Teleoperation of Forest Machinery

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Presentation

- Challenges for NZ Forestry
- Rationale for Harvesting R&D
- Vision for Steepland Harvesting
- Programme Goals
- Remote Control in Forestry
- Outputs to date
- Innovative Yarding System
Challenges for NZ Forestry

NZ Exotic Forest Harvest

Includes 8000 owners of small steep forests
Challenges for NZ Forestry

- Make work safer (isolate from hazards)
- Reduce workload (easier more productive jobs)
Rationale for Harvesting Research & Development

- Need to continue to increase efficiency

Health and safety must also be improved
Rationale for Harvesting Research & Development

• Vital to maintain industry momentum in harvesting innovation
Vision for Steepland Harvesting

“No worker on the slope, no hand on the chainsaw”
Programme Goals

- Eliminate LTI accidents in felling, breaking out and extraction phases of steep country harvesting
- Reduce steep country harvesting costs by 25% ($8.00/t)
- Reduce current diesel fuel consumption in steep country harvesting by 10%
- Develop new prototype products that will result in forest harvesting machinery sales
Applications for Remote Control in Forestry

- Remote control / semi-automated yarder
- Remote control tree harvester
- Remote control cameras
- Remote control grapple carriages
- Teleoperated felling machine / mobile tail hold
- Remote control lineshifting
Existing Remote Control in Forestry

- Remote control yarders
- Gremo Besten 106RH harvester
Remote Control in Forestry

- Remote controlled camera technology
  - Grapple cameras
  - Winch cameras
Remote Control Developments in NZ Forestry
- Advanced Hauler Vision

**CutoverCam system**

- IP technology
- Remote controlled
- Pan-tilt-zoom (PTZ)
- Easy to set up
- 18x zoom
- HD quality video
- Monitor in cab
Remote Control Developments in NZ Forestry
- Improved grapple carriage control

- Falcon Forestry Claw
- Alpine Grapple
Remote Control Developments in NZ Forestry

- Alpine Grapple Carriage
  - Hydraulic powered
  - Remote controlled
  - Power open and rotate
  - Easy to use
  - Lightweight (1.4 tonne)
  - Suitable for two drum yarder
Remote Control Developments in NZ Forestry
- Teleoperated feller buncher

• Full teleoperation control system in JD909 feller buncher
• Remote control mobile tail hold
From remote controlled tree felling…
...to full teleoperated tree felling

- Trailer mounted console with multiple monitors
- Multiple robust fixed cameras on machine
Remote Control Developments in NZ Forestry:
- Teleoperated tree-to-tree felling machine

Inspiration for tree-to-tree mobility

- “Arboreal locomotion”
Teleoperated tree-to-tree felling machine
Remote Control Developments in NZ Forestry
- Twin Winch Tail Hold Carriage

- Lateral movement of working ropes
- Remote controlled by yarder operator
- Fewer and faster line shifts
- Improvement in grapple productivity
Innovative Yarding System

- Remote controlled yarder
- Teleoperated Feller Buncher
- Alpine Grapple
- Twin Winch Tail Hold Carriage
Summary

- Clear advantages of teleoperation
- Programme is a catalyst for further innovation
- Remote control and teleoperation is the direction for the future
- Next steps are robotics and semi-automation
- Investment demonstrates commitment to improved safety and maintains social licence to operate
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