

By Mike Imlay

ADAS AND CVT SYSTEMS

Data, Definitions and Market Opportunities



■ **Advanced driver assistance systems (ADAS) and connected vehicle technologies (CVTs) are poised to transform the aftermarket. Do you know what's coming? The latest SEMA research can help you grasp the market and its many categories—and harness the rapidly developing opportunities.**

parking assistance, driver vision augmentation, and connected vehicle systems. Each of these categories can be further broken down into sub-categories associated with specific ADAS functions or “product themes” whose development is progressing to market with varying speed and complexity.

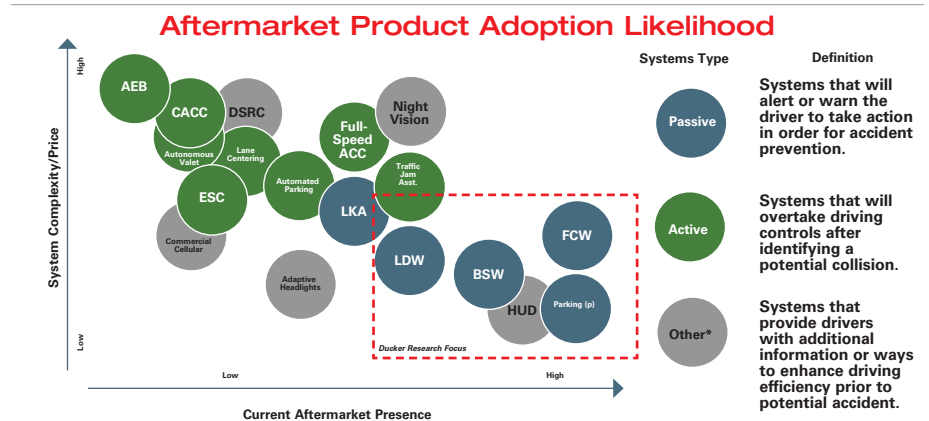
In this second installment of our eight-part *SEMA News* series highlighting key “SEMA Advanced Vehicle Technology Report” findings, we look more closely at these categories along with the strengths, weaknesses, opportunities and threats (SWOT analysis) they present to the aftermarket. An interview with SEMA Vice President of Technology John Waraniak further explaining the implications of these technologies can be found on p. 168. Readers are encouraged to download the full report at www.sema.org/avt-opportunities.

SEMA research indicates that the U.S. aftermarket for advanced driver assistance systems (ADAS) and connected vehicle technologies (CVT), although still in its infancy, can be expected to grow into a \$1.5 billion industry within the next five years. With so much at stake in these rapidly emerging technologies, SEMA has made identifying ADAS/CVT opportunities for association members a key priority.

The supplier landscape for these technologies is currently limited, spelling plenty of growth potential for new participants ready to enter the marketplace and stake out a strong presence in multiple product categories. In the meantime, channel and service providers must start now to acquire the proper education, equipment and skilled personnel if they are to successfully adapt to this changing market and truly thrive.

While slow in the early adoption of advanced driver assistance and connected vehicle products, American consumers are not only warming to them but also increasingly embracing them. SEMA-led research by Ducker Worldwide and the Center for Automotive Research has identified seven major ADAS categories to watch:

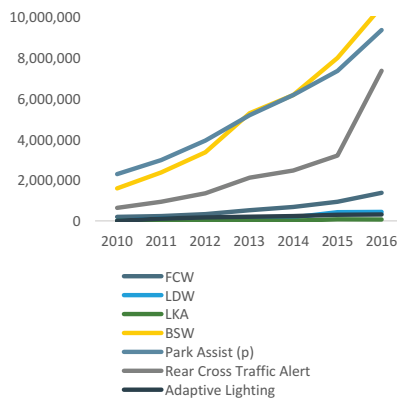
forward-collision avoidance, automated performance enhancement, advanced cruise control, lateral collision avoidance,



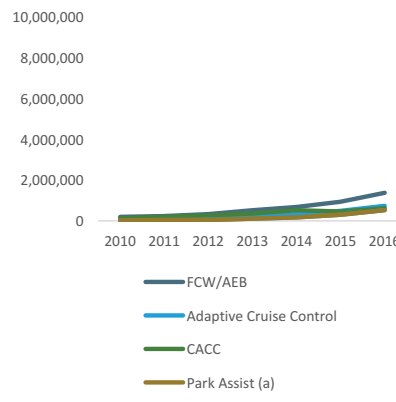
Source: Market Feedback, Ducker Analysis

■ This chart identifies the many emerging ADAS/CVT categories while calling out those with the most aftermarket potential. Note that almost all of the latter are “passive” systems.

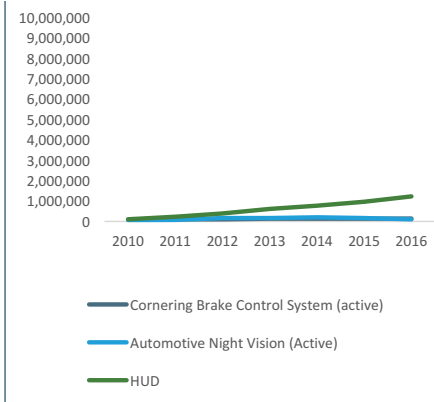
Passive ADAS Systems
(annual systems produced at the OEM level)



Active ADAS Systems
(annual systems produced at the OEM level)



Other CVT/ADAS Systems
(annual systems produced at the OEM level)



Source: Market Feedback, Ducker Analysis

■ OEMs are expected to significantly raise production of the embedded passive ADAS systems shown in this chart. That production is also expected to drive consumer awareness and aftermarket demand for those systems on lower trim levels and older vehicles that lack them.

Breaking Down the Tech

To help make the data we're about to look at more understandable, think of ADAS technologies as coming in two flavors, active and passive.

"Active systems are highly integrated with the vehicle and are an OEM specialty, because they know the vehicle architecture better than anybody else," Waraniak explained. "An active system such as lane-keeping assistance will actually steer you back into the lane if you drift. The growth potential for the aftermarket is in the passive arena, and the three greatest opportunities there are lane-departure, blind-spot and forward-collision warning systems. Warning is the key word: They don't actually control the vehicle; they just give you an alert or warning—a light, a sound or a rumble."

With that in mind, we can now turn below to the seven main ADAS categories and the breakdowns of the specific product technologies within them. Under each heading, the products progress from simplest to most complex as their levels of overall integration with a vehicle increase.

Forward Collision Avoidance

- Forward Collision Warning (FCW)
- Automated Emergency Braking (AEB)
- Automated Integrated Emergency Intervention

Automated Performance Enhancement Systems

- Anti-Lock Braking Systems (ABS)

- Traction Control (TC)
- Electronic Stability Control (ESC)
- Specialty Applications

Advanced Cruise Control Systems

- Adaptive Cruise Control (ACC)
- Low-Speed ACC; Traffic-Jam Assist
- Full-Speed ACC
- Cooperative Adaptive Cruise Control Platooning (CACC)

Lateral Collision Avoidance Systems

- Lane-Departure Warning (LDW)
- Blind-Spot Warning (BSW)
- Lane-Keeping Assistance "Nudge" (LKA)
- Lane Centering

Parking Assistance Systems

- Passive Parking Assistance
- Automated Parking Assistance
- Autonomous Valet

Driver Vision Augmentation

- Adaptive Headlights
- Dynamic Responsive Headlights
- Infrared Night-Vision Display
- Head-Up Display (HUD)

Connected Vehicle Systems

- Dedicated Short-Range Communication (DSRC)
- Commercial Cellular
- Other Communication Technologies

Looking at these categories and the products within them, it becomes clearer

how passive ADAS and CVT systems rank among their many more highly integrated counterparts. Given their overall lower complexity, it's also clear why they boast the highest aftermarket adoption rates to date (see chart: Aftermarket Product Adoption Likelihood). While OEMs continue to control the active ADAS space, the aftermarket has found significant room to grow in the areas of LDW, BSW, FCW, passive parking assistance, and HUD systems.

However, that does not mean that OEMs ignore the passive ADAS space altogether. In the past five years, they too have adopted passive technologies at higher rates than active systems (see chart: "OEM Adoption of Systems"). In fact, similar to what is happening in the aftermarket, production of FCW and LDW systems has surged among the OEMs, along with lane-keeping assistance. Even the production of typically OEM-embedded active systems such as ACC and AEB pales by comparison. Nevertheless, the opportunities for the specialty-equipment industry in passive ADAS products will be plentiful as OEMs continue to work toward standardizing both active and passive ADAS capabilities on all of their newer vehicles.

Key Market Drivers

Obviously, the main market drivers for OEMs versus the aftermarket will differ due to OEM's inherent advantage in integrating increasingly complex systems into their offerings. OEMs will set market

trends as they attempt to meet growing consumer demands for increased safety and autonomous driving features. And the price points for those systems will inevitably decrease as OEMs deliver more and more of those technologies as standard on newer models.

Even so, two key drivers for the aftermarket will be its ability to offer lower-cost alternatives to OEM systems as well as the ability to retrofit older vehicles and new-car lower trim levels that lack ADAS options. Over time, OEMs can be expected to standardize active ADAS systems across numerous platforms and deliver them on lower trim levels. That in turn should drive an increased interest in safety among consumers that the aftermarket can leverage. In addition, some technologies are so simple that the specialty-equipment industry can easily market them as low-cost, do-it-yourself installation options for consumers (see charts: “Key Drivers of OEM Adoption” versus “Key Drivers of Aftermarket Adoption”).

ADAS SWOT Analysis

As the specialty-equipment industry moves toward greater participation in the ADAS and CVT markets, it’s important to assess the strengths and weaknesses it has in meeting consumer hunger for safety performance. Again, we should remember that the ADAS aftermarket is driven in part by increased OEM penetration. That should be advantageous for improved consumer, channel, manufacturer and installer awareness, not to mention the development of fresh and competitive aftermarket ADAS solutions. Below is a summary of the major strengths, weaknesses, opportunities and threats for the industry over the next five years that SEMA research has identified:

Strengths

- As stated above, a higher level of aftermarket penetration is expected for less-complex systems.
- Increased consumer awareness of ADAS/CVT technologies will fuel demand for aftermarket products.
- Government regulation is anticipated to increasingly mandate standardization of numerous ADAS/CVT technologies, in turn driving further OEM

Key Drivers of OEM Adoption of ADAS Systems:

- Increased demand among end users for safety systems and autonomous driving.
- Lowering price points for technology as it becomes increasingly standard.
- Active systems migrating from higher-end vehicles to mass-produced vehicles and lower trim levels.
- Standardizations of specific systems on all vehicles in upcoming years (e.g., rear cam).

Key Drivers of Aftermarket Adoption of ADAS Systems:

- Lower cost of systems relative to OEM products which are often included in a higher trim level.
- Ability to utilize ADAS systems on older vehicles and lower trim levels that did not offer the option.
- Increased interest in safety systems among end users.
- Some systems have the ability for easy do-it-yourself installation (e.g., passive parking assistance).

Source: Market Feedback, Ducker Analysis

■ This is a side-by-side comparison of the key drivers for the OEM and specialty-equipment ADAS markets.

integration and consumer awareness.

Weaknesses

- False-positive warnings of some ADAS features can lead consumers to deem them needless.
- Consumer awareness is low for some systems and technologies.
- Automated systems require heavy integration into a vehicle’s existing control systems.

Opportunities

- Developing and marketing ADAS products that require the lowest amount of integration into a vehicle’s existing control systems.
- Developing and marketing ADAS systems that have pending regulations promoting installation at the OEM level.

Threats

- Negative long-term effects from regulations that standardize systems at the OEM level.
- Liability concerns surrounding ADAS products.

CVT SWOT Analysis

We’ve focused on ADAS so far, but CVT systems bring the ability to supple-

ment and extend the capabilities of current ADAS technologies. In that arena, such technologies as DSRC devices will help network vehicles with each other and roadway infrastructure. Among other things, they can enhance ADAS features such as adaptive cruise control, allowing vehicles to better cruise together on the highway and help drivers identify road hazards or take advantage of service and maintenance opportunities along their routes. However, a more developed infrastructure along with technology standardization and greater cybersecurity measures must be in place before mass production and aftermarket CVT applications become realistic options. The following is a SWOT analysis of the potential CVT aftermarket as identified by SEMA market research.

Strengths

- DSRC devices enable CVT to improve road safety.
- Vehicle-to-vehicle and vehicle-to-infrastructure technologies can be integrated into ADAS systems.

Weaknesses

- CVT systems still require a change in infrastructure, vehicle integration and evolution.
- Vehicles must be fitted with the

appropriate DSRC hardware to warn and react.

Opportunities

- Upfitting of older vehicles will most likely spill over into the aftermarket.
- Cooperative adaptive cruise control, or automated platooning, is a notable potential entry system for market participants.

Threats

- The CVT aftermarket is unlikely to materialize until the U.S. Department of Transportation finalizes equipment standards.
- Cybersecurity remains an issue.
- Proper infrastructure must be implemented for CVTs to work.

The Bottom Line

To sum up, the aftermarket for ADAS/CVT systems is being driven by a blend of consumer demand for safety performance, new OEM offerings in that market space, and the growing ability of installers to offer those innovative products for lower trim levels and older vehicles that may lack them. Connected technologies such as DSRC also present a major opportunity for the aftermarket but will be slower in materializing until issues of regulation, standardization and security can be worked out. Infrastructure will also have to advance before CVT becomes a truly viable market. Regardless, ADAS/CVT systems will inevitably impact every segment of the aftermarket, so now is the time to evaluate your business readiness for the ADAS/CVT revolution.

Stay Informed!

The tremendous potential ahead for the specialty-equipment industry is detailed in the “SEMA Advanced Vehicle Technology Opportunities Report.” To download your copy, go to www.sema.org/avt-opportunities.

For additional information about ADAS technologies and how they may impact your business, visit the SEMA Garage Vehicle Technology webpage at www.semagarage.com/services/vehicletechnology.

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