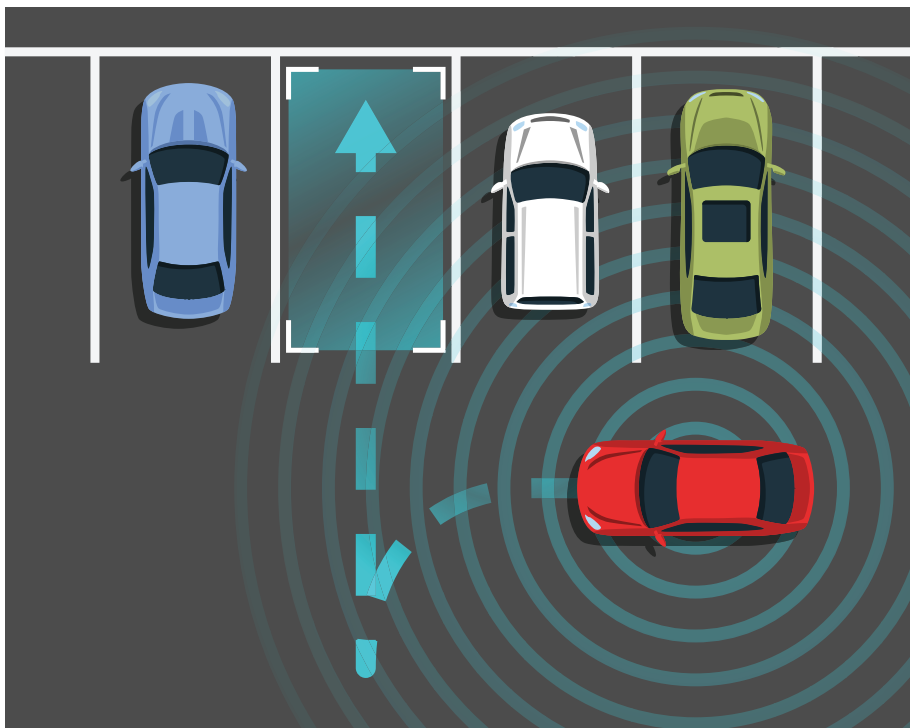


ADAS Q&A WITH JOHN WARANIAK

Grasping the Basics of Parking-Assistance Systems

By Mike Imlay



Passive parking-assistance systems currently comprise the most prevalent category of new ADAS technologies rapidly transforming the aftermarket. They promise a new level of safety performance and convenience for consumers.

While identifying multiple growth opportunities for the specialty-equipment industry, the recently released “SEMA Advanced Vehicle Technology Opportunities Report” (see p. 106) predicts specific growth potential in the area of parking-assistance systems. To better understand this advanced driver assistance systems (ADAS) technology, *SEMA News* turned to SEMA Vice President of Vehicle Technology John Waraniak.

SEMA News: *Let’s begin with a basic overview of the parking-assistance systems (PAS) category. What technologies are involved?*

John Waraniak: PAS technologies allow drivers to park under circumstances that may be difficult for less-experienced drivers or drivers in high-traffic and close-quar-

ters environments. The systems include both passive and active technologies that improve driver awareness of surroundings at low speeds. Passive PAS alerts the driver of the vehicle’s distance to objects while parking but doesn’t engage vehicle control systems. Active PAS technologies are currently available as automated and fully autonomous systems. Active PAS is not

intended as a safety benefit but as a driver convenience.

SN: *Since active PAS is more complex, can you break it down first for us?*

JW: Automated parking technologies engage the steering system of a vehicle to help the driver park, but they still require driver monitoring. The systems are integrated into steering controls to guide vehicles into parking spots. However, the systems still require drivers to apply brakes and acceleration throughout the process. Active parking steering assistance is an SAE Level 1 automation system.

Autonomous and self-parking technologies take complete control of the vehicle’s steering to move a car from a traffic lane into a parking spot. Active automated parking, specifically, is an SAE Level 2 driving automation system that allows a car to automatically enter or exit a parking space without the driver exercising direct physical control over either the powertrain, steering or brakes. The feature can be initiated with the driver inside or outside of the vehicle. If the driver is outside, he or she typically operates the system via a smartphone app or a remote key and is responsible for overseeing its operation.

SN: *And next we have passive PAS?*

JW: Yes, and those technologies include backup or 360-degree cameras along with electromagnetic or ultrasonic sensors to warn or assist a driver while parking. A rear cross-traffic alert is an added function in some of the systems. Systems with 360-degree vision use four or more wide-angle cameras combined with image processing software to generate a bird’s-eye

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JW: The supplier landscape for passive PAS is highly fragmented due to its prevalence, ease of installation and integration, as well as the declining costs of the component technologies. A variety of different aftermarket suppliers can compete in the market by offering varying price points and customized and personalized PAS products and applications.

Backup cameras and parking sensors showed the greatest penetration of the U.S. fleet in the Highway Loss Data Institute's projections for 2016. Nearly 25% of all vehicles had backup cameras, and that number is expected to grow to more than half of the fleet in 2021. Rear parking sensors had diffused to an estimated 17% of the fleet in 2016. They were projected to reach 39% penetration by 2021 and to reach 50% in 2025.

New PAS growth opportunities for SEMA members are also being created with aftermarket accessories that integrate with vehicle trailer hitches—think bikes and gear racks. Those accessories may interfere with factory-installed ADAS and PAS sensors and cameras. But new players and collaborations with leaders such as Yakima and its vehicle racks for bikes, gear and cargo will develop innovative products and solutions that integrate with factory-installed or aftermarket ADAS and PAS technologies as well as bring them to market more quickly and efficiently to drive aftermarket sales and new growth opportunities.

SN: *Which brings us to future trends. What do you foresee?*

JW: NHTSA estimates that 25% of all parking-lot accidents are caused by vehicles backing up into another vehicle and estimates that a 46% reduction in accidents while backing up can be expected if all vehicles are equipped with backup cameras. Although those first-generation systems and technologies are rather basic, the technology, hardware and software integration will continue to improve and evolve with smarter and more connected products to detect vehicles as well as pedestrians, bicyclists and motorcycles.

Autonomous valet parking systems will certainly be part of the driving experience in five to 10 years. The only known auton-

Q Aftermarket companies offer a variety of display solutions for PAS and backup cameras, including replacement-kit mirrors like the Metra Electronics iBeam with integrated 4.5-in. LCD screen. Two video inputs allow for rearview and secondary video feeds.

omous valet system I am aware of today is Tesla's "Summon" function of its embedded autopilot software package. Automated valet parking systems are an SAE Level 4 driving and parking technology capable of operating without direct human control or monitoring. That could be achieved by programming specific routes for a vehicle owner who would like the ability to exit the car and then have it autonomously drive and park itself in another location as well as retrieve itself.

SN: *Do you have any parting advice on PAS for SEMA members?*

JW: PAS and ADAS represent new business and product opportunities for SEMA members. However, vehicles equipped with the latest ADAS technologies pose challenges for aftermarket companies seeking to modify and accessorize them. As the complexity of automated driving functions, products and systems increases, so too does the cost and complexity of testing and validation.

PAS and ADAS sensors, cameras, radars and software are often integrated in the parts and systems that SEMA companies are customizing or replacing. Most PAS and ADAS technologies are not yet regulated and need to be addressed today with new procedures for recalibration and functional compliance testing, system evaluation and full-vehicle scanning software tools.

Although passive PAS are simpler than active systems, SEMA members modifying PAS-equipped vehicles need to pay

attention to the functional operation of the rearview cameras and sensors. One example is Jeeps' new ParkSense rear parking assist system.

Larger wheels and tires may cause warning lights and throw diagnostic trouble codes. In that case, the sensors and cameras may need to be recalibrated or relocated to ensure the functional operation and compliance of the PAS. On some vehicles the PAS sensors and software are smart enough to recalibrate themselves, but functional operation and system capability may be reduced.

The automakers have guidelines and best practices available to dealers and collision-repair shops to help ensure that ADAS technologies are recalibrated and function as intended after a vehicle has been repaired. If SEMA members are not using those tools and checking the OEM information database, they may be missing an important step in customer satisfaction and the customization process of late-model vehicles with PAS.

SEMA's vehicle technology department is working with the Society of Collision Repair Specialists and I-CAR to help connect members to those tools and procedures and integrate them with SEMA Garage measuring sessions and the Tech Transfer program. ADAS sensor location, calibration tools, resources, procedures and costs will be addressed in an upcoming article focused on sensor recalibration and included in the SEMA Vehicle Technology ADAS Resource Guide: www.semagarage.com/services/vehicledas.