# iMapPESTS SENTINEL SURVEILLANCE FOR AGRICULTURE

iMapPESTS is a national program of research, development and extension designed to put actionable information into the hands of Australia's primary producers to enhance on-farm pest management decision-making.

Over a five-year period (2017-2022), **iMapPESTS** will lay the foundations for a national cross-industry surveillance system that can rapidly monitor and report the presence of airborne pests and diseases affecting major agricultural sectors across the country, including grains, cotton, sugar, horticulture, wine and forestry. This will be achieved through a range of surveillance, diagnostics, forecasting and engagement and adoption activities.

Once established, the system could enhance pest management decision-making by providing timely information on high-priority, cross-sectoral pest and disease abundance and spread. Such information could be used by industry stakeholders to guide the direction or intensity of scouting efforts and pest control actions. The system could also facilitate a co-ordinated response to biosecurity efforts during exotic pest and disease incursions, including use in delimiting surveys and proof-of-freedom claims.
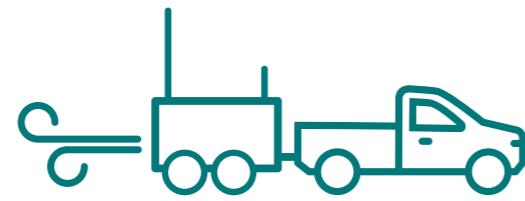
Mobile Surveillance Units

Custom designed and built surveillance units ('Sentinels') with specialised trapping equipment and technology will be deployed at various locations across regional Australia to monitor the presence of high-priority pests and diseases.

Pest and Disease Capture and Diagnosis

Samples captured by the Sentinels will be analysed using morphological identification and advanced molecular diagnostic tools to rapidly detect and quantify high-priority pests and diseases.
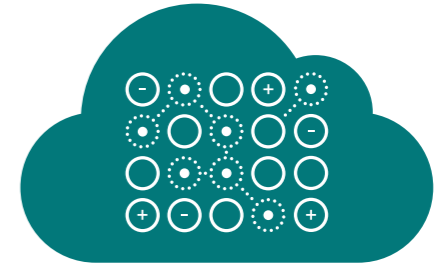
Data Collection and Management

Surveillance data will be uploaded to the cloud-based platform, AUSPest*Check*, and used to develop a forecasting tool for predicting abundance and spread of high-priority pests and diseases. These data will be summarised in simple tailored information products (e.g., reports and alerts).

Pest and Disease Forecasting

Computer simulations will model the timing, abundance and spread of high-priority pests and diseases. Forecasted data will flow to AUSPest*Check* where it will be incorporated with surveillance data.
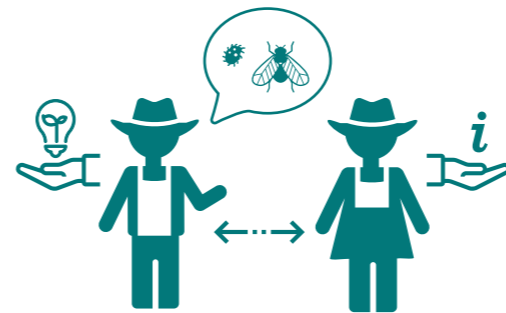
Engagement and Adoption

Tailored information products will be distributed and promoted across the vast extension networks that will be established for each industry. Key stakeholders will be encouraged and supported to utilise the information through a range of communication and engagement activities, including workshops and events.

Enhanced Pest Management, Biosecurity and Area Freedom

iMapPESTS aims to validate a proof-of-concept surveillance system that can rapidly monitor and report the presence of high-priority pests and diseases.

DATA COLLECTION → ACTIONABLE INFORMATION → DELIVERY TO STAKEHOLDERS

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AUSVEG will establish a vast extension network to raise awareness, build support and promote adoption of the program's outputs and outcomes across each industry. Key stakeholders will be encouraged and supported to utilise the information through a range of communication and engagement activities, such as workshops and events. These activities will essentially extend the research and development to practical applications.

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Plant Health Australia (**PHA**) will manage and distribute the surveillance data across the cloud-based platform, AUSPest*Check*. The platform will be functionally upgraded to accommodate data management requirements and support timely analysis of the surveillance data. These data will be summarised and visualised in the form of simple tailored information products (e.g., reports and alerts).

KEY CONTACTS
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Commonwealth Scientific and Industrial Research Organisation (**CSIRO**) will develop a forecasting tool for predicting abundance and spread of high-priority pests and diseases. This research will commence with a User Needs Analysis to identify opportunities for a forecasting tool to assist in pest management decision-making. The outcomes of the analysis will underpin the design and development of a software system that simulates timing, abundance and spread of high-priority pests and diseases. A cotton-specific biosecurity risk assessment component also forms part of CSIRO's research and will assess biosecurity vulnerability in the Australian cotton industry.

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As the program's grantee, **Hort Innovation** will oversee the operations of the individual projects that encompass the program. In collaboration with each research partner, they will coordinate time, budget and resources to complete activities within program guidelines. They will coordinate interactions among the partner organisations, and report progress and outcomes to the Department of Agriculture and water Resources' Rural Research and Development for Profit Program.

KEY CONTACTS
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Sugar Research Australia (**SRA**) will improve molecular diagnostics for a range of diseases and exotic pests that threaten the sugar industry. This research will also explore and design a toolkit for new disease threats and modernise molecular and morphological diagnostics for priority pests.

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The University of Queensland (**UQ**) will develop cotton species-specific contingency plans for high-priority insect species, a boll weevil surveillance and eradication plan, and novel methods for assessing host plant feeding by trapped insects to increase general preparedness for exotic cotton insect threats. This research will inform and prepare Australia's cotton industry for the arrival of any high-priority insect species.

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Centre For AgriBioscience (**AgriBio**), through the Department of Economic Development, Jobs, Transport and Resources (DEDJTR), will develop cutting edge diagnostic capability using Next Generation Sequencing (NGS). NGS technologies can be used for the detection of known pests and diseases as well as a tool to detect "unknowns", which will be particularly useful in mixed population samples captured by the Sentinels. This research will establish an NGS pipeline (samples collected in-field through to analysis) that will be made available to industry, as well as state and federal governments, on a fee-for-service basis that is affordable and sustainable.

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South Australian Research and Development Institute (**SARDI**) will build and deploy up to eight mobile surveillance units ('Sentinels') that combine specialised trapping technology for airborne pests and diseases with cutting edge detection and molecular diagnostics systems. The Sentinels will be optimised for new and established high-throughput molecular techniques to target high-priority pests and diseases. This research will expand the capacity of current airborne surveillance technology and diagnostic tools.

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Department of Primary Industries and Regional Development (**DPIRD**) will provide additional surveillance data by integrating an existing network of automated smart traps/sensors that are currently being trialled in-field as part of the Western Australian grain surveillance program. This research will be incorporated in the current program and further extended to include at least eight additional locations across WA's grainbelt.

KEY CONTACTS
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Program Management

- Engagement and Adoption
- Surveillance
- Diagnostics
- Forecasting