

EQUIPMENT SPECIFICATIONS

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
TECHNICAL SPECIFICATIONS FOR

1-TON CARGO VAN, HIGH ROOF, w/ROAD PROFILER SYSTEM

SERIES NO. 182-200

EQUIPMENT SPECIFICATION 182-200D

REV. 12/9/2024

GENERAL

This specification sets forth the minimum requirements for a full-size high roof cargo van outfitted to perform advanced profiling of roadways in real-time at highway speeds and store the data real-time.

Equipment shall be new, a production model of current manufacture, and must meet all state and Federal safety and emission standards in effect at time of order.

REPRESENTATIVE SPECIFICATIONS

A Ford Transit-350 with Pathway Services Pathrunner XP Model 3D-PAS Data Collection System, with appropriate options and standard features, was used to develop these specifications and establish equivalency evaluation criteria.

Equipment of similar style, type, character, quality, features, and purpose conforming to the following detailed requirements/specifications will be considered. For evaluation purposes, bidders proposing an exception/equivalent option/feature to those specified herein, may be required to provide manufacturer/product information (catalogue sheets, detailed specifications, pictures, etc.). This information will be evaluated against the minimum requirements of this specification. Proposed submittals that are determined not to be equivalent to the established criteria will be rejected.

LOUISIANA AUTHORIZED DEALER(S)

Proposed item(s) must be from a manufacturer who has at least one (1) authorized dealer **within the State of Louisiana** where parts and service can be obtained. Authorized dealer(s) must have properly trained technicians plus all other resources necessary to perform warranty and repair services in complete accordance with the manufacturer's requirements. A letter certifying the ability to meet this requirement, inclusive of the company name(s) and address(es) of the Louisiana authorized dealer(s), should be supplied with the bid submittal and may be required prior to award.

DELIVERY & ACCEPTANCE

Vendor shall perform a test run of each unit to verify that all features and capabilities are operating properly at time of delivery. Documentation of testing may be required prior to acceptance by the Department.

Unit(s) must be delivered completely assembled (including all components, accessories, etc.) and ready for operation without any additional preparation including, but not limited to, ensuring all fluid levels are at their full mark, fuel tank(s) is full, all necessary lubrication has been performed, etc. A Louisiana safety inspection shall be performed on each vehicle prior to delivery and a Louisiana safety inspection sticker properly affixed.

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Any unit delivered under this specification is subject to rejection if there is evidence of poor workmanship, by either the vendor or the original manufacturer. Noted defects and/or nonconformance findings may be corrected by the vendor. Corrections must be completed and approved by the Equipment Engineer or his representative prior to final acceptance.

Unit(s) shall be delivered **"on the ground;"** DOTD will not unload nor provide any unloading equipment to the vendor/delivery driver in order to offload the unit(s).

NOTE: The Department will have space available for equipment to be unloaded.

EACH UNIT MUST BE SUPPLIED WITH THE FOLLOWING DOCUMENTATION AT TIME OF DELIVERY:

1. Notarized Bill of Sale
2. Original Certificate of Origin (MSO), (no photocopy)
3. Dealer's Service Policy
4. Owner's/Operator's Manual(s)
 - a. One (1) Hardcopy
 - b. One (1) Digital Copy
 - i. Acceptable Formats: PDF delivered via USB "Flash Drive", or E-mail
5. Service Manual(s)
 - a. One (1) Hardcopy
 - b. One (1) Digital Copy
 - i. Acceptable Formats: PDF delivered via USB "Flash Drive", or E-mail
6. Build Sheet(s) – as applicable
 - a. One (1) Hardcopy
 - b. Build sheets should be writing in plain language (not company specific codes) and include, at a minimum, all standard & optional features of the delivered unit.

NOTE: Invoices will not be processed for payment until the unit(s) have been inspected by the Equipment Engineer or their representative and deemed in compliance with the specifications.

BID SUBMITTALS

Any additions, deletions, or variations from the specifications should be noted in the "Bidder's Exceptions" page of this specification. Exceptions that are noted to be less than a minimum requirement will not be accepted.

Any additions, deletions or variations from the manufacturer's standard published specifications should be noted on the "Bidder's Exceptions" page of this specification. Unless otherwise noted, any items appearing in the manufacturer's standard published specifications furnished by the Bidder are assumed to be included in the Bidder's submittal.

Bidder should note on their submittal any installation(s) to the equipment that will be performed by the vendor instead of the manufacturer.

Failure to note any specification exceptions, manufacturer specification alterations, and/or vendor installations prior to award may result in rejection of the equipment at the time of delivery.

THE NUMBER OF DELIVERY DAYS AFTER RECEIPT OF ORDER (ARO) MAY BE USED AS A FACTOR IN THE AWARD.

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NOTICE TO BIDDERS

Bidder should review the detailed "Equipment Specification" completely and respond to the compliance question at the end of each section by marking "X", in the space provided, for "Yes" or "No". Mark "Yes" to indicate that the equipment bid meets the section exactly as specified. Mark "No" if there are exceptions to any part of that section. Exceptions/deviations to any part of the specification are to be detailed on the "Bidder's Exceptions" page of this specification.

IN ORDER TO BE CONSIDERED FOR AWARD, BIDDER SHOULD RETURN THIS SPECIFICATION, COMPLETED IN FULL, WITH THEIR BID SUBMITTAL.

Note: All values listed below are minimums unless noted otherwise.

1. Vehicle

1.1. Basic Configuration

- 1.1.1. Ford Transit 350
- 1.1.2. GVWR: 9,500 lbs.
- 1.1.3. V-6 Gas engine
- 1.1.4. Wheelbase: 148"
- 1.1.5. High roof
- 1.1.6. Transmission: automatic, rear-wheel drive
- 1.1.7. 4-Wheel ABS braking system
 - 1.1.7.1. Parking brake
- 1.1.8. 235/65-R16C all-season tires or equal

Comply: ____ Yes ____ No

1.2. Electrical System and Lights

- 1.2.1. 12-volt system
- 1.2.2. Dual heavy-duty AGM batteries
- 1.2.3. 4,000-watt power generator or 1,800+ watt pure sine DC inverter
- 1.2.4. Four (4) additional rocker style body circuit switches (upfitter switches) mounted in cab (dash or overhead). Switches are intended to be used for simple on/off functions for accessories (warning lights, etc.)
- 1.2.5. All exterior lighting, except headlights, should be LED
- 1.2.6. Cruise control
- 1.2.7. Power windows and door locks
- 1.2.8. AM/FM radio with auxiliary front input, Bluetooth
- 1.2.9. Two (2) 12V accessory power outlets with covers, mounted in dash
- 1.2.10. Four (4) 120 AC outlets @20A
- 1.2.11. Backup camera system with in-cab color monitor. Camera to be mounted in an area as protected and obscure as possible

Comply: ____ Yes ____ No

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1.3. Additional Features & Accessories

- 1.3.1. Extra insulation
- 1.3.2. Power exterior mirrors
- 1.3.3. Privacy glass
- 1.3.4. High-capacity air conditioning (front and rear)
- 1.3.5. Finished walls and ceiling
- 1.3.6. Ceiling lighting
- 1.3.7. All welded heavy gauge steel shock mounted equipment racks
- 1.3.8. Air-conditioned vents inside equipment rack
- 1.3.9. Storage cabinet
- 1.3.10. Monitor stand with tilt capability

Comply: ____ Yes ____ No

1.1. Paint: Manufacturer's standard, white

Comply: ____ Yes ____ No

Note: The van vendor and attached equipment manufacturer/vendor must mutually resolve any unexpected chassis/attached equipment component conflict with a sound and functional solution as a requirement of this specification.

2. Multi-Function Pavement and Road Condition Testing Vehicle System

NOTE: The laser-based longitudinal profiler shall meet AASHTO R56 certification.

2.1. ASTM E950 Class I-compliant Longitudinal Profiler for IRI road roughness

- 2.1.1. 2500 pulses per revolution Optical Pulse Encoder for distance measuring
- 2.1.2. 12-channel GPS Receiver for latitude, longitude and altitude, DGPS capable
- 2.1.3. Capable of loading PMS database in vehicle for data collection
- 2.1.4. Capable of starting and ending road sections based on GPS
- 2.1.5. Capable of voice feedback for operation, navigation and diagnostics
- 2.1.6. Capable of displaying real-time sensor output data graphs

Comply: ____ Yes ____ No

2.2. Computer System

- 2.2.1. Intel i7 core processor PC computer
- 2.2.2. 4GB RAM minimum
- 2.2.3. 200+ GB hard drive
- 2.2.4. USB 2.0 500+ GB removable hard drive
- 2.2.5. Windows 10 64-bit operating system
- 2.2.6. 19" SVGA flat color monitor

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- 2.2.7. Distance measurement interface and control
- 2.2.8. Uninterruptible power supply system
- 2.2.9. Enhanced keyboard with mouse pad
- 2.2.10. Push button for start and end of road sections
- 2.2.11. Digital speakers for voice feedback system

Comply: ____ Yes ____ No

2.3. Data Acquisition Software

- 2.3.1. 64-bit data acquisition software application
- 2.3.2. Windows 10 operating system
- 2.3.3. Graphical user interface
- 2.3.4. Real-time graphical display of:
 - 2.3.4.1. Accelerometer signal outputs
 - 2.3.4.2. Laser sensor signal outputs
 - 2.3.4.3. Longitudinal profiles
 - 2.3.4.4. Vehicle speed
 - 2.3.4.5. Vehicle heading
 - 2.3.4.6. Vehicle pitch
- 2.3.5. Database management system compatible with current PMS database
- 2.3.6. Real-time storage of sensor data on disk
- 2.3.7. Menu-driven calibration procedures
- 2.3.8. Automatic calibration of distance measurement system
- 2.3.9. Electronic calibration of center rutting sensor
- 2.3.10. Voice feedback system able to:
 - 2.3.10.1. Notify the operator when the vehicle approaches the end of a road section
 - 2.3.10.2. Voice to the operator the ending description of the road section being tested
 - 2.3.10.3. Inform the operator when activate/deactivate/start/end operations are performed
- 2.3.11. Ability to:
 - 2.3.11.1. Display the location of the vehicle on a GPS map in real-time
 - 2.3.11.2. Load shape files as navigation background on the GPS map
 - 2.3.11.3. Display the starting and ending points of the road sections on the GPS map
 - 2.3.11.4. Display the sections already tested with a specific color on a GPS map
 - 2.3.11.5. Display the sections not tested with a specific color on a GPS map

Comply: ____ Yes ____ No

2.4. Inertial Profiler System

- 2.4.1. South Dakota-type inertial profiler
- 2.4.2. Collects longitudinal profile on both wheel paths
- 2.4.3. Compliant with active ASTM E950 Class 1 standard
- 2.4.4. Calculates IRI roughness according to ASTM E1926 standard
- 2.4.5. Calculates Ride Number (RN) measurements
- 2.4.6. Uses raw laser height measurements to calculate texture

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- 2.4.7. Native 64-bit Windows 10 data acquisition software application
- 2.4.8. Longitudinal profile sampling frequency: 37mm
- 2.4.9. Storage media: real-time hard disk
- 2.4.10. Data backup: USB removable hard disk
- 2.4.11. Collects data up to 105 kilometers per hour/65 miles per hour
- 2.4.12. Uses 100mm wide Gocator laser sensors for road applications
 - 2.4.12.1. Laser measurement range: 200.0mm
 - 2.4.12.2. Laser stand-off: 300mm
 - 2.4.12.3. Laser sampling rate: 16KHz
 - 2.4.12.4. Laser signal conditioning, filtering and computer interface boards
- 2.4.13. Two linear accelerometers
 - 2.4.13.1. Accelerometer range: +-2g
 - 2.4.13.2. Accelerometer linearity: +0.05%
 - 2.4.13.3. Accelerometer bias: 1g
 - 2.4.13.4. Accelerometer noise: .002v
 - 2.4.13.5. Computer interface boards
- 2.4.14. Distance measurement instrument
 - 2.4.14.1. Pulse frequency: 2500ppr
 - 2.4.14.2. Distance interval: 0.75 inches
 - 2.4.14.3. Distance accuracy: +/-0.1%
- 2.4.15. Software to collect and store the raw sensor data
- 2.4.16. Software to calculate longitudinal profile, IRI and rutting

Comply: ____ Yes ____ No

- 2.5. On-Board GPS System
 - 2.5.1. 12 Satellite GPS Receiver, DGPS capable
 - 2.5.2. Frequency: L1
 - 2.5.3. Tracking channels: 12
 - 2.5.4. Static accuracy: submeter
 - 2.5.5. Dynamic accuracy: 2-5 meters
 - 2.5.6. GPS antenna mounted above vehicle
 - 2.5.7. Software to collect latitude, longitude, altitude, and synchronize with digital images and sensor data
 - 2.5.8. Reports heading, grade, and cross-slope
 - 2.5.9. Reports vertical and horizontal curvature
 - 2.5.10. Data-synchronized images and profile data output
 - 2.5.11. Resolution: 1/200th degree
 - 2.5.12. Accuracy: +-0.5 degrees
 - 2.5.13. Free drift: 0.1 degrees per minute
 - 2.5.14. Altitude: -1000 to 40000 feet
 - 2.5.15. Vibration: 5 g
 - 2.5.16. Custom industrial housing for adequate cooling and protection

Comply: ____ Yes ____ No

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2.6. High-Resolution Digital Roadway Images

- 2.6.1. Native resolution: 2750 X 2200 pixels minimum
- 2.6.2. Fixed Focal Length and Iris
- 2.6.3. Auto exposure and gain control (With real time iris range adjustment for varying light conditions)
- 2.6.4. Software to capture digital images in JPEG format in real-time
- 2.6.5. Software to write JPEG images in real time to removable hard drives
- 2.6.6. Camera installed looking at the perspective view of the road
- 2.6.7. Rear view camera for opposite direction travel imaging with customizable viewing angle
- 2.6.8. Camera to have corrective filter to minimize glare

Comply: ____ Yes ____ No

2.7. 3D Pavement Surface Imaging

- 2.7.1. Single 3D laser-based high-speed camera capable of image capture at highway speeds
- 2.7.2. Transverse profiles are captured continuously for the entire lane width
- 2.7.3. 3D system shall be capable of detecting minimum 2 mm cracking across the entire lane
- 2.7.4. 3D system captures a color intensity image and a 3D depth image of the entire lane width pavement surface simultaneously
- 2.7.5. Images capture rate: 200 per mile
- 2.7.6. Images do not have shadows
- 2.7.7. 3D system data:
 - 2.7.7.1. Is stored to disk in real-time
 - 2.7.7.2. Is compressed using lossless compression in real-time before being written to disk
 - 2.7.7.3. Compression rate is at a minimum rate of 20 to 1
- 2.7.8. 3D system requires no more than 1GB per mile
- 2.7.9. Distance between 3D camera and laser light is 30 inches apart for maximum resolution
- 2.7.10. 3D system is mounted at minimum 80 inches from the pavement surface
- 2.7.11. Lateral field of view: 4+ meters
- 2.7.12. Increased field of view of the pavement surface (4+ meters)
- 2.7.13. Depth range measurement (20")
- 2.7.14. Crack resolution: 1-2 mm
- 2.7.15. 3D system includes:
 - 2.7.15.1. an automated laser light shutoff triggered by a motion sensor
 - 2.7.15.2. blinking LEDs when laser lights are active
 - 2.7.15.3. transverse plane calibration object
- 2.7.16. 3D system software:
 - 2.7.16.1. Displays synchronized color intensity image and 3D depth image
 - 2.7.16.2. Allows depth measurement between any two points on the image
 - 2.7.16.3. Allows pavement images to be displayed with user definable distances from 10 to 150 feet per image

Comply: ____ Yes ____ No

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2.8. 3D Transverse Profile and Rutting

- 2.8.1. 3D system displays a transverse profile graph synchronized with the 3D depth image
- 2.8.2. 3D system displays precise rutting depths on both wheel paths
- 2.8.3. Rutting is calculated according to ASTM E 1703
- 2.8.4. Virtual 6-foot straight edge is displayed over the transverse profile graph
- 2.8.5. Location of deepest rut is highlighted on transverse profile graph
- 2.8.6. Rut width: +/- 2 mm
- 2.8.7. Rut depth: +/- 1 mm

Comply: ____ Yes ____ No

2.9. 3D Faulting

- 2.9.1. 3D system displays a graphical longitudinal profile graph synchronized with the 3D depth image
- 2.9.2. Faulting is calculated for every joint at the left and right wheel path locations
- 2.9.3. Faulting is calculated using a 6-inch window to minimize effect of grade on measurements
- 2.9.4. Faulting Depth Precision: 1 mm

Comply: ____ Yes ____ No

2.10. 3D Auto-Crack Detection System

- 2.10.1. System automatically detects lane markings and wheel path location assignment for every image
- 2.10.2. System automatically detects lane drop-offs on both sides of the lane
- 2.10.3. Crack map detection includes cracks, seals and patches
- 2.10.4. System captures and reports crack depth, crack width, crack roughness and crack faulting
- 2.10.5. Crack depth, crack width, crack roughness and crack faulting are used to estimate crack severity
- 2.10.6. System classifies three severity levels automatically: low, medium and high
- 2.10.7. System includes elimination of false positives common with pixel-based automated crack detection software
- 2.10.8. Shall automatically detect:
 - 2.10.8.1. Transverse Crack: low, medium, and high severity
 - 2.10.8.2. Longitudinal Crack: low, medium, and high severity
 - 2.10.8.3. Alligator Crack: low, medium, and high severity
 - 2.10.8.4. Block Crack: low, medium, and high severity
 - 2.10.8.5. Transverse Joints
 - 2.10.8.6. Longitudinal Joints
 - 2.10.8.7. Transverse Joint Spalling: low, medium, and high severity
 - 2.10.8.8. Longitudinal Joint Spalling: low, medium, and high severity
 - 2.10.8.9. Transverse Joint Seal Condition: low, medium, and high severity
 - 2.10.8.10. Longitudinal Joint Seal Condition: low, medium, and high severity
 - 2.10.8.11. Corner Cracks: low, medium, and high severity
- 2.10.9. Playback software that allows user to view the road surface in 3D with actual depth of potholes, patches, delamination, etc.
- 2.10.10. Playback software includes color-based cracking layers to be toggled on and off
- 2.10.11. Crack detection algorithms have customized classification methods based on user-defined protocols

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2.10.12. The server grade detection application supports network level deployment

Comply: ____ Yes ____ No

2.11. Macrotexture

- 2.11.1.** Compliant with ASTM E 1845 Standard
- 2.11.2.** 1320-point line laser
- 2.11.3.** 10cm line laser footprint
- 2.11.4.** 128 mm measurement range
- 2.11.5.** Inaccuracy: +/-0.1 % of measuring range
- 2.11.6.** Resolution: 0.025% of measuring range
- 2.11.7.** Precision: +/-0.01 % of measuring range
- 2.11.8.** Captures 100 mm samples
- 2.11.9.** Testing speed: 10-120 Km/h
- 2.11.10.** Calculates macrotexture depth
- 2.11.11.** Calculates mean segment depth
- 2.11.12.** Graphical interface
- 2.11.13.** Custom user report

Comply: ____ Yes ____ No

2.12. Ground Penetrating Radar

- 2.12.1.** 2GHz air-launched antenna
- 2.12.2.** High-resolution layer thickness data can be recorded at user defined intervals (as short as six inches)
- 2.12.3.** Measuring as deep as 15 feet below the road surface
- 2.12.4.** Average layer thicknesses and medium/material changes can be reported at user defined intervals
- 2.12.5.** Route location information (Latitude, Longitude, and/or Mile Post) and imaging directly tied to collected data

Comply: ____ Yes ____ No

2.13. 360 Degree Imaging System

- 2.13.1.** Minimum 4.7-megapixel image created from six (6) 1024 x 768 images (up to 2048 X 2448 per camera (6) for 30 MP image)
- 2.13.2.** Rendering includes virtual camera view from inside the sphere
- 2.13.3.** Images can be collected manually or automatically using GPS coordinates
- 2.13.4.** Direct import to vehicle from client created GIS

Comply: ____ Yes ____ No

2.14. Data Processing Workstation

- 2.14.1.** Displays all the sensor and distress results such as roughness, rutting and distress condition index for each road section

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- 2.14.2. Queries the system and prints hard copies of the road sections that meet user-definable thresholds. For example: The user can load only the road sections with roughness greater than 150 inches per mile
- 2.14.3. Exports specific data fields and database records to other applications using text formatted output files
- 2.14.4. Processes raw sensor data files for roughness, rutting, faulting, texture, geometry and GPS
- 2.14.5. Prints reports to a hard copy or file of sensor results using user-defined intervals such as 1/10 mile, 100 feet, etc.
- 2.14.6. Displays the sensor data using dynamic graphs. User can select the variables to graph such as roughness, rutting, faulting, texture, the distance segment to graph and the scales of the graph
- 2.14.7. Includes a database management software for opening a road section database, saving, exporting, importing records, cut/copy/paste records
- 2.14.8. Allows playback of digitized images forward and backwards by pointing and clicking over the desired record
- 2.14.9. Displays location information for each digitized image including user-definable fields such as section number, section name, distance, mile point, direction, lane number, etc.
- 2.14.10. Performs pavement surface distress evaluations

Comply: ____ Yes ____ No

2.15. Hardware Specifications

- 2.15.1. Processor: Intel quad core processor 3GHz min.
- 2.15.2. Memory: 4GB PC 800 MHz DDR2 dual channel RAM
- 2.15.3. Hard drive: 1TB per 1000 lane miles (up to 200 TB supported in RAID 6)
- 2.15.4. 2 X 30" high resolution (2560 x 1600) monitors
- 2.15.5. USB external storage a peripheral device
- 2.15.6. 1 gigabit ethernet
- 2.15.7. Operating system: Microsoft Windows 10

Comply: ____ Yes ____ No

2.16. Mounting Hardware and Miscellaneous

- 2.16.1. All sensor mounting components to be fabricated of durable, corrosion resistant materials or coated to prevent corrosion
- 2.16.2. All fasteners to be corrosion resistant materials and installed to be leak-proof if installed through any cab/body panel
- 2.16.3. All wiring and cables should be logically routed, secured, and protected with convoluted loom where possible. Rubber grommets shall be used where wires and cables penetrate any cab panels, body panels, or chassis structure. All cab and body penetrations shall be adequately sealed to prevent water from entering.

Comply: ____ Yes ____ No

BIDDER'S EXCEPTIONS

Instructions: Bidder should note all exceptions in space provided below. List the detail number from the aforementioned specification in the column to the left and the exception in the column to the right. Responses may be typed or hand-written. Handwritten responses must be legible. If additional space is needed, please print a duplicate copy of this sheet. "Bidder's Exceptions" page(s) should be returned with the bid submittal.

Examples:

1.6	Engine has 325 horsepower
1.18.3	Batteries have 2000 CCA combined.
2.2.8	Crossmembers are 4" channel on 12" centers.

**Spec./Detail
Reference**

Exception
