

ASX RELEASE

15 January 2025

ASX: NVU

EMASS Demonstrates Ultra-Low Power Fall Detection Technology with ECS-Dot Chipset

ECS-Dot Chipset delivers industry-leading energy efficiency and real-world AI performance.

Nanoveu Limited ("Nanoveu" or the "Company") (ASX: NVU) is pleased to announce the successful results of the Embedded AI Systems ("EMASS") ECS-Dot Chipset ("ECS-Dot") in a comprehensive fall detection evaluation.

Performance Highlights:

- **ECS-Dot** achieves up to 90x lower power consumption compared to traditional "always-on" systems. **Unmatched Energy Efficiency Comparison Summary:**
 - Traditional Always-On Systems: ~10mW.
 - Optimised Power Management Systems: ~0.5mW.
 - EMASS's ECS-Dot Chipset: 0.112mW.
- **ECS-Dot** executes its accurate fall detection AI model in just 1ms
- Results are first in a series of assessments underway to validate the ECS-Dot Chipset's computational performance and energy efficiency in several real-world use cases
- Results demonstrate the comparative advantages of EMASS ECS-Dot to address the increasing demand for energy-efficient, AI-capable chip solutions in a number of growing global markets.

EMASS Advanced Energy Efficiency and Technical Application

The global fall detection systems market is projected to reach approximately **USD 748.40 million by 2030**¹ driven by factors such as the increasing elderly population, rising adoption of mobile-based solutions for personal safety, and advancements in wearable technology.

Traditional fall detection systems involve placing sensors on areas of the body such as the chest or wrist to detect sudden movements or impacts indicative of a fall. These systems often rely on continuous monitoring and are required to perform energy expensive computations in order to distinguish falls from other events. This can result in significant energy consumption and limits the practicality for sustained, long-term fall detection surveillance in battery-powered devices.

The proprietary ECS-Dot Chipset addresses these challenges by incorporating:

- **Non-Volatile MRAM Technology:** Enables the system to power down between tasks while preserving data, reducing energy usage.
- **Optimised AI Execution:** Processes fall detection data in 1 millisecond, maintaining responsiveness with minimal energy demand.
- **Edge AI Processing:** Performs computations directly on the device, reducing reliance on cloud-based systems, improving latency, and enhancing security.

¹ <https://www.grandviewresearch.com/industry-analysis/fall-detection-systems-market-report>

Transformative Efficiency for Real-world Applications

In order to assess the capabilities of the ECS-Dot Chipset in a variety of real-world simulations. Recent fall detection simulation demonstrates unmatched power efficiency and performance. The ECS-Dot detects falls with high precision and efficiency:

- **Data Acquisition Frequency: 25Hz** from an inertial sensor.
- **Fast AI Execution Time:** Just **1ms** to process fall detection.
- **Ultra-Low Power Consumption:** Only **0.112mW**, drastically reducing energy use.

Such extremely low power consumption was a result of a two-fold system optimisation in the platform. Firstly, the fall detection application was optimised for the chipset and mapped to the efficient EMASS AI hardware module. Secondly, the non-volatility and high speed of EMASS MRAM was leveraged to quickly turn off computing components for any idle time, ensuring maximum energy efficiency. These innovations achieved a **90x improvement** in energy efficiency compared to traditional systems and showcases a significant leap in sustainability for Edge-powered safety solutions.

Prof. Mohamed M. Sabry Aly, Founder of EMASS commented: “These breakthrough results showcase how the ECS-Dot Chip, when used with advanced AI data processing and modern memory technologies can deliver practical, energy-efficient solutions for various real-world challenges. These results move us closer to our goal to develop and commercialize highly efficient semiconductor solutions that allow for seamless integration of AI into everyday life, improving both functionality and sustainability and opening multiple large unmet market opportunities for our proprietary technology.”

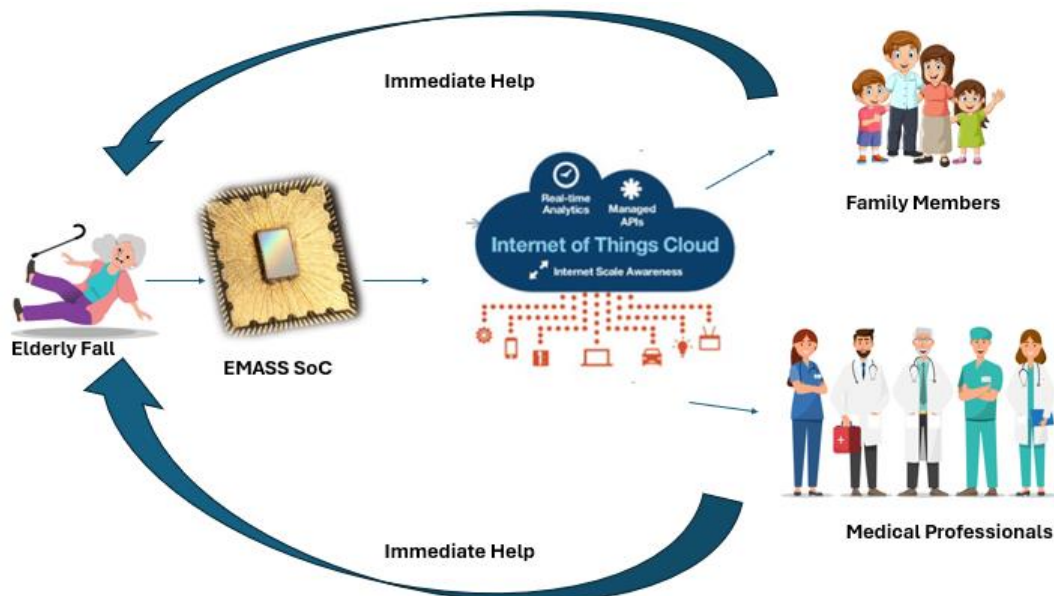


Figure 1. Schematic of sensor data flows in a healthcare context using EMASS System of A Chip (SoC). The EMASS SoC enables local, algorithm-driven fall detection by processing sensor input data with exceptional energy efficiency. This capability allows for prolonged monitoring and supports more advanced, real-time fall detection, making it ideal for healthcare applications.

Towards a Sustainable AI Future

EMASS's fall detection results show the potential of the proprietary chipset to support the development of energy conscious AI-enabling technologies ideal for low-power devices requiring:

- **Energy Efficiency:** Extends device lifespans, reducing e-waste and operational costs.
- **Compact Design:** Minimises material use and manufacturing emissions.

- **Cloud Independence:** Cuts energy demands from data centres and improves data security through on-device processing.

Empowering Next-Generation Applications

Building on its proven track record of exceptional performance in previous benchmarking tests², the ECS-Dot Chipset demonstrates unique capabilities for several real-world applications:

- **Wearable Health Monitors:** Better energy efficiency prolongs battery life and supports continuous operation without the hassle of frequent recharging which is ideal for fall detection and other continuous health monitoring needs.
- **Smart Home Safety Devices:** Compact, battery-efficient systems deliver reliable fall detection and enhanced safety, reducing the need for ongoing maintenance while offering peace of mind for independent living.
- **IoT and Edge Devices:** Exceptional energy efficiency and miniaturised designs enable smarter, more sustainable technologies, unlocking new possibilities for connected solutions in smart cities, industrial automation, and beyond.

Additional real-world testing of the EMASS Dot Chipset is underway to evaluate its energy efficient computation for applications in Smart Cities and Smart Homes with results expected later this quarter.





EMASS BENCHMARKING RESULTS				
	Person Detection	Image Classification	Anomaly Detection	Keyword Spotting
Benchmark Status	✓ Completed	✓ Completed	✓ Completed	✓ Completed
Benchmark Description	Evaluate the chipset's latency and energy efficiency in detecting human presence	Measure the chipset's performance in accurately classifying images	Test the chipset's ability to detect anomalies	Assess the chipset's capability to efficiently recognize spoken keywords
Results & Outcomes	> Latency: 5.2 ms > Energy: 3.7 µJ	> Latency: 6.3 ms > Energy: 5.5 µJ.	> Latency: 1.22 ms > Energy: 0.8 µJ.	> Latency: 3.9 ms > Energy: 3.07 µJ.
	Industry-leading performance	20x energy improvement compared to industry leader	200x energy improvement compared to industry leader	10x energy improvement compared to industry leader
Next Steps	Integration testing in edge cameras	Integration into IoT devices for trials	Test in predictive maintenance systems	Apply in smart assistants and wearables
				

Figure 2: Previous Benchmarking Results Summary

What's Next for EMASS?

EMASS plans to:

- Complete series of additional assessments to validate the ECS-Dot Chipset's computational performance and energy efficiency in several real-world use cases including "smart cities".
- Seek partnerships with device end-users to advance technology uptake and deployment.

Further information:

Alfred Chong
 Managing Director and CEO
 t: +65 6557 0155
 e: info@nanoveu.com

² Refer to ASX announcement 28 November 2024

About Nanoveu Limited

Nanoveu is a company specialising in advanced films and coatings. <https://www.nanoveu.com/>.

Further details on the Company can be found at <https://wcsecure.weblink.com.au/pdf/NVU/02656570.pdf>.

EMASS

EMASS is a pioneering technology company specialising in the design and development of advanced systems-on-chip (SoC) solutions. These SoCs enable ultra-low-power, AI-driven processing for smart devices, IoT applications, and 3D content transformation. With its industry-leading technology, EMASS will enhance Nanoveu's portfolio, empowering a wide range of industries with efficient, scalable AI capabilities, further positioning Nanoveu as a key player in the rapidly growing 3D content, AI and edge computing markets.

EyeFly3D™

The EyeFly3D™ platform is a comprehensive solution for delivering glasses-free 3D experiences across a range of devices and industries. At its core, EyeFly3D™ combines advanced screen technology, sophisticated software for content processing, and now, with the integration of EMASS's ultra-low-power SoC, powerful hardware.

Nanoshield™ - is a self-disinfecting film that uses a patented polymer of embedded Cuprous nanoparticles to provide antiviral and antimicrobial protection for a range of applications, from mobile covers to industrial surfaces. Applications include:

Nanoshield™ Marine, which prevents the growth of aquatic organisms on submerged surfaces like ship hulls, and

Nanoshield™ Solar, designed to prevent surface debris on solar panels, thereby maintaining optimal power output.

Forward Looking Statements

This announcement contains 'forward-looking information' that is based on the Company's expectations, estimates and projections as of the date on which the statements were made. This forward-looking information includes, among other things, statements with respect to the Company's business strategy, plans, development, objectives, performance, outlook, growth, cash flow, projections, targets and expectations and related expenses. Generally, this forward-looking information can be identified by the use of forward-looking terminology such as 'outlook', 'anticipate', 'project', 'target', 'potential', 'likely', 'believe', 'estimate', 'expect', 'intend', 'may', 'would', 'could', 'should', 'scheduled', 'will', 'plan', 'forecast', 'evolve' and similar expressions. Persons reading this announcement are cautioned that such statements are only predictions, and that the Company's actual future results or performance may be materially different. Forward-looking information is subject to known and unknown risks, uncertainties and other factors that may cause the Company's actual results, level of activity, performance, or achievements to be materially different from those expressed or implied by such forward looking information.