Drones and public perception: enabling codesign to achieve social licence to operate



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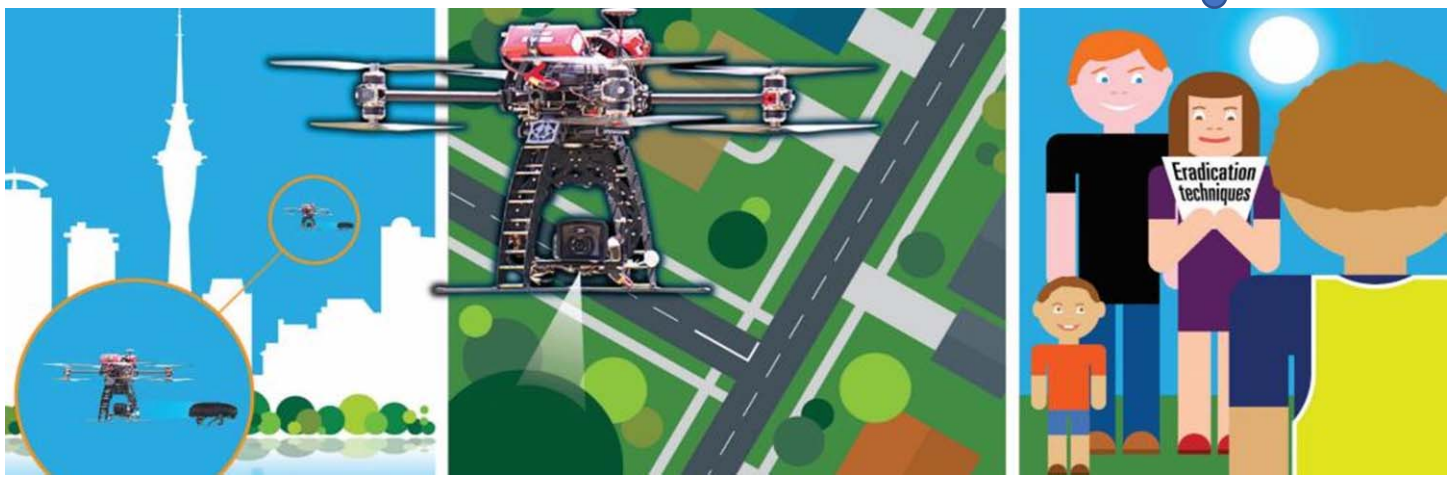

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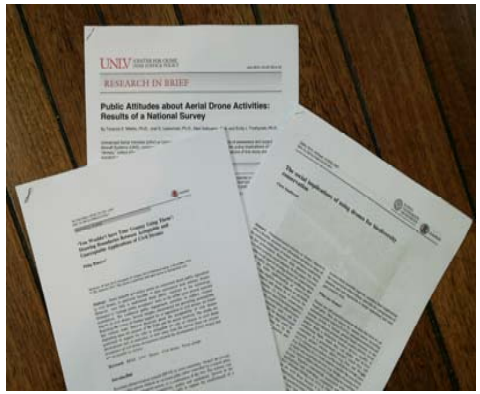
Underpinning connection

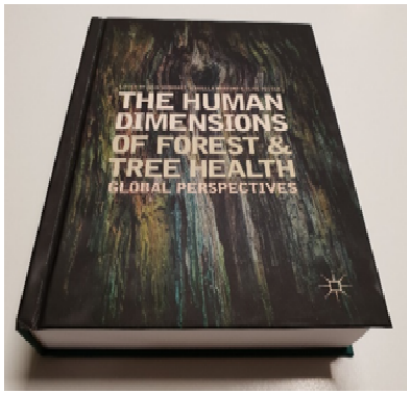
- A tool can be technologically perfect, (e.g. achieve eradication) but fail if communities don’t like it

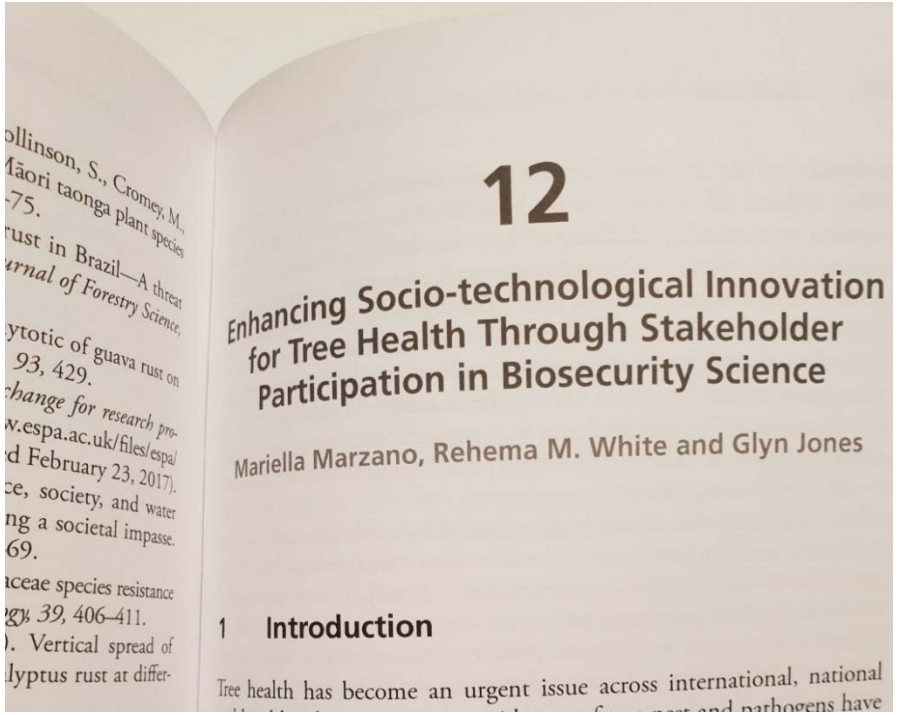
- Community opposition, dislike, distrust of a technology is akin to technological failure

Literature review, UAVs

- Emerging topic in peer-reviewed journals
- Key take-home messages
  - People make nuanced decisions about acceptability depending on purpose of flight and actors involved
  - Call to strengthen the role of citizens in civil UAV development
  - ‘Forcing’ Acceptance vs Adoption (arising from **co-design**)







Co-design

- Users participate in the design process
- Enhanced when methods are visual, creative, tactile
- Participants feel empowered, reflective, more amenable to change
- Shared understanding

UAV usages

- Wide current range of UAV applications
- Equally wide range of social perceptions
  - Social Licence to Operate Continuum

- Surveillance

- Entertainment

Negative **Positive**

- Military applications

- Parcel delivery

- Search and Rescue

Research questions

- What are people's perception of different UAV applications?
  - Survey, discussion
  - But need to go beyond just "asking users what they want"
  - "If I had asked people what they wanted, they would have said faster horses." ~ Henry Ford

- How can we initiate the co-design process?
  - It is our role as designers to facilitate that participation
  - Codesign workshops make heavy use of visual materials as a way to assist people to make and communicate associations and experiences
  - Visual, tactile

Survey: 13 broad categories presented

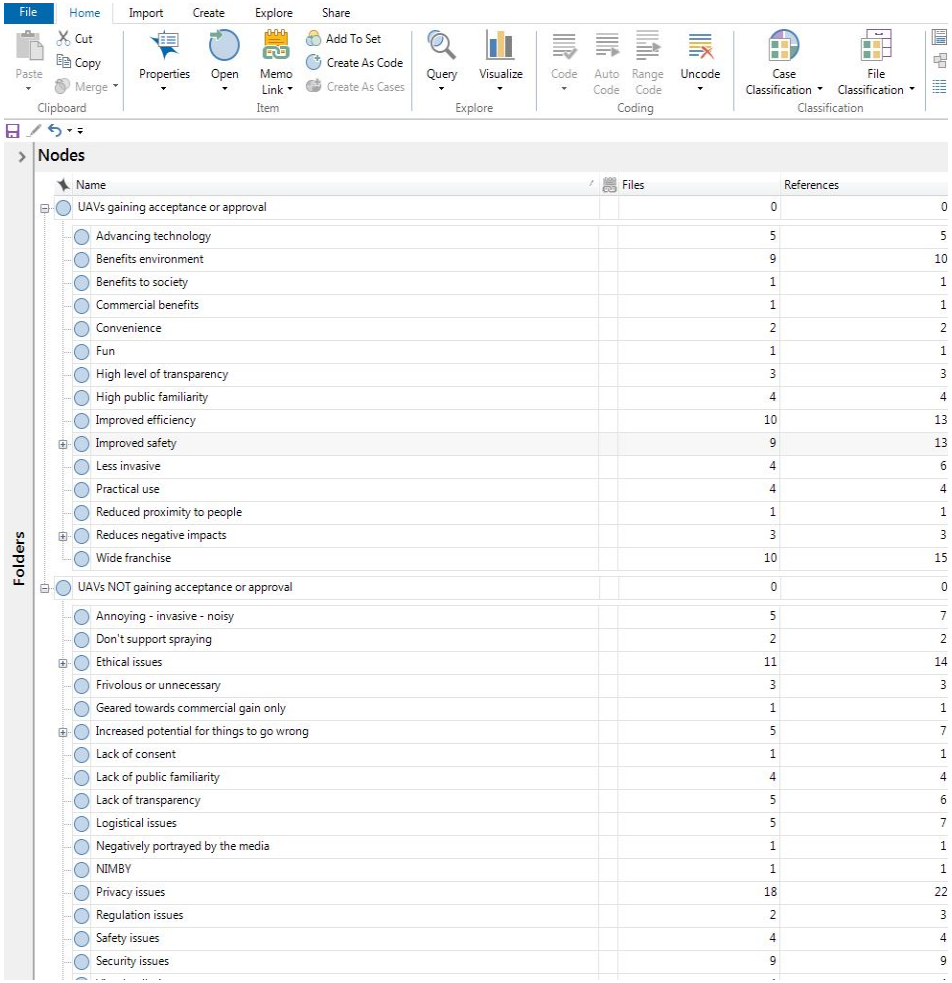
Cargo delivery (e.g. door to door delivery of online purchases)
Military combat use (e.g. UAV carrying aircraft ordinance such as missiles, usually used for drone strikes)
Military reconnaissance (e.g. scouting, gathering information about natural features and enemy presence)
Search and rescue (e.g. airborne lifeguards, disaster site inspection)
Hobby and recreational use (e.g. private photography / videography)
Surveying (e.g. topographical mapping, geophysical surveying, archaeological mapping)
Conservation (e.g. pollution monitoring, anti-poaching, locating wildlife)
Commercial surveillance (e.g. livestock monitoring, wildlife mapping, pipeline security, home and infrastructure security, road patrol)
Law enforcement (e.g. surveillance, crowd monitoring)
Commercial and motion picture filmmaking (including newsgathering and journalism)
Light show (e.g. UAVs equipped with LED's for night-time aerial displays as an alternative to fireworks)
Active Biosecurity (e.g. targeted spraying for urban pest control)
Passive Biosecurity (e.g. surveillance, identification of pest species)

Survey

- Participants asked to place each category on the SLO continuum: *"How publicly acceptable do you think each category of UAV use will be?"*
- Positive aspects of UAV uses: *"Please give reasons why you placed categories nearer the green end"*
- Negative aspects of UAV uses: *"Please give reasons why you placed categories nearer the red end"*
- Visual, tactile

Analysis

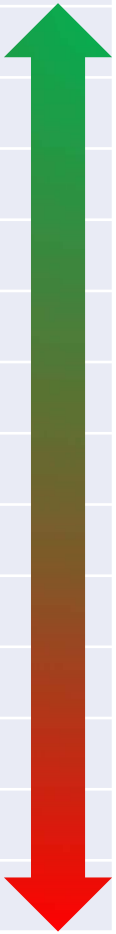
- 25 participants
- Pilot test, people in biosecurity space
- UAVs assigned relative score along continuum. Averaged across all participants
- Survey responses and subsequent discussions transcribed and coded into themes using NVIVO software



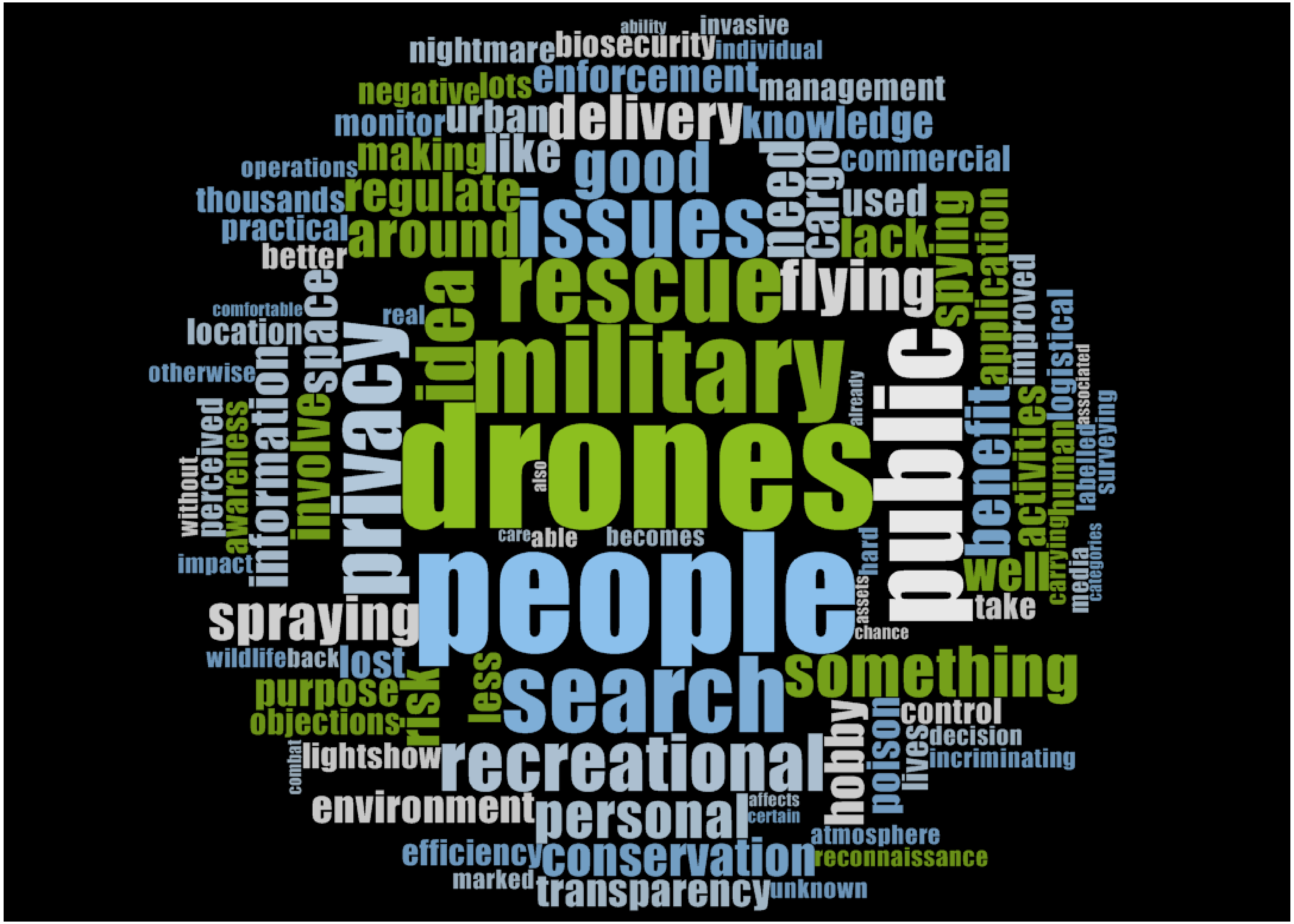
Name	Files	References
UAVs gaining acceptance or approval	0	0
Advancing technology	5	5
Benefits environment	9	10
Benefits to society	1	1
Commercial benefits	1	1
Convenience	2	2
Fun	1	1
High level of transparency	3	3
High public familiarity	4	4
Improved efficiency	10	13
Improved safety	9	13
Less invasive	4	6
Practical use	4	4
Reduced proximity to people	1	1
Reduces negative impacts	3	3
Wide franchise	10	15
UAVs NOT gaining acceptance or approval	0	0
Annoying - invasive - noisy	5	7
Don't support spraying	2	2
Ethical issues	11	14
Frivolous or unnecessary	3	3
Geared towards commercial gain only	1	1
Increased potential for things to go wrong	5	7
Lack of consent	1	1
Lack of public familiarity	4	4
Lack of transparency	5	6
Logistical issues	5	7
Negatively portrayed by the media	1	1
NIMBY	1	1
Privacy issues	18	22
Regulation issues	2	3
Safety issues	4	4
Security issues	9	9

Findings

UAV category	Average relative score
Search and rescue	11.5
Conservation	11.2
Surveying	10.6
Passive biosecurity (surveillance)	8.2
Commercial surveillance	7.9
Light show	6.8
Commercial and motion picture filmmaking	6.6
Hobby and recreational use	6.4
Cargo delivery	5.8
Law enforcement	4.3
Active biosecurity (spraying)	4.0
Military reconnaissance	3.1
Military combat use	1.4



Findings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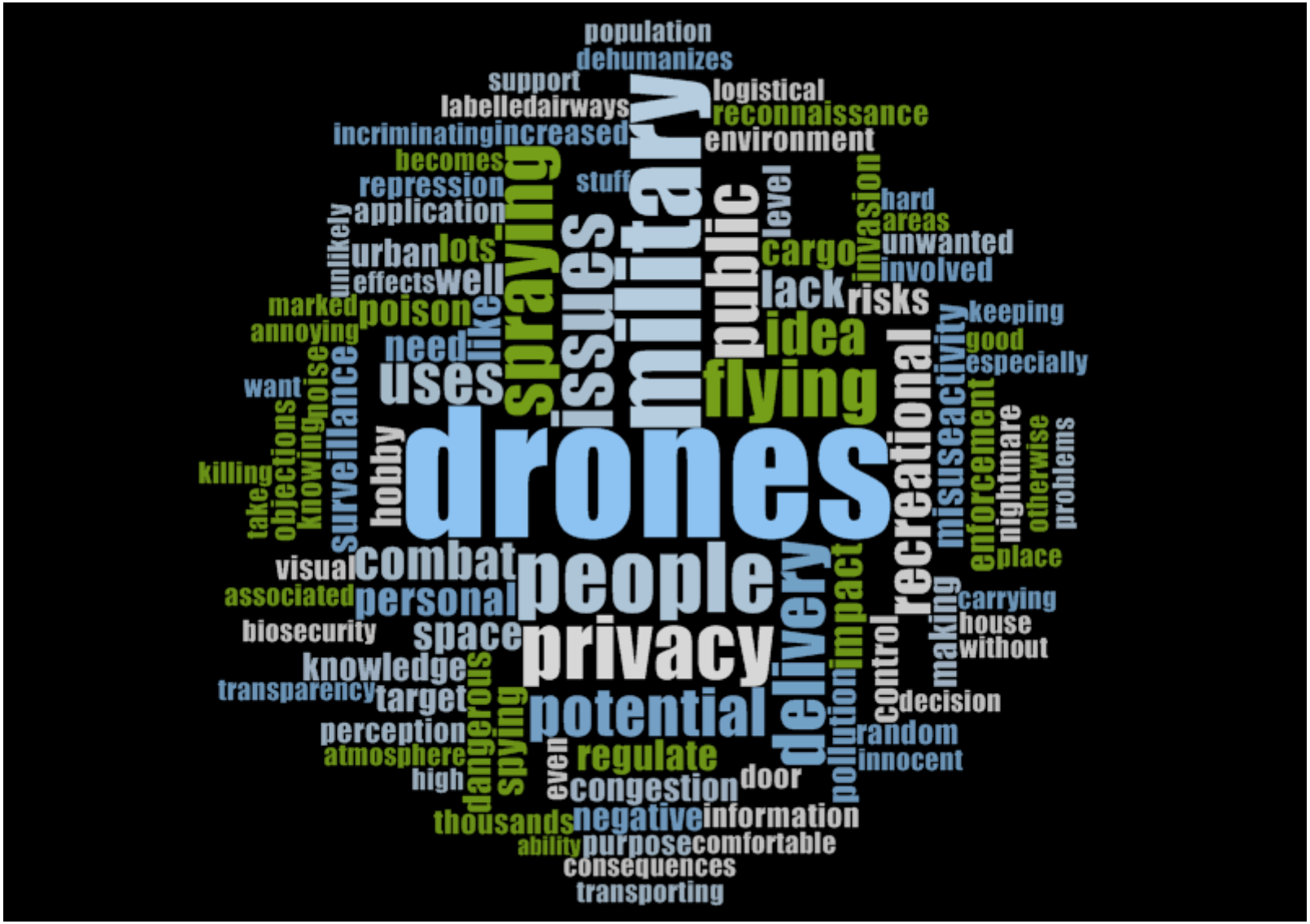
Findings (positive)

Findings (negative)



Findings: good UAV use/design

- **Improved efficiency**

"Streamlines things. Easier to search with drones than sending out a team of people. Also cheaper"

- **Improved human safety**

"Can be used to save lives"

- **Benefits the environment**

"Does environmental good with no obvious negative aspects"

- **Wide franchise**

"Wide application, good for both the environment and economy"

"Can be used to save lives or improve the environment"

- **High public familiarity**

"Certain activities are already happening now, so there is a social awareness of UAVs for these purposes"

Findings: bad UAV use/design

- **Privacy issues**

"Law enforcement and military combat drone use is an invasion of privacy"

"Becomes a privacy issue, potential for spying and foul play"

- **Ethical issues**

"Military drone use dehumanizes people. Victims are no longer real people"

- **Security issues**

"Big brother society, unseen repression. Potential for unwanted surveillance of people"

- **Lack of transparency / public consent**

"I have issues around who manages their application and the lack of ability for public to have a say"

- **Annoying – invasive – noisy**

"Don't want drones flying around at every event. They're noisy, invasive and detracts from the experience. They take away from the natural environment"

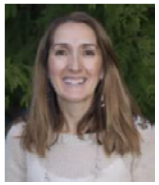
Lessons to bring back to the designers

- Involving people in the design process requires us to move from experts to facilitators
- We need to move from just interviews and focus groups to establish spaces where ideas can be generated, explored and documented. These are:
  - Visual and expressive
  - Physical and tangible
  - Provide framing to support relevant ideas and creativity
  - Activities should be relevant and engaging

Concluding remarks

- Discovering process of discussion / tactile nature of this survey method – process is the important part
- Way to have deep and connected conversation
- Co-design of a tool / technology
- Tactile tool (‘changing hearts and minds’) opens discussion, more amenable to changing perception of spraying
- Co-design process is continuing, with better tools for connection, and subsequently better tools for biosecurity responses

Acknowledgments – wide community of practice



Dr Mariella Marzano (Forest Research, UK)

UK Forestry Commission • social dimensions tree health

Qualitative social research • community dialogue & participation • community resilience

Sustainable development • participatory action research • community engagement

Mātauranga Māori • community engagement • community resilience

Dr Will Allen (Learning for Sustainability)

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Melanie Mark-Shadbolt (Lincoln University)

Dr Shaun Ogilvie (Eco Research Associates)

Mātauranga Māori • environmental science • ecotoxicology

Socio-ecological research • environmental science

Alaric McCarthy (Eco Research Associates / Cawthron Institute)

Dr Andrea Grant (Scion)

Dr Nick Waipara (Plant and Food Research)

Mātauranga Māori • plant pathology • environmental science

Risk communication• participatory action research • stakeholder engagement