



HARVESTING PROGRAMME UPDATE

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Summary

This programme update summarises Progress in the PGP steep land harvesting programme to end of Quarter 3, 2014/15. The focus of the programme has been on continuing engineering developments in the teleoperation, grapple control and innovative yarding system projects. Progress in developing industry input to a new harvesting and logistics research programme is also highlighted.

RESEARCH PROGRESS: Q3 2014/15

The third quarter of the FFR 2014/15 Harvesting Programme has been completed. Progress in the Research Plan to 31 March 2015 was presented at the Technical Steering Team Meeting on Wed 29th April, 2015 in Rotorua.

1.1 Steep Slope Feller Buncher

Extension to the wider forest industry of the HarvestNav software application has continued during the quarter. So far 26 licences have been issued, and seven units implemented across the industry.

Planned enhancements include: integration with mobile in-field communications; ability to handle external GPS sensors to monitor all machines and crew positions on-screen; and integration of external tilt sensors for self-levelling machines. Version 1.5 of HarvestNav is available as a free download from the Interpine Forestry website or click here to download:

<http://www.interpine.co.nz/SitePages/HarvestNav.aspx>.

1.2 Teleoperated Felling Machine

In Task A, the remote control of the John Deere 909 feller buncher, owned by Ross Wood of Wood Contracting Nelson Limited, further development of the remote control unit has been undertaken. Stage 1 of this part of the teleoperation project, was to implement a minimal remote-control system to test the motion functions of the machine. Initial field testing in

July 2014 was successful and resulted in a few trees being felled by remote control. A Technical Note on this testing has been published (HTN07-04).

Stage 2 of this project is to commission the system in the feller buncher such that the operator can control all functions of the machine from a nearby location within line of sight using video feedback displayed on a portable remote-control unit. The video and audio feedback to the operator has been developed with an in-cab camera system, and this will be installed by 31 May 2015.

Stage 3, the final stage is to implement the full teleoperation system on the John Deere 909 feller buncher that allows the operator to operate the machine from a console (similar to a replica cab) at a distance, using audio and video feedback. This exciting development for the programme will be achieved in the final year of the programme.

In the other part of Task A of the teleoperation project, the work by University of Canterbury Mechatronics researcher Bart Milne has been published in Technical Report H021. A plan to retrofit a remote control system to a mobile tail hold machine (a Volvo EC290 excavator) will be achieved by Scion by 30 June 2015.

In Task B of the teleoperation project, Scion researcher Dr Richard Parker is working with UC Mechatronics researcher Chris Meaclem in the further development of the prototype lightweight semi-autonomous tree-to-tree felling machine ("Stick Insect").



2.1 Advanced Hauler Vision System

Extension of the CutoverCam hauler vision system to the forest industry has continued during the Quarter. If you would like an in-field demonstration of the CutoverCam system please contact Paul Milliken at Cutover Systems Ltd (Phone 07 349 4189 or email Paul at: info@cutoversystems.com).

2.2 Improved Grapple Control

In the Cable Rigging Configurations Efficiency project, Dr Hunter Harrill published his PhD thesis on different cable rigging configurations (Technical Report H020).

Further development work on the dual-arm Scorpion grapple carriage has stalled during the Quarter and further trials of the alpha prototype grapple have been delayed. Resources in this project have been reallocated to other projects.

In the Felling Wedge project, aimed at improving directional felling of manually-felled trees for better grapple extraction, another type of felling wedge has been trialled as an alternative to the Jackson Beckham felling wedge. This is the Koller felling wedge which has been sourced from Koller in Austria. A side-by-side trial of the two wedges has been completed and a report is in preparation.

2.3 Innovative Yarding System

Development was completed on the alpha prototype mobile tail hold carriage (1/8 scale working model) and a demonstration of the setup and operation of this alpha prototype tail hold carriage was made to the TST in Gisborne in February. Work now continues on finalising the design of the full sized version of the tail hold carriage.

The Development Plan for this project has been revised. To ensure that the mobile tail hold carriage is developed to pre-commercial stage by 30 June 2016, the project has prioritised this development and further work on the self-propelled grapple carriage has been terminated.

3.2 Benchmarking Cost and Productivity and Harvesting Technology Watch

Data collection for the Benchmarking project from harvest areas logged in 2014 has been completed. About 150 data entries were received, bringing the total number of entries in the database to 900 harvest areas. A Technical Note on the 2014 data is in preparation.

A field demonstration of the remote controlled Koller K602 yarder from Austria was held in Mangatu Forest in February. The field day was very successful with over 80 forest owners, managers and contractors attending.

Development of a Quick Coupler Attachment has advanced this Quarter. Further discussions have been held with Southstar Equipment Ltd on the design. A cost-benefit analysis has been undertaken showing benefits at different productivity levels averaging \$1.40/tonne. Southstar have developed a proposal for co-funding the development and this proposal has been included in the draft 2015/16 Annual Plan.

At the University of Canterbury, School of Forestry, work continues on the integration of GPS/GNSS data with grapple harvester production data to provide opportunities for improved forest management. The project on Fuel Use in New Zealand harvesting operations is also continuing. Actual fuel use data is being collected from participating logging contractors and analysed to better understand the drivers of fuel use of different harvesting machines and systems to help make operations more cost effective.

2015/16 ANNUAL RESEARCH PLAN

After consultation and input by industry members and the technical steering team, the research programme for the 2015-16 year is currently being finalised. The Annual Plan will be presented and discussed by the programme steering group and then presented to the FFR Board for approval at its meeting on 26th May, 2015.



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HARVESTING RESEARCH WORKSHOP

A second strategic research forum to seek wider industry input to determine industry priorities for new harvesting and logistics research was held on Wednesday, 18th March, 2015 in Balclutha.

This forum was organised in conjunction with the Southern Wood Council and NZFOA. About 35 industry members attended and gave their input at the workshop sessions.

The strategic forum in Balclutha discussed:

- Current Industry Issues and Future Trends
- Industry Needs and Gaps
- Future Research Ideas
- Research Priorities

If you would like a summary of the outputs of the workshop forum in Balclutha please contact Keith Raymond at keith.raymond@ffr.co.nz or phone 027 4385233.

The results of this second Harvesting and Logistics Research Forum will be consolidated with those of the earlier forum in Rotorua in November 2014 into a series of common research themes which will be circulated out to industry for comment and for members to prioritise. If there is adequate alignment on priorities and sufficient support for a new research programme, a funding application will be developed.

FOREST GROWER LEVY FUNDING

As reported in Russell Dale's latest Members Update the Forest Grower Levy Trust (FGLT) made a decision in 2014 to provide a one-off grant of \$250,000 to the Steep Land Harvesting Programme. The Trust acknowledged the good work of the programme in catalysing more innovation in harvesting to improve the safety and efficiency of steep land harvesting.

The FGLT investment in the programme doesn't change the management or control of the programme in any way with the Technical Steering Team and Programme Steering Group

structure remaining the same. Ownership of IP and benefits arising from commercialisation arrangements will be held by FFR members who have supported the programme since inception.

In recognition of this grant it has been agreed that the research reports arising from the programme prior to 2014, will be made available to all forest grower levy payers, with the exception of the Productivity and Cost Benchmarking reports which are restricted and not available in any form unless non-member companies make available a retrospective data set of similar size to that contributed by the FFR member companies.

This effectively means everyone can now access this information via the FFR web site: (click on this link):

<http://www.ffr.co.nz/documents/5589>

RESEARCH OUTPUTS TO Q3

The following research reports were published this Quarter:

Technical Reports:

- Report H020: Rigging Configurations Efficiency Case Studies – H. Harrill and R. Visser.
- Report H021: Teleoperated Steep Slope Harvester: Semi-Autonomy and Haptic Feedback – B. Milne.

Harvesting Technical Notes:

- Harvesting Technical Note HTN07-04: Remote Control of a John Deere 909 feller buncher – P. Milliken, D. Lamborn and A. Keast.

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