# Tools & Technologies – What's Next?

Dan Tompkins, Predator Free 2050 Limited

PEOPLE—NATURE
TOGETHER WE FLOURISH
TUIA TE TAIAO


A government-owned company founded in 2017, and registered under the charities act:

- Driving mainland predator elimination
- Breakthrough science for step-change
- New tools to make elimination possible

Doing this for biodiversity recovery

We have a ‘bottom-up’ philosophy of enabling and supporting locally ‘owned’ landscape elimination projects

Sir Paul Callaghan (2012)

*An "Apollo programme" for New Zealand*

Research strategy

Tool development

Embedded R&D

2017 -

2019 -

PROVINCIAL GROWTH FUND

JOBS FOR NATURE | MAHI MŌ TE TAIAO

IMPACT FOR ACHIEVING AND MAINTAINING PREDATOR ELIMINATION

# Research Strategy 2017-2020 Priorities

## Breakthrough Science & Transformational Research

Scoping exercise with the Biological Heritage Challenge took the ongoing research activity in the system into account and identified two key areas requiring more focus:

- Eradicating the last 1%
  - *"Current approaches for landscape scale predator management on the New Zealand mainland can reliably suppress populations by >90%, yet are unable to reliably eradicate"*

- New genetic control tools
  - *"Recent international developments indicate that new genetic approaches could potentially provide step-change population control/eradication tools for rat, possum and stoat control "*

# Research Strategy

## Breakthrough Science & Transformational Research

# 2017-2020 Highlights

ZIP
ZERO INVASIVE PREDATORS
*Enabling a new future*

# Research Strategy

Breakthrough Science & Transformational Research

# 2017-2020 Highlights

THE Cacophony PROJECT

# Research Strategy

## Breakthrough Science & Transformational Research

# 2017-2020 Highlights

genomics aotearoa

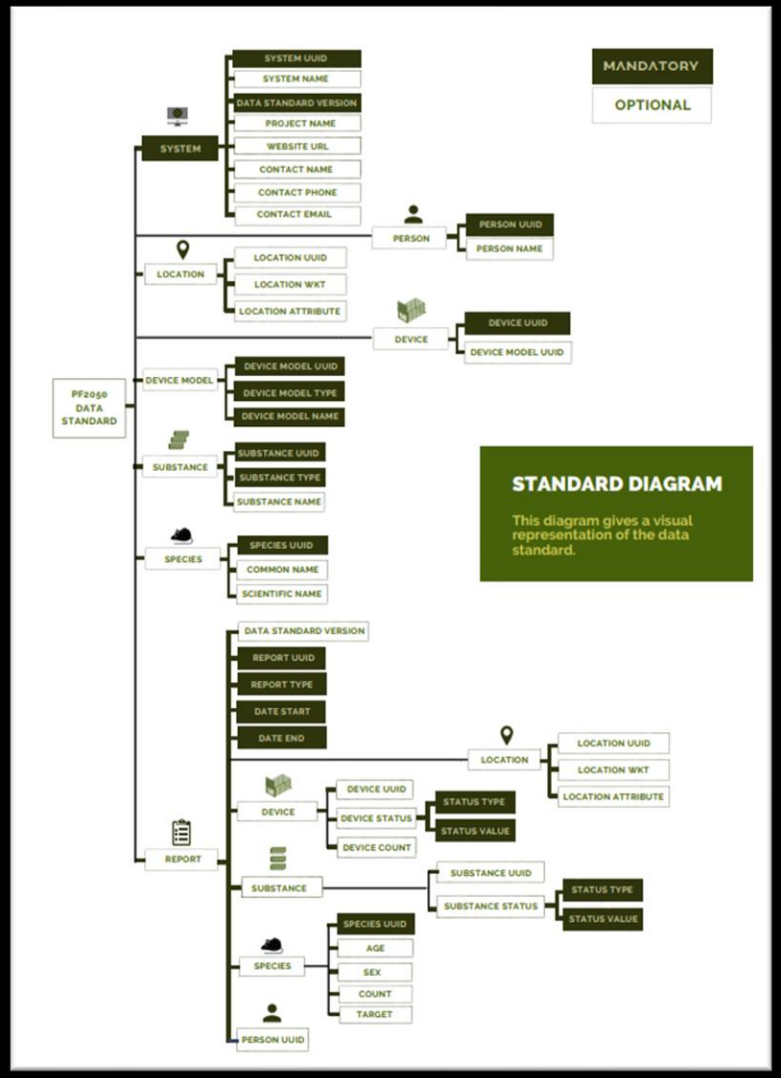
Manaaki Whenua
Landcare Research

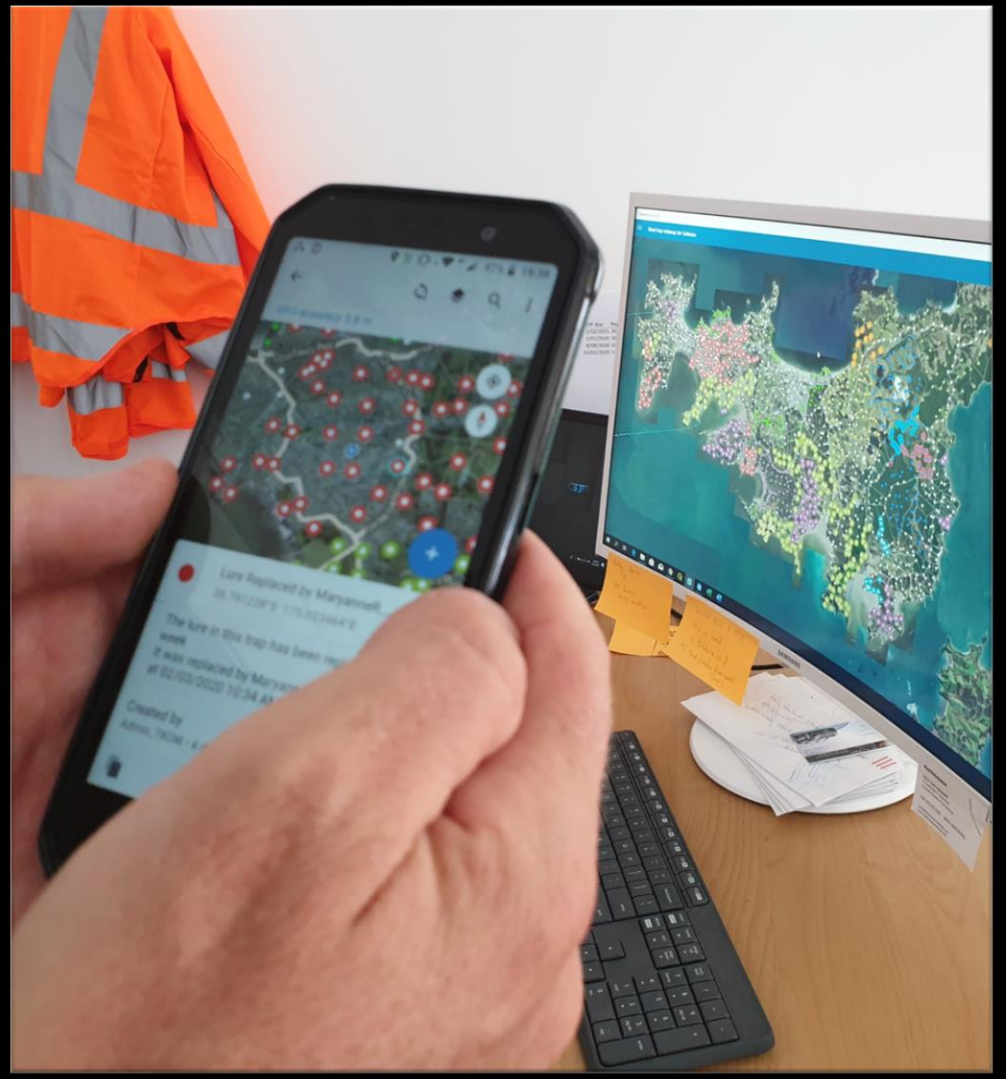
CSIRO

# Research Strategy

## Breakthrough Science & Transformational Research

# 2017-2020 Highlights



# Research Strategy 2020-2024

# Critical hurdles

**Rats and mustelids:** difficult to eliminate in all contexts with current tools and approaches

# Research Strategy 2020-2024

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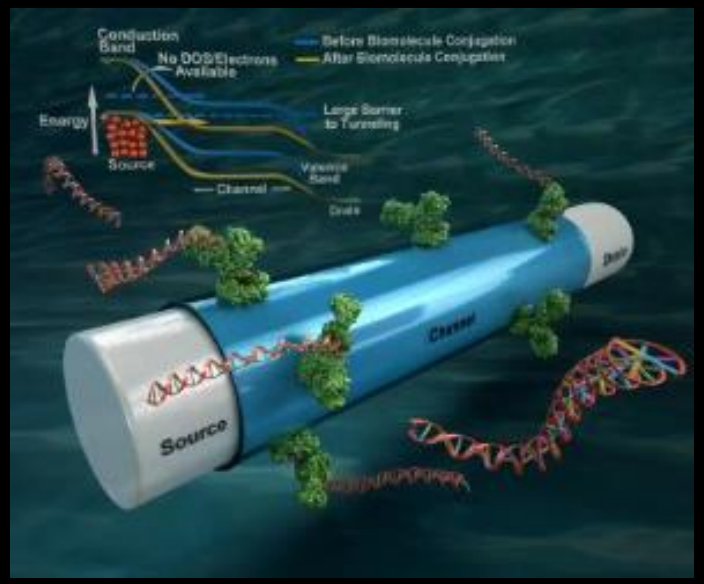
**Rats and mustelids:** difficult to eliminate in all contexts with current tools and approaches

**Remote and hard to reach landscapes:** difficulty and expense of control and surveillance deployment

# Research Strategy 2020-2024

# Highlights to date


SCION™
FORESTS ▪ PRODUCTS ▪ INNOVATION

ZIP
ZERO INVASIVE PREDATORS
*Enabling a new future*

THE UNIVERSITY of ADELAIDE

# Tool development

To date, our landscape projects need over 1,000,000 trapping devices

And also surveillance, communication and management systems

Requiring:

- design and engineering
- manufacturing and supply chains
- servicing, training and monitoring

# Meeting immediate elimination project needs

- Improved toxins (including species selectivity and ‘alternatives to 1080’)
- More efficient remote monitoring solutions (including thermal and A.I.)
- More effective trapping and control devices (including self-resetting)
- Better lures (facilitating long-term control and surveillance deployment)
- More effective remote communication solutions (including swarm satellite)

# Rapid and successful development

- 16 new and improved tools in operational use since 2019
- ~$15m in national scales to date
- International revenue
- Another 11+ new and improved tools planned for the next 15 months
- Best practice guidelines

# Product to Projects

## Available Products

### NZAuto Traps-  AT220

- Self-resetting possum/rat trap

### Manaaki Whenua/trap.nz

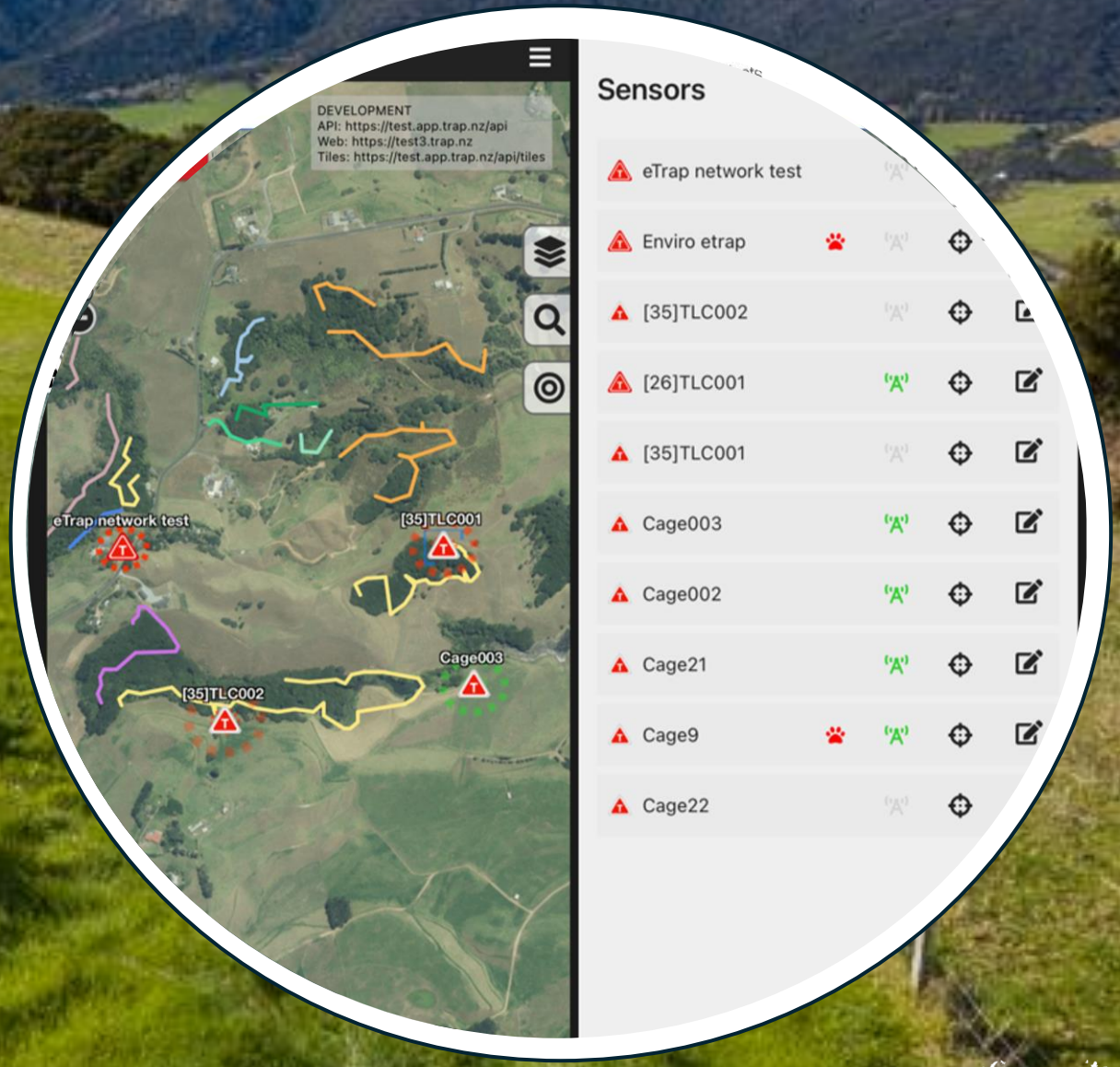
- A.I. image recognition for rapid assessment of camera trap images

### trap.nz - Deployment Module

- Support the management of initial device deployments, entirely within the trap.nz

### trap.nz - Sensor Network using Lora

- Allows sensor networks (LoRaWan) to communicate directly to TrapNZ



# Product to Projects

## Available Products

### The Cacophony Project

- Multi-species high interaction rate live trap

### Critter Solutions Limited- EzyLure

- Automatic multi-species lure dispenser

### Boffa Miskell- PoaUku

- Mustelid & possum/rat long-life lure

### eTrapper- BaitSense

- Real-time bait monitor (possum and rodent)

# Product to Projects

## Zero Invasive Predators

### A.I Camera (2025 wider use)

- Remote reporting detection device

### Drone Truck (Available)

- Aerial drone bait delivery truck guidelines

### Motolure (Available)

- Automatic lure dispenser

### OutPost (Available)

- Remote reporting for trapping devices

### ZIPinn (2025)

- Combination trap with lure, remote reporting, humane kill function and escape-proof design

### Toxic rodents (2025/2026)

- Pre-poisoned rodent carcass

# Korehāhā Whakahau

## Mātauranga Research

- Extensive **literature review** is ongoing
- Interviews with a number **notable holders** of mātauranga
- Development of staff training programmes- e.g., **mātauranga sessions conducted in the bush**
- Exploring ways data capture can be designed to meet current management and mātauranga objectives
- Written and audio-visual resources that outline the KW mātauranga processes
- Late 2024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# Invasive Pest Control Ltd.

## Norbormide

- Completed all Norbormide **paste** bait pen and field trials (Norway and ship).
- Registration application lodged with both EPA and ACVM and responses to specific questions are underway.
- Successful Norbormide **solid bait** (Norway rat) field trials completed (two trial sites saw a 93% and 100% reduction).
- Solid bait for ship rat was not successful, more research to be funded to complete solid bait for ship rats and re-test on Norway rats.
- Next steps best practice use and further field trials.


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## Envico Technologies Limited

### Stoat Spitfire (paused)

- This development is now paused due to toxin development issues.
- The aim is to continue development once additional funding is secured.

### Possum Spitfire (late 2024)

- D+C
- Large scale field trials are underway

### Rat (2025)

- Toxin development underway
- Small scale interaction trials are underway

# Critter Solutions Limited

## Flexi-comms (2024 - 2025)

- Long-life, remote comms systems for both traps and monitoring devices.
- 2 versions: cellular (available for OEM); and satellite (available next year).
- Real-time notifications, data and images via the Flexi-comms website.
    - APIs available to send data to other platforms  e.g. trap.nz
- Trap version will retrofit to almost any existing trap.
- Provides easy-to-use comms for other devices wanting to upload images and data.

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# Critter Solutions Limited

## AI Kill Trap (late 2024)

- A single trap capable of killing possums, mice, ship rats, Norway rats, weasels, stoats & hedgehogs.
- NAWAC complete for mice, rats, weasels, stoats, ferrets and hedgehogs.
- Possum NAWAC is underway.

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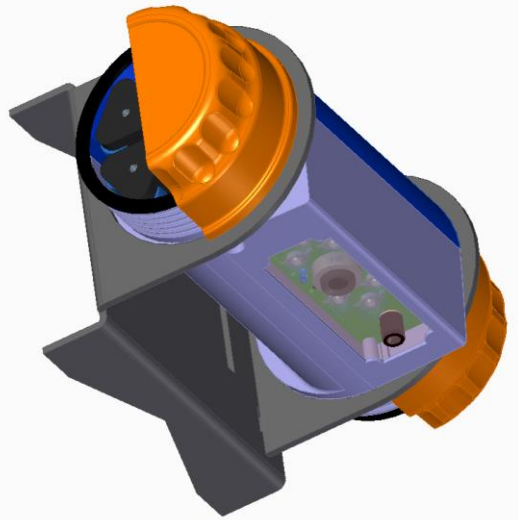
# Critter Solutions Limited

## AI Camera (late 2024)

- Thermal-based trigger (day & night operational)
- High probability of detection (>PIR cameras)
- Lightweight, portable and lower cost
- Low power & long-life (3-6 months on AA batteries)
- Real-time, onboard AI classification and notifications to users
- Links to visual dashboard
- Ability to ID all target pests and send real-time pic of target detected to user



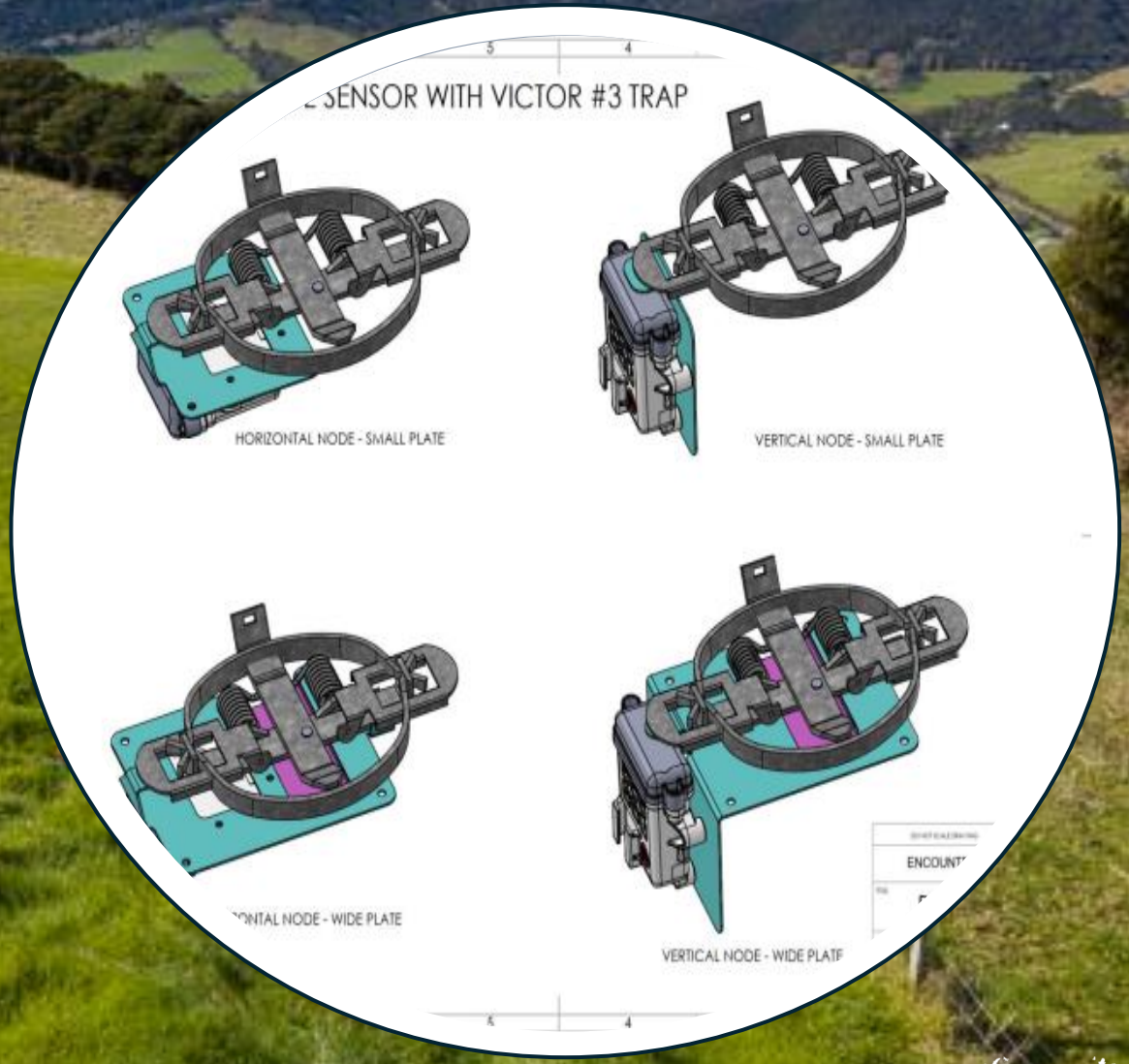
# Encounter Solutions Ltd.

## Live Capture

- Enable live capture traps and leg-holds to be locked remotely on command or on a predetermined schedule.
- Leg-holds are available for purchase
- RFID Live Capture traps being tested

## Remote Network Best Practice (Available)

- Learning management system- Overview and best practice guidance on remote monitoring systems.
- Can be accessed via the PF2050 Limited Website.



# Hammerforce

Airbow (2025)

- Rat and Possum self-resetting trap
- NAWAC Class A complete for possum, rat underway
- No electronics, automatic lure compatible (e.g. EzyLure, Poa Uku etc.)
- Field trials underway

# Goodnature

AutoRat (2025)

- Rat self-resetting trap
- Urban focus
- Real-time notifications
- Trigger and interaction trials underway

Aerial microtrap (2026)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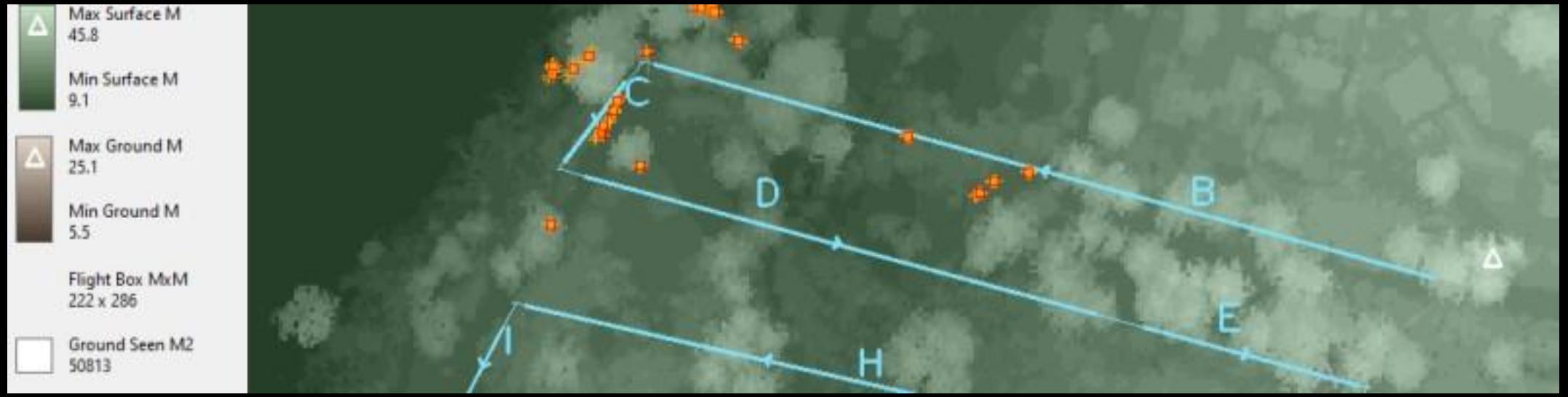
# Embedded R&D




Operationalising drone thermal camera surveillance with A.I. image recognition

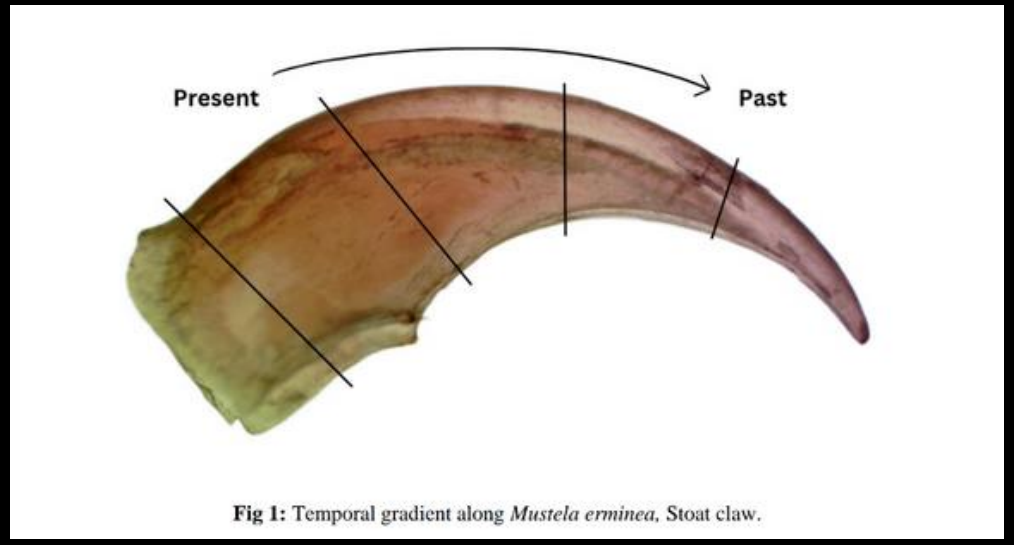



**Fig 1:** Temporal gradient along *Mustela erminea*, Stoat claw.

Tracing animal origins using biochemical tracers

# Embedded R&D

Remote-reporting communication networks for A.I. cameras

Refining A.I. models for rat detection in trail camera images

Lure improvements for traps

Best use of detection dogs

# Acknowledgements

## Embedded R&D

SkyComb Limited
University of Otago
ASG Technologies Limited
FTP Solutions NZ Limited
Lincoln University

## Tool developers

Boffa Miskell
Critter Solutions
Encounter Solutions
Envico Technologies
eTrapper
Goodnature
Groundtruth
Hammerforce
Invasive Pest Control
Manaaki Whenua Landcare Research
NZ Autotraps
Red Fern Solutions
The Cacophony Project
Zero Invasive Predators

## Research Strategy

Manaaki Whenua
Zero Invasive Predators
The Cacophony Project
Cornell University
CSIRO
Econode
Envico Technologies
Groundtruth
Massey University
Noos
Papa Taioa Earthcare
Te Manahuna Aoraki
The Catalyst Group
University of Auckland
University of Otago
Victoria University of Wellington
EcoNet
Island Conservation
Genomics Aotearoa
Plant and Food Research
AgResearch
Scion
SfTI Challenge
Lincoln University
Canterbury University
University of Adelaide
Ahika
University of Melbourne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