



Ambarella Unveils Full Software Stack for Autonomous and Semi-Autonomous Driving, Optimized for its CV3-AD Central AI Domain Controller Family

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- Neural network processing-based stack for perception, sensor fusion and path planning
- Chip family and stack co-developed for superior AI performance per watt
- Accelerates OEM development; offers scalability for L2+ and higher autonomy levels
- Realtime HD map generation from perception and SD maps eliminates need for stored HD maps

SANTA CLARA, Calif., Dec. 12, 2023 (GLOBE NEWSWIRE) -- [Ambarella, Inc.](https://www.ambarella.com) (NASDAQ: AMBA), an edge AI semiconductor company, today announced its autonomous driving (AD) software stack, which is primarily based on deep learning AI processing for all of its modular components, including environmental perception, sensor fusion and vehicle path planning. This leading-edge AD stack and Ambarella's CV3- AD AI domain controller system-on-chip (SoC) family were designed in conjunction, so the stack runs optimally on the SoC's CVflow[®] AI engines, minimizing power consumption and the processing load for its on-chip Arm cores. Likewise, these SoCs provide optimal processing for vision and radar sensing and fusion, based on the company's deep knowledge and experience with these sensing modalities. Additionally, Ambarella's stack provides a flexible implementation model, enabling automotive OEMs to leverage any or all of its modules in combination with their own software intellectual property.

View a short video about this AD software stack and see it operating in one of Ambarella's fully autonomous R&D vehicles: <https://youtu.be/xhZfGCwU-GY>



"This software stack draws on our more than 25 years of experience, building on the heritage of our VisLab Automotive R&D Team, whose AD stack has steadily evolved to take advantage of our latest AI SoCs," said Fermi Wang, President and CEO of Ambarella. "Today, we are realizing the vision of our VisLab acquisition in 2015, which, in combination with our algorithm-first philosophy for designing purpose-built SoCs, has culminated in this platform that will enable automakers to deliver on the promise of autonomous driving."

One hallmark of Ambarella's AI-based based software stack is its deep-learning based planner. This dynamic vehicle path planning module enables a

natural driving experience. That functionality resulted from the company's experience and investments over many years in its evolving R&D vehicle fleet, which enabled the "deep planner" module to be trained with data from a wide variety of real-world scenarios.

The latest members of this R&D vehicle fleet include a sensing suite that consists of mono and stereo cameras, as well as Ambarella's Oculii™ 4D imaging radar; and all of the processing is being done by the CV3-AD. While Ambarella's many years of AD and sensor-processing experience led to this optimal configuration, its solutions are flexible to support OEMs' specific sensing suites (including the option for adding LiDAR).

Another key feature of Ambarella's software stack is that it only requires readily available, standard-definition (SD) maps; eliminating the need for pre-generated high-definition (HD) maps. Instead, the stack (running on the CV3-AD), generates HD maps in real time using live environmental data from the vehicle's sensing suite. In contrast, the pre-generated HD maps used by other AD systems are brittle and expensive to maintain, requiring centimeter-level localization capability. They are also unreliable under dynamic conditions such as road construction or accidents. Additionally, Ambarella's real-time HD map generation is ideal for handling difficult AD scenarios, such as downtown areas in large cities with roundabouts, narrow roads with parked vehicles, heavy traffic, construction, and a high density of pedestrians, cyclists and other vulnerable road users.

Ambarella's modular AD software and hardware solutions provide OEMs with a scalable platform that enables them to select the CV3-AD family member with the right mix of performance and features for each model in their fleets, opening the door for autonomous features in mass-market vehicles. This includes a broad range of autonomous and semi-autonomous vehicle implementations, from fully featured L2+ systems through to higher levels of autonomy.

The CV3-AD SoCs run Ambarella's entire AD stack with industry-leading power consumption, providing superior AI performance per watt and simplifying thermal management. In the growing electric vehicle (EV) market, that processing efficiency is particularly important in order to increase battery range. Additionally, because this software and hardware were designed to work optimally together—with the stack using just a small fraction of the CV3-AD's Arm processing power—automakers have plenty of headroom for integrating additional software to create differentiated features, including those for functional safety.

In addition to its optimized AD software and hardware solutions, Ambarella provides automotive OEMs with a complete tool chain—both in-house and from ecosystem partners. This includes tailored tools for data collection (in conjunction with the CV3-AD's on-chip encoder), simulation and annotation. Development is streamlined via accelerated software-in-the-loop (SIL) simulations using CV3-AD PCIe server cards, while Ambarella also provides a fully automated 3D annotation pipeline to support AI training.

The new Ambarella AD software stack will be demonstrated via fully autonomous test drives at Ambarella's invitation-only exhibition during [CES](#) in Las Vegas. For more information or to schedule a ride, please contact your Ambarella representative or visit www.ambarella.com.

About Ambarella

Ambarella's products are used in a wide variety of human vision and edge AI applications, including video security, advanced driver assistance systems (ADAS), electronic mirror, drive recorder, driver/cabin monitoring, autonomous driving and robotics applications. Ambarella's low-power systems-on-chip (SoCs) offer high-resolution video compression, advanced image and radar processing, and powerful deep neural network processing to enable intelligent perception, fusion and planning. For more information, please visit www.ambarella.com.

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Ambarella's Full Software Stack for Autonomous and Semi-Autonomous Driving



Optimized for Ambarella's CV3-AD central AI domain controller family, this neural network processing-based, AD stack eliminates the need for HD map inputs, and accelerates OEM vehicle development for L2+ and higher autonomy.