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Australian Plant Monitoring Technology Set for Space Debut in UniSQ-Led Project

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An Australian-developed plant monitoring technology, designed to revolutionize both space and terrestrial agriculture, is set to be launched into space as part of a University of Southern Queensland (UniSQ) iLAuNCH Trailblazer project. This initiative will demonstrate the technology's critical capabilities for sustainable plant-based food production in microgravity, with significant implications for Earth-based Controlled Environment Agriculture (CEA).

The project builds upon UniSQ's pioneering research in machine vision algorithms for plant monitoring, further refined through collaborations with international partners, including the UK's Vertical Future. The technology aims to address the growing need for automated food production systems, essential for long-term space missions and increasingly vital for addressing global food security challenges on Earth.

Key Project Objectives and Collaborations:

- **Machine Vision in Space:** UniSQ will showcase machine vision algorithms for early detection of plant health using unique space-grown plant image datasets.
- **Plant Growth Systems:** The University of Adelaide will contribute expertise in plant stress tolerance biology.
- **Hardware Innovation:** Yuri Gravity will provide a flight-certified plant growth chamber with advanced imaging capabilities.
- **Terrestrial Applications:** Medicinal Harvest, an Australian agricultural business, will assess the technology's commercial viability for Earth-based CEA.

The project will integrate machine vision with a space-ready plant chamber, capture images to monitor plant growth in microgravity, and demonstrate the early detection of plant health issues. The technology's scalability for commercial CEA applications on Earth will also be evaluated.

"Collaborating with iLAuNCH and UniSQ, alongside esteemed industry partners, provides an incredible opportunity to trial predictive AI in our medicinal cannabis facility. The insights gained from this facility have broad applications across controlled environment agriculture, as the core principle remains the same. At the end of the day, we are cultivating plants, and optimising their growth is key to the future of agriculture, both in space and on Earth," said Medicinal Harvest Director, Tracey Perez.

"Our second collaboration with Axiom Space will focus on advancing a novel plant stress monitoring technique developed by the University of Southern Queensland by testing it in space," said iLAuNCH Trailblazer Executive Director, Darin Lovett. "The iLAuNCH Trailblazer mission will provide launch capability for machine vision of plant growth, building on UniSQ's expertise in terrestrial agriculture. In collaboration with Axiom Space, the ARC Centre of Excellence in Plants for Space, and space laboratory company Yuri Gravity, the project will deploy a flight-ready plant growth chamber to advance machine vision technology for monitoring plant development in microgravity. Additionally, the partnership with Australian company Medicinal Harvest will explore the commercial applications of this technology for terrestrial agriculture, further expanding its potential impact."

UniSQ's Centre for Agricultural Engineering, leveraging decades of experience in terrestrial agriculture, recognizes the critical role of autonomous plant growth monitoring in future sustainable food production systems. "Controlled Environment Agriculture technologies are pivotal to addressing food security challenges posed by limited land availability and a growing global population," said UniSQ Associate Professor Cheryl McCarthy.

"Axiom Space is delighted to partner on this effort to advance global efforts toward agriculture in space that translate into benefits for every human, everywhere," said Axiom Space Chief Scientist, Dr Lucie Low.

This project underscores iLAuNCH Trailblazer's commitment to fostering collaboration between industry and academia, driving innovation in space technology, and delivering practical solutions for Earth-based challenges.