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# Sundance launches VCS-1 embedded processor module for precision robotics applications

## Optimized for robotics, using Computer Vision, Edge AI and Deep Learning

## Utilizes industry-standard PC/104 form factor

* **Developed for the EU’s VineScout viticulture project (Project ID:** **737669)**

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| A truck driving down a dirt road  Description automatically generated | DSCF1231.jpg | A close up of a device  Description automatically generated |
| Image 1: Second  VineScout Prototype | Image 2: The full VCS-1 Development  Platform | Image 3: The PC/104-Blade for VCS-1 |

**Chesham, UK – August 9, 2019.** Sundance Multiprocessor Technology Ltd., an established supplier and manufacturer of embedded modules, has launched the Sundance VCS-1, a small, high performance, low power and lightweight embedded processor platform designed specifically for precision robotics incorporating complex, real-time vision, control and sensor applications.

The Sundance VCS-1 has been developed and proven as part of the European Union’s H2020 ‘Fast-Track-Innovation’ pilot program (FTI - Project ID: 737669). The VineScout delivers a precision robotics solution designed to better facilitate the collection of real-time data in vineyards from which improved grape maturation and harvesting strategies can be devised.

Utilizing the PC/104 form factor, which measures just 90mm x 96mm, to provide industry-standard compatibility and expandability, the Sundance VCS-1 embedded processor module is optimized for computer vision, Edge AI and Deep Learning requirements. It weighs just 300g, has a low power consumption of typically 15W and is highly compatible with a wide range of commercially available sensors and actuators.

At the processing heart of the Sundance VCS-1 is a Xilinx Zynq MPSoC which is mounted on to the PC/104 board using a System-on-Module (SoM). It incorporates an ARM Cortex A53 64-bit quad-core processor combining real-time control through engines for graphics, video, waveform, and acceleration with an FPGA. These include an ARM Mali 400 graphics processing unit (GPU) for graphics acceleration, an ARM Cortex R5 Real-Time Processing Unit (RPU) for managing real-time events and the programmable FPGA logic for hardware acceleration of AI algorithms used for on-the-fly image processing.

The Sundance VCS-1 features extensive I/O capabilities made available through the Sundance External Interface Card (SEIC), including multiple USB3 interfaces for interfacing various cameras and sensors such as the Intel RealSense T265 tracking camera, Intel RealSense D435 and Stereo Labs Zed depth cameras and FLIR AX-8 thermal camera. It can also connect with most Arduino and Raspberry Pi actuators and sensors. A further interface enables it to mimic PC with HDMI display, SATA storage and Ethernet networking. An onboard ADC is available to gather data from an external sensor and there is an onboard DAC to control servos etc. A large selection of I/O standards is also implemented directly on the programmable logic to reduce the latency between the various supported cameras, sensors and servos.

Extensive software support is provided for precision robotics solutions including the ROS Melodic Morenia (ROS compatible and ROS2 ready) robotics platform, MQTT machine-to-machine connectivity protocol, OpenCV computer vision library of real-time programming functions, the Xilinx’s Edge-AI solutions and the Python scripting language. Also supported are the Ubuntu operating system, Xilinx SDSoC environment, TULIPP’s STHEM toolchain and Xilinx DPU (deep learning processing unit) for convolutional neural networks.

The Sundance VCS-1 is available in a custom enclosure, the PC/104-Blade, designed to remove the need for any fans and provide a rugged environment for building embedded applications for resilient precision robotics.

“The Sundance VCS-1 embedded processor module has been designed to provide the resilient processing power needed for the development of ruggedized precision robotics applications,” said Flemming Christensen, Managing Director of Sundance Multiprocessor Technology. “Available on a fully reconfigurable and expandable, industry-standard PC/104 platform, it delivers high performance and extremely low power consumption. It provides compatibility with a wide range of commercially available sensors and actuators as well as being optimized for computer vision applications, Edge AI and Deep Learning.”

The Sundance VCS-1 precision robotics platform has been developed in conjunction with the VineScout viticulture partners that encompass the French Agri-robotics manufacturer, Wall-YE ([www.wall-ye.com](http://www.wall-ye.com)) and Symington Estate ([www.symington.com](http://www.symington.com)), a leading producer of port-wine in Portugal as the target end-user.

The project aim is to significantly improve the success factors for the European viticulture industry by developing a robot for vineyard monitoring to help wine producers measure key parameters of their vineyards, including water availability, the temperature of the leaves and plant robustness. Capable of operating 24/7, with a battery life of 6 hours to mimic a conventional tractor operations before refuelling, the VineScout is intended to eliminate the subjectivity involved in traditional winemaking by providing winemakers with comprehensive and reliable real-time data on vine and grape growth and maturation, so that they can more easily and less expensively optimise irrigation and harvesting strategies for their vineyards.

“Grapes must be picked at the exact point of maturation, and the vines must have the appropriate intake of water during development so that the wine ends up with desired properties,” explains Pedro Machado, R&D Manager of Sundance Multiprocessor Technology. “Controlling these parameters using traditional techniques is complicated and expensive, and few vine-growers and winemakers can really afford it. Thus, a majority of producers don't have real data about the grape's growth and maturation cycles that could help them. VineScout changes all this, bringing a new and valuable dimension to winemaking.”

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**About Sundance Multiprocessor Technology**

Sundance designs, develops, manufactures, and markets internationally high-performance signal processing and reconfigurable systems for original equipment manufacturers in embedded applications. Leveraging its multiprocessor expertise and experience, Sundance provides OEMs with modular systems as well as data acquisition, I/O, communication and interconnectivity products that are essential to multiprocessor systems where scalability and performance are important. Sundance, founded in 1989 by the current directors, is a member of the Xilinx Alliance, Texas Instruments’ Design Network and MathWorks’ Connection programs. Sundance is also a member of the PC/104 Consortium, the focal point for the entire PC/104 industry including manufactures and OEMs. It provides a place for information on current specifications, product offerings, news, and events and a place to advance and develop specifications that are consistent and stable for long-term use. For more information about Sundance Multiprocessor Technology and its products, visit <http://www.sundance.com>.

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