



# LiDAR innovator Baraja raises AUD\$40m to enable autonomous vehicles sooner

## Strategic investment from Hitachi provides real-world demonstration of LiDAR reliability and capability

**SAN FRANCISCO, 24 March, 2021** - Baraja has raised AUD\$40 million in a new funding round to accelerate development of its breakthrough Spectrum-Scan™ LiDAR technology. Baraja's LiDAR sensors are higher performance and more reliable than legacy LiDAR systems, and enable the safe rollout of autonomous vehicles sooner. The latest capital raising was led by Blackbird Ventures and includes new strategic investment from Hitachi Construction Machinery.

Hitachi's strategic investment comes after a two-year partnership to validate Baraja's Spectrum-Scan™ sensors in real-world scenarios that prove the technology's reliability in harsh environments. The investment will support an expanded rollout of the sensor in mining, construction & industrial vehicle use cases, and help road-test the products for future autonomous vehicles.

Additional participants in the capital raising include returning investor Main Sequence Ventures, the venture arm founded by CSIRO, alongside new investors Regal Funds Management, Perennial Value Management, superannuation fund HESTA and InterValley Ventures, an Australian based venture capital fund anchored by the Mizuho Financial Group via its affiliate New Frontier Capital Management.

The new capital will be used to expand Baraja's team and accelerate the development of LiDAR technology for automotive-grade use in self-driving vehicles. Baraja has validated the technology in numerous settings through partnerships with Tier 1 suppliers, mining operators and researchers such as Australia's national science agency CSIRO and Taiwan's renowned Industrial Technology Research Institute's (ITRI) intelligent mobility division.

### **Spectrum-Scan™ LiDAR to enable Level 4 self-driving vehicles**

Baraja's Spectrum-Scan™ LiDAR is built to provide the long-term reliability, resolution, range and automotive-grade features needed to reach Level 4 autonomous driving.

The pioneering technology completely rethinks environment scanning for autonomous vehicles, exploiting the wavelength properties of light to steer lasers through a prism in order to better detect objects at range. Spectrum-Scan™ technology is more tolerant to factors that have hindered traditional LiDAR systems such as heat, shock and vibration. The result is a more precise, more affordable LiDAR system featuring long-term reliability and exceptional resolution, deployable in more environments, from highways and city streets to mines and ports.

Spectrum-Scan™ LiDAR technology gives Baraja's partners the ability to instantly adjust and adapt scanning resolution to the changing environment, similar to how humans can control their visual focus. This leads to better safety by improving obstacle detection for self-driving vehicles in a range of settings.

"Legacy LiDAR systems have been hampered by poor performance with limits on range, resolution and reliability," said Federico Collarte, CEO and Co-Founder of Baraja. "Our Spectrum-Scan™ LiDAR has proven reliability in the field, which has been recognized by partners such as Hitachi — one of the world's most innovative machine manufacturers. This latest capital and the partnership with Hitachi will also help us to advance our mission to help make self-driving vehicles an everyday reality."

Baraja's Spectrum-Scan™ technology was invented by Federico Collarte and co-founder Cibby Pulikkaseril, telecommunications industry veterans who used their photonics and fiber optic expertise to create a LiDAR system that uses the same principles in an autonomous vehicle setting.

### **Blackbird Ventures and Hitachi investments validate Baraja's opportunity**

Returning investor Blackbird Ventures has doubled down on its previous investment, showcasing its continued support for Baraja's superior technology capabilities and product roadmap.

"Countless LiDAR makers have made promises and set deadlines they have failed to meet due to one fundamental issue: legacy LiDAR doesn't work the way it needs to," said Rick Baker, Blackbird Ventures Co-Founder and board director at Baraja. "Baraja founders Federico and Cibby have taken a truly different approach with Spectrum-Scan™ that addresses and solves the fundamental challenges others have faced out of the lab and provides a clear roadmap to automotive-grade LiDAR in the coming years."

Hideshi Fukumoto Vice President, Executive Officer, and CTO, Hitachi Construction Machinery; President of Research & Development Group; and President of Client Solutions Group, said: "Spectrum-Scan™ LiDAR is a must-have technology providing better autonomous sensing solutions for mining customers who demand increasingly higher safety and production efficiency. We are delighted to be working with Baraja, a company with leading-edge technology in this field.

"More than just an investment relationship, we expect that this relationship will lead to technological improvements and accelerated commercialization for both parties in areas such as terrain measurement and obstacle detection. Through this investment, Hitachi Construction Machinery will accelerate the improvement of autonomous haulage systems (AHS) and the practical application of remote and autonomous operation of ultra-large hydraulic excavators, as well as expand its application to the civil engineering and construction fields. We will also strengthen our open innovation initiatives in the digital field, such as this one."

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### **About Baraja**

Baraja Pty Ltd: Founded in 2016 and headquartered in Sydney, Baraja began its work on a breakthrough LiDAR technique in the garage of Founder & CEO Federico Collarte. Federico and his Co-Founder & CTO

Cibby Pulikkaseril created an elegant solution to the complex problems facing legacy LiDAR systems that give vision to self-driving vehicles. Their Spectrum-Scan™ approach addresses scalability, reliability, vehicle integration and performance issues that legacy LiDAR technologies cannot. Baraja, backed by Sequoia China, Blackbird Ventures and Main Sequence Ventures' CSIRO Innovation Fund, has over 100 employees and has offices in Sydney, San Francisco and Shanghai.

### **About Spectrum-Scan™**

Baraja's Spectrum-Scan™ LiDAR completely rethinks previous approaches to environment-scanning by exploiting the wavelength properties of light to precisely steer the laser beams being emitted. The result is a high-performance LiDAR with innate tolerance of factors that have typically inhibited previous LiDAR systems — such as heat, shock and vibration — leading to long-term high reliability.

Baraja's SpectrumScan™ technology operates at 1550 nm and is capable of creating high-resolution, long-range point clouds without the shortcomings or mechanical components that hold back traditional systems. For example, it exceeds the industry long-range sensing requirement of detecting a 10 percent reflectivity object at more than 200 meters.

Designed and built for maximum reliability in automotive environments, the modular design of the system uses prisms and tuneable wavelength lasers to provide an unprecedented ability to dynamically adjust resolution in key regions of interest. This allows the technology to mimic the abilities of the human eye by instantly changing areas of focus based on the situation.

Spectrum-Scan™ works by rapidly switching the laser's wavelength and transmitting light through a prism, which diffracts each color of light in a different direction. When the light returns to the sensor, it is only processed if wavelength, angle, timing and encoding matches on all signals, ensuring immunity to interference