ADAS Calibrations Workflow
The Value of a Standardized Industry Process

Presented by: Emerging Technologies Committee

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ADAS Calibrations Workflow

The CALIBRATION workflow was developed by the CIECA Calibration Committee to provide an overview of the process that is supported by the messages developed and updated in the Business Message Suite (BMS) and Codes.

- **Problem**: The repair community currently has no standard process to approach and document vehicle calibrations to ensure safe repairs. Meanwhile, ADAS-equipped vehicles requiring calibrations have doubled in the last 5 years and will become standard on most vehicles by model year 2022.

- **Solution**: Create a workflow to identify steps and documentation methods for vehicle calibrations to assist the industry in performing complete, safe, and quality repairs to vehicles with complex ADAS systems.
Benefits Identified by the CIECA Calibration Committee

Enable a more accurate, consistent, efficient and transparent process for calibration

Enable processes and procedures that assure vehicle safety by setting the vehicle to the OEM’s prescribed calibration settings

Improve the level of documentation standards regarding calibration processes

Identify third-party resources for calibration services that employ OEM procedures

Enable calibration data to flow through multiple providers and document the process

The calibration data includes the final confirmation that the calibration was done accurately and to the OEM specifications

Increased repair facility’s confidence and accountability through verification of proper answerable data

Reduce the risk and potential liability of various entities— including repair facilities, insurers, and vehicle manufacturers—with respect to calibration procedures and confirmation
Industry Segments

The service being implemented with this guide includes the sending and/or receiving of Calibration information. Industry segments impacted by this Implementation Guide include:

- **Repair Facilities:** Any company whose business concern is to repair and calibrate damaged vehicles. Repair facilities include, but are not limited to: dealerships, mechanical providers, collision centers, calibration centers; to perform calibration according to procedures (sublet)

- **OEM Vehicle Manufacturers:** These are the originators of all necessary proprietary technical information, establishing calibration procedures and documentation. Certification, warranty and other programs may include required communication

- **Information Technology Providers:** Any entity that develops and/or maintains software applications or services related to the repair and calibration of ADAS and other vehicle calibration features

- **Tier One Providers:** These are companies with whom the OEM manufacturers contract to provide the calibration procedures. It is recognized the OEM Vehicle Manufacturer’s procedures have priority on calibration procedures over the Tier One Providers.

- **Calibration Companies:** Those who offer calibration services for repair facilities, including on-site and off-site companies (this includes the sublet calibration providers)

- **Insurance Companies:** Property and Casualty insurers in one or multiple lines of business who act on behalf of their policy holder and impacted parties for the settlement of the loss for the vehicle repair including necessary electronic and physical calibration features

- **Third Party Administrators (TPA):** The companies whose main business is to administer the repair process life cycle for insurance carriers and repair facilities and others, including appraisers

- **Other Entities:** Other parties that are not directly providing loss settlement, vehicle repair or calibration tasks
Agree/Disagree/Abstain question: A standard “best practices” process to address all ADAS related calibration procedures will benefit my operation.

1. Agree
2. Disagree
3. Abstain
**Workflow page 1**

- **STEP 2** –
  - Document Vehicle ADAS Option’s Content and Features using a Check List and/or
    - Visual verification
    - OEM Build Data Sheet (if Available)
  - Document Repair Procedures (If OEM Procedures are Available)
    - This includes identifying pre-existing and non-related damage
    - This is critical information that is not easily captured.

- **STEP 3** –
  - Document Parts and Repair Operation to include ADAS Systems
  - Identify the tasks that need to be completed and determine who is going to complete the work
  - Identify if and what Calibrations are Needed, (ADAS & Non-ADAS Calibrations)
  - Documenting All Dates and Times Associated in this Process (i.e. for info retrieved, for repair procedures downloaded, etc.) is Critical
  - Identify Required Inspections
Workflow page 2

- **STEP 4** –
  - Document DTCs and the Assessment

- **STEP 5** –
  - Document Initialization, Programming, and Module Setup Processes using OEM Procedures (e.g., for modules), if needed

- **STEP 6** –
  - Document DTCs (Document Scan Results) - Virtual Printout (*.pdf, *.jpg, etc.) of all the DTCs and all the modules tested
  - Research Results
  - Document Required Repair Procedures
  - Note: Calibration or re-learn may or may not be reported via DTCs (vehicle specific)

- **STEP 7** –
  - Document Scan Results (see above)

- **STEP 8** –
  - Retrieve Calibration Procedures from OEM
  - Identify Calibration Prerequisites
  - Identify Tools & Qualified Personnel
    - Refer back to STEP 3 for an inclusive list
  - For Sublet, please see bullet at the end of this document
Workflow page 3

STEP 9 –
Document Calibration Procedures from OEM and that Pre-requisites were Met

Ensure and document all calibration process pre-requisites have been met, e.g., full fuel tank, check tire pressure, alignment
If the vehicle was altered, e.g. larger/high performance tires or modified ride heights, it may not be possible to perform a proper calibration
However, some OEMs may have limited procedures for related alterations
If altered, document and advise the owner/driver that the alteration can cause the inability for some ADAS systems to operate correctly and proper calibrations to be performed successfully

STEP 10 –
Document Completed Proper Calibration Process via
Retrieved OEM Calibration Processes Steps Followed, Photos, Videos & Other Documentation (e.g., screen shots) to Provide Evidence It Was Performed Correctly
Again, Personnel, Dates and Times Associated with Each Step
Insurance Companies and OEMs may require pictures supporting calibrations

STEP 11 –
Repair facility should have an agreement with the personnel performing the test drive and receive adequate documentation to prove it completed correctly
Document Personnel and Date & Time of Test Drive and Results

STEP 12 –
Review ADAS Features with Owner, Document and Inform Owner ADAS Systems set to OEM Specifications

Note: All Documentation Has Personnel, Dates and Times Associated with It
ADAS Calibrations Workflow-Next Steps

• Enhance usability of workflow in both electronic and printable formats
• Combine supporting documentation with workflow into a single electronic product
• This feature will add the function of clicking on a step to view “Matching Workflow Documentation”
• Present updated product features as finished product during CIC-SEMA session in November 2020
• Create an animated video to describe workflow process and promote a standard ADAS calibration workflow with documentation
• Keep workflow consistent with CIECA-developed Business Message Suite (BMS) and Codes.
CIC Wiki-Glossary

Automotive Scan, Diagnostics, Calibration and Programming

Presented by: Emerging Technologies Committee

Chuck Olsen
Emerging Technologies Glossary Updates; Definitions

- CIC WIKI www.ciclink.com/wiki-glossary/
  www.ciclink.com/automotive-scan-diagnostics-calibration-and-programming/
Current Definitions, Automotive Scan, Diagnostics, Calibration and Programming

• **ADAS CALIBRATION:** A post-repair process that can have three different methods of interaction: (1) Static, (2) Dynamic and (3) Combination Static/Dynamic. Static calibrations are performed in a repair facility with OEM provided setup procedures, normally requiring a special target and often a scan tool to initiate the calibration sequencing. Dynamic calibrations are performed during a manufacturer-specified road test, requiring the vehicle sees a series of objects to learn in real-time. Combination Static/Dynamic calibrations require both fixed targeting and road tests to complete. It is crucial that the technician performing the calibration refers to OEM service information for targeting and calibration procedures.

• **CALIBRATION:** Calibration is a software “learn” or “re-learn” procedure for a vehicle system or component, typically performed with a scan tool using appropriate software. Examples could be ADAS radar, windshield/surround cameras, window regulators, brake pedal position, steering angle and HVAC actuators. Performing a calibration is not programming as those two terms are typically used in the automotive repair environment. A calibration needs to be performed whenever the OEM service information indicates it is necessary as part of a repair procedure, regardless of whether or not a component was replaced. In many cases, a battery disconnect can be enough to require calibrations to be performed. If a module or component was replaced, module programming may need to be done prior to the calibration procedure.
Recently Added Definitions

- **DIAGNOSTICS**: The process of determining problems associated with DTCs, scan data or symptoms identified to determine what repairs, calibrations or parts will be necessary for a complete and safe repair. Process may also include service information research, on-vehicle pin-point testing, and inspecting systems or components in damaged areas.

- **ROAD TEST BASIC/TEST DRIVE**: Performed by shop personnel to verify standard vehicle performance and condition, including – but not limited to, centered steering wheel, vibrations, pulling conditions, wind noise, rattles, engine performance, transmission shifting, etc.

- **DYNAMIC SYSTEMS VERIFICATION (DSV) ROAD TEST/TEST DRIVE**: Performed by trained and qualified shop personnel to identify and confirm performance of the vehicle systems (as described above) plus advanced vehicle features and systems including driver assistance and safety systems such as advanced cruise control and safety restraint systems.

- **DYNAMIC**: Driving the vehicle as defined by the OEM to meet specific criteria and conditions

- **SYSTEMS**: any part of the vehicle- safety systems, steering/suspension, body, accessories, optional equip and ADAS

- **VERIFICATION**: proving out proper driving & handling characteristics, wind noise, rattles, squeaks and the proper operation of any/all ADAS equipment on the vehicle regardless of whether the shop serviced that system or not.
CIC Wiki-Glossary new Definition/Edit Requests
www.ciclink.com/wiki-glossary/
Advanced Driver Assistance Systems (ADAS) have become increasingly prevalent on new vehicles, but the terminology used by automakers to describe them varies widely and so far has focused on marketing strategies.

The common naming outlined is simple, specific and based on system functionality. The list is meant to aid in reducing driver confusion and define the functions of ADAS in a consistent manner. This is critical to ensure that drivers are aware these systems are designed to assist, not replace an engaged driver.

The list is not meant to replace automaker proprietary system or package names, but rather help identify key functions within those packages and provide clarity to consumers. The list will be continually refined as we work with other stakeholders and as new systems are developed.
Industry Terms to describe ADAS Features and Functions Classified by SAE J3063

**COLLISION WARNING**

- **Blind Spot Warning**: Detects vehicles in the blind spot while driving and notifies the driver to their presence. Some systems provide an additional warning if the driver activates the turn signal.

- **Forward Collision Warning**: Detects a potential collision with a vehicle ahead and alerts the driver. Some systems also provide alerts for pedestrians or other objects.

- **Lane Departure Warning**: Monitors vehicle’s position within the driving lane and alerts driver as the vehicle approaches or crosses lane markers.

- **Parking Collision Warning**: Detects objects close to the vehicle during parking maneuvers and notifies the driver.

- **Rear Cross Traffic Warning**: Detects vehicles approaching from the side at the rear of the vehicle while in reverse gear and alerts the driver. Some systems also warn for pedestrians or other objects.

https://www.sae.org/binaries/content/assets/cm/content/miscellaneous/adas-nomenclature.pdf
Industry Terms to describe ADAS Features and Functions
Classified by SAE J3063

COLLISION INTERVENTION

**Automatic Emergency Braking:** Detects potential collisions with a vehicle ahead, provides forward collision warning, and automatically brakes to avoid a collision or lessen the severity of impact. Some systems also detect pedestrians or other objects.

**Automatic Emergency Steering:** Detects potential collisions with a vehicle ahead and automatically steers to avoid or lessen the severity of impact. Some systems also detect pedestrians or other objects.

**Reverse Automatic Emergency Braking:** Detects potential collisions while in reverse gear and automatically brakes to avoid or lessen the severity of impact. Some systems also detect pedestrians or other objects.

https://www.sae.org/binaries/content/assets/cm/content/miscellaneous/adas-nomenclature.pdf
PARKING ASSISTANCE

**Backup Camera:** Displays the area behind the vehicle when in reverse gear.

**Surround View Camera:** Displays the immediate surroundings of some or all sides of the vehicle while stopped or during low speed maneuvers.

**Active Parking Assistance:** Assists with steering and potentially other functions during parking maneuvers. Driver may be required to accelerate, brake, and/or select gear position. Some systems are capable of parallel and/or perpendicular parking. The driver must constantly supervise this support feature and maintain responsibility for parking.

**Remote Parking Assistance:** Without the driver being physically present inside the vehicle, provides steering, braking, accelerating and/or gear selection while moving a vehicle into or out of a parking space. The driver must constantly supervise this support feature and maintain responsibility for parking.

**Trailer Assistance:** Assists the driver with visual guidance while backing towards a trailer or during backing maneuvers with a trailer attached. Some systems may provide additional images while driving or backing with a trailer. Some systems may provide steering assistance during backing maneuvers.

[https://www.sae.org/binaries/content/assets/cm/content/miscellaneous/adas-nomenclature.pdf](https://www.sae.org/binaries/content/assets/cm/content/miscellaneous/adas-nomenclature.pdf)
Adaptive Cruise Control: Cruise control that also assists with acceleration and/or braking to maintain a driver selected gap to the vehicle in front. Some systems can come to a stop and continue while others cannot.

Lane Keeping Assistance: Provides steering support to assist the driver in preventing the vehicle from departing the lane. Some systems also assist to keep the vehicle centered within the lane.

Active Driving Assistance: Provides steering and brake/acceleration support to the driver at the same time. The driver must constantly supervise this support feature and maintain responsibility for driving.

https://www.sae.org/binaries/content/assets/cm/content/miscellaneous/adas-nomenclature.pdf
Industry Terms to describe ADAS Features and Functions
Classified by SAE J3063

OTHER DRIVER ASSISTANCE SYSTEMS

**Automatic High Beams:** Switches between high and low beam headlamps automatically based on lighting and traffic.

**Driver Monitoring:** Observes driver actions to estimate if they are not engaged in the task of driving. Some systems may monitor eye movement and/or head position.

**Head-Up Display:** Projects information relevant to driving into the driver’s forward line of sight.

**Night Vision:** Improves forward visibility at night by projecting enhanced images on instrument cluster or head-up display.

[https://www.sae.org/binaries/content/assets/cm/content/miscellaneous/adas-nomenclature.pdf](https://www.sae.org/binaries/content/assets/cm/content/miscellaneous/adas-nomenclature.pdf)
Panel Discussion Q&A

Moderator:
- Jeff Peevy – CIC Chairman

Panelists:
- Darrell Amberson - LaMettry’s Collision and Glass
- Chuck Olsen - AirPro Diagnostics
- Gene Lopez - Seidner’s Collision Centers
- Charley Quirt - CIECA