LiDAR's Role in the New Zealand Forestry Industry

NZIF Auckland Section Meeting
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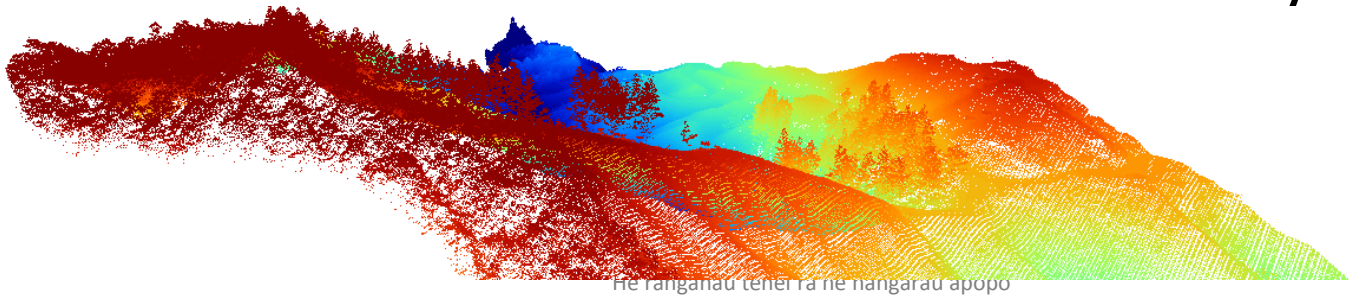
Shaping Today's Forests with **Technology** of **Tomorrow**

INTERPINE

He rangahau tenei ra he hangarau apopo

LiDAR

- LiDAR (Light detection and ranging)
  - First studied and tested in 1960s.
  - 1975 – First forest research into LiDAR.
  - In 1980's mostly used for atmospheric and volumetric analysis etc.
  - 1990 – General remote sensing and photography use
  - Mid 1990 first commercial use in Forestry



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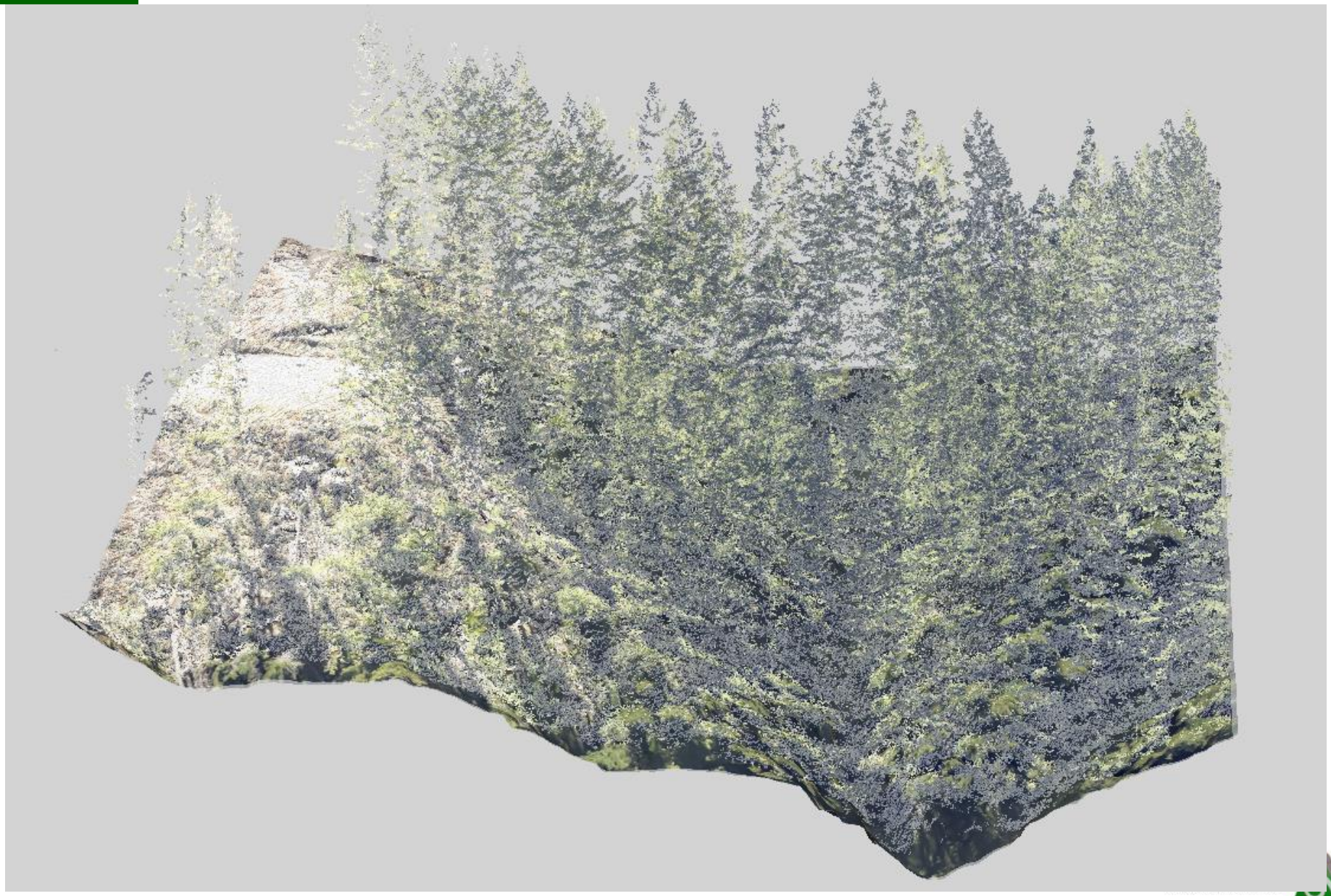

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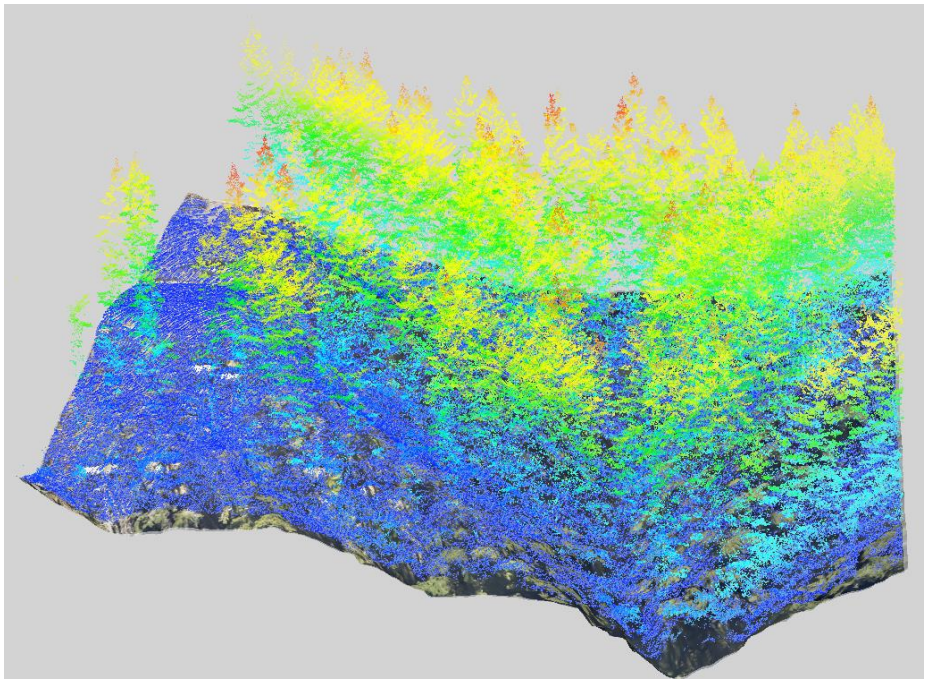
He rangahau tenei ra he hangarau apopo

Comparison

Aerial Photo



LiDAR

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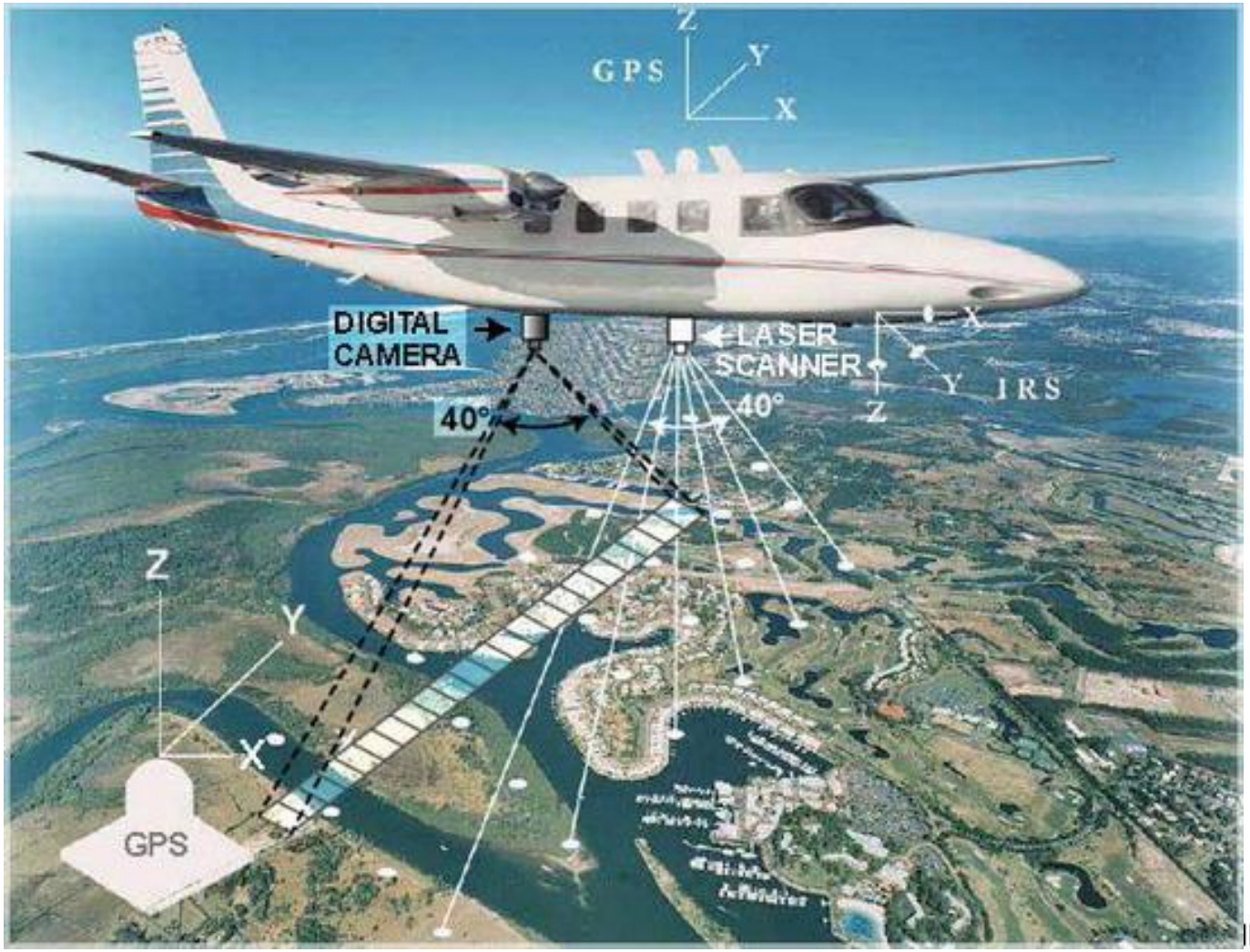
How does it all work?

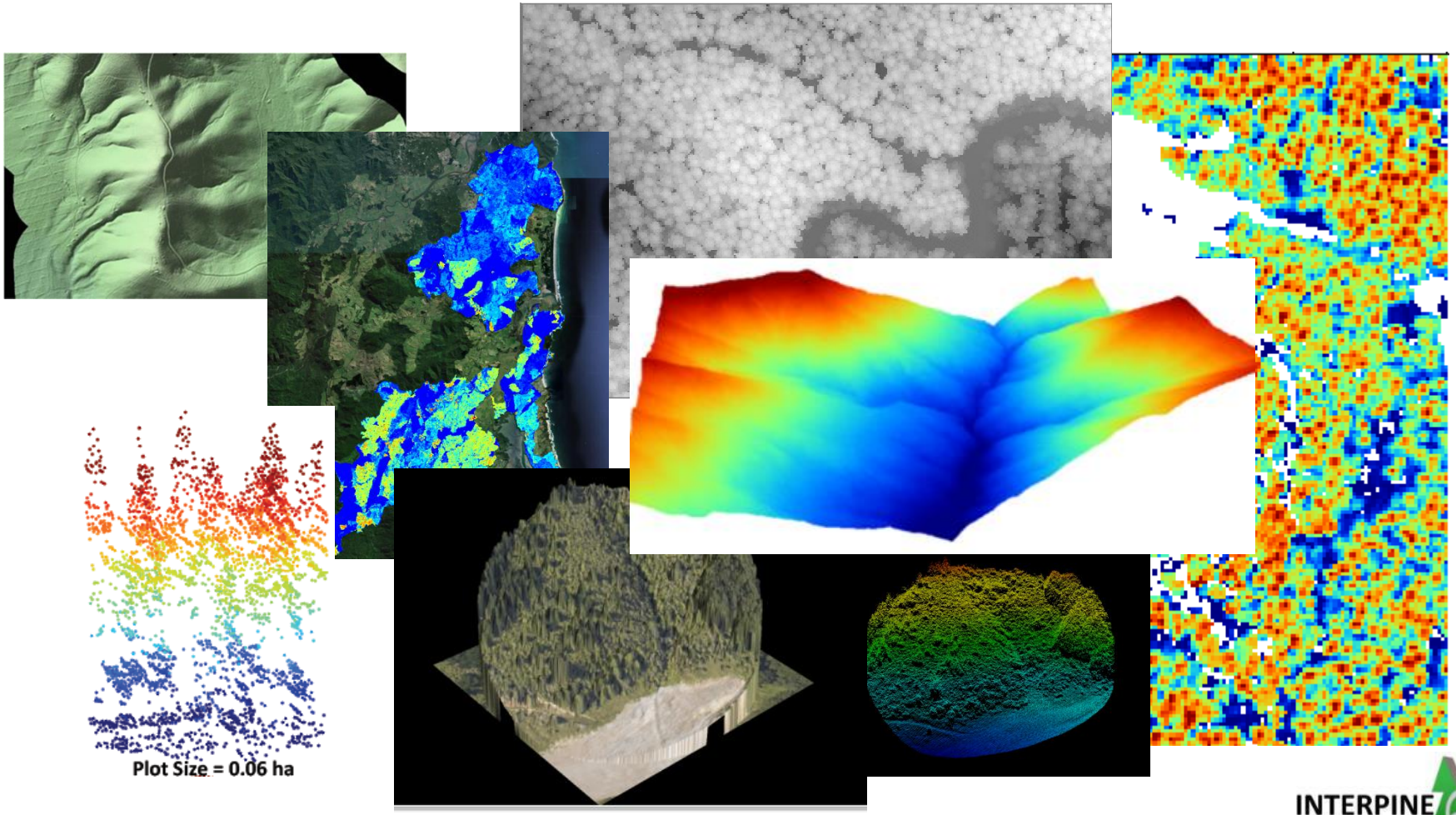


Source: searchmesh

History LiDAR in NZ Forestry

- 2006 - Ernslaw One Ltd – East Coast – Australian Provided
- 2008 - LUCAS LiDAR project.
- 2011 - PF Olsens, Nelson Forests, Pan Pac
- 2012 - Timberland CS, Blakely Pacific, Rayonier
- 2013 – Rayonier

Beyond the Cool Pictures



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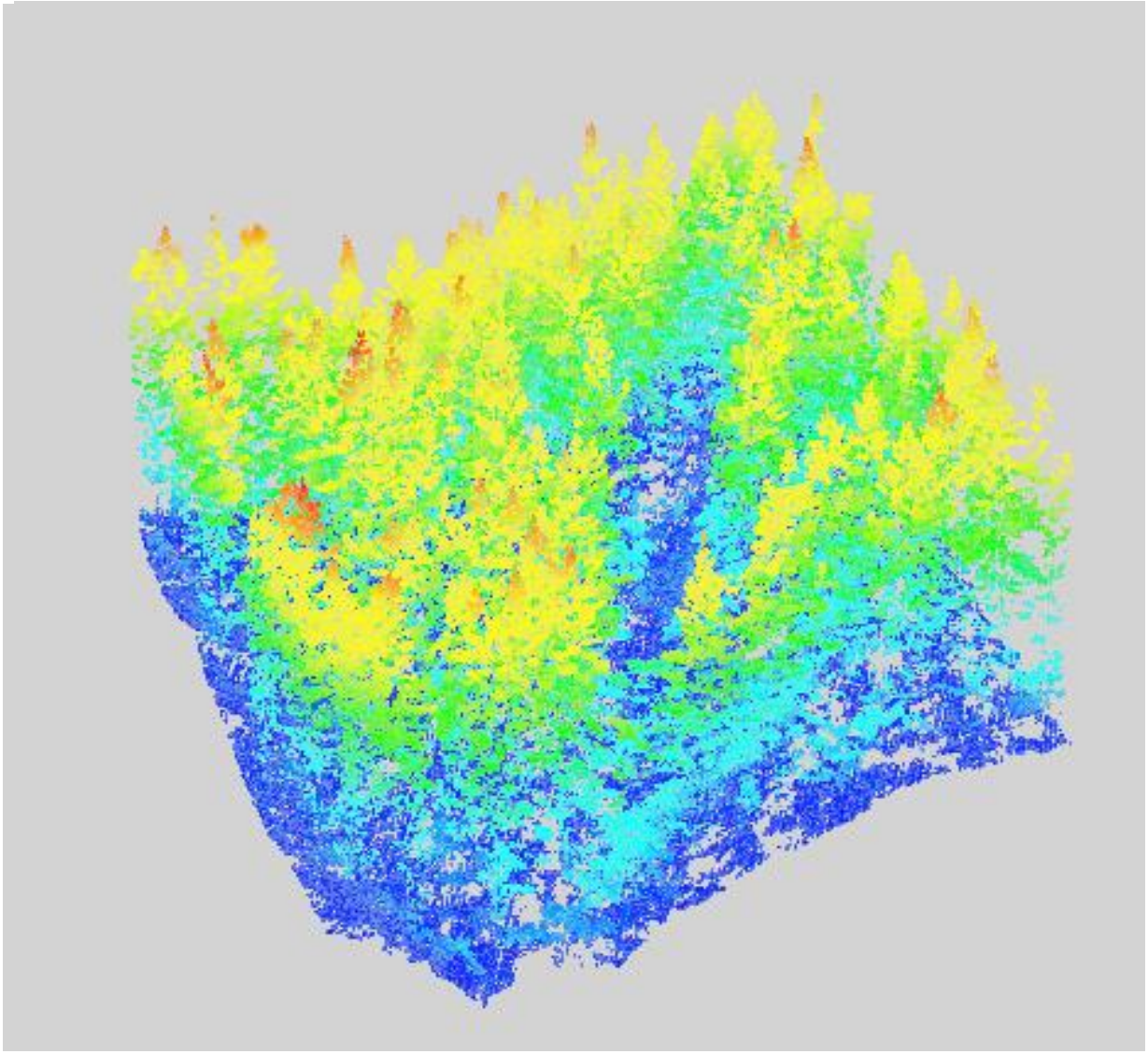
Terrain Modelling



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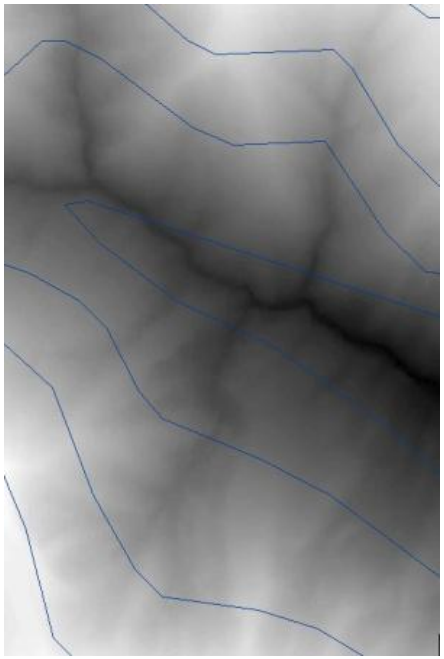
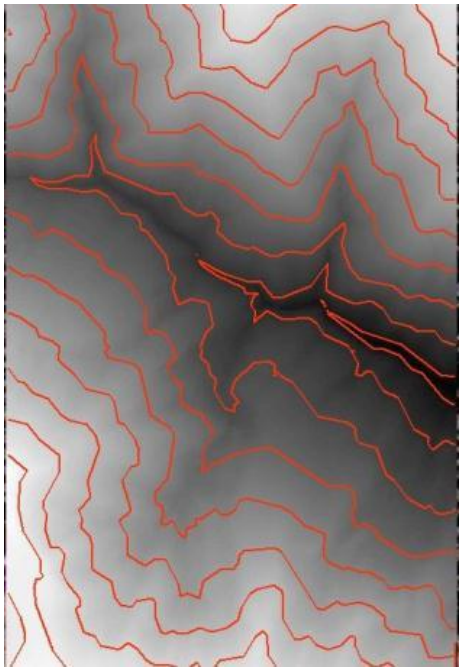
Terrain Modelling



20 metre LINZ contours

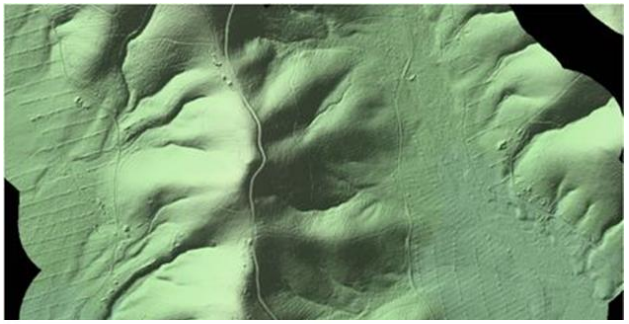


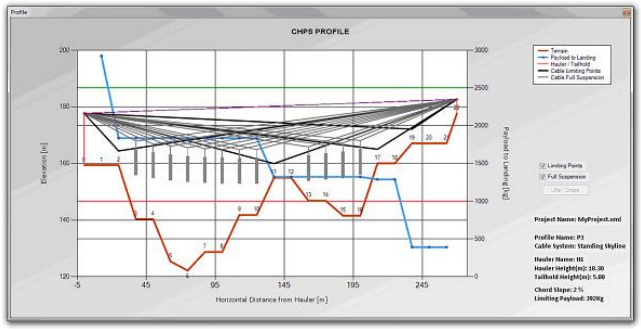
10 metre LiDAR contours

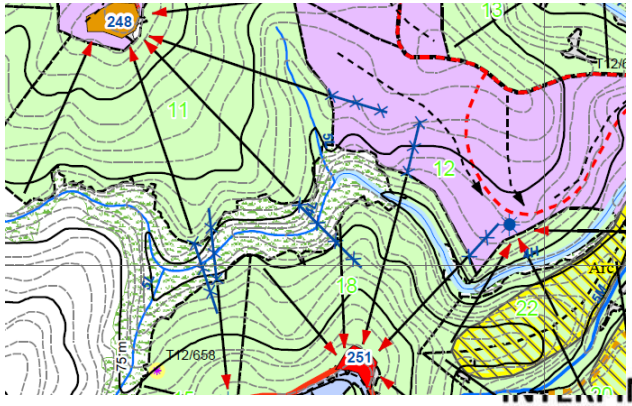
Overall X,Y,Z accuracy of LiDAR is 10 – 15 cms

Harvesting Planning

- Improved topographical data
  - Improved ground based/cable logging classification
  - Improve harvest planning – greater use of cable planning tools such as CHPS.
  - Better identification of the difficult areas
  - More confidence in harvest plans.

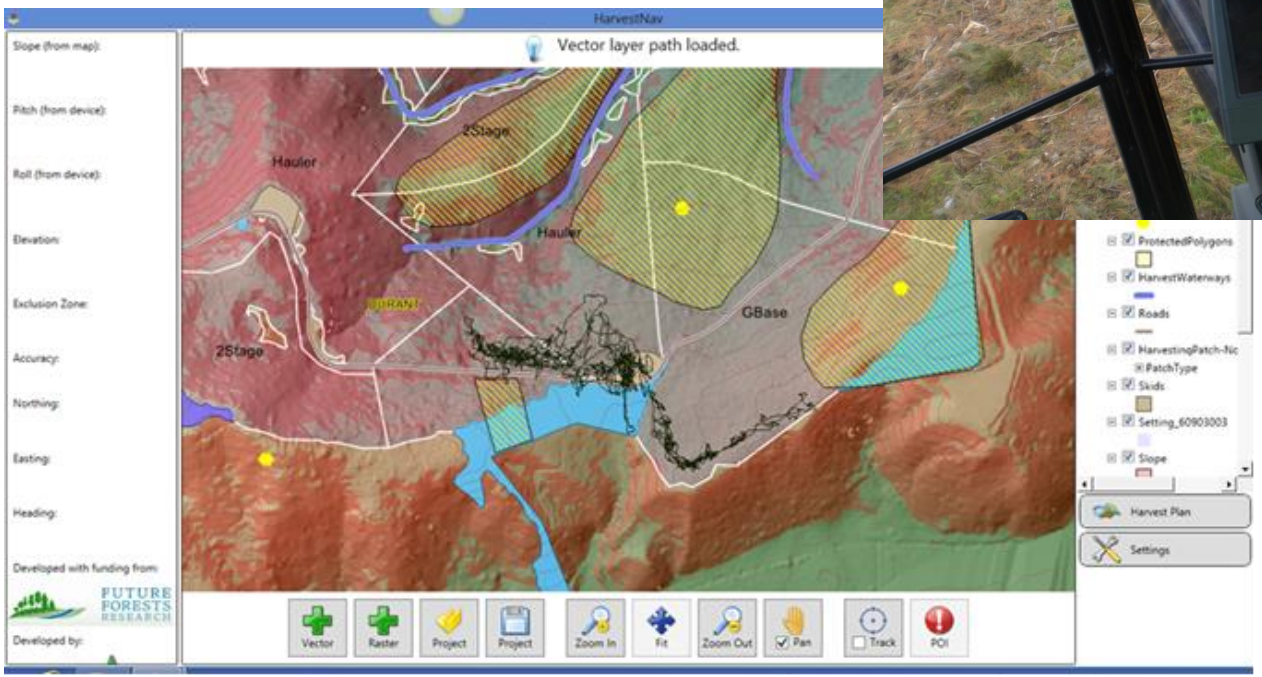






Harvesting Execution

- Improve confidence in topographical data
- Field utilisation



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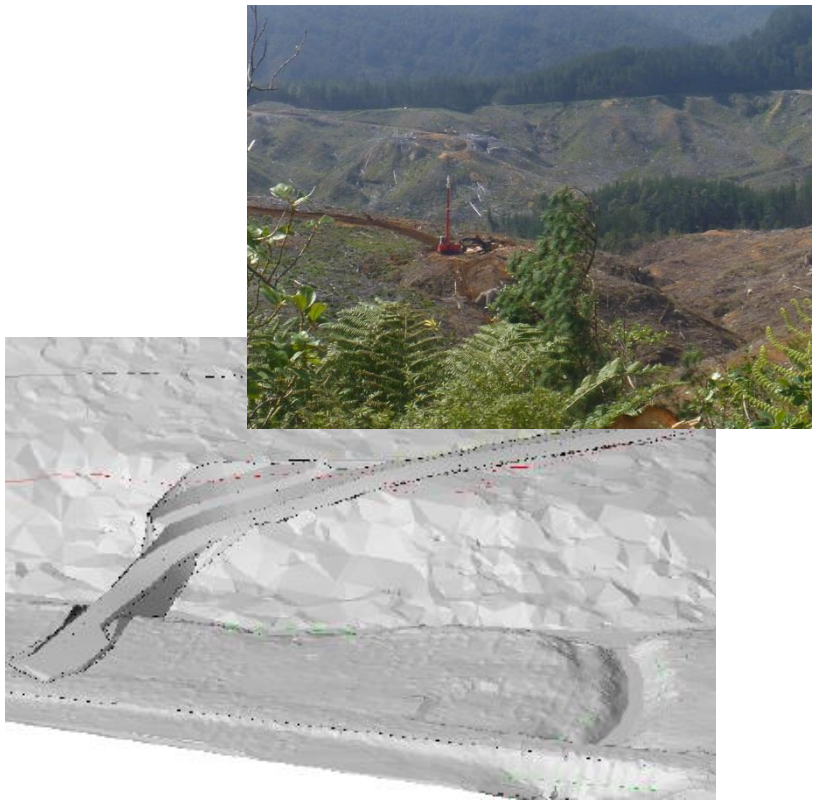
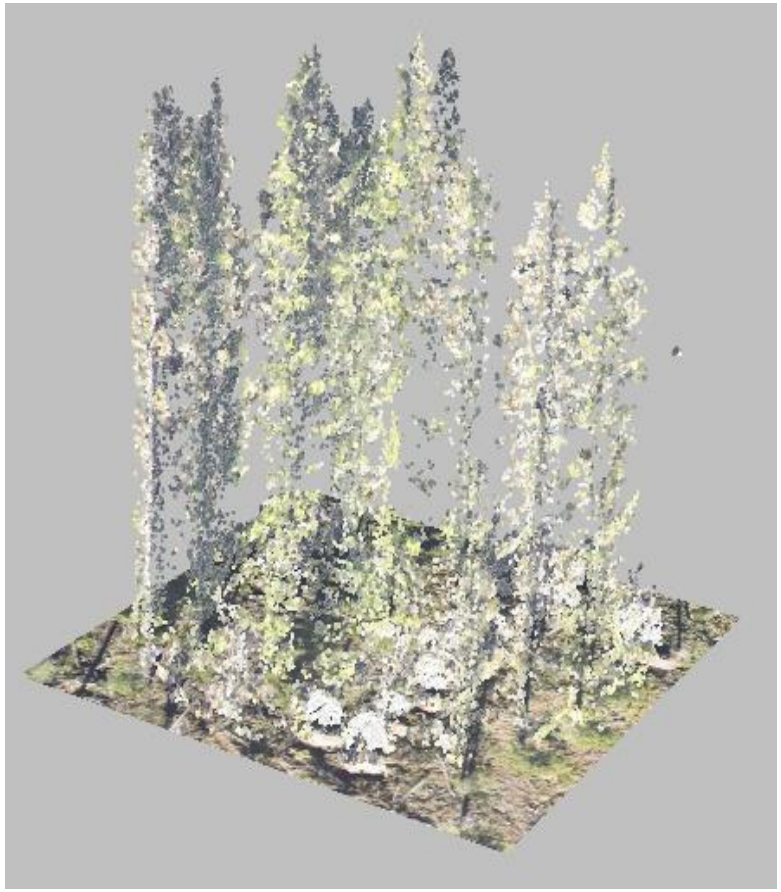
Roading

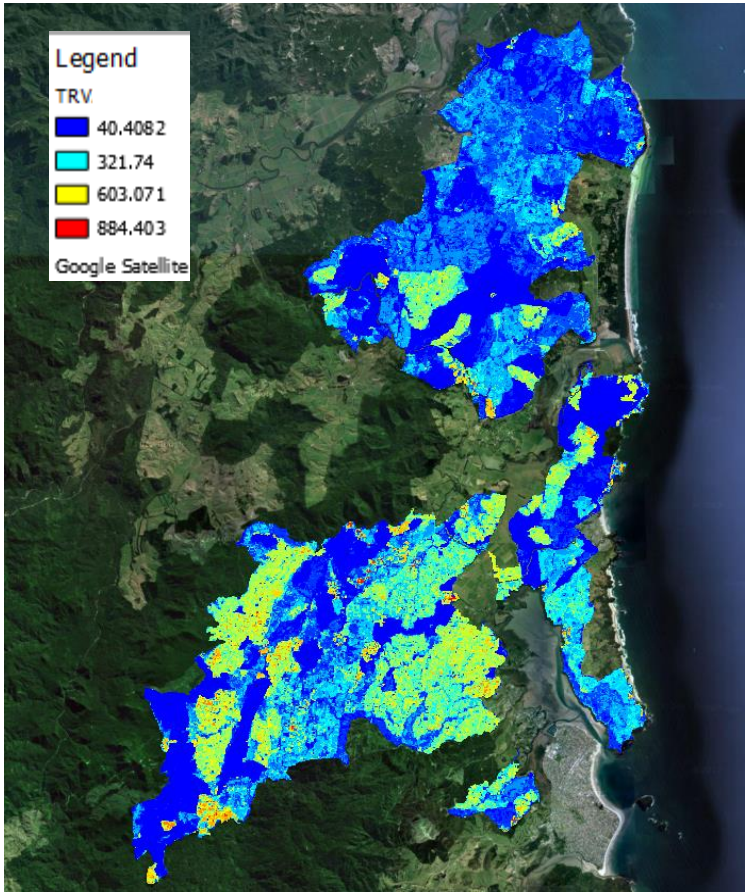
- Road Design
  - Improved road location planning
  - Avoid high risk area
  - Optimisation of cut and fill calculation
  - Improved confidence in design
  - Reduce cost and risk



- Roading planning can be carried by an engineer not the bulldozer driver.

Vegetation Modelling





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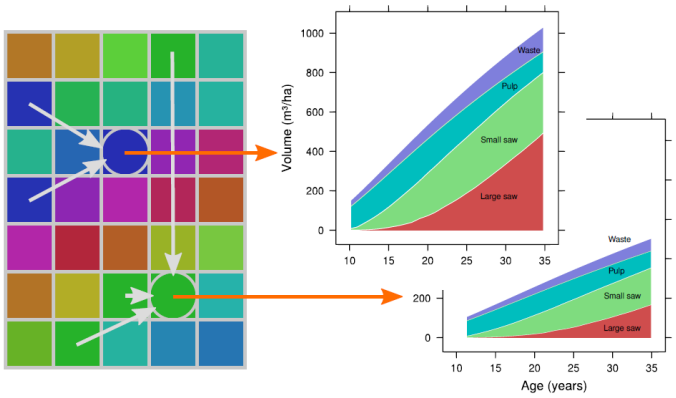
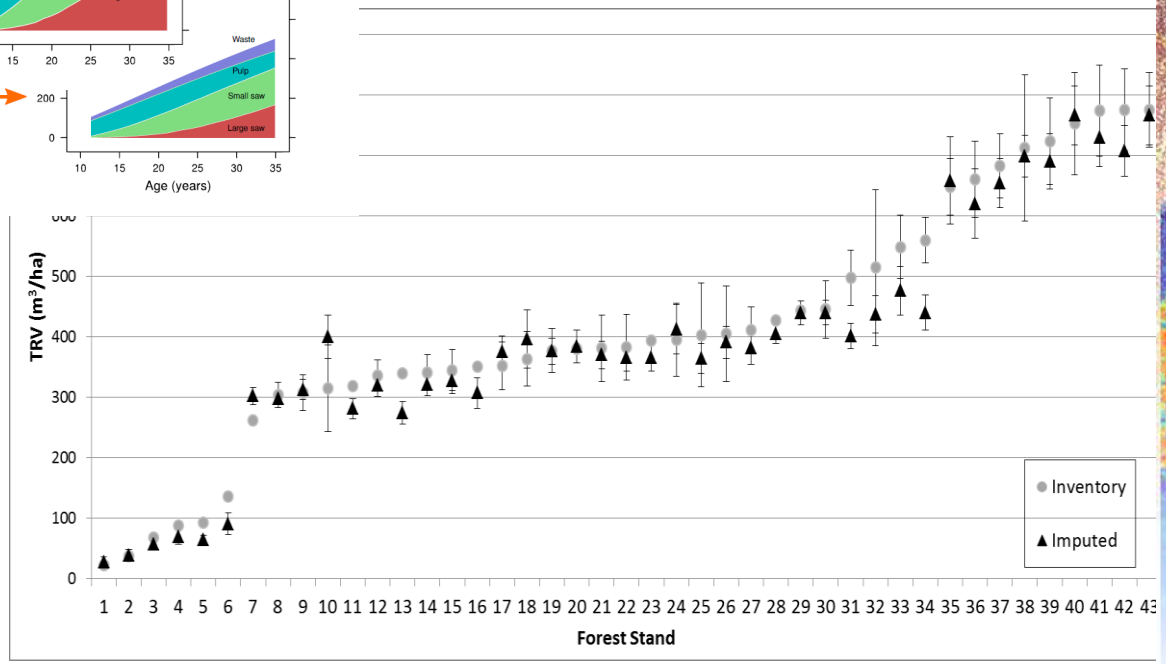
Forest Inventory – Approaches





There are number of approaches - Reduce ground plot numbers

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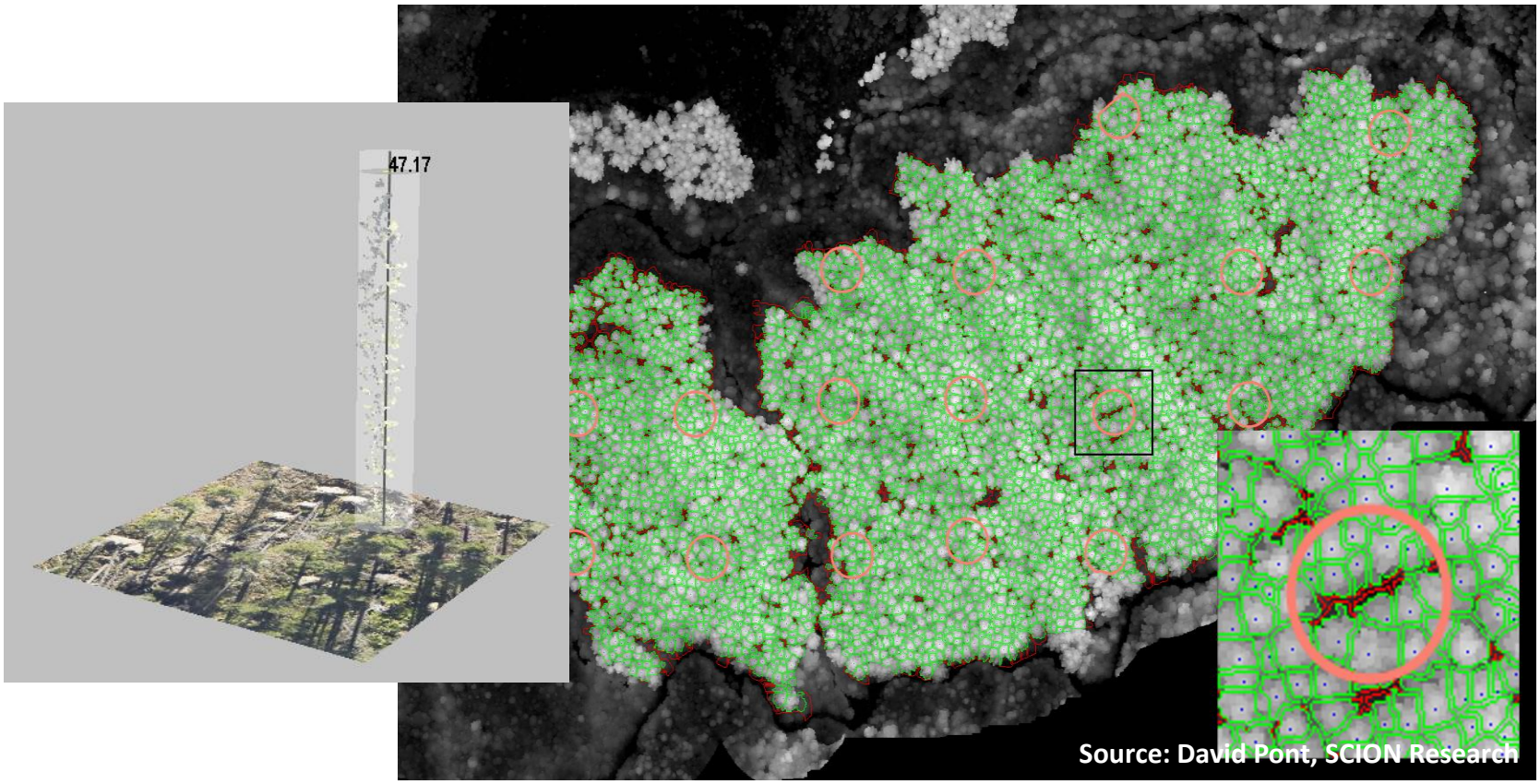
Individual Tree Delineation



Area of on-going research

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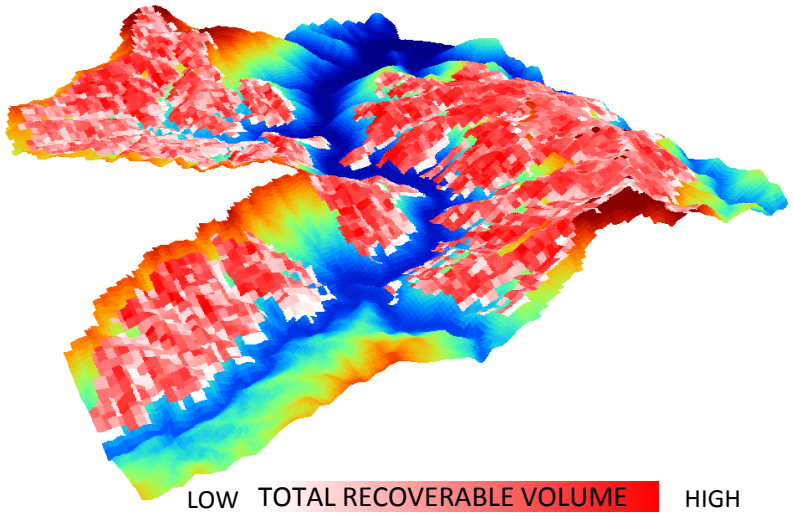
Forest Inventory - LiDAR

- Stand stock estimates (BA, MTH, TRV etc)
- Confidence estimates around those estimates
- Yield Tables
- Spatial layers of Yield



All with considerably less plots

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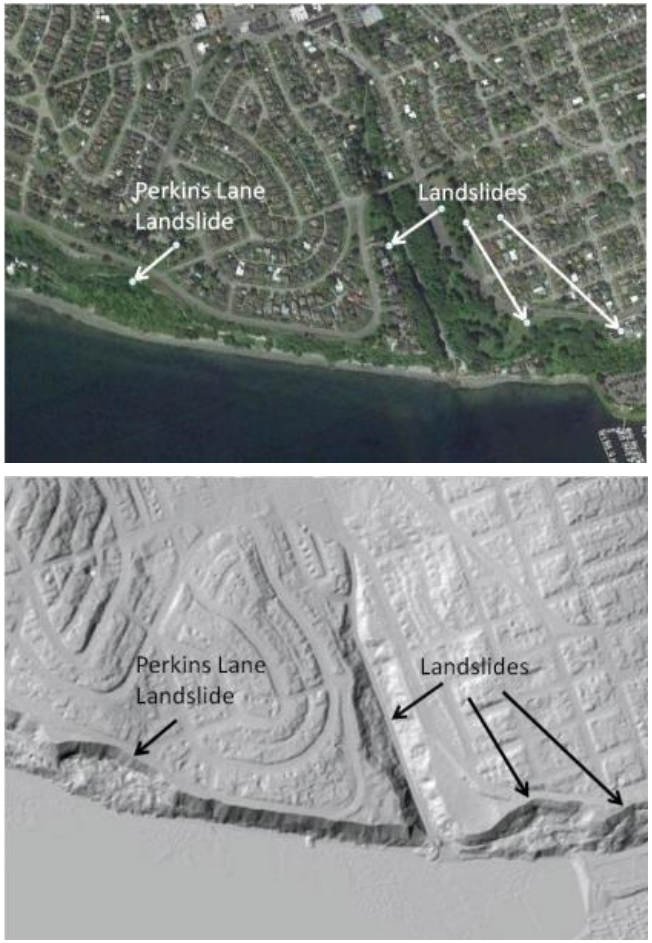
Environmental Modelling

- Landslide and Erosion detection
- Forest Hydrology
- Biodiversity
- Forest Health
- etc.



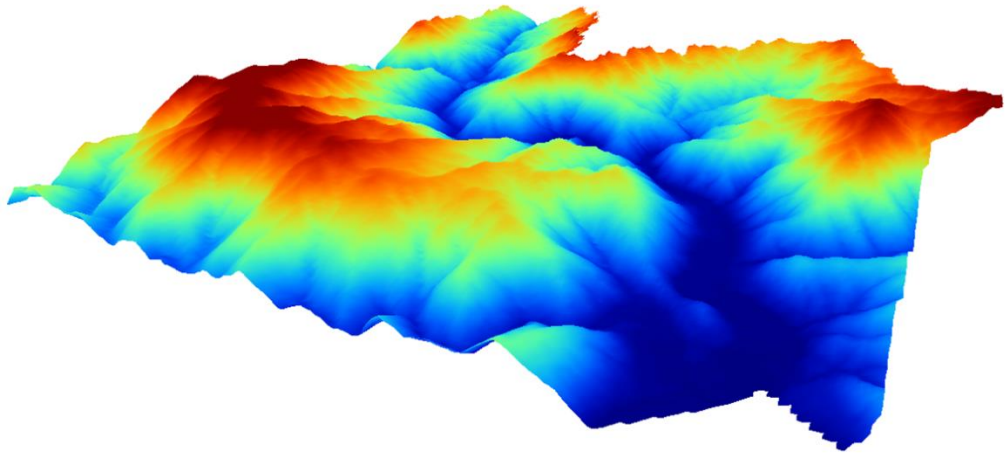
Source: spie.org

Can LiDAR save you money?

- YES – Couple of example.
  - Every hectare that can be transferred from Cable to GB, you can fly 1500 hectares (assuming $15 per m^3 difference between Cable and GB and $5 per hectare for LiDAR)
  - For every ground plot that can be replaced, you can fly 20 hectares of LiDAR.
  - Every km of road not built, you can fly 10,000 hectares

Who's Flying?

- Timberland
- PF Olsens
- Rayonier
- Pan Pac
- Nelson Forests
- Blakely Pacific
- A number of regional councils



Conclusion

- LiDAR derived terrain models are now common place in New Zealand forestry.
- Increasing use for forest inventory in the future.
- More competition in the provider marketplace.
- Benefits of its use are starting to be realised in the industry.

Questions…