Nanoveu Limited
Level 45, 108 St Georges Terrace
Perth WA, 6000 Australia
+61 8 6244 9095
www.nanoveu.com

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ASX: NVU

Nanoveu Completes First Major Milestone in Drone Flight Time Evaluation

Nanoveu's ECS-DoT chip reaches 50 updates per second in drone trials, achieving real-time flight control capabilities

Highlights

- Nanoveu subsidiary, EMASS, has successfully demonstrated ECS-DoT's ability to complete a full "sense–think–act" loop at **50 Hz** in PX4/Gazebo Hardware in loop (HIL) tests — the chip can process flight data and adjust propeller output 50 times per second (50 Hz) in real-time simulation tests; fast enough for many real-time control systems enabling the rapid feedback needed for stable flight.
- This capability supports drone stability in variable flight environments with projected flight time improvements of up to 30%.
- ECS-DoT is designed for advanced on-board, ultra-low-power AI tasks such as inspection and precision landing, while using less power than a typical digital watch (<1 mW).
- Next, the chip will begin learning and optimising its own flight strategies through advanced, adaptive-AI techniques.
- Final Phase 1 results expected end of June using the PX4/Gazebo platform1 and hardware-in-the-loop (HIL) testbenches, with live drone trials to begin thereafter.

Nanoveu Limited (ASX: NVU) ("Nanoveu" or the "Company"), a technology innovator across advanced semiconductor, visualisation, and materials science applications, is pleased to announce that Embedded A.I. Systems Pte. Ltd ("EMASS") has cleared the critical first checkpoint in phase 1 of its structured drone testing program.

EMASS successfully demonstrated, in real-time simulation, flight data processing and updated propeller outputs 50 times per second (50 Hz), with loop-to-loop variation held under ±1 ms across thousands of cycles—performance on par with today's most advanced flight controllers. This real-time decision-making capability represents a crucial foundation for developing ultra-efficient autonomous flight systems enabling smarter navigation, stability and energy use. As a result, ECS-DoT is well positioned to support the next-generation of commercial drones across industries like delivery, inspection, agriculture, and defence, where longer flight times and onboard AI are key differentiators.

Milestone Overview – Rapid, Ultra Low-Power, On-Board Decision Making

A drone's control loop must read IMU and air-speed data, run inference, and drive PWM outputs without delay. Achieving 50 Hz on a sub-100 mW SoC requires:

- High-Speed I/O: 1 kHz IMU sampling via SPI/I^2C with DMA transfers.
- Microsecond-Scale Inference: Neural workloads completed in 1–6 ms at single-digit microjoules (e.g. MLPerf Tiny person-detection at 3.7 µJ).
- Bare-Metal Determinism: Hardware timers and interrupt-driven loops ensure each cycle executes on schedule, keeping jitter under ±1 ms.

The 50 Hz control loop achieved by ECS-DoT is a significant technical benchmark. In drone systems, a control loop is the rapid feedback cycle through which the aircraft reads sensor inputs, processes flight dynamics, and updates motor outputs to maintain stable and responsive flight. The positive test results confirm the chip's ability to perform rapid closed-loop adjustments in response to environmental changes such as wind gusts, shifts in payload distribution, and mid-flight directional commands while maintaining exceptional energy efficiency necessary for prolonging flight times.

Dr. Mohamed M. Sabry Aly, **EMASS founder, commented:** *"This 50 Hz milestone proves that ECS-DoT can handle real-time, high-frequency control loops with extreme energy efficiency. It's a crucial first step toward transforming drones into smarter, longer-flying platforms that can perform complex tasks without cloud dependence or battery trade-offs."*

Why this Matters

- ✓ **Real-Time Responsiveness**: Achieving a 50 Hz control loop allows drones to make instantaneous flight adjustments, maintaining stability during environmental disturbances such as wind shifts or sudden manoeuvres.
- ✓ **Path to Extended Endurance:** This control frequency serves as the technical foundation for achieving the Company's target of 1.2–1.3× increases in drone mission duration, a key goal of the ECS-DoT program.
- ✓ **AI-Ready Platform:** The result confirms that ECS-DoT can support future on-board AI applications including real-time infrastructure inspection, precision landing, and predictive maintenance within a sub-milliwatt power envelope.

Next Steps in the Testing Program

1. **AI Model Integration**: ECS-DoT will be equipped with trained surrogate and reinforcement learning control policies, which will operate within the 50 Hz closed-loop environment.
2. **Advanced Simulation Testing**: Further simulation runs under variable and challenging flight conditions will validate performance consistency across scenarios.
3. **Preparation for Live Flight Trials**: The outcomes of Phase 1 will form the basis for **Phase 2** live demonstrations, enabling real-world validation of endurance, responsiveness, and AI functionality.

Strategic Alignment with Broader Embedded AI Vision

ECS-DoT's drone evaluation is a key part of Nanoveu's broader strategy to expand into ultra-low-power embedded AI markets, where energy efficiency and real-time processing are paramount. Beyond drones, ECS-DoT is well positioned to power a range of emerging applications, including:

- **Wearables:** Health and fitness devices requiring local signal processing (e.g., heart rate variability, movement detection).
- **IoT Devices**: Smart home and industrial sensors benefiting from on-device decision making without latency or bandwidth constraints.
- **Health Technology**: Devices for continuous monitoring in aged care, rehabilitation, or remote diagnostics.
- **Visual Technologies:** including AR/VR markets and Nanoveu's own EyeFly3D technology.

The global wearable technology market alone was valued at over USD 84 billion in 2024 and is projected to surpass USD 186 billion by 2030[1], highlighting the scale and momentum behind these AI-driven form factors. ECS-DoT's compact footprint, sub-milliwatt power draw, and real-time inference capabilities make it ideally suited for these applications.

By demonstrating its performance in the demanding environment of drone control where size, weight, and power constraints are critical the ECS-DoT reinforces its value as a versatile AI platform capable of driving innovation across multiple next-generation industries.

[1] Wearable Technology Market Size | Industry Report, 2030

Mark Goranson, CEO of Nanoveu Semiconductor Division, added: *"This milestone is more than a technical achievement, it's a validation of the ECS-DoT architecture as a commercially viable solution for ultra-low-power, real-time AI applications. Achieving 50 Hz control within a sub-milliwatt power envelope demonstrates the chip's readiness for high-growth sectors like drones, wearables, and IoT. As the demand for intelligent, edge-deployed systems continues to rise, ECS-DoT offers a scalable platform to meet the performance and energy needs of next-generation devices."*

The Company looks forward to reporting further updates with the next results expected by the end of June as the ECS-DoT testing program progresses toward full deployment in commercial drone systems across inspection, agriculture, emergency response, and other industrial use cases.

This announcement has been authorised for release by the Board of Directors.

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Nanoveu Media
Alfred Chong, Nanoveu MD and CEO
P: +65 6557 0155
E: info@nanoveu.com

Nanoveu Investors
Namratha Gunnala, Automic Group
P: +61 2 8072 1400
E: namratha.gunnala@automicgroup.com.au

About Nanoveu Limited

Further details on the Company can be found at https://nanoveu.com/.

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™ is a comprehensive platform solution for delivering glasses-free 3D experiences across a range of devices and industries. At its core, EyeFly3DTM 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', 'ambition', 'anticipate', 'project', 'target', 'potential', 'likely', 'believe', 'estimate', 'expect', 'intend', 'may', 'mission', '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.