Remote Sensing Cluster Group

Tools for foresters

Annual Update 2022-2023

PRESENTED BY:
ROBIN HARTLEY

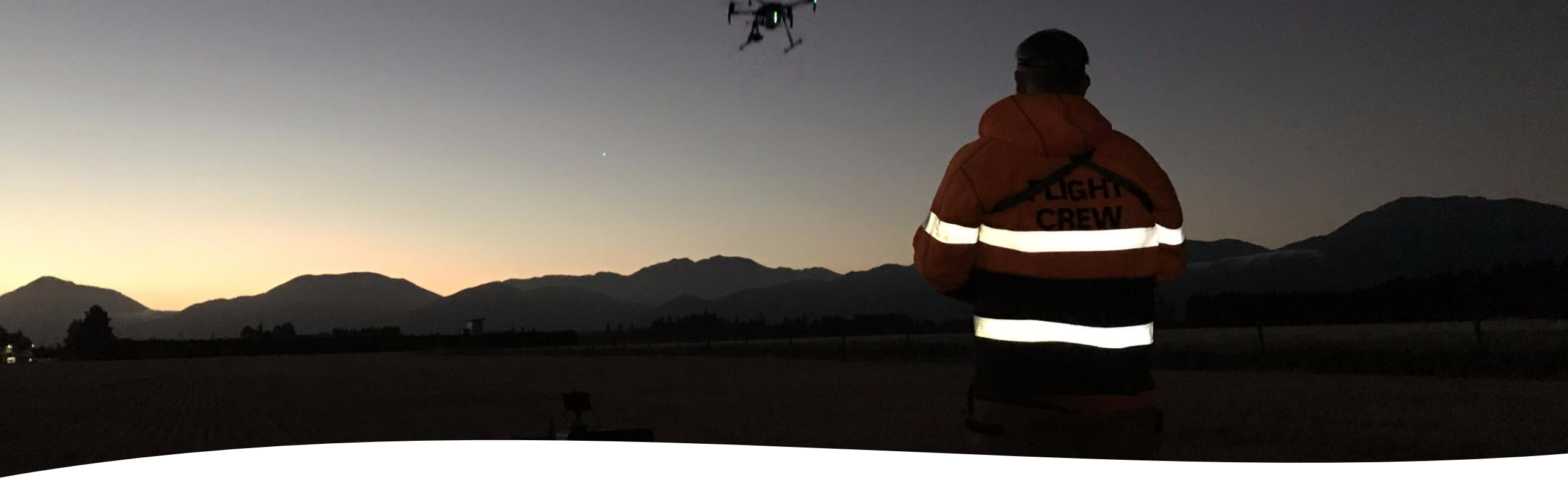
forest tech 23

Remote Sensing • Inventory Management • Mechanised Silviculture

Vision:

"Eyes in the air, reducing the boots in the blackberry"

Tools for foresters



Aims

- Create a network
- Disperse knowledge
- Be an advocate for tech users
- Instigate trials
- Familiarise technology
- Democratise technology
- Drive stretchy research
- <u>Standardise & professionalise UAV operation</u>

Tools for foresters

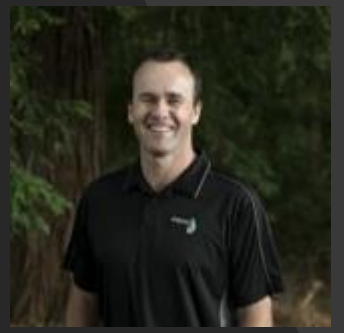
Tools for foresters

Update

- Update on the committee
- Tech Tuesdays update
- UAVNZ conference
- Developments in industry use of UAVs
- UAV Applications updates
- Research updates
  - UAV survival surveys
  - Deep learning
  - UAV post-thin stocking assessments
- Funding
- Website update
- Mailing list update
- Newsletter
- Next steps

Meet the Team

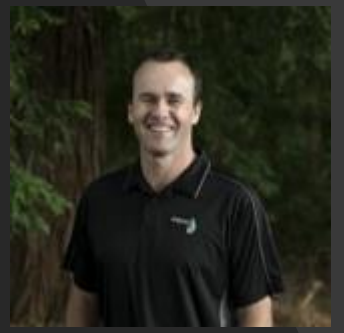
- Ben Doherty – Te Uru Rākau
- Cherie Rangiahua – Whenua Oho
- Craig Morley – Toi Ohomai/Te Pūkenga
- David Herries – Interpine
- Frazer French – Forest360
- Guy Bonner – City Forests
- Jack Burgess – Port Blakely
- Kevin Ihaka – Forest Protection Services
- Mike Wilson - Timberlands
- Morgan Scragg – Pan Pac
- Paul Cox – Precision Air Space Ltd
- Peter Massam – Scion
- Robin Hartley – Scion
- Sebastian Klinger – PF Olsen
- Vega Xu – Te Kura Ngahere (UC)



Meet the Team

- Geospatial Researchers
- Surveyors
- Digital and Data specialists
- Forest Managers
- Foresters
- Silvicultural contractors
- Fire Fighters
- Conservationists
- Land Use Advisors
- Remote sensing contractors
- Government Agencies
- Lecturers/Professors
- Pilots/spray contractors

- We have a broad range of skills, interests and experience in our team, and even more in our wider network!
- Working on problems alone is not going to help industry to adopt new technologies, we have to work together!



Thanks to outgoing committee members

- **Camilo Rojas Orrego – Envico Technologies**
- **Claire Stewart – Scion (now FGR)**
- **Matt Cotterrell – Forest Management Ltd.**
- **Mitch Cooke – Port Blakely**

Mitch and Matt were founding members of TFF so I just wanted to reiterate a massive thanks for their contribution over the years!

Tech Tuesdays

Earlier this year new seminar series called “Tech Tuesdays” announced through Scion’s social media channels.

Intended to take over from our newsletter that we were struggling to find time for.

Due to start in September and run to mid-December.

Series of 10 to 20 minute videos answering common questions about UAV operations within the forestry industry.

These will be made available through the TFF discord forum.

Due to departures from Scion’s team we have not have the resources to launch this

As this delay has been ongoing I felt it was time to give an update.

Recently been talking with a committee member who has kindly volunteered to take over coordination of the series.

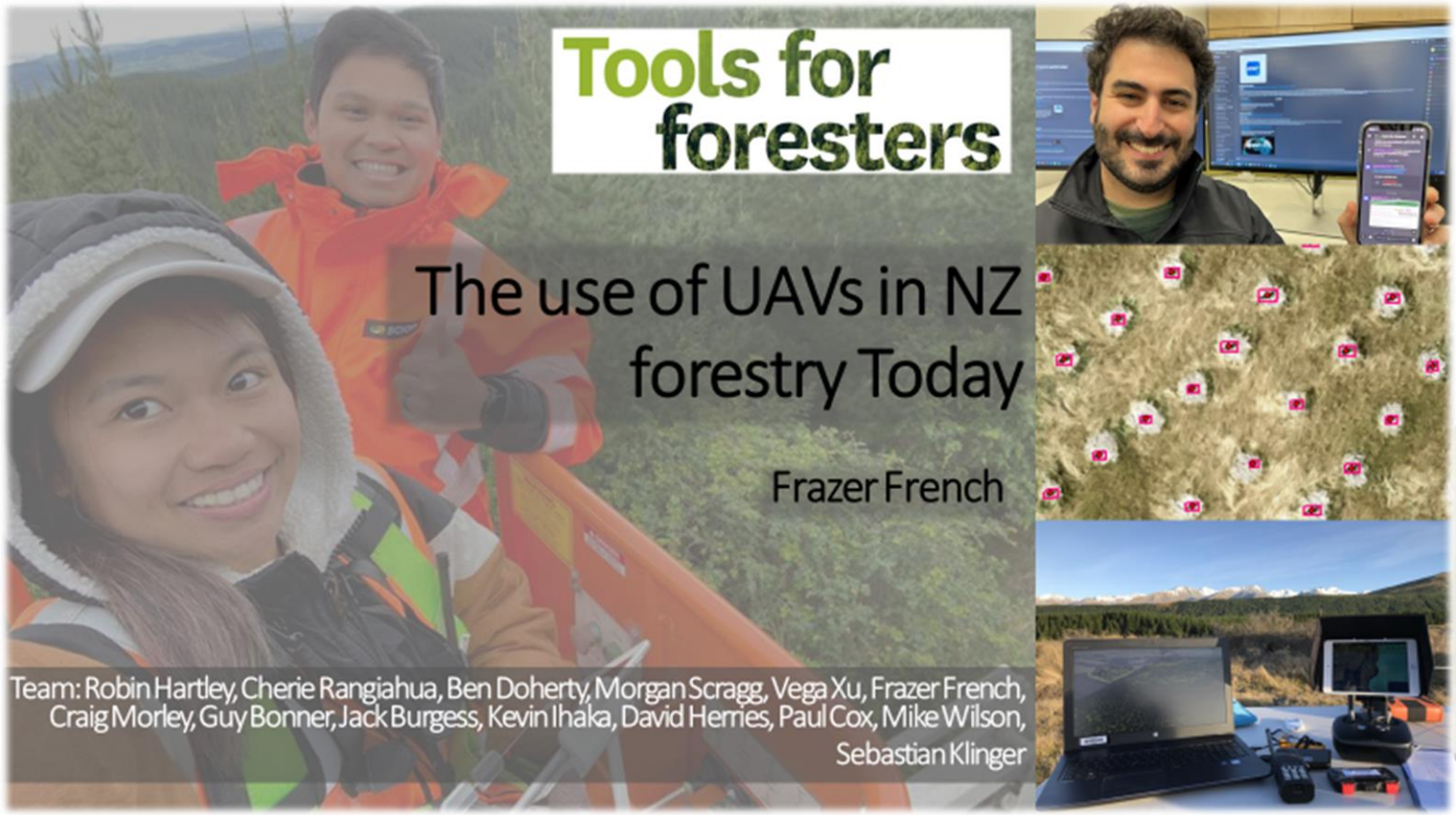
Stay tuned for an update on the progress…

Tools for foresters

UAVNZ Conference

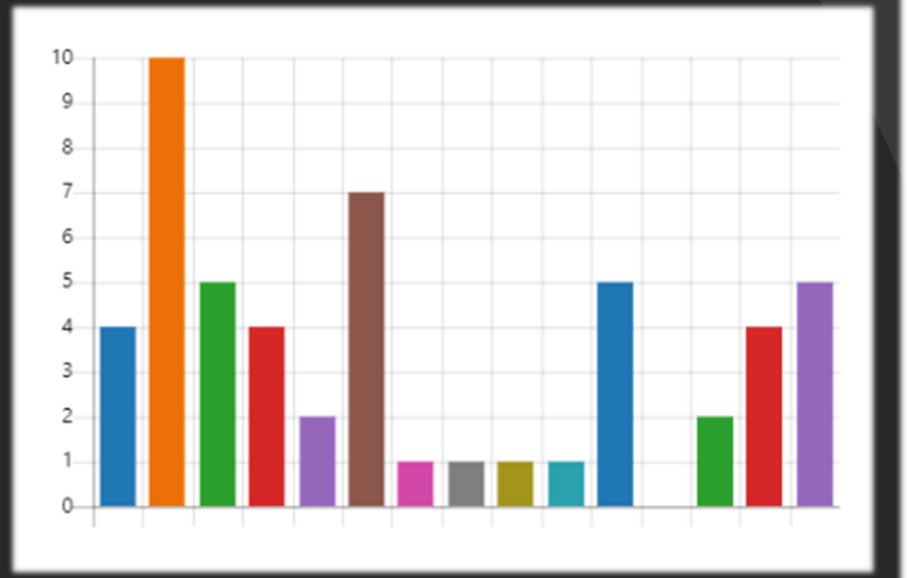
- Frazer French from TFF committee/Forest360 recently gave a presentation on how we are using UAVs as an industry at the annual UAVNZ conference
- Part of a session exploring the use of UAVs in primary industries
- It put forestry in a really progressive light and showcased a lot of very innovative UAV use by a number of great forestry organisations
- Thanks to the TFF committee for sharing your UAV operations and some cool pictures!

– great work Frazer!



Industry use of UAVs in NZ

- **Most companies are now using UAVs**
- **Within our committee alone we have companies that:**
  - **Operate 2-27 UAVs (average 5-10)**
  - **Have 3-45 trained pilots!**
- **The majority of industry are using DJI crafts**
- **Survey results from the RSCG in February 2022 showed that UAV use was relatively basic**
- **A recent survey of our committee found that UAV use it beginning to become more complex…**



Tools for foresters

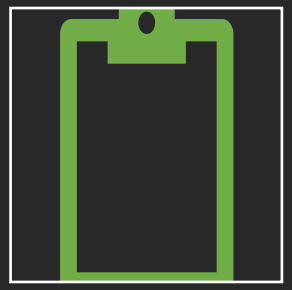
- Roading
- "Eye in the sky"
- Post-planting
- Survival surveys
- Post-thinning QC
- Stockpile assessments
- Fire - hotspot mapping
- Fire - other
- Breakage studies
- 3D modelling of forests
- DTM creation
- Measuring tree growth
- Disease monitoring
- Crop health assessments
- Other

The potential of UAVs in forestry is being explored actively!

UAV Applications

Tools for foresters

- **To meet the requirements of industry we are developing SOPS in 3 areas:**



TFF Essentials

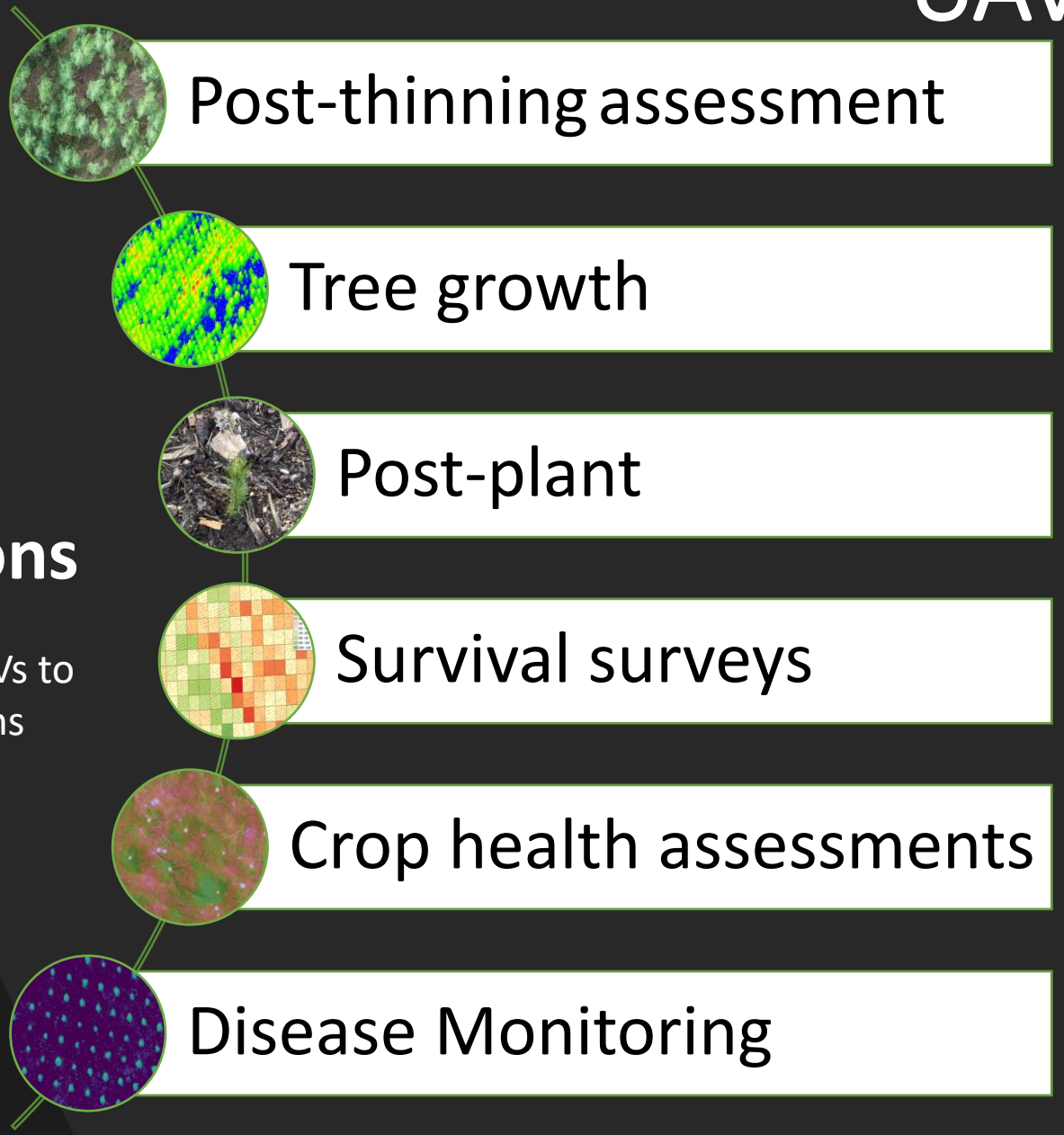
TFF Operations

TFF Processes

UAV Applications

- **TFF Operations**

Specific applications of UAVs to different forestry operations



Tools for foresters

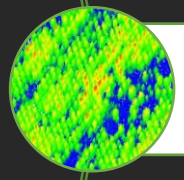
UAV Applications

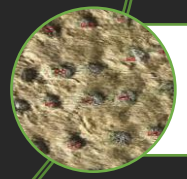
Tools for foresters

- **TFF Processes**

Instructions for how to carry out operational data processing on UAV data

Deriving a DTM

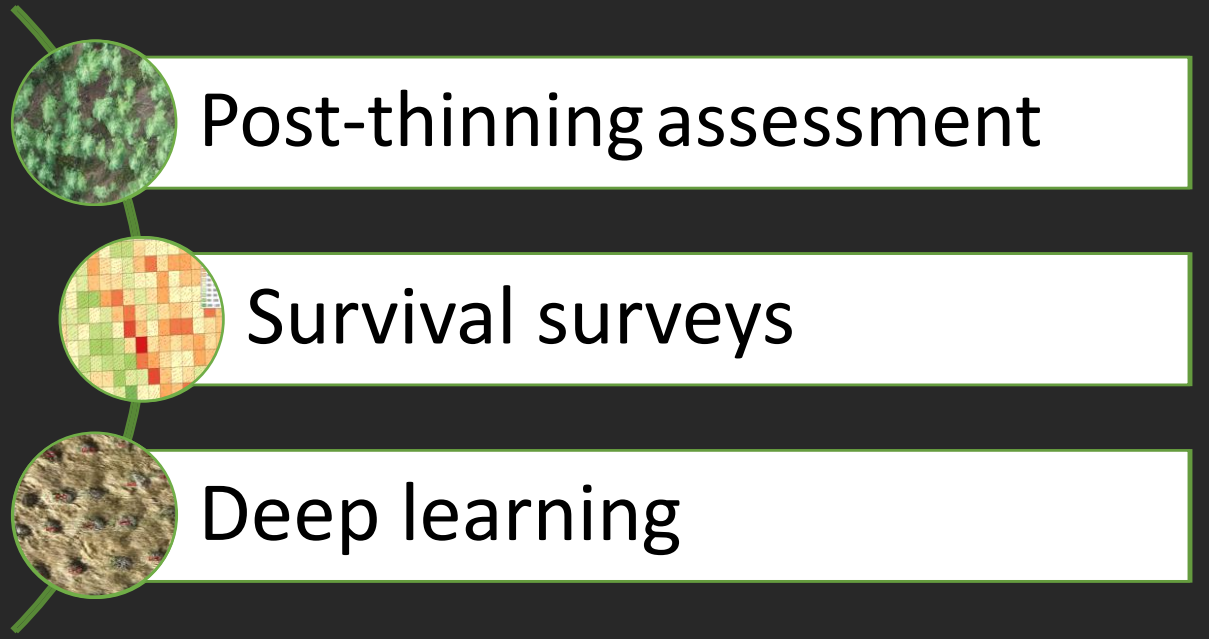

Deriving a CHM


Deep Learning for stocking

UAV Applications

Tools for foresters

- **Working on this year**



UAV-RGB

TOI-OHOMAI Institute of Technology

Jake Emmens

Multispectral

UC UNIVERSITY OF CANTERBURY Te Whare Wānanga o Waitaha CHRISTCHURCH NEW ZEALAND

Blake Singleton

High-resolution

TOI-OHOMAI Institute of Technology

Whanarua Edmonds

Exploring the use of UAVs for survival surveys!

- 3 Students – 3 different methods

Tools for foresters

FOREST GROWERS RESEARCH

Precision Silviculture Partnership

scion FORESTS ▪ PRODUCTS ▪ INNOVATION

ForestTech Competition

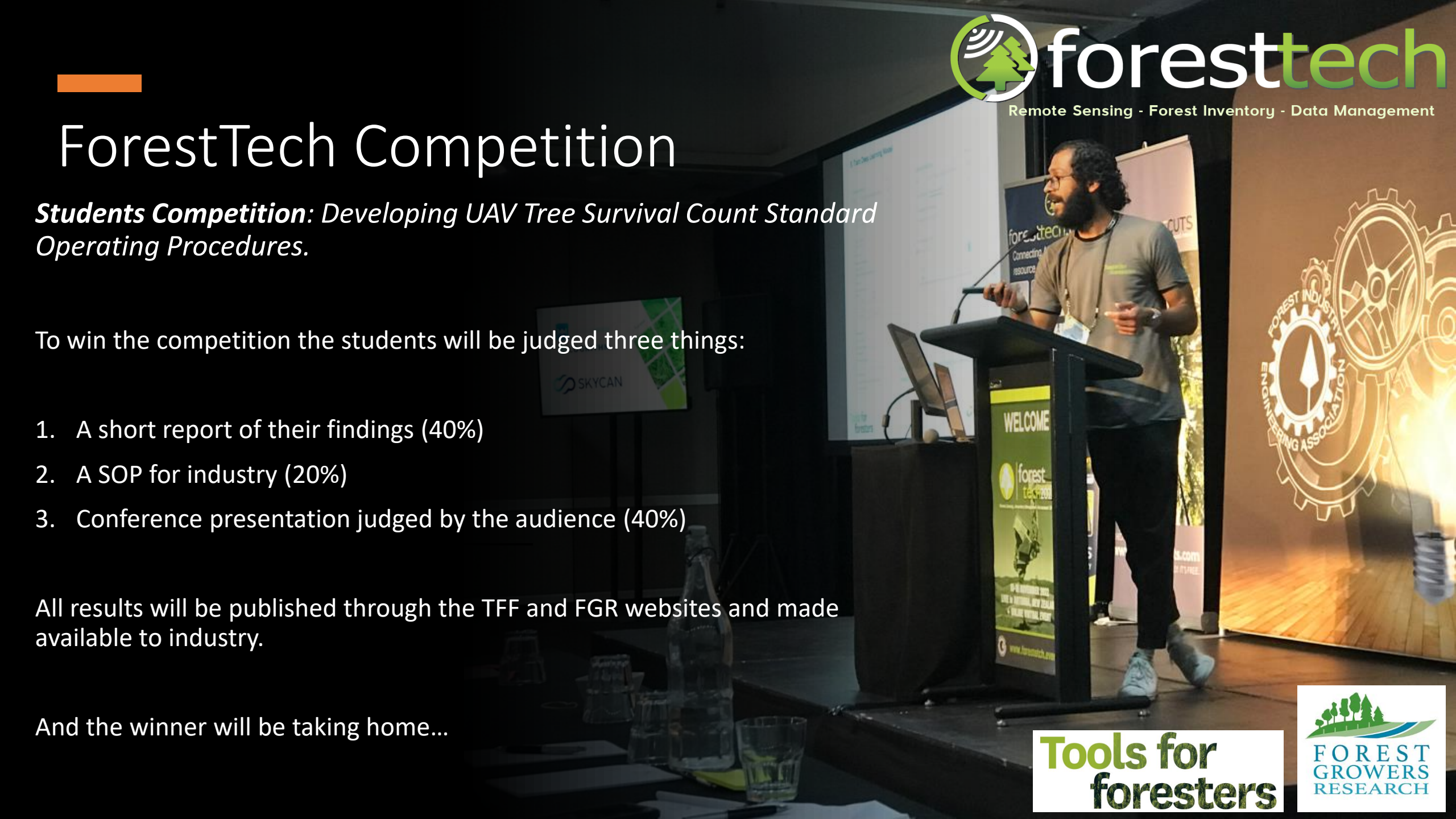
***Students Competition**: Developing UAV Tree Survival Count Standard Operating Procedures.*

To win the competition the students will be judged three things:

1. A short report of their findings (40%)
2. A SOP for industry (20%)
3. Conference presentation judged by the audience (40%)

All results will be published through the TFF and FGR websites and made available to industry.

And the winner will be taking home…



DJI Mavic 3 Enterprise Care bundle!

- DJI Mavic 3 Enterprise - the latest generation in portable drones for land surveying. With fast and efficient data capture this is a must have tool for all commercial drone pilots.
- Valued at $7000
- Generously donated by event sponsor Ferntech
- Media release on the competition an the prize to follow…

DJI ENTERPRISE

Ferntech

Workshop

Workshop at ForestTech will help attendees to get a better idea of how to implement UAV survival surveys and deep learning workflows in their operations.

1.00pm | Intro and students will go over data capture methodologies

2.00pm | Eagle workshop - deep learning demo

3.00pm | Afternoon tea

3.30pm | Eagle workshop - lab

5.00pm | Workshop Ends

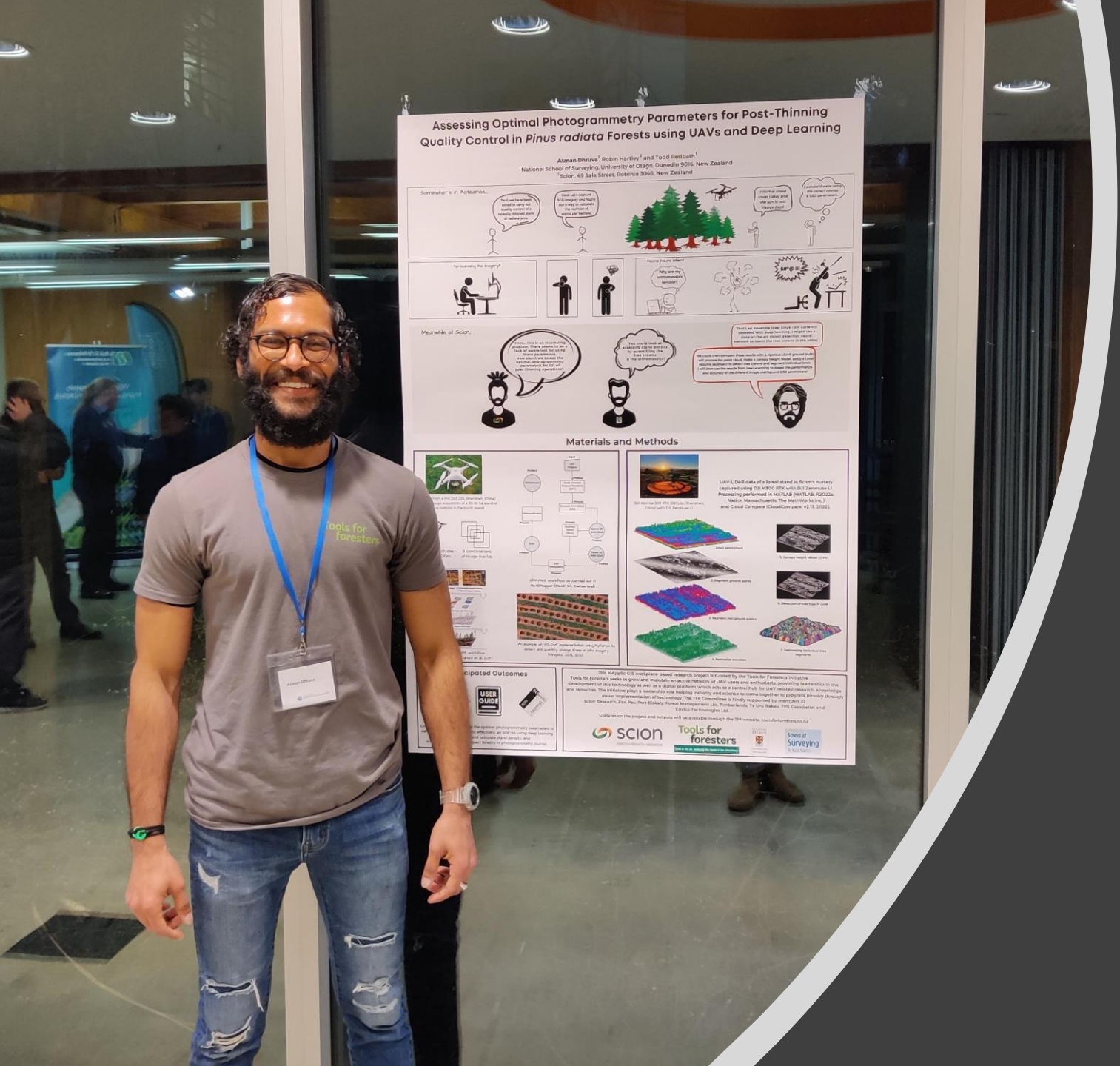
Lead by Mel Palmer – Data Analyst from Scion's GIS and Remote Sensing Team

FOREST GROWERS RESEARCH

Tools for foresters

SCION
FORESTS ▪ PRODUCTS ▪ INNOVATION

EAGLE TECHNOLOGY



Masters study: optimal flight parameters for post-thinning assessment using UAVs

Atman Dhruva (now at Orbica!)

Completed his MAppSc GIS at University of Otago

Delivering a workshop at ForestTech last year

- available on TFF Website under News and Events>ForestTECH 2022: https://youtu.be/DD61QC8X71k

Currently writing up the results for a peer-reviewed article.

Funding

- 2021-2023:
  - Scion funding:
    - Website, forum and newsletter set up
    - Branding sorted
    - Publication of a paper on BVLOS in forestry
    - MSc study for UAV post-thinning assessments
    - Workshop at Forest Tech
- 2023-2024
  - FGR funding:
    - Deep Learning shared data sets project
    - Survival surveys and student project
  - Scion funding:
    - Some hours for keeping things ticking along

- <u>Need to think about what we want to do next as there is no more funding from second quarter of 2024… without funding we can't keep up the pace!</u>
- Please contact me with ideas!

Tools for foresters

Challenges

- **Lots to do but a lack of people to work on things**
- **Student projects are fantastic**
  - **Allows us to explore ideas in detail**
  - **Provided students with opportunities & experience**
  - **Can we work closer with education institutes to build collaborations into their courses?**
- **Recent departures from Scion have highlighted bottlenecks and risks – if I left, would this continue?**
- **<u>If industry want this to continue, perhaps we need to assign somebody to this as a permanent role?</u>**
- **Would FGR/industry be interested in funding somebody to oversee the initiative and ensure it is fully functioning?**
- **Perhaps we could have a graduate position at FGR/Scion assigned to this?**
- **Happy to receive ideas and discuss further!**

Tools for foresters

Tools for foresters

Questions???

Acknowledgements

- The TFF committee – your time and commitment makes all of this possible!
- James Broadley from Toi Ohomai for assisting with the student project
- Honey Jane Estarija and David Cajes of Scion for data capture
- FPS geospatial for UAV capture and field plots in Northland
- FGR for funding this through the Precision Silviculture Partnership
- Claire Stewart and Carol Rolando from PSP for helping to organise things and keep it moving along
- Brent and the team at Innovatek for turning this coffee catch up idea into this awesome event!
- Ferntech for the amazing prize!

www.scionresearch.com
www.toolsforforesters.co.nz

SCION
FORESTS ▪ PRODUCTS ▪ INNOVATION

Tools for foresters

Prosperity from trees *Mai i te ngahere oranga*

Scion is the trading name of the New Zealand Forest Research Institute Limited