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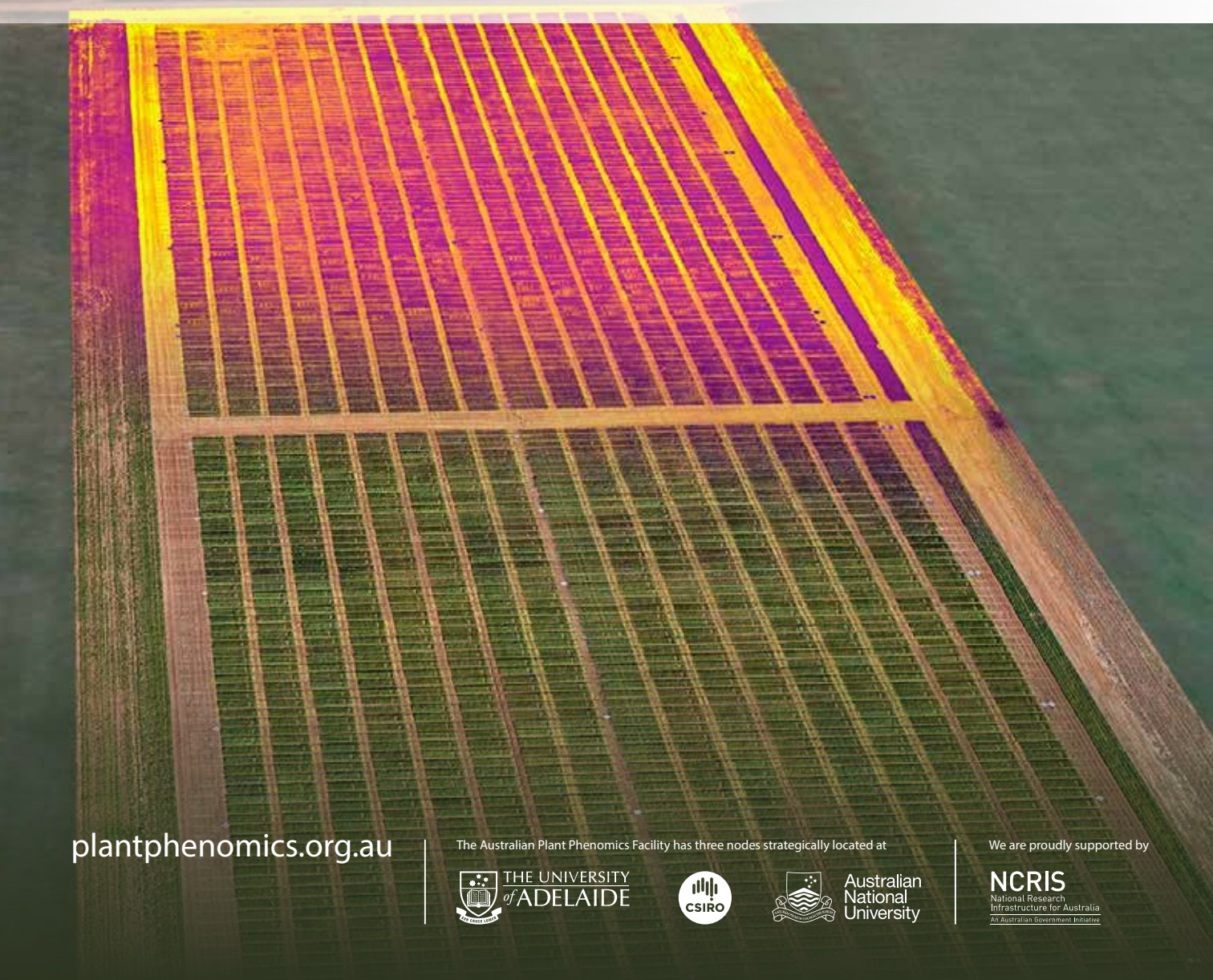
Australian Plant Phenomics Facility

phenoAIR™ pod

phenoAIR™ pod is an advanced airborne multi-trait, thermal, infrared and RGB-colour imaging platform. It offers high-throughput data acquisition suitable for characterising and monitoring plant performance at the field scale.



plantphenomics.org.au

The Australian Plant Phenomics Facility has three nodes strategically located at

THE UNIVERSITY of ADELAIDE

CSIRO

Australian National University

We are proudly supported by

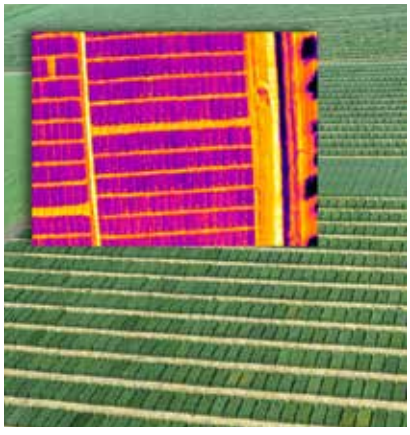
NCRIS National Research Infrastructure for Australia

An Australian Government Initiative

Australian Plant Phenomics Facility

Discover more

An advanced airborne multi-trait, thermal, infrared and RGB imaging platform, and image processing pipeline



PHENOAIR™ POD

Capability highlights

- Fully certified R44 helipod equipped with advanced imaging payload.
- High resolution FLIR SC645 thermal camera & 30MP RGB camera with integrated IMU and GPS.
- Rapid assessment offering virtually simultaneous measurements for large trials.
- High-throughput image processing pipeline provided for quick extraction of thermal data on a plot-by-plot basis.
- Improved heritability for canopy temperature from less than 0.1 (manual methods) to as high as 0.6 (aerial IR thermography).

Research has shown canopy temperature to be an excellent method of measuring crop stress through stomatal responses.

This high-resolution aerial thermography solution provides rapid measurement of crop canopy temperature in the field using a fully STC certified helipod that can be fitted to any R44 helicopter. The pod carries an advanced imaging payload consisting of a high resolution FLIR SC645 infrared camera and 30MP RGB camera, with a fully integrated IMU and GPS. The imaging system is controlled by an onboard industrial PC computer, operated through a touchscreen monitor from within the cockpit.

Capability benefits

The high resolution and high-throughput capability of the phenoAIR™ pod thermal imaging system allows for small differences in temperature to be detected between plant varieties making it a powerful phenotyping tool for large-scale experiments.

RGB imagery can be used to construct whole of experiment mosaics and 3D point cloud reconstructions (using Pix4D software) for use in visual assessments. The APPF's CSIRO node is currently working on extracting other valuable trait information from this RGB imagery.

Technical specifications

Helipod

- Simplex Helipod II Slim Line (certification FAA STC #SR01817SE)
- Dimensions: 122 x 46 x 46cm. Door opening: 66 x 32cm approx.

Computer

- Advantech TREK-688 with Touchpad TREK-306D screen

Thermal camera

- FLIR SC645 camera
- <0.05°C @ + 30°C/ 50 mK thermal sensitivity
- 640 x 480 resolution
- Frame rate up to 25 fps

RGB digital camera

- Canon 5D Mark IV
- 30.4MP resolution with 50mm f/1.4 lens

Navigation

- GPS, Tersus Precis-BX305 GNSS

Power

- Rechargeable 24V Li ion battery
- Power regulator - input 24V, output 12V and 24V regulated, 24V unregulated

Expertise at the High Resolution Plant Phenomics Centre (HRPPC)

The HRPPC combines expertise in plant science and engineering to develop and build (i) cutting-edge phenotyping technologies to support medium-throughput phenotyping of model and potted plants in controlled environments, and (ii) novel plant phenotyping solutions to support research experiments at large scale and high-throughput in the field with a capacity of over 250,000 plots p.a.

Discover more: plantphenomics.org.au

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