

Incorporating Remote Telematic OBD Submission into the HD I/M Program

A growing number of Heavy-Duty vehicle (HDV) fleets use telematics services to both meet the federal requirements for tracking and recording hours of service (Electronic Logging Device [ELD]), and for fleet logistics management to enhance profitability and lower the operational costs. The increasing use of telematics services among HDV fleets is something that CARB staff believes can be leveraged in California's upcoming Heavy-Duty Inspection and Maintenance (HD I/M) program to reduce unnecessary downtime associated with vehicle compliance demonstration. Traditionally, I/M programs are based upon periodic inspection of the vehicle, either via measuring tailpipe emissions or downloading a vehicle's onboard diagnostic (OBD) data at established testing stations to verify that the vehicle's emissions control systems are functioning properly. In addition to requiring substantial capital costs to build up a testing infrastructure, these traditional I/M testing processes can also unnecessarily burden vehicle owners themselves as they have to schedule a test appointment and take time off from their regular activities to drive to the inspection facilities for testing. For HDV fleets, such downtime means less time for the vehicle to be in operation and making money. Thus, minimizing vehicle downtime as a result of the HD I/M program is crucial to ensuring a successful program.

CARB staff envisions a HD I/M program where HDV fleets can demonstrate periodic OBD compliance through their existing telematics service providers. The entire submission process would take place automatically through the telematics vendor with no driver intervention or vehicle downtime. Given the relatively small size of the OBD data files, the incorporation of a periodic OBD data collection and submission process would not be expected to substantially increase the data traffic between the telematics device on the vehicle and the destination database. CARB would establish a certification process where participating HDV telematics vendors would need to verify that their data collection and submission process meets the technical specification requirements of the HD I/M program.

The main purpose of this document is to lay out some potential key functionalities that CARB staff have identified for a continuously-connected remote OBD (CC-ROBD) system in order to be used in the HD I/M program. Staff hopes to discuss these proposed functionalities with the workgroup participants today and work together to establish a high-level vision of what needs to be required of any telematics system participating in the HD I/M program.

Key functionalities for potential incorporation into a HD I/M telematics system:

1. Establishing connection with the vehicle and verifying vehicle's support of HD OBD
2. Checking for key events
3. Identifying when data submission to the HD I/M database should occur

4. Collecting the required OBD data
 5. Submitting data via a standardized data submission format
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1. Establishing connection with the vehicle and verifying vehicle's support of HD OBD
 - Establishing and maintaining communication on the correct protocol to access the standardized HD OBD data
 - Identifying emission-related ECUs and confirming their support of HD OBD
 2. Checking for key events
 - Within 5 minutes of every engine start, the CC-ROBD system could run a key event check.
 - The following could be considered as key events:
 - i. Any detected loss of CC-ROBD device power
 - ii. Any change in the following OBD parameters since the last check at engine start:
 - MIL status
 - Electronic identifiers (e.g., E-VIN, ECU ID, etc.) of the vehicle and the OBD system
 - Readiness profile of the OBD monitors
 - iii. Entering California (GPS-based)
 - An optional feature, likely used by fleets that operate intermittently/seasonally in CA and may not be active within the state every 90 days
 - The CC-ROBD system could identify if the vehicle has entered or exited CA since the last engine start through CA state geofence parameters.
 3. Identifying when data submission to the CARB HD I/M database should occur
 - Key event
 - Upon identifying a key event, the CC-ROBD system could transmit a full OBD data submission to the CARB HD I/M database.
 - Submission requirement upon not hearing from a vehicle within a set time interval
 - If no full OBD data submission has been received within a specified time interval, for example, in the last 90 days, a full submission could be required.

Note: For submissions triggered by the optional CA entry key event check:

- While the vehicle is in CA, both data submission triggers above could be in effect.
- Upon exiting CA, the system could simply submit a message to the CARB HD I/M database stating that the vehicle has left CA.
- Vehicles could not be required to submit OBD data to CARB HD I/M database until coming back to CA.

4. Collecting the required data for a full HD I/M OBD data submission

Such data could include OBD parameters required by the HD OBD regulation, section 1971.1 of title 13, California Code of Regulations to verify compliance with the HD I/M program, OBD parameters to assess potentially fraudulent activity, and OBD parameters relevant to gather information necessary to support CARB programming validation efforts.

- Vehicle and controller identifiers
- Diagnostic trouble codes (DTCs)
- Readiness information
- Monitors support status and performance
- Data stream
- REAL data
- Others

5. Submitting data via a standardized data submission format

The CC-ROBD system used in the HD I/M program could be required to collect a vehicle's OBD data according to the program requirements and securely submit it to the CARB HD I/M database in a standardized format. Submitting data in a standardized format would:

- Result in consistency across data files from different vehicle engine makes/models received from different CC-ROBD systems.
- Enable automated and time-efficient analysis of the submitted data internally within the HD I/M database system and ensure proper, data-informed verification of vehicle compliance with the HD I/M program.
- Facilitate enhanced data mining efforts to assess and analyze the effectiveness of CARB programs.