



Australian Plant Phenomics Facility

FieldExplorer

The FieldExplorer is a ground-based phenotyping platform to measure plant growth and crop health in field trials non-destructively. It incorporates a range of imaging sensors and a software platform which provide dataset fusion enabling trait discovery.



plantphenomics.org.au

The Australian Plant Phenomics Facility has three nodes strategically located at



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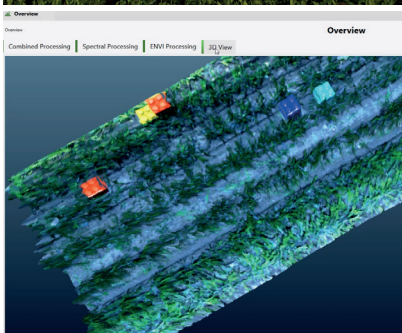


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NCRIS
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Improving crop data collection in the field



APPF is a world-leading infrastructure facility that underpins innovative plant phenomics research to accelerate the development of new and improved crops, healthier food and more sustainable agricultural practice. APPF's three complementary nodes are at the CSIRO Canberra, ANU and the University of Adelaide. APPF is funded by the Australian Government under the National Collaborative Research Infrastructure Strategy (NCRIS).

FIELD PHENOTYPING PLATFORM

Capability highlights

- Tough, durable agricultural grade platform suitable for a variety of field conditions
- Sensors onboard include RGB, LiDAR, GPS/INS and two hyperspectral cameras.
- Easy to use and intuitive interface provides real time position/orientation of the platform and in relation to plots.

Research benefits

The FieldExplorer brings capability to accurately measure the performance of plants in different environments non-destructively and over time, giving a greater ability to measure critical information about crop growth and health in field trials such as biomass, nutrient content and stress responses.

The high resolution imaging module enables consistent and precise data collection across trial sites. Supplementary halogen lighting provides consistent imaging conditions all day regardless of cloud cover.

The FieldExplorer combines LiDAR, enabling 3D reconstruction of a plant canopy and biomass estimates, with visible-near infrared (VNIR) and short-wave infrared (SWIR) hyperspectral imaging (400-1700 nm) and high resolution RGB imaging.

Easy loading of plot files and simplified automated data storage of all sensor data, plus calibration and system information logging allows simplified data analysis.

Specialised software enables single pixel level mining and sensor data fusion, based on pre-defined plot coordinates derived from GPS/INS for precision and accuracy.

The open data format enables connection to third party analysis platforms to maximise data utility and flexibility.

Technical specifications

Dimensions

- W 2.3 m L 5.7 m H 2.6 m

Wheels

- Agricultural profile tyres with adjustable track width 1.4 – 2.0 m

Gross weight

- 2850 kg

Speed

- 0 – 7 km/h with cruise control

Drive

- 4 independent, hydraulically driven wheel hubs
- Steering wheel combined with joystick forward/reverse control
- Articulated steering for tighter turning at end of plot rows

Imaging and illumination cabinet

- Hydraulic height adjustment: 0.2 – 1.3 m from ground
- Halogen illumination for consistent imaging regardless of ambient lighting
- Built-in colour referencing and camera calibration

Power

- Diesel engine powers hydraulic systems. Generator provides power surplus with UPS regulated power supply

Interface and positioning

- Panasonic ToughPad – WiFi to PC/PLC running MS Windows
- Drive direction indicated with colour coordinated plots showing impending, scanning and completed data acquisition
- High precision multi GPS/INS allows exact co-registration of pixels from various sensors

Discover more: plantphenomics.org.au

Australian Plant Phenomics Facility The Plant Accelerator

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