameplate.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO, the driving compartment speedometer shall register when the generator drive system is engaged.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO and a chassis transmission retarder is furnished, it shall be automatically disengaged for generator operations.

The direct drive generator shall be mounted so that it does not change the ramp breakover angle, angle of departure, or angle of approach as defined by other components, and it shall not extend into the ground clearance area.

The direct drive generator shall be mounted away from exhaust and muffler areas or provided with a heat shield to reduce operating temperatures in the generator area.

GENERATOR ENGAGEMENT

A "Generator Engaged" indicator shall be provided in the driving compartment to indicate that the generator shift has been successfully completed.

An "OK to Operate Generator" indicator shall be provided in the driving compartment to indicate that the generator is engaged (if not always engaged), the transmission is in the proper gear (if required, automatic transmissions only), and the parking brake is engaged (if applicable).

An interlock system shall be provided to prevent advancement of the engine speed in the driving compartment or at any operator's panel unless the parking brake is engaged, and the transmission is in neutral or the output of the transmission is correctly connected to a pump or generator instead of the drive wheels.

WARRANTY PERIOD

Provided such goods are operated and maintained in accordance with Onan's written instructions, Onan warrants that the Protec YDCR series PTO generators shall be free from defects in material and workmanship for a period of five (5) years or one thousand (1,000) hours, whichever comes first, from the date of delivery to the first purchaser.

GENERATOR SPLASH GUARD

A powder coat painted splash cover shall be installed to reduce the amount of road spray on the frame mounted PTO generator. A V-ring seal shall also be installed in the cover to provide additional protection against contaminates reaching the generator front seals.

GENERATOR MOUNTING

The generator shall be mounted between the chassis frame rails. The generator mounting brackets shall be fabricated using heavy duty steel tubing, or structural channel. The generator mounting shall be bolted and removable so that the generator can be lowered from under apparatus for service, if necessary. The generator case shall not extend below the bottom edge of the apparatus body.

MANUALS AND SCHEMATICS

Two (2) complete manuals on parts list, maintenance, wiring schematics, hydraulic schematics, circuit boards, voltage regulator board and other components shall be provided on delivery.

POWER-TAKE-OFF GENERATOR DRIVE

There shall be a "Hot Shift" power-take-off (PTO) installed on the transmission PTO by the cab chassis manufacturer. The "Hot Shift" PTO is provided to allow the engagement of the PTO at higher engine RPM speeds. The PTO output shall be connected to the generator through hollow tube type driveline with heavy duty universals.

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO.

The power supply to the PTO engagement control shall be wired to the parking brake and a neutral position transmission switch to prevent engagement unless the vehicle is stopped and transmission has been placed in neutral.

ENGINE SPEED CONTROL

An engine speed auxiliary control device (high idle switch or throttle) shall be installed to maintain a stable cycle output from generator when the apparatus is parked.

An interlock shall prevent the operation of the engine speed auxiliary control device unless the parking brake is engaged and the transmission is in neutral or park, or the parking brake is engaged and the engine is disengaged from the drive wheels.

The engine shall be prevented from regulating its own engine speed during times when engine rpm control is critical for consistent apparatus functions such as generator, water pump, or aerial operation.

GENERATOR MONITORING PANEL

To properly monitor the generator performance and load demand during operation, the generator installation shall be equipped with a full instrument monitor panel.

This unit shall be manufactured by FRC model FROG-D and mounted next to the circuit breaker panel. This generator output display shall consolidate five (5) generator monitoring instruments into one device. The display case shall be waterproof and have dimensions not to exceed 4 1/4" high by 4 1/4" wide by 3 1/4" deep.

The following continuous displays shall be provided with super bright LED digits more than 1/2" high:

- Generator frequency in hertz
- Line 1 current in amperes
- Line 2 current in amperes
- Generator voltage in volts

The program shall support the accumulation of elapsed generator hours and the monitoring of engine oil temperature. Generator hours and oil temperature shall be displayed at the push of a button.

LOADCENTER

The loadcenter shall be a Cutler Hammer, BR Series, specifically designed for protection and distribution of 120/240 volt AC, such as lighting and small motor branch circuits. The loadcenter enclosure shall be made of 16 gauge galvanized sheet steel. The galvanized coating provides corrosion protection and as such does not require paint. All trims used on the BR Loadcenter shall be chromate sealed and finished with electro disposition epoxy paint (ASA61) which exceeds requirements for outdoor and indoor applications. A combination surface/flush cover with integral door shall be supplied.

The loadcenter shall be UL / CSA listed, **NO EXCEPTIONS** will be allowed.

SHORE POWER INLET - BATTERY CHARGER

The above mentioned shore power inlet, and battery conditioner shall be specified in the 12 volt section.

SHORE POWER INLET - INVERTER

One (1) Kussmaul 30 amp "Super Auto-Eject" shore power inlet shall be furnished and installed. The shore power connection shall automatically disengage from vehicle when chassis ignition is engaged. The shore power inlet shall provide an external power source for apparatus electrical circuits. A matching 30 ampere plug shall be shipped with the apparatus for HOUSTON FIRE DEPARTMENT supplied external power source wiring.

A transfer switch shall be required to isolate one power source from the other where a circuit(s) is intended to be supplied from more than one power source. To protect both the generator and external power source from back feed, two (2) 120 volt, 30 ampere, 4PST auxiliary contact with safety interlock relay shall be installed. Relay shall cut-off the connection between the generator supply circuit and device circuits when shore power is connected.

Transfer equipment, including transfer switches, shall operate such that all ungrounded conductors of one power source are disconnected before any ungrounded conductors of the second power source are connected. The neutral conductor shall be switched through the transfer switch. The apparatus shall have a label permanently affixed at the power inlet that indicates the line voltage, and amperage.

- The outlet cover shall be yellow.
- The shore power plug shall be located near the Driver door area.
- Shore power shall be wired to the specified 120 volt inverter.

SHORE POWER INLET - 100 AMP

A 100 ampere, 240 VAC, single phase shore power inlet shall be provided on the apparatus to provide an external power source for apparatus electrical circuits. A matching 100 ampere plug shall be shipped with the apparatus for HOUSTON FIRE DEPARTMENT supplied external power source wiring.

Shore power shall be wired to apparatus main circuit breaker in the circuit breaker distribution panel and feed all 120/240 electrical circuits on apparatus.

To protect both the generator and external power source from back feed, a manual switch shall be installed at the generator control panel, to cut off the connection between the apparatus circuits and the generator when the external power source plug is in use.

OUTLETS AND CIRCUITS

The generator shall supply the electrical equipment and outlets outlined below. Proper circuit protection shall be installed as noted:

- Four (4) 120 volt exterior outlets, two (2) each side near rear wheel well area.
  - Two (2) receptacles shall be 20 amp, straight-blade (NEMA 5-20R).
  - Two (2) receptacles shall be 20 amp, Fire Power type.
- Two (2) 120 volt exterior outlets, one (1) each side rear of body.
  - The receptacles shall be 20 amp, Fire Power type.

INTERIOR BODY 120 VOLT LIGHTING

There shall be eleven (11) 120 volt light(s) installed in the walk-in area of the body. The fixtures shall be single bulb, 22 watt fluorescent lights with fully enclosed protective lens covers, and flush aluminum trim. Each light shall be recessed down the center of the walkway.

The operation of the lights shall be at the entry doorway area. The interior lights shall be wired to the generator system with a 15 amp circuit breaker protection.

INVERTER

The apparatus shall be equipped with a Xantrex model Prosine 3.0 inverter that provides 3,000 watt inverter, 50 A surge capability, 120 VAC, 60 cycle output from 12 VDC.

The alternator and/or battery system shall be adequate to provide power for continuous operation for a minimum of 2 hours at full output.

Prosine 3.0

- Power factor corrected multistage charger
- True sine wave output (crystal controlled)
- Built-in 30 A transfer switch automatically transfers between inverter power and incoming AC power
- Equalization mode conditions batteries for longer life
- Power sharing prevents tripping of shorepower breaker
- Compact, lightweight, and easy to install
- Includes remote panel and battery temperature sensor
- Two year warranty

Protection Features

- Over voltage and under voltage protection
- Over temperature protection and automatic overload protection
- Short circuit AC backfeed protection

Prosine 3.0 (ACS) Remote Panel (Included)

- Independent inverter and charger on/off controls
- Push button control of power sharing, equalizing, battery set-up
- Easy to read backlit digital display
- Single at-a -glance display of AC and DC system information
- Text message fault diagnostics

INVERTER BATTERY SUPPLY

There shall be six (6) deep cycle batteries provided as the 12volt power source for the onboard inverter. The batteries shall incorporate Absorbent Glass Mat (AGM) technology for efficient gas recombination of up to 99% and freedom from electrolyte maintenance. The batteries shall be mounted in a stainless steel pan with hold down provisions for mobile application.

INVERTER BATTERY SUPPLY - VSR

There shall be one (1) Voltage Sensitive Relay (VSR) provided with the deep cycle batteries. The VSR allows two batteries to be charged at the same time. When the engine is started and the start battery reaches 13.7 volts, the VSR engages, allowing two battery banks (start and inverter supply) to be charged simultaneously. When the voltage drops below 12.8 volts (e.g. the engine is stopped), the VSR disengages, separating the batteries. This system eliminates the possibility of draining the wrong battery and protects sensitive electronic equipment powered from the house battery from harmful engine start up spikes.

GENERAL REQUIREMENTS

Stability

Any fixed line voltage power source producing alternating current (ac) shall produce electric power at 60 Hz, ±3 Hz when producing power at all levels between no load and full rated power. Any fixed line voltage power source shall produce electric power at the rated voltage ±10 percent when producing power at all levels between no load and full rated power.

The maximum voltage supplied to portable equipment shall not exceed 275 volts to ground. Higher voltage shall be permitted only when used to operate fixed wired, permanently mounted equipment on the apparatus.

Conformance with National Electrical Code

All components, equipment, and installation procedures shall conform to *NFPA 70*, *National Electrical Code*, except where superseded by the requirements of this chapter. Where the requirements of this chapter differ from those in *NFPA 70*, the requirements in this chapter shall apply.

Where available, line voltage electrical system equipment and materials included on the apparatus shall be listed and used only in the manner for which they have been listed. All equipment and materials shall be installed in accordance with the manufacturer's instructions.

Location Ratings

Any equipment used in a dry location shall be listed for dry locations. Any equipment used in a wet location shall be listed for wet locations.

Any equipment, except a PTO-driven generator, used in an underbody or under chassis location that is subject to road spray shall be either listed as Type 4 or mounted in an enclosure that is listed as Type 4.

If a PTO-driven generator is located in an underbody or under chassis location, the installation shall include a shield to prevent road spray from splashing directly on the generator.

Grounding

Grounding shall be in accordance with 250.34(A) and 250.34(B) of *NFPA 70*. Ungrounded systems shall not beused.

Only stranded or braided copper conductors shall be used for grounding and bonding.

The grounded current-carrying conductor (neutral) shall be insulated from the equipment-grounding conductors and from the equipment enclosures and other grounded parts.

The neutral conductor shall be colored white or gray in accordance with 200.6, “Means of Identifying Grounded Conductors,” of *NFPA 70*.

Any bonding screws, straps, or buses in the distribution panelboard or in other system components between the neutral and equipment-grounding conductor shall be removed and discarded.

Bonding

The neutral conductor of the power source shall be bonded to the vehicle frame. The neutral bonding connection shall occur only at the power source. In addition to the bonding required for the low voltage return current, each body and each driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor.

The conductor shall have a minimum amperage rating, as defined in 310.15, “Ampacities for Conductors Rated 0–2000 Volts,” of *NFPA 70*, of 115 percent of the rated amperage on the power source specification label.

A single conductor that is sized to meet the low voltage and line voltage requirements shall be permitted to be used.

Ground Fault Circuit Interrupters

In special service vehicles incorporating a lavatory, sink, toilet, shower, or tub, 120 V, 15 or 20 A receptacles within 6 ft (1.8 m) of these fixtures shall have ground fault circuit interrupter (GFCI) protection. GFCIs integrated into outlets or circuit breakers or as stand-alone devices shall be permitted to be used in situations.

Power Source General Requirements

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

The power source shall be shielded from contamination that would prevent the power source from operating within its design specifications.

Power Source Rating

For power sources of 8 kW or larger, the power source manufacturer shall declare the continuous duty rating that the power source can provide when installed on fire apparatus according to the manufacturer’s instructions and run at 120°F (49°C) air intake temperature at 2000 ft (600 m) above sea level.

The rating on the power source specification label shall not exceed the declared rating from the power source manufacturer.

Access shall be provided to permit both routine maintenance and removal of the power source for major servicing.The power source shall be located such that neither it nor its mounting brackets interfere with the routine maintenance of the fire apparatus.

Instrumentation

If the power source is rated at less than 3 kW, a “Power On” indicator shall be provided. If the power source is rated at 3 kW or more but less than 8 kW, a voltmeter shall be provided.

If the power source is rated at 8 kW or more, the following instrumentation shall be provided at an operator’s panel:

(1) Voltmeter
(2) Current meters for each ungrounded leg
(3) Frequency (Hz) meter
(4) Power source hour meter

The instrumentation shall be permanently mounted at an operator’s panel. The instruments shall be located in a plane facing the operator. Gauges, switches, or other instruments on this panel shall each have a label to indicate their function.

The instruments and other line voltage equipment and controls shall be protected from mechanical damage and not obstructed by tool mounting or equipment storage.

An instruction plate(s) that provides the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Operation

Provisions shall be made for placing the generator drive system in operation using controls and switches that are identified and within convenient reach of the operator.

Where the generator is driven by the chassis engine and engine compression brakes or engine exhaust brakes are furnished, they shall be automatically disengaged for generator operations.

Any control device used in the generator system power train between the engine and the generator shall be equipped with a means to prevent unintentional movement of the control device from its set position in the power generation mode.

If there is permanent wiring on the apparatus that is designed to be connected to the power source, a power source specification label that is permanently attached to the apparatus at the operator’s control station shall provide the operator with the information required.

The power source, at any load, shall not produce a noise level that exceeds 90 dBA in any driving compartment, crew compartment, or onboard command area with windows and doors closed or at any operator’s station on the apparatus.

Power Supply Assembly

The conductors used in the power supply assembly between the output terminals of the power source and the main overcurrent protection device shall not exceed 12 ft (4 m) in length.

All power supply assembly conductors, including neutral and grounding conductors, shall have an equivalent amperage rating and shall be sized to carry not less than 115 percent of the amperage of the nameplate current rating of the power source.

If the power supply assembly connects to the vibrating part of a generator (not a connection on the base), the conductors shall be flexible cord or other fine-stranded conductors enclosed in metallic or nonmetallic liquid tight flexible conduit rated for wet locations and temperatures not less than 194°F (90°C).

Overcurrent Protection

Manually resettable overcurrent devices shall be installed to protect the line voltage electrical system components.

Power Source Protection

A main overcurrent protection device shall be provided that is either incorporated in the power source or connected to the power source by a power supply assembly.

The size of the main overcurrent protection device shall not exceed 100 percent of the rated amperage stated on the power source specification label or the rating of the next larger available size overcurrent protection device, where so recommended by the power source manufacturer.

If the main overcurrent protection device is subject to road spray, the unit shall be housed in a Type 4–rated enclosure.

Branch Circuit Overcurrent Protection

Overcurrent protection devices shall be provided for each individual circuit and shall be sized at not less than 15 amps in accordance with 240.4, “Protection of Conductors,” of *NFPA 70*.

Any panelboard shall have a main breaker where the panel has six or more individual branch circuits or the power source is rated 8 kW or larger.

Each overcurrent protection device shall be marked with a label to identify the function of the circuit it protects.

Dedicated circuits shall be provided for any large appliance or device (air conditioning units, large motors, etc.) that requires 60 percent or more of the rated capacity of the circuit to which it is connected, and that circuit shall serve no other purpose.

Panelboards

All fixed power sources shall be hardwired to a permanently mounted panelboard unless one of the following conditions exists:

(1) All line voltage power connections are made through receptacles on the power source and the receptacles are protected by integrated overcurrent devices.
(2) Only one circuit is hardwired to the power source, which is protected by an integrated overcurrent device.

The panel shall be visible and located so that there is unimpeded access to the panelboard controls. Allpanelboards shall be designed for use in their intended location. The panel(s) shall be protected from mechanical damage, tool mounting, and equipment storage.

Where the power source is 120/240 V and 120 V loads are connected, the apparatus manufacturer or line voltage system installer shall consider load balancing to the extent that it is possible.

Wiring Methods

Fixed wiring systems shall be limited to the following:

(1) Metallic or nonmetallic liquid tight flexible conduit rated at temperatures not less than 194°F (90°C) withstranded copper wire rated for wet locations and temperatures not less than 194°F (90°C)
(2) Type SOW, SOOW, SEOW, or SEOOW flexible cord rated at 600 V and at temperatures not less than 194°F (90°C)

Electrical cord or conduit shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring and shall be arranged as follows:

(1) Separated by a minimum distance of 12 in. (300 mm) from exhaust piping or shielded from such piping
(2) Separated from fuel lines by a minimum distance of 6 in. (150 mm)

A means shall be provided to allow “flexing” between the driving and crew compartment, the body, and other areas or equipment whose movement would stress the wiring.

Electrical cord or conduit shall be supported within 6 in. (150 mm) of any junction box and at a minimum of every 24 in. (600 mm) of run.

Supports shall be made of nonmetallic materials or of corrosion-resistant or corrosion-protected metal. All supports shall be of a design that does not cut or abrade the conduit or cord and shall be mechanically fastened to the apparatus.

Only fittings and components listed for the type of cord or conduit being installed shall be used.

Splices shall be made only in a listed junction box.

Additional Requirements for Flexible Cord Installations

Where flexible cord is used in any location where it could be damaged, it shall be protected by installation in conduit, enclosures, or guards.

Where flexible cord penetrates a metal surface, rubber or plastic grommets or bushings shall be installed.

Wiring Identification

Each line voltage circuit originating from the main panelboard shall be identified.

The wire or circuit identification either shall reference a wiring diagram or wire list or shall indicate the final termination point of the circuit.

Where prewiring for future power sources or devices exists, the un-terminated ends shall be marked with a label showing their wire size and intended function.

Wiring System Components

Only stranded copper conductors with an insulation rated for temperatures of at least 194°F (90°C) and wet locations shall be used. Conductors in flexible cord shall be sized in accordance with Table 400.5(A) of *NFPA 70*. Conductors used in conduit shall be sized in accordance with 310.15, "Ampacities for Conductors Rated 0–2000 Volts," of *NFPA 70*. Aluminum or copper-clad aluminum conductors shall not be used.

All boxes shall conform to and be mounted in accordance with Article 314, "Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Manholes," of *NFPA 70*. All boxes shall be accessible using ordinary hand tools. Boxes shall not be permitted behind welded or pop-riveted panels.

The maximum number of conductors permitted in any box shall be in accordance with 314.16, "Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies," of *NFPA 70*.

All wiring connections and terminations shall provide a positive mechanical and electrical connection. Connectors shall be installed in accordance with the manufacturer's instructions. Wire nuts or insulation displacement and insulation piercing connectors shall not be used.

Each switch shall indicate the position of its contact points (i.e., open or closed) and shall be rated for the continuous operation of the load being controlled. All switches shall be marked with a label indicating the function of the switch. Circuit breakers used as switches shall be "switch rated" (SWD) or better. Switches shall simultaneously open all associated line voltage conductors. Switching of the neutral conductor alone shall not be permitted.

Line voltage circuits controlled by low voltage circuits shall be wired through properly rated relays in listed enclosures that control all non-grounded current-carrying conductors.

Receptacles and Inlet Devices

Wet and Dry Locations

All wet location receptacle outlets and inlet devices, including those on hardwired, remote power distribution boxes, shall be of the grounding type, provided with a wet location cover, and installed in accordance with Section 406.8, "Receptacles in Damp or Wet Locations," of *NFPA 70*.

All receptacles located in a wet location shall be not less than 24 in. (600 mm) from the ground. Receptacles on off road fire apparatus shall be a minimum of 30 in. (750 mm) from the ground. All receptacles located in a dry location shall be of the grounding type and shall be at least 12 in. (300 mm) above the interior floor height. No receptacle shall be installed in a face-up position.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical.

Receptacle Label

Each receptacle shall be marked with a label indicating the nominal line voltage (120 volts or 240 volts) and the current rating in amps of the circuit. If the receptacle is DC or other than single phase, that information shall also be marked on the label.

All receptacles and electrical inlet devices shall be listed to UL 498, *Standard for Safety Attachment Plugs and Receptacles*, or other recognized performance standards.

Receptacles used for DC voltages shall be rated for DC service.

Receptacle Label

Each receptacle shall be marked with a label indicating the nominal line voltage (120 volts or 240 volts) and the current rating in amps of the circuit. If the receptacle is DC or other than single phase, that information shall also be marked on the label.

All receptacles and electrical inlet devices shall be listed to UL 498, *Standard for Safety Attachment Plugs and Receptacles*, or other recognized performance standards.

Receptacles used for DC voltages shall be rated for DC service.

Wiring Schematics

An "As-Built" Wiring diagrams for line voltage systems shall be provided to include the following information;

(a) Pictorial representations of circuit logic for all electrical components and wiring
(b) Circuit identification
(c) Connector pin identification
(d) Zone location of electrical components
(e) Safety interlocks
(f) Alternator–battery power distribution circuits
(g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems

120/240 VAC SCENE LIGHTING

COMMAND APPARATUS TECHNICAL EQUIPMENT

The following specification is to provide the descriptions of the technical equipment that will be installed on the apparatus.

FIRE DEPARTMENT SUPPLIED RADIOS AND ANTENNAS

The HOUSTON FIRE DEPARTMENT will supply sixteen (16) radios sixteen (16) radio antennas to the Body Manufacturer. Eight (8) radios will be installed in a designated data rack. Seven (7) radios will be installed in the Forward Conference Area, with one (1) at each work station. There will be one (1) radio at the rear streetside, slide-out workstation, center work station. The HOUSTON FIRE DEPARTMENT will provide the make and model of the radios at the pre-construction meeting.

RADIO INTEROPERABILITY

One (1) complete Telex radio interoperability system shall be provided and installed in the apparatus by the Body Manufacturer. The system shall allow for patching and cross patching of the specified eight (8) radios and two (2) POTS lines. There will be a dispatch location at each work station for a total of seven (7) dispatch positions in the forward Conference Area.

Dispatch Locations:

- Streetside forward slide-out, forward work station
- Streetside forward slide-out, middle work station
- Streetside forward slide-out, second middle work station
- Street side forward slide-out, rear workstation

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- Curbside forward slide-out, forward workstation
- Curbside forward slide-out, middle workstation
- Curbside forward slide-out, rear workstation

The following radio interoperability equipment shall be provided and installed by the Body Manufacturer:

- Five (5) Telex IP223 adapters
- Two (2) Telex PIB223 adapters
- Seven (7) FS-1 foot switch petals
- Seven (7) HB3 Plus adapters
- Seven (7) CSoft 12-line USB software packages

COMPUTERS

Seven (7) Dell Optiplex 755 computers shall be provided by the Body Manufacturer at various locations on the truck with Intel® Core 2 Duo E7300 (2.66Ghz, 3M, 1066MHz FSB) processor orequal as follows:

- **Operating System(s):** Genuine Windows® XP Professional downgrade
- **File System:** NTFS file system for all operating systems NTFS
- **Ship Packaging Options:** Shipping material for systems, small form factor
- **Memory:** 2.0GB DDR2 Non-ECC SDRAM, 800MHz, (1 DIMM)
- **Video Card:** 256MB ATI Radeon 2400 XT, dual monitor VGA (TV-out), low profile
- **Monitors:** Two (2) Dell 17" UltraSharp™ 1708FP flat panel monitor, VGA/DVI
- **Keyboard:** Dell USB keyboard, no "Hot Keys"
- **Mouse:** Dell USB 2-button entry mouse with scroll, black
- **Boot Hard Drives:** 160GB SATA 3.0GB/s and 8MB DataBurst Cache™
- **Floppy Drive and Media Reader:** No floppy drive NFD
- **Removable Media Storage Devices:** 8x Slimline DVD+/-RW Roxio Creator™ CyberlinkPowerDVD™
- **Basic Systems Management Mode:** ASF basic hardware enabled systems management BCSM
- **Resource CD and DVD:** Dell OptiPlex systems RCD
- **Speakers:** Dell AX510 Sound Bar for all UltraSharp flat panel displays
- **Hardware Support Services:** Three (3) Year Basic Limited Warranty and a Three (3) Year Next Business Day On-Site Service NBD

40" LCD AND SMARTBOARD

Two (2) Samsung 400PXN 40" LCD flat screen monitors shall be provided and installed by the Body Manufacturer. One (1) will be installed and centered on the forward bulkhead wall. The second will be installed and centered on the curbside, rear slide-out wall.

A Smart Tech PX340 Smartboard overly shall be provided over each of the above flat screen monitors.

There will be two (2) Dell Optiplex 755 computers or equal provided and installed. One (1) for each Smartboard and shall be installed to close proximity to its corresponding monitor and overlay.

NETWORK & PHONE SYSTEM

The Body Manufacturer will provide a Cisco based computer network system with eleven (11) Cisco IP phones. One (1) phone per workstation in the forward Conference Area for a total of seven (7) phones. There will be one (1) phone in the Rear Conference Area on the conference desk. Two (2) phones will be provided in the rear curbside slide-out, at the forward and rear work stations. The phone system shall have three (3) cellular lines, five (5) VoIP lines, and four (4) POTSlines. When the VoIP lines are unavailable they shall be forwarded to the cellular lines.

There will be a total of thirteen (13) network jacks as follows:

- Four (4) in the forward streetside slide-out
- Three (3) in the forward curbside slide-out
- Three (3) in the rear streetside slide-out
- One (1) in the Rear Conference Area on the rear conference desk
- Two (2) in the exterior patch panel

DATA SATELLITE SYSTEM

The data satellite system shall provide broadband internet connections from the vehicle while on scene. The vehicle's computer network shall be wired to the satellite equipment so that internet access is shared by the network. The Bandwidth Plan 1mb download with 512kbps upload prepaid for twenty-four (24) months by the Body Manufacturer.

If the plan needs to be readjusted after delivery of apparatus, it shall be the responsibility of HOUSTON FIRE DEPARTMENT to contact Carolina Satellite Networks (704-644-3532) to do so.

The broadband internet connection shall be provided by the installation of a C-Com Satellite Systems 980 Series satellite.

Satellite Features**:**

The iNetVu transportable system is an automatic scanner polarizer and beam positioner system for a foldable 2-way satellite antenna. It is designed to automatically find and acquire the satellite beam and the satellite position based on the GPS position reading and other positioning parameters. It is aimed for the nomad users who want to have high speed Internet access in remote locations where cable and DSL do not exist. This allows mobile users with the capability to stop anywhere, under the satellite coverage, and to access Internet over satellite in both directions while maintaining satellite TV signal reception.

While maintaining the same functionality, the transportable dish offers additional capabilities such as:

- Satellite acquisition and lock within three (3) minutes or less
- Satellite independent - works with any configured satellite
- Satellite dish pointing is automatic and is fully software controlled
- Optimized signal reception and transmission
- Automatic signal cross polarization with confirmation from the NOC
- Fast reacquisition based on last good position
- System authentication with the service provider
- System monitoring based on GPS location
- Antenna folds automatically upon vehicle movement
- The iNetVu transportable system consists mainly of the following components:
- 2-way satellite dish
- 2-way modems
- iNetVu mount
- iNetVu controller box, 9000 series 1-Touch
- iNetVu mobile 2-way application

TV SATELLITE SYSTEM

One (1) KVH Trac Vision model R6DX "In-Motion" satellite receiver shall be provided on roof of apparatus body. This satellite receiver is designed exclusively for mobile users (RV's, boats, buses, etc.). The KVH Trac Vision R6 is 12" H x 28" diameter, and weighs 28 lbs. The R6 satellite receiver is equipped with an automatic controller so that the antenna automatically aims at the satellite.

The satellite shall be located so that it does not interfere with operation of other roof mounted equipment.

Satellite dish shall be provided with dual LNB capability and wired so that multiple receiver(s) can be used with system.

There will be four (4) DIRECTV model D12 receivers located in the 19" data rack.

The DIRECTV service plan shall be the responsibility of HOUSTON FIRE DEPARTMENT.

AUDIO/VIDEO ROUTING AND CONTROL SYSTEM

There shall be one (1) complete audio/video routing system provided and installed by the Body Manufacturer. The system shall allow for twenty-five (25) inputs and twenty-one (21) outputs. Each monitor connected to the video routing system will be capable of displaying four (4) video inputs simultaneously on one (1) monitor.

Four (4) iEi PPC-2706GHS 6" Touch Panel PC's shall be provided and located:

- Two (2) in the streetside slide-out
- One (1) in curbside slide-out
- One (1) in conference room

The touch panels shall communicate with the audio/video routing system to control the viewable inputs for each monitor, the Broadcast TV tuner, DirecTV receivers, the two (2) 40" LCD's, and the Pelco camera.

BROADCAST TV

One (1) Winegard RV3095 crank up TV antenna shall be installed on the body roof. The RV3095 is capable of receiving HDTV and Analog TV signals. Location to be determined at the pre-construction meeting.

Four (4) Contemporary Research ATSC digital TV tuners shall be installed in the audio/video data rack.

DVD RECORDERCOMMAND APPARATUS TECHNICAL EQUIPMENT

The following specification is to provide the descriptions of the technical equipment that will be installed on the apparatus.

EXTERIOR SURVEILLANCE CAMERAS

Five (5) Bosch 2mm wide angle cameras shall be supplied and mounted, to provide 360 degree surveillance around the apparatus. Cameras shall be IP accessible. Location of cameras will be discussed at the pre-construction meeting.

EXTERNAL PATCH PANEL COMPARTMENT

There shall be one (1) external patch panel provided on the rear of the body in a cast aluminum compartment. The patch panel shall include the following:

- Two (2) phone jacks.
- Two (2) network jacks.
- One (1) set of RCA video/audio inputs.

EXTERNAL 32" LCD COMPARTMENT

There shall be one (1) external compartment located on the rear streetside slideout. A 32" LCD monitor with mount shall be provided and installed. The 32" LCD monitor will be controlled for a specified iEi control station inside the body so that any video source can be sent to it for viewing.

COMMAND CAMERA SYSTEM

There shall be one (1) Pelco ES31C22-5N camera system(s) complete with pan & tilt drive system, enclosure with shield wiper, high quality camera and lens. The camera system shall be a high resolution unit with Lowlightä color technology and a 176X zoom lens (22X optical, 8X electronic).

The camera control system shall contain one (1) KBD300A keyboard with joystick, and one (1) KDBKIT keyboard kit.

TELESCOPING PNEUMATIC MAST

The apparatus shall be equipped with one (1) Will-Burt 7-42 heavy duty pneumatic powered telescoping mast(s). The mast shall utilize air from the chassis brake system. Air to operate the telescoping mast must be drawn from a drier system and be regulated to 20 psig and shall have a back pressure protection valve.

A red flashing warning light will be visible to the driver to warn when a light tower is out of roof nested position.

A pneumatic kit to raise and lower the mast shall include air control valve, 0-160 psig air gauge, regulator, 0-30 psig air gauge.

The mast shall be of a free standing design (non-guyed) and use high strength, heat treated aluminum alloy tubes and collars. Each mast section (tube) shall have two full length external keys and nominal .095" wall thickness collars with matching keyways to maintain directional azimuth.

Each mast section and collar shall be of the low friction synthetic bearings for smooth operation and longer life. Bumpers shall be supplied to reduce shock on extension and retraction. All exterior aluminum surfaces shall be anodized and sealed. Fasteners and fittings shall be plated steel or stainless steel for corrosion resistance.

One (1) maintenance and instruction manual will be provided for the towers on delivery. Wiring schematic, air piping schematic and installation diagrams shall be provided with the manual. Manufacturer's blueprint of tower, complete parts list and bill of materials for towers provided with manuals.

MODEL 7-42 SPECIFICATIONS

Nested height tower only:	7'-1"
Extended height tower only:	41'-2"
Normal payload capacity:	150 lbs.
Number of sections:	9
Mast Diameter:	9" - 3"
Mast Volume:	7.2 cu. ft.
Collar type:	Non-locking
Maximum operating pressure:	35 psi

The operational envelope of the mast shall be automatically illuminated by a lookup light whenever the mast assembly is being raised as required by NFPA .

NYCOIL WIRING (7-42)

A 70' Nycoil conduit measuring 1" ID x 16-1/2" OD coil shall be provided for the 7-42 telescopic mast.

MAST MOUNTING - EXTERNAL

The above telescoping mast shall be mounted using an external mounting kit. The mast shall be located on the rear of the body mounted to the rear bumper.

MAST COVER

There shall be a custom designed, 1/8" smooth aluminum cover (painted body color) provided to store control cables, air hoses, and to protect the mast from the elements. The cover shall be easily removed to allow access to mast for maintenance.

MAST SAFETY SYSTEM

Provide and install Will-Burt D_TEC mast safety system. System shall consist of the following features:

- High voltage sensor aides operator in detecting overhead power lines
- Anti-collision sensor automatically stops mast extension, assisting operator in detecting overhead obstructions
- Tilt sensor that will ensure vehicle is level and D-TEC is pointing directly upward prior to mast extension
- 35 watt quartz halogen look-up spot light. Look-up light illuminates area directly above the telescoping mast

EQUIPMENT

The following equipment shall be furnished with the completed Special Service vehicle;

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.

- There shall be two (2) NFPA approved aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20 % grade, with the transmission in neutral, and the parking brake released.

  - The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.

- Two (2) Streamlight LiteBox Vehicle Mounting Systems shall be provided. Each flashlight shall be orange in color. Each flashlight shall have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have a 20 watt spotlight style bulb and reflector. The flashlights shall be wired to batter direct unless otherwise specified by the customer.

  - The flashlight(s) shall be mounted on the completed unit, locations as per the HOUSTON FIRE DEPARTMENT.