CEVA Unveils MotionEngine™ Scout, a Highly-Accurate Dead Reckoning Software Solution for Indoor Autonomous Robots

Robust and precise dead reckoning software offers cost-reduced alternative to expensive camera or LIDAR based systems for indoor robot navigation by fusing sensor data from optical sensors, IMU sensors and wheel encoders

Taiwan, 30 March 2021 – CEVA, Inc. (NASDAQ: CEVA), the leading licensor of wireless connectivity and smart sensing technologies, today unveiled the Hillcrest Labs MotionEngine™ Scout, a highly accurate dead reckoning software solution for intelligent navigation systems in indoor robots including robot cleaners and Autonomous Mobile Robots (AMR) used in industrial or commercial settings. MotionEngine Scout enables indoor autonomous robots – an industry that ABI Research expects to grow at a Compound Annual Growth Rate (CAGR) of 20% over the next 5 years - to achieve precise positioning without the need for expensive cameras or LiDAR for navigation. Instead, this sensor and processor agnostic embedded software solution fuses measurements taken from the robot's optical flow sensor, wheel encoders and Inertial Measurement Unit (IMU) and uses this data to deliver better dead reckoning accuracy and robustness against individual sensor errors. As a testament to this, MotionEngine Scout reduces the trajectory error by a factor of 5x in challenging scenarios, including surface flooring such as vinyl, tile, and various styles of carpet.

Chad Lucien, Vice President and General Manager of the Sensor Fusion Business Unit at CEVA, commented: "We developed MotionEngine Scout to lower the cost and Technology barriers faced by OEMs developing indoor autonomous robots. Our vast experience in robot navigation, sensor fusion, calibration, and sensor analytics have enabled us to deliver a high-precision dead reckoning software solution that can enhance or provide an alternative to camera or LiDAR based systems. MotionEngine Scout paves the way for a new class of indoor robots that can intelligently navigate their environment while enabling OEM's to achieve the challenging price points necessary to meet end user demand."

For robot OEMs, MotionEngine Scout simplifies and accelerates the integration timeline by providing a single software package that interfaces with the IMU, optical flow sensor and wheel encoders and provides an integrated sensor output with the

unified robot pose (includes location and orientation in 3D space). It supports a broad range of commercial IMU sensors from the leading suppliers including STMicroelectronics, Bosch-Sensortec, and TDK InvenSense to provide OEM's with supply chain flexibility, thereby reducing supply shortage risks and providing options for cost and performance tradeoffs. For the essential optical flow sensor, CEVA has partnered with PixArt to incorporate its PAA5101 dual-light optical tracking sensor into the solution, further reducing development complexity and time-to-market.

Charles Chong, Director of Strategic Marketing at PixArt Imaging USA commented: "CEVA's unique sensor fusion knowhow for indoor robot navigation perfectly complements our optical tracking sensor expertise and we are pleased to partner with CEVA to address this lucrative and growing market. Our PAA5101 sensor and the MotionEngine Scout software combines to deliver a robust, high-performance solution, without the need for customized sensors or lenses, lowering the overall BOM and simplifying the design effort."

MotionEngine Scout extends CEVA's sensor product line for autonomous indoor robots which includes the following IMU-based solutions: MotionEngine Robotics software, FSP200 sensor hub, BNO086 system-in-package, and FSM300 module. CEVA also offers complementary IP products required for autonomous robots, including its RivieraWaves Bluetooth and Wi-Fi platforms for connectivity and its SensPro2 sensor hub DSP which is capable of handling multiple sensor processing workloads from sensors such as cameras, LiDAR, IMUs etc.

MotionEngine Scout is available for evaluation today. For more information, visit https://www.ceva-dsp.com/product/motionengine/.

Live Webinar

CEVA, together with PixArt will host a live webinar titled: "Spot-On Dead Reckoning for Indoor Autonomous Robots." The webinar will take place on April 27th, 2021 at 11:00am U.S. Eastern / 08:00am U.S. Pacific and be available for on-demand viewing shortly after the live event. For more information and to register for the webinar, visit https://go.ceva-dsp.com/28-04-2021-Webinar-Dead-reckoning-navigation_LP.html.

About CEVA, Inc.

CEVA is the leading licensor of wireless connectivity and smart sensing technologies. We offer Digital Signal Processors, AI processors, wireless platforms and complementary software for sensor fusion, image enhancement, computer vision, voice input and artificial intelligence, all of which are key enabling technologies for a smarter, connected world. We partner with semiconductor companies and OEMs worldwide to create power-efficient, intelligent and connected devices for a range of end markets, including mobile, consumer, automotive, robotics, industrial and IoT. Our ultra-low-power IPs include comprehensive DSP-based platforms for 5G baseband processing in mobile and infrastructure, advanced imaging and computer vision for any camera-enabled device and audio/voice/speech and ultra-low power always-on/sensing applications for multiple IoT markets. For sensor fusion, our Hillcrest Labs sensor processing technologies provide a broad range of sensor fusion software and IMU solutions for AR/VR, robotics, remote controls, and IoT. For artificial intelligence, we offer a family of AI processors capable of handling the complete gamut of neural network workloads, on-device. For wireless IoT, we offer the industry's most widely adopted IPs for Bluetooth (low energy and dual mode), Wi-Fi 4/5/6 (802.11n/ac/ax) and NB-IoT. Visit us at www.ceva-dsp.com and follow us on Twitter, YouTube , Facebook, LinkedIn and Instagram.

About PixArt Imaging Inc.

PixArt Imaging Inc. is an industry leader for Smart Sensor SoC solutions incorporating CMOS Imager, optics and proprietary algorithm engines. With its core sensing technology in CMOS imaging, PixArt's highly integrated, application based imagers are designed to perform complex tasks in a wide variety of applications; from enhancing human-machine interaction to image analytics used for computer vision across various market segments. The product portfolios of PixArt include Standard CMOS Image Sensor, Optical Navigation, Object Motion Sensing, Capacitive/Force Touch, Computer Vision, Health/Thermal Biosensing, and Customized ASICs. With our extensive experience in mixed-signal image processing and systems development, we pride ourselves in developing the latest low-power smart sensing solutions for Smart IoT, industrial, robotics and consumer products. For more information on products and applications from PixArt Imaging, please visit us at www.pixart.com.