



# HARVESTING PROGRAMME UPDATE

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## Summary

Commercialisation of the many products arising from the FFR Primary Growth Partnership Steep Land Harvesting Programme has been a key focus over the last quarter. Arising from the review of FFR Commercialisation Plans undertaken in February by Geoff Todd, an independent commercialisation expert, a proposal for a one-year extension of the programme was submitted to MPI.

This update also summarises progress to end of Quarter 3 of the final year of the programme. Significant progress has been made on the completion of the major projects in the teleoperation control system for the John Deere 909 feller buncher, and construction of the Awdon Skyshifter twin winch tail hold carriage.

## EXTENSION TO STEEP LAND HARVESTING PROGRAMME

In February a review of the commercialisation of FFR projects in the Steep Land Harvesting Programme was undertaken by Geoff Todd, a commercialisation specialist from Viclink, the Victoria University technology transfer office.

Several of the recommendations from the review involved further work by FFR to finalise commercialisation plans for the projects and engage more business development support for the various technology developers in the projects. A confidential report of the review of each project output from the programme was distributed to each technology developer.

The summary report of the Commercialisation Review by Geoff Todd is available on the FFR website (Technical Report H027).

The Programme Steering Group (PSG) supported the recommendations of the review but noted that there was not enough time or resources available in the existing programme to implement these recommendations before the end of the programme on 30 June, 2016.

The PSG directed FFR to submit a proposal to the Primary Growth Partnership (PGP) for funding support to action these recommendations.

This proposal for a one-year extension to the Steep Land Harvesting Programme was submitted to the PGP Investment Panel on 19th May. The programme extension will focus on commercialisation of the following technology products:

- HarvestNav on-board navigation system
- Teleoperation control system
- CutoverCam hauler vision system
- Remote-controlled felling wedge
- Awdon Skyshifter tail hold carriage
- Doherty quick coupler attachment

The result of that submission (and a question session with Russell Dale at the panel meeting on Thursday 26th May) was that the panel decided to recommend to the Director-General of MPI that the extension be approved, subject to some changes to the personnel we proposed using to assist with commercialisation activities.

We are currently awaiting formal confirmation of this decision from MPI, however we are confident that the extension will be approved, subject to those changes.

## NEW PGP PROGRAMME

The development of a new harvesting and logistics research funding application to the Primary Growth Partnership was completed during the Quarter and submitted to MPI in March.



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The programme was based around the highest priority projects identified as a result of the extensive industry consultation undertaken in 2014/15:

- Development of the remote-controlled tree-to-tree harvesting machine
- Totally new felling technologies
- Log identification during processing
- Automate the log scaling method
- Create safe high productivity workplaces

Approval for industry co-funding received the recommendation of the sub-committee of the joint FOA/FFA Forest Research Committee for FGLT funding. The new harvesting and logistics programme proposal, called LogPlus: Added Value through Automation, was considered by the Investment Advisory Panel (IAP) of the Primary Growth Partnership in April.

The Investment Advisory Panel of the PGP has requested significant changes to the structure of the new PGP LogPlus proposal. FFR will be working on addressing these issues prior to resubmitting the proposal.

## RESEARCH PROGRESS: Q3 2015/16

Quarter 3 of 2015/16 in the PGP Steep Land Harvesting Programme was completed on 31 March 2016. Progress in the Annual Research Plan to Q3 was reviewed at the Technical Steering Team Meeting on Wed 27th April, 2016.

### 1.1 Step Slope Feller Buncher

Commercialisation of the ClimbMAX steep slope harvester continued with ten ClimbMAX harvesters now sold, three in New Zealand, six in Canada and one in the U.S. Trinder Engineering Ltd are currently building 5 new ClimbMAX machines for supply to separate customers in British Columbia, Canada and Oregon, U.S.A. These machines are expected to be available by mid-2016.

Development of the HarvestNav on-board navigation application has been completed, and so far 31 licences of the HarvestNav software app have been issued, and 18 units implemented

across the industry. A report on improved in-forest communication methods has been published during the Quarter (Harvesting Technical Note HTN08-06). Further commercialisation of the HarvestNav app to provide a full system is planned as part of the Steep Land Harvesting extension.

HarvestNav is available as a free download from the Interpine Forestry Ltd website: <http://www.interpine.co.nz/SitePages/HarvestNav.aspx>.

In the tension monitoring of winch-assisted machines project, three different cable-assisted machine operations have been studied by School of Forestry, University of Canterbury. A report on the winch rope tensions measured over a range of conditions is in preparation. Work has continued on developing the teaching / best practice materials and results have been presented at the tension monitoring workshops organised by the School of Forestry, aimed at providing information for operators and planners to eliminate operational risks. Nine workshops were held during Quarter 3, with over 170 industry participants.

### 1.2 Teleoperated Felling Machine

In Task A of the teleoperated felling machine project, construction of the mobile operator console for the John Deere 909 feller buncher (including operator seat, pedals and three screens for video/audio feedback has been completed. This full teleoperation control system was scheduled for field testing at the end of May prior to installation in Ross Wood's feller buncher in Nelson in June. A demonstration of the system is scheduled for mid-July once commissioning has been completed. Further commercialisation of the teleoperation control system is planned as part of the Steep Land Harvesting extension.

In the other project in Task A, the remote control unit (RCU) has been installed in the Volvo EC290 mobile tail hold machine in Nelson. Three tail hold cameras have been installed in the tail hold machine to give better vision of the tracks and the camera control and monitor installed in the hauler



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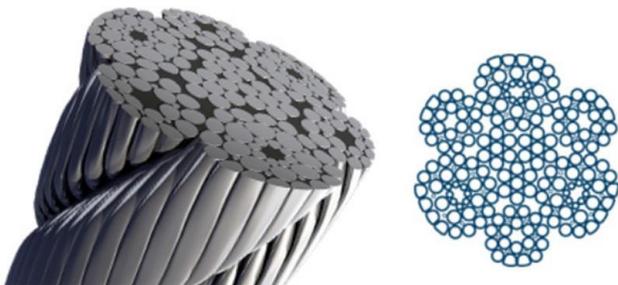
to enable full visibility and control of the machine from the hauler cab. Testing is underway.

In Task B, further development of the robotic tree-to-tree felling machine has continued during the Quarter with extra resources applied to the project to complete it ready for field testing and demonstration later in the year.

## 2.2 Improved Grapple Control

In the Skyline Tension Monitoring project to optimise yarding operations, Dr Hunter Harrill has collected data from the Active 70 yarder operation. A prototype tension monitoring 'app' has also been developed and is undergoing testing to validate results.

The New Wire Rope Technology project is aimed at exploring a new-generation wire rope available for cable logging called Constructex. This new type of wire rope has been installed on two different yarders and data collection of the rate of wear has commenced and will continue at two-monthly intervals over the lifespan of the rope.



In the Felling Wedge project, the alpha prototype of the remote-controlled power pack for the manual felling wedge has been built and field testing is underway. It has been designed so it can be operated remotely after the faller has moved out of the hazard zone around the tree.

Modifications from the first field tests have been identified and the second (beta) prototype is currently under construction, with the following changes:

\* Using a higher quality driver with a 13mm output rather than the 6mm output on the first prototype.

\* A different battery clip arrangement will be required as the more robust impact driver has a different battery.

\* A guard around the battery and the emergency stop button.

\* A handle and facility for a shoulder strap for carrying in the field.

A commercialisation plan will be developed to address the introduction of wedges into the market and further commercialisation of the felling wedge is included in the extension of the current PGP Steep Land Harvesting programme.

## 2.3 Innovative Yarding System

The beta prototype (full sized version) of the Skyshifter twin winch tail hold carriage has been constructed.



Initial field tests at Dewes Contracting Ltd in Gisborne were completed in March and a full field trial will be undertaken at Skyline Harvesting Ltd in Kererutahi Forest in June.

The field trials will investigate the performance of the carriage in the following areas:

- Carriage setup
- Operational productivity
- Winch rope tensions
- Winch rope wear
- Line shifting
- Down rigging

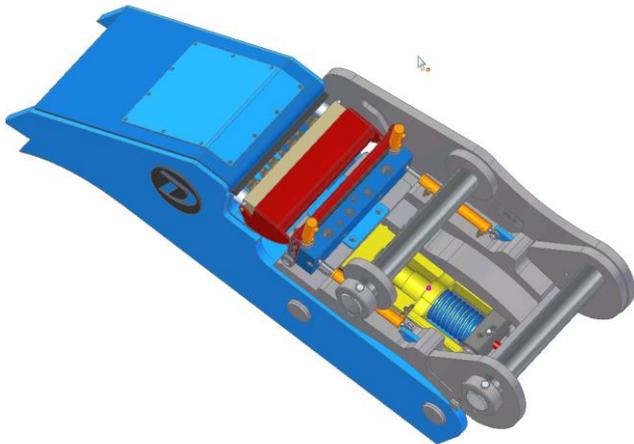


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The carriage will be leased to harvesting contractors as a first step towards commercialisation and further commercialisation of the Skyshifter carriage is included in the Steep Land Harvesting extension.

## 3.2 Harvesting Technology Watch

In the Quick Coupler Attachment project, Doherty Engineered Attachments Ltd of Mount Maunganui has completed design of the remotely controlled coupler to rapidly switch between a processor head and a loading grapple. Additional resources were included in the project to enable the quick coupler to be constructed before the end of June, 2016. Further commercialisation of the Doherty Quick Coupler is planned as part of the Steep Land Harvesting extension.



The production study of the Active 70 Tower Yarder was completed by Thornton Campbell of the University of Canterbury and a report published (Harvesting Technical Note HTN08-05). A study of the Koller K602 yarder owned by Mr Christian Welte, of Waikura Joint Stations on the East Coast, was also completed in March and a report is in preparation.

The Steep Slope Logging Conference was held in Vancouver on 2<sup>nd</sup> March, 2016. Dr Paul Milliken gave a presentation on the FFR Teleoperation Control System. The FFR research programme has been recognised internationally as being successful in developing innovative harvesting systems. As part of the conference there was a

field trip to view the ClimbMAX harvester and the Remote Operated Bulldozer (ROB) winch-assisted systems. A Technical Report has been completed on the highlights of the Steep Slope Logging Conference and will be published soon (Technical Report H026).

## RESEARCH OUTPUTS TO MAY 2016

The following research reports were completed during the last Quarter:

### Technical Reports:

- Report H026: Steep Slope Logging Conference: Vancouver B.C. March, 2016 – P. Milliken.
- Report H027: Review of Commercialisation of FFR Projects – G. Todd.

### Harvesting Technical Notes:

- Harvesting Technical Note HTN08-05: Productivity of the Active 70 Tower Yarder – T. Campbell, H. Harrill and R. Visser
- Harvesting Technical Note HTN08-06: Improved In-Forest Communication Methods – H. Marshall.

### Harvesting Technology Watch:

- HTW-017 (March 2016): Excavator Yarders – T. Evanson.

These reports will soon be available to FFR members on the FFR website: <http://www.ffr.co.nz/> (requires login and password).