THE AUTO DEALER'S ORIGINAL FIXED OPERATIONS RESOURCE

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RAPID ADVANCES IN COLLISION REPAIR

PERSONALIZED SERVICE VIDEOS

DRIVING PARTS SALES

OEM WARRANTY SUBMISSIONS

CHALLENGES AHEAD

KEEPING PACE WITH RAPID ADVANCES IN COLLISION REPAIR

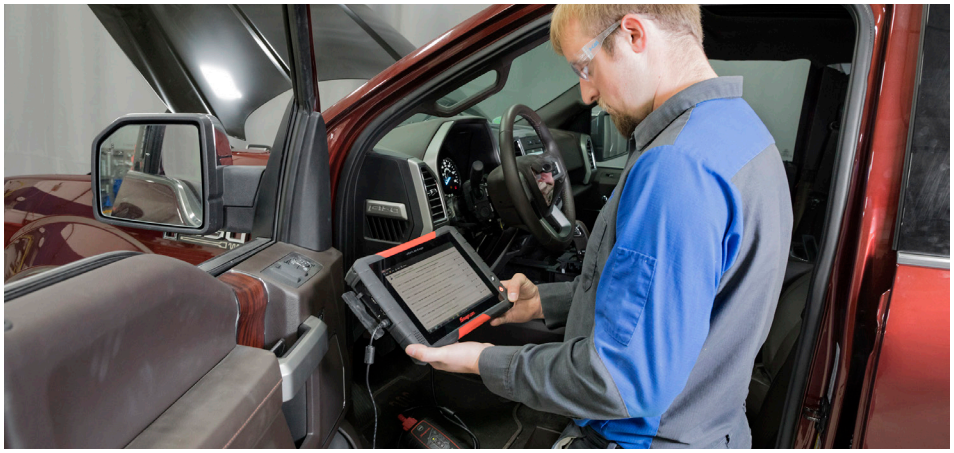
BY JASON BARTANEN

As the automotive industry moves deeper into the mobility arena, it also enters a more challenging realm for the collision repair industry.

The wide array of Advanced Driver Assistance Systems (ADAS) that provide active safety measures for vehicle occupants are powered by an electronic communication network that requires near-perfect accuracy when repaired after a collision.

Features such as lane-keep assist, collision mitigation, blind spot detection, adaptive cruise control and automatic braking contain a network of wiring and control modules that work with cameras, sensors, radar and LIDAR to detect and calculate speed and distance in fractions of a second and alert the driver about potential threats. Errors in repairing any component of these highly sensitive electronic components could result in catastrophe.

The growth in electric vehicle (EV) sales translates to yet another electronic system that collision repair professionals will be required to repair.



A system pre-scan is being done to aid in the repair plan process.

The European Commission has declared 2025 as the target year when all new vehicles sold in Europe will be electric and China has set a 40 percent EV goal for 2030. Although the U.S. has yet to set a target for EV sales, the global nature of the automotive industry will induce U.S. OEMs to increase EV production to meet the standards set in countries where they sell vehicles.

Battery packs for EVs bring different electronic systems into the collision repair shop, as well as the need to ensure proper thermal management.

As ADAS continues to gain in technological sophistication and EVs continue their rapid growth, collision repair shops will need to provide ongoing training to help keep their Technicians up-to-speed with the continuous, fast-paced changes to these complex vehicle systems.

ADAS control modules rely heavily on external cameras and sensors positioned around the vehicle to interpret data, calculate distance and relay information to driver warning systems.

Special 360° camera calibration mats for the new Ford F-150.

Both cameras and sensors use radar and LIDAR to detect the presence of a potential threat, the distance from it and the speed to impact. For the collision repair specialist, this means understanding how these systems work individually, as well as together, to provide active safety benefits.

The best resource for understanding how the components of ADAS integrate into a system is vehicle maker repair information.

Repair information often provides a systems overview, along with details on how to work with specific aspects of the ADAS components used in that particular system. Technicians will also have to rely on the information gathered by scan tools.

During the blueprinting process, a scan tool can be used to identify damage that the eye cannot detect, especially hidden damage in the vehicle's electronic communication network.

Similar to three-dimensional (3D) measuring being used to identify damage to the vehicle structure, a pre-repair scan can become the foundation for repairs required for ADAS and other electronic systems. It facilitates the discovery of damage throughout the vehicle and serves as the blueprint that guides the repair plan.

To complicate matters further, collision repair professionals must select the right scan tool for each evaluation from an array of scan tools with different capabilities designed to detect damage in various ways and at different levels.

THE GROWTH IN ELECTRIC VEHICLE (EV) SALES TRANSLATES TO YET ANOTHER ELECTRONIC SYSTEM THAT COLLISION REPAIR PROFESSIONALS WILL BE REQUIRED TO REPAIR.

For example, there are basic code readers, aftermarket scan tools and OEM-specific scan tools.

It's important to understand how each tool works. This is where shop standard operating procedures (SOPs) come into play.

It's highly beneficial for collision repair shops to utilize SOPs for proper diagnostics, including: retrieving, recording and assessing diagnostic trouble codes (DTCs); performing calibration procedures; and completing post-repair scanning and system verification processes.

SOPs help streamline the approach to each vehicle repair, create efficiencies throughout the repair process and facilitate a complete, safe and quality repair.

Calibration and aiming, or both, is an essential step in repairing ADAS. Because ADAS operates using highly sensitive cameras and sensors, proper calibration / aiming is imperative for these interdependent systems to work with high degrees of accuracy.

I-CAR, a not-for-profit organization, has developed specific courses to enable collision repair specialists to conduct a complete damage analysis for ADAS as well as the calibration requirements to fix them.

Forward-facing camera calibration set-up on a Honda CR-V.

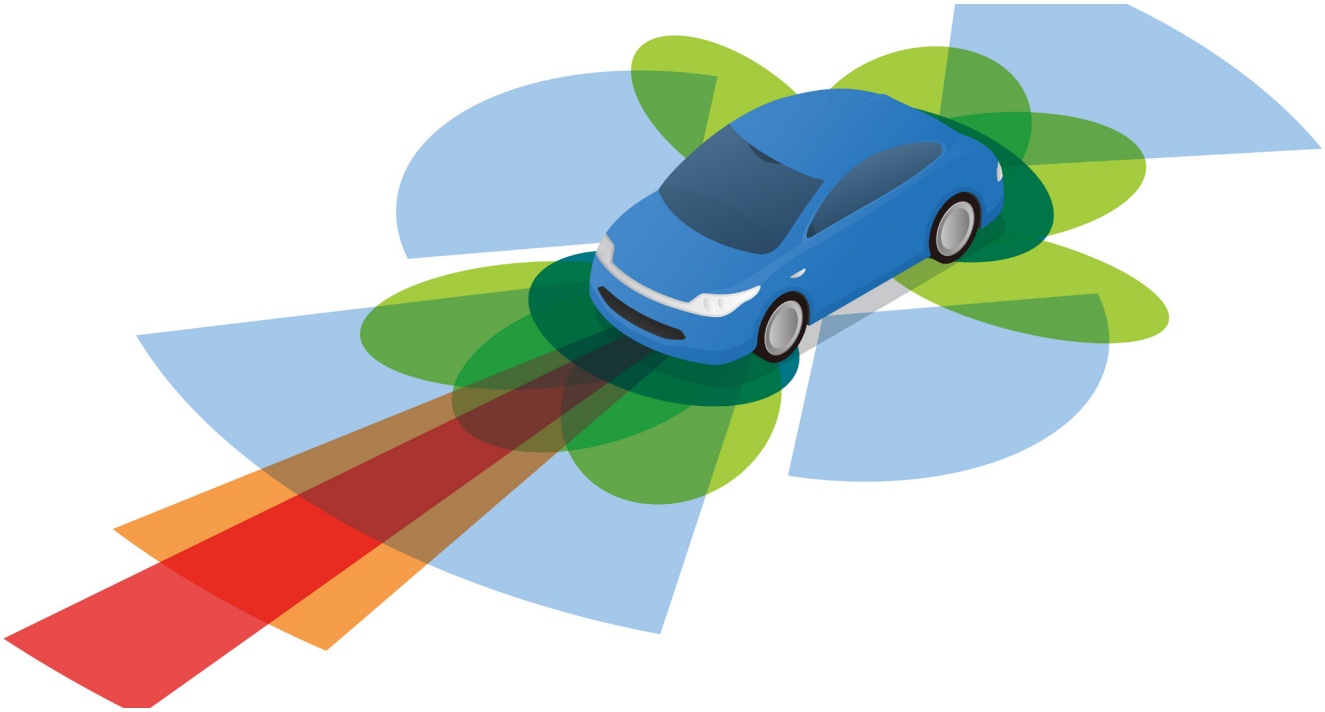
THE BEST RESOURCE FOR UNDERSTANDING HOW THE COMPONENTS OF ADAS INTEGRATE INTO A SYSTEM IS VEHICLE MAKER REPAIR INFORMATION.

As simple as it sounds, the first step is to identify the specific type of ADAS that needs repair. From there, our best practices for repairing complex ADAS systems include:

- Using a factory scan tool
  + Identify all modules and build data
    - Will have current model year
    - Can perform all program / scan / calibration / initializations

Special targets for the forward-facing camera calibration on a Honda CR-V.

- Using an aftermarket scan tool
  + Identifies most modules
    - May not have coverage of most current model year
    - May not be able to identify / communicate with all modules
    - OEMs may not test or approve aftermarket scan tools
  + Can perform many program / scan / calibration / initialization procedures
    - A robust scan tool can do most program /scan / calibration / initialization
- Using OEM repair information and VIN build data
  + Not all OEMS have build data in non-dealership information
  + Not all OEM build data terms mirror repair information terms
    - Some have a sales designation for an ADAS that does not match the name in the repair information
- Identify systems updates from pre-repair scan
  + Use Diagnostic Trouble Code (DTC) information
    - Flow charts
    - Part location diagrams
    - Physical damage to systems/parts/wires/mounting areas
    - Modules that are present, but unresponsive
- Identify calibration requirements
  + I-CAR's Repairability Technical Support (RTS) portal calibration requirement search
  + Need OEM repair information to perform procedures
    - OEM information for procedures
- Special tools / targets / scan tool requirements / drive cycle requirements
  + Some parts may require in-process calibration to verify the system will be calibrated when repairs are completed
    - If mounting location is damaged / disturbed
  + Prepare for post-repair calibration and post-repair scan



Advanced Driver Assistance Systems (ADAS) rely heavily on external cameras and sensors to interpret data, calculate distance and relay information to driver warning systems.

I-CAR has also published, with the help of inter-industry subject matter experts, information on considerations for ADAS diagnosis and repair.

EVs and hybrid electric vehicles (HEVs) bring additional challenges to the collision repair facility. When repairing EVs and HEVs, it's imperative to follow OEM information. Properly disabling these vehicles' high voltage batteries is critical for personal and vehicle safety. OEM procedures include disabling the high-voltage battery system before repairs begin, precautions for moving disabled vehicles throughout the repair facility and refinishing considerations.

As the automotive industry continues to drive toward mobility and autonomy, new technologies will be developed to support ADAS systems that are even more advanced than those found on today's new vehicles. I-CAR is committed to keeping pace with these innovative developments from the collision repair side by continually adapting our course offerings to give collision repair Technicians the knowledge and skills they need to perform complete, safe and quality repairs. Our organization will continue to build tools and articles, while closing gaps in available collision repair information, via the I-CAR Repairability Technical Support (RTS) initiative.

SOPS HELP STREAMLINE THE APPROACH TO EACH VEHICLE REPAIR, CREATE EFFICIENCIES THROUGHOUT THE REPAIR PROCESS AND FACILITATE A COMPLETE, SAFE AND QUALITY REPAIR.

Calibration set-up for the blind spot sensors on a Lexus RC 300.

I-CAR's RTS portal offers a wealth of valuable technical information. You can access the portal by visiting https://rts.i-car.com

Jason Bartanen is I-CAR's Director, Industry Technical Relations. His responsibilities include maintaining technical relationships with vehicle, tool, equipment, product and material manufacturers, as well as oversight of the I-CAR Repairabiity Technical Support • (RTS) portal. Bartanen has served in a variety of technical positions during his 22 years at I-CAR.

Photos courtesy of I-CAR.