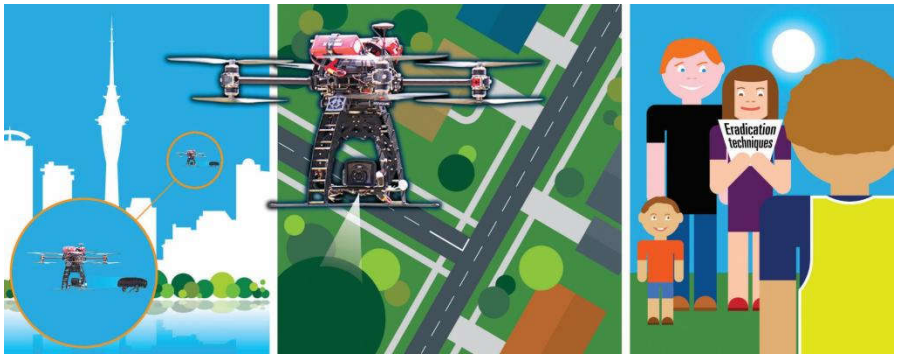
Incursion response in urban areas

Tara Strand 17-October-2017



Research aligned with: B3 Science Solutions for BETTER BORDER BIOSECURITY www.b3nz.org
NEW ZEALAND'S BIOLOGICAL HERITAGE National SCIENCE Challenges
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Biosecurity:
Urban environments are typical entry pathways

- Managing biosecurity risk is a high priority for New Zealand
- Risks of damaging insect pests and pathogens entering New Zealand are increasing
- Eradication operations in urban environments are constrained by public concerns and environmental issues
- Broadcast aerial pesticide application is often the most effective tool but is also the least socially acceptable
- Locating source pest populations takes time; delays increase the likelihood of pest spread and the need for broadcast aerial application

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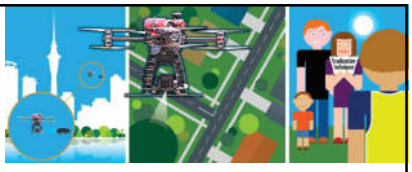
A Toolkit for urban responses



1. New active surveillance technologies – speed up responses
   - Cyborg surveillance and deployment of active sensors
   - Public engagement in surveillance
2. Targeted eradication tools – achieve efficacy and reduce environmental and social impacts
   - Helicopter spot spraying
   - UAV spraying
   - Pesticide / non-pesticide strategies
3. Improved risk communication and engagement – maintain licence to operate
   - Risk communication and engagement strategies within agencies
   - Protocols for agencies to use with new technologies
   - Strong link to Māori Biosecurity Network

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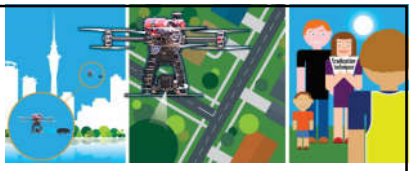
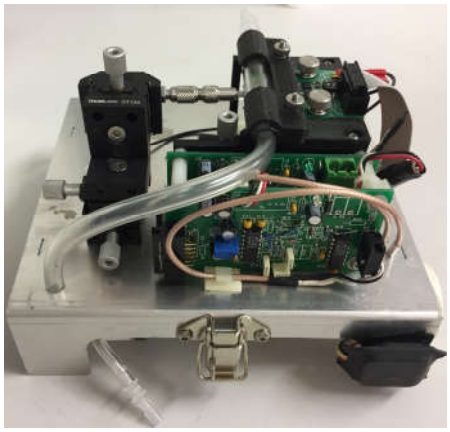


1. New active surveillance technologies – speed up responses
   - **Cyborg surveillance and deployment of active sensors**
   - Public engagement in surveillance (Bioheritage NSC linked project)



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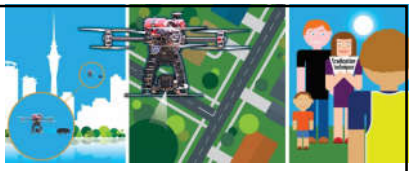

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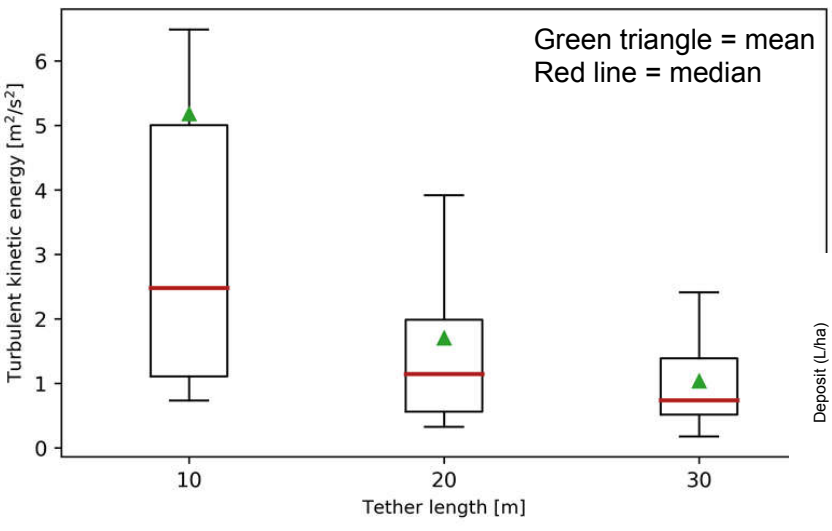
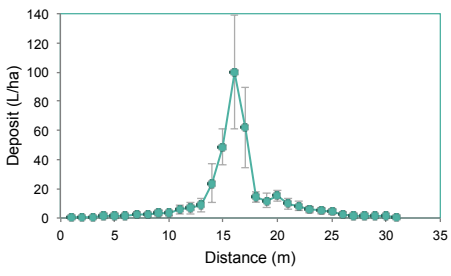
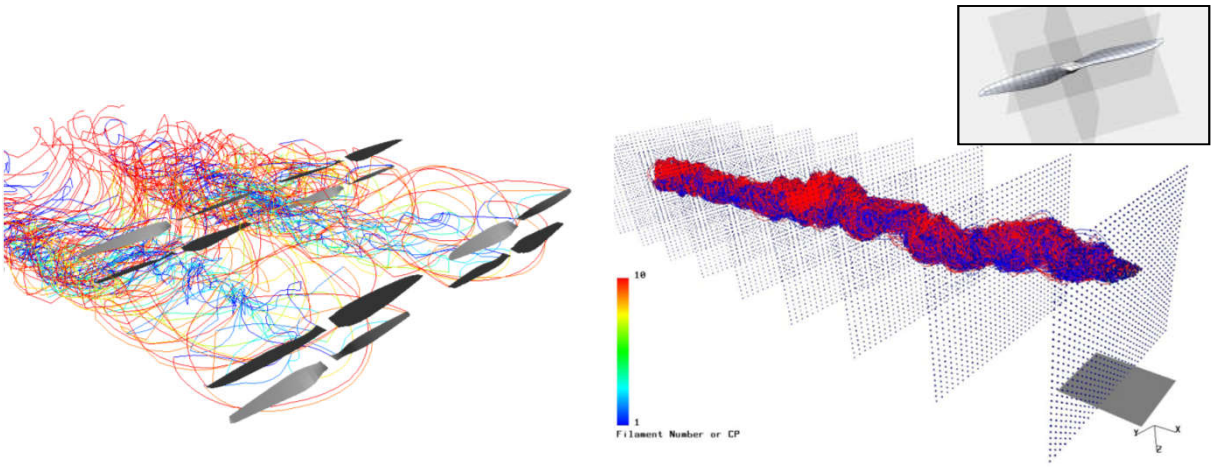
Resultant wake energy (TKE)





RESEARCH

UAV wake characterisation for AGDISP implementation



- Modelling undertaken by Continuum Dynamics Inc. / US Forest Service based on Aeronavics UAV platform
- Implementation into AGDISP by December 2017

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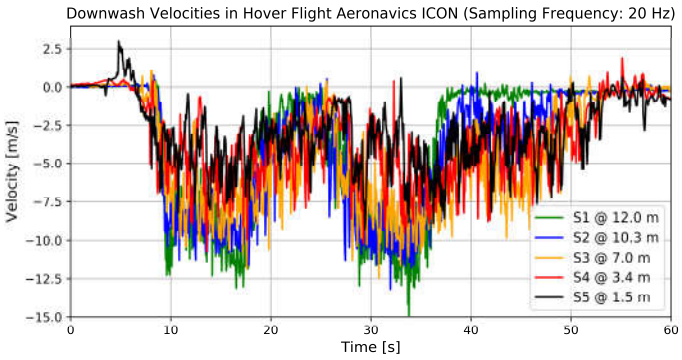
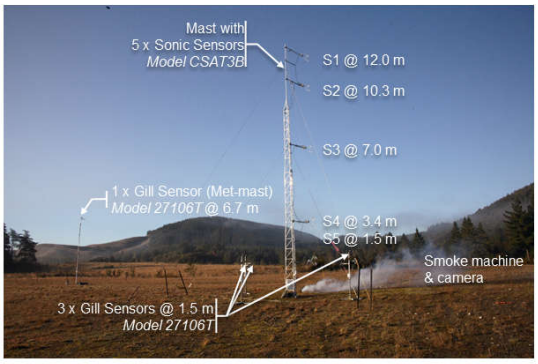
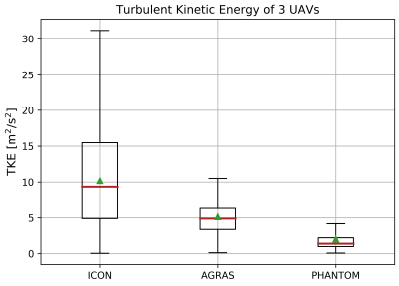
UAV Wake Study



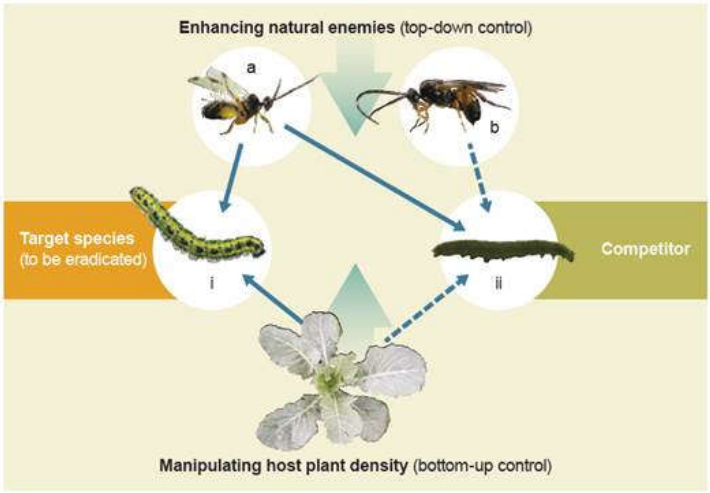


Vehicle	Weight [kg]
Aeronavis ICON	31.5 / 44.0
Aeronavics NAVI	7.5
DJI AGRAS	14.5 / 24.5
DJI Phantom	1.4



Pesticide / non-pesticide eradication strategies

"Top-down": natural enemies - predators, parasites, pathogens



"Bottom-up": resources such as food and shelter

- Push population to collapse by enhancing:
  - Natural enemies
  - Failure to find mate
  - Introduce competitor
  - Removal of host plant
    - Physical
    - Pesticide

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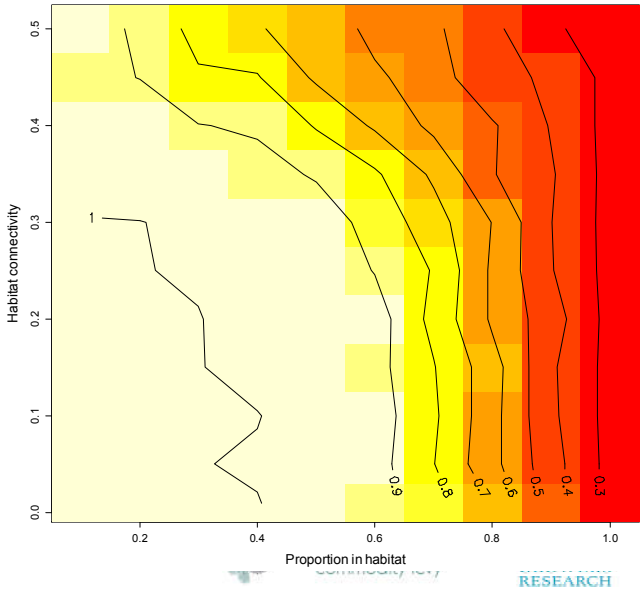
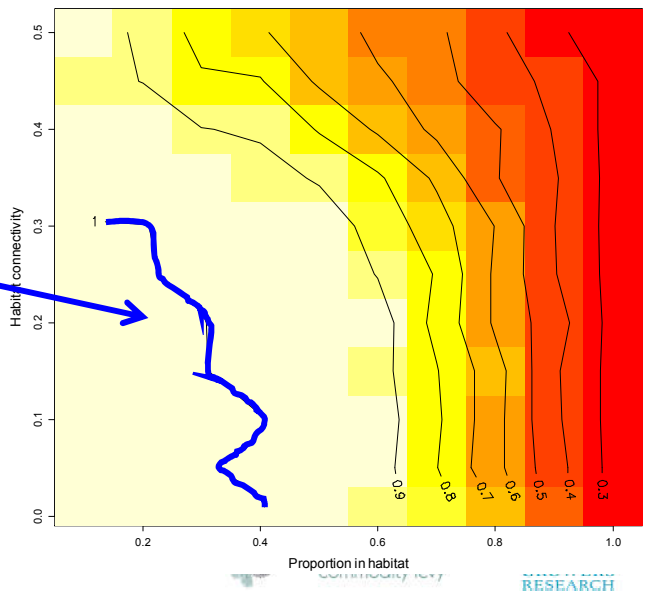
Decreasing connectivity and amount of habitat → increased probability of eradication (for European gypsy moth)



Decreasing connectivity and amount of habitat → increased probability of eradication (for European gypsy moth)

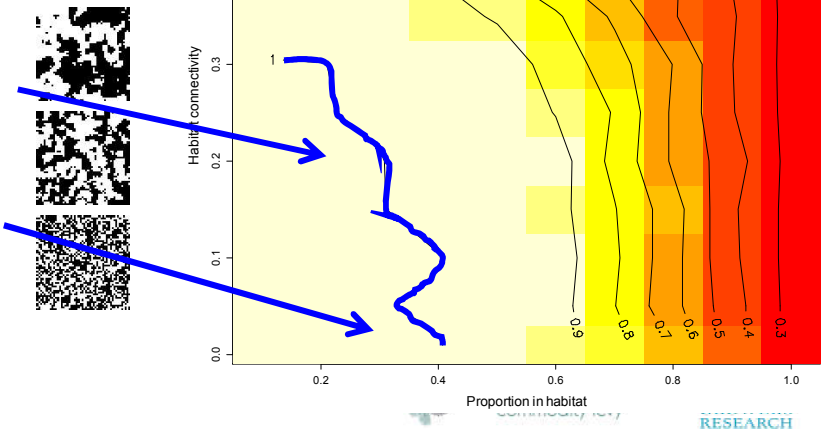
Indicates eradication



Decreasing connectivity and amount of habitat → increased probability of eradication (for European gypsy moth)

Indicates eradication

Model exploration:
Do not have to eliminate all of habitat if highly fragmented



RESEARCH

Taking this to the field

- **Objective:** Evaluate eradication theory experimentally through host removal and reduced habitat connectivity

Model system – Using an approved biocontrol

- **Invasive weed: *Tradescantia fluminensis***
- **Biocontrol agent: *Neolema ogloblini***

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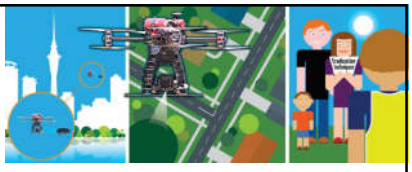

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Social / Cultural research steps

Social licence to operate

Understanding SLO

Stakeholder analysis

- Who to involve
- How to engage

Bring in new perspectives

e.g. technology design

Assessing complex tasks

e.g. general surveillance

- Taking an agency focus
- Tools and approaches to bring social/cultural considerations into research, design and operations
  - Engagement protocols for new tools developed

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UAV Social Licence to Operate Spectrum

- Rapidly advancing area of technology

- Terrorist attacks

- Crowd monitoring

- Entertainment
- Search and Rescue

- Medical supply

- Military applications

- Parcel delivery

- Whale conservation

- Wide range of public perception

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Contributors

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- Christina Dunker
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- Amanda Baron
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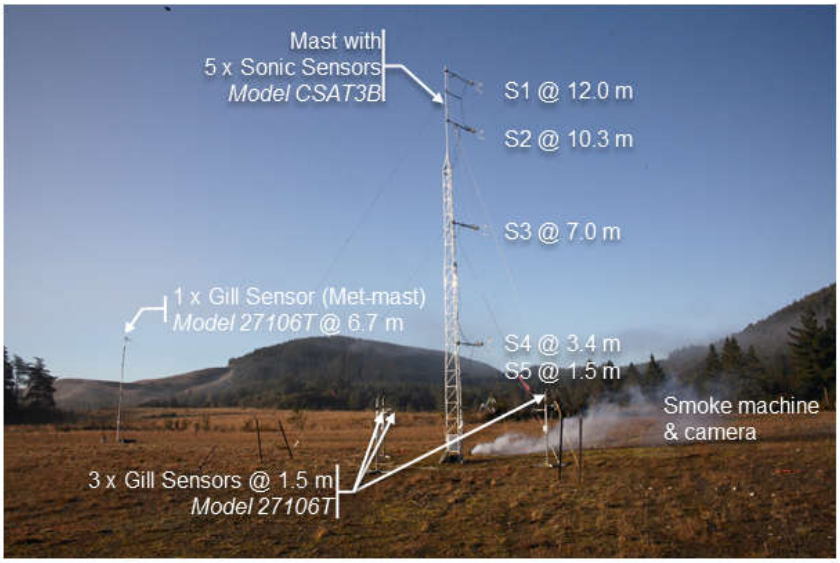
- Andrea Grant
- Will Allen
- Lynsey Earl



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scion GROWERS RESEARCH

Science collaborators

Will Allen & Associates

Stakeholders / oversight

Includes Bioheritage NSC project

Local Government Biosecurity Working Group

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