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Production in Sight for AEye's Solid-State Lidar

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by David E. Zoia │ Dave.Zoia@informa.com

Executive Summary

The start-up says it is bidding on production programs from Tier 1 suppliers aimed at next-generation advanced driver-assistance system applications and soon will begin pilot builds of its solid-state lidar for testing.

SAFETY-ENHANCING LEVEL 2-PLUS ADAS TECHNOLOGY WHERE AUTOMAKERS FOCUSING BULK OF THEIR ATTENTION.

Lidar-system developer AEye is moving closer to production, with first applications targeting the next big step for advanced driver-assistance systems.

The Pleasanton, CA, start-up, which boasts a unique approach to vision-system technology that combines camera data with that of its intelligent, flexible solid-state lidar, says it is quoting on several production applications for launch as early as 2023.

Key AEye partners include Germany-based Hella, South Korea's LG Electronics and Toyota affiliate Aisin Group. The three Tier 1s are considered odds-on favorites to get AEye's sensing technology to market first, but AEye officials say the company is not finished filling out its dance card yet, so new partners still could emerge. Other key backers include Subaru/SBI Investment, Intel, Airbus Ventures and venture-capital firms Kleiner Perkins, Tyche Partners and Taiwania.

Among products demonstrated at CES 2019 in Las Vegas in January is the diminutive AE200 lidar package, which AEye is about to deliver to Tier 1s for initial testing. About the size of a portable DVD drive, it is ideal for

positioning behind the windshield as part of the rearview-mirror assembly and designed to accommodate a range of task-specific Level 2-Level 3 ADAS applications.

Safety-enhancing Level 2-plus ADAS technology is where automakers and Tier 1s are focusing the bulk of their attention when it comes to developing automated-driving features for the retail market. There's still work throughout the industry on more advanced Level 4 systems for fully autonomous driving within geofenced areas, but those efforts are being directed mainly at the robo-taxi, shuttle and commercial-vehicle markets.

In addition, developers ultimately want to produce Level 5 AVs that can travel on any road anywhere, but most view that work as a technological moonshot unlikely to be achieved before the 2030s, if at all.

That has heightened interest in higher-tech ADAS features for the retail market, reflecting the industry's interest in improving safety and reducing traffic fatalities ahead of full autonomy, as well as to begin drawing revenue sooner rather than later from some of the investment made in AV technology.

Pointing to forecasts suggesting the industry will pour $250 billion into AV development, Stephen Lambright, vice president-marketing for AEye, says OEMs now are asking themselves how they're going to pay for that.

"What they're looking at is, how we can leverage and monetize some of the technology we've invested in near-term to help fund the long-term strategy of these Level 4 and Level 5 mobility applications," he says. "It's sort of this evolution vs. revolution approach that says, 'We can start building ADAS solutions (now).'"

Tier 1s have a long list of potential applications for AEye's lidar, Lambright says, from traffic-jam assist to automatic parking, lane assist and better pedestrian detection. "The (suppliers) looking for lidar right now (want it) for the 'edge cases,'" where cameras may not provide enough detection, he says.

Unlike the somewhat larger AE110 units aimed at full Level 4 autonomy, the AE200 is designed to satisfy specific advanced driver-assistance system applications. Modular in design, the AE200 is tunable "to adapt to whatever ADAS feature a Tier 1 wants to make for the OEM," says Shanvir Dhinsa, field application engineer for AEye.

Although the AE200 is small, it doesn't lack capability, Dhinsa says.

"Everybody thinks the bigger unit must mean more power," he says, but advances that make receivers more sensitive to light means laser power can be dialed down, allowing packaging to become more compact. "That's how we become smaller over time. Everything shrinks."

AEye boasts a couple of advantages with its solid-state sensing package. For one, its lidar is smart enough to focus where needed and provide only relevant information back to the vehicle's main controller. For example, when scanning the road ahead, the system can tune out irrelevant data, such as stationary objects, and focus on more important things such as a pedestrian at the side of the road who may step in front of the vehicle.

In a brief demo, an AEye-equipped car scans the horizon, locating trees and other objects ahead, but instantly switches its focus on Lambright when he steps into its path.

"We're able to uniquely choose where we look (and) send more resolution, revisit objects faster and put more density on things we care about," Dhinsa says, pointing to the system's unique scanning patterns and camera algorithms. "There's a lot of flexibility within our system."

The smaller AE200, at about $1,000 to the Tier 1, costs about a third of the full-featured AE110. In a full robo-taxi Level 4 application, the vehicle would use a combination of these sensors, but the cost of the package, consisting of one or two AE110s and three or four AE200s, would run about $10,000, "a fraction" of existing technology out there, Lambright says.

"In fact, our goal is to make it less than $10,000," he adds. "That's the idea. And hopefully, with volume, that (cost) will go down (further)."

AEye expects to reveal its initial manufacturing strategy before the end of 2019, but the goal is to find someone else to manufacture the components for production applications. It currently is nearing pilot output of the lidar systems for testing, but ultimately it will hand off production to a Tier 1 partner or a contract manufacturer.

"We'll do a pilot so that we know how to manufacture it," Lambright says, adding AEye will begin to get pre-production units to potential customers beginning later this year and in Q1 2020, depending on the product line. "We'll have our expertise and intellectual property around best practices for how to manufacture it, but when it comes to scaling, that's where we'll partner. We're not going to be manufacturing at scale. That's not our business."

Next up for AEye is Hydra, an integration hub that fuses data from the lidar, camera and other sensors such as radar to allow seamless 360-degree "vision" coverage around the vehicle. The developer will introduce the technology officially at the upcoming CES 2020 in Las Vegas in January and reveal more detail then, but it promises to allow AVs to make mission-critical decisions faster.