

Theme: Harvesting

DEMONSTRATION PLAN – FARM FORESTRY CONFERENCE 10TH APRIL 2017

**Demo Plan No: 1
Task Number: 3.2**

Innovative Yarding System

**Authors:
Spencer Hill**

**Research Providers:
Logpro Ltd**

Date: 16th March 2017

TABLE OF CONTENTS

BACKGROUND	2
INTRODUCTION	2
DEMONSTRATION SITE	3
Site Layout	4
EQUIPMENT TO BE DEMONSTRATED	5
CutoverCam Hauler Vision System	5
Skyshifter Twin Winch Tailhold Carriage	5
Alpine Grapple	5
HarvestNAV On Board Navigation.....	5
Skyline Tension Monitor	5
Drone Technology	6
TIME TABLE	6
BUDGET	Error! Bookmark not defined.
SAFETY REQUIREMENTS	7
OTHER EQUIPMENT NOT DEMONSTRATED	8
FOREST VALUE CHAIN TRANSFORMATION	9



BACKGROUND

The returns from steep country harvesting in many parts of New Zealand are close to break-even in view of the long term average log prices and increasing costs. Therefore a slight drop in log prices or slight increases in operation costs may render many forests uneconomic to harvest. All cable operations therefore must investigate smarter ways to operate to minimise the risk of increasing costs.

In 2010 a group of Forest Owners and the Primary Growth Partnership funded a programme, managed by Future Forests Research Ltd, to develop machinery and equipment to improve harvesting in steep country. These improvements focused on the extraction phase of the steepland harvesting process with the aim to produce more at a lower cost while improving the safety of operations.

The equipment developed during the Steepland Harvesting Programme over the last 6 years includes: the ClimbMAX steep slope harvester; the CutoverCam hauler vision system; the HarvestNAV on-board navigation system; the Alpine remote-controlled hauler grapple; the Skyshifter twin winch tail hold carriage; the Teleoperation Control System for a feller buncher and a tail hold machine; the Doherty Quick Coupler, a hydraulic attachment that allows rapid swapping of a processor for a grapple; and a radical new Tree-to Tree Felling Machine.

The initial programme was completed in June 2016 with an additional one-year extension to commercialise the products from the programme. As part of that commercialisation extension work, three demonstrations are scheduled during 2017 to show case as many of the products from the programme as possible.

INTRODUCTION

As part of the 2017 NZ Farm Forestry Association Conference, a field trip to view a harvesting operation has been organised in Wanganui on 10 April 2017. The Farm Forestry Association invited Future Forests Research to participate in that field trip to demonstrate some of the new technologies that have been developed as part of the Steepland Harvesting Programme. The field trip and demonstration site is to be held at Ray McDougall's (Mangoihe Logging) logging site in Greenoch Forest 35km north of Wanganui (refer Figure 1).

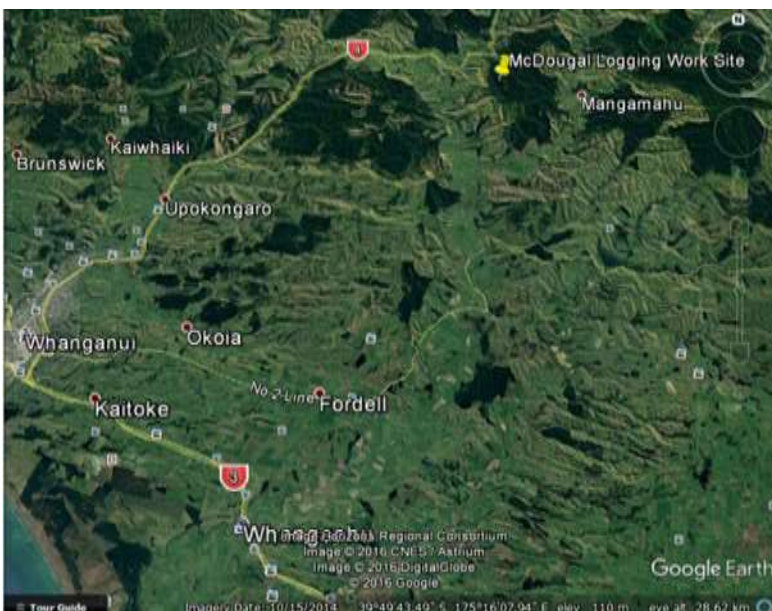


Figure 1: Greenoch Forest – 35km north of Wanganui

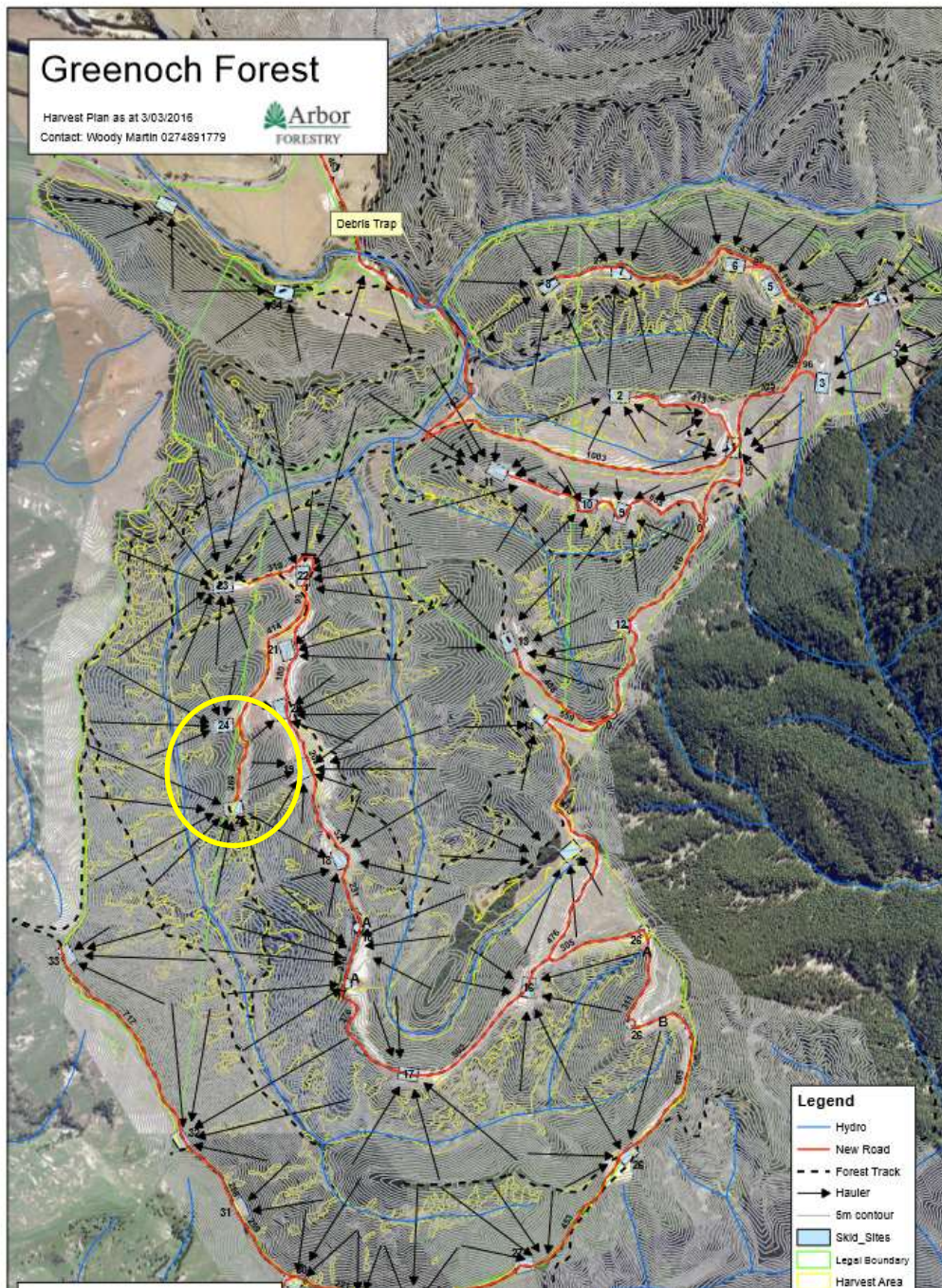


Figure 2: Greenoch Forest harvest plan – demo site inside yellow circle

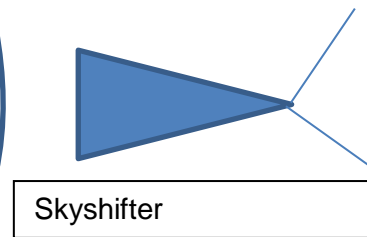
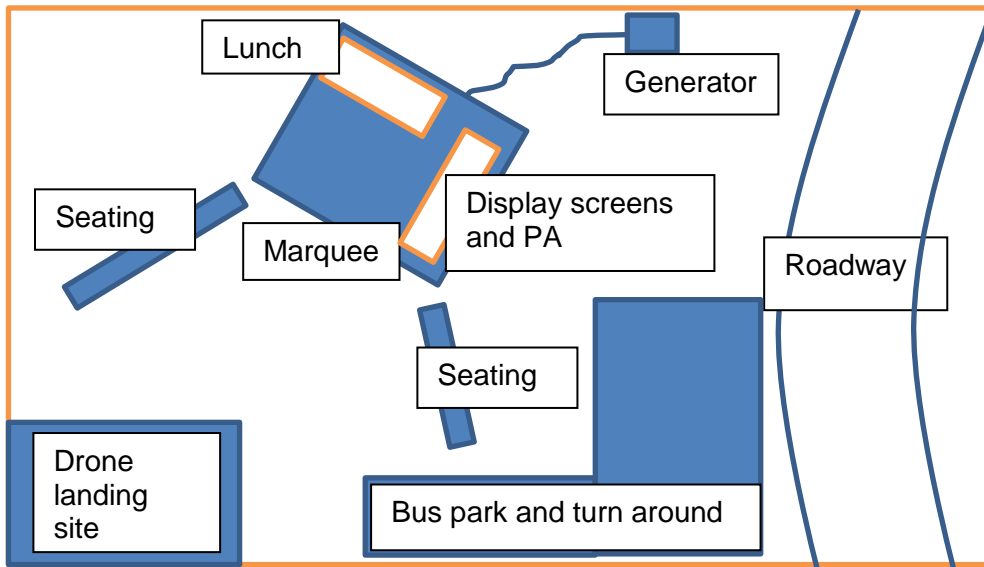
DEMONSTRATION SITE

The demonstration will be held on Skid 24 in Greenoch Forest. The harvesting crew will be operating on Skid 25 about 240m from Skid 24 (inside yellow circle in Figure 2). The harvesting operation consists of a Thunderbird TTY70 and mobile tail hold, a processor and a loading machine. The operation produces around 6 to 7 loads per day.

A 10m x 10m marquee will be erected on Skid 24 and will have display boards and 3 TV screens mounted. One screen will display the drone view of the harvesting operation, the second screen will display the CutoverCam imagery and the third screen will be for video display of other products developed during the course of the Steepland Harvesting programme.

Site Layout

Skid 24



EQUIPMENT TO BE DEMONSTRATED

CutoverCam Hauler Vision System

The CutoverCam system was developed by Paul Milliken of Cutover Systems Ltd firstly as a safety device to allow the hauler driver to see and keep an eye on the breakerouts. A second objective of the system was to offer the hauler operator a better view of the cutover to enable faster grappling time. The CutoverCam will be set up on site (most likely of the landing area) and the image will be relayed back to the demonstration site marquee. Paul will cover the development process of the CutoverCam and its uses.

Skyshifter Twin Winch Tailhold Carriage

The Skyshifter was developed by Don Scott of Awdon Technologies Ltd. Primarily the Skyshifter was developed to reduce the skyline shifting time and enhance grapple harvesting where pre-bunching of trees was not possible. However a secondary objective of the skyshifter was, to allow night logging with the assurance that no person is required to shift ropes or mobile tailhold machinery at night. The Skyshifter will be set up adjacent to the marquee for a live demonstration.

The Skyshifter will be setup not far from skid 24 just above the road on Sunday 2nd April. Two tail trees will be topped and guyed back to stumps (2 guyelines per tree, possibly using synthetic rope). The Skyshifter will be placed on a track just above the road. The winch ropes will be secured to the tail trees. A short piece of skyline will be secured to the Skyshifter and the other end to an excavator sitting on the road way. The Skyshifter will be raised clear of the ground and moved from left to right demonstrating the movement of the skyline across the cutover. All equipment and rigging will be supplied as part of the demonstration cost.

Alpine Grapple

The Alpine Grapple was developed by Alpine Equipment in South Africa. Logpro Ltd has the sales agency for Alpine Equipment in NZ. Alpine Equipment built a prototype grapple and provided free of charge to FFR a unit to trial, modify and demonstrate to NZ loggers. After trialling was complete a number of changes were made to the grapple prior to the first commercial grapple arriving in NZ in 2012. There are now 13 units operating throughout NZ. The grapple is remote controlled and works on just two ropes. The Alpine Grapple will be operating on the hauler and will be viewed up close with the aid of a drone with onboard camera system.

The Alpine will be fitted to the hauler on Saturday 1st April. Fitment includes setting up the remote box in the hauler cab, mounting the camera receiver at the top of the tower (or on the edge of the landing) mounting the camera TV screen in the hauler cab and teaching the hauler operator what to do and how to use the grapple

HarvestNAV On Board Navigation

HarvestNAV is a machine navigation system that runs on a tablet mounted in a machine (feller buncher or skidder for example). The operator will know his exact location at all times in relation to the forest block. The HarvestNAV system is excellent in showing the operator how close he is to critical parts of the block (a boundary for instance). The HarvestNAV has a warning system if slope becomes an issue. HarvestNAV was developed by Hamish Marshall.

The HarvestNAV system will be setup as a static display by Hamish on Monday 10th April prior to 10am. Hamish will be present to give a demonstration of the HarvestNAV system.

Skyline Tension Monitor

The skyline tension monitor is not a FFR project but was developed by Logpro (an FFR contractor). The tension monitor wirelessly communicates with the display screen in the hauler cab so the operator knows at all times what the tension in the skyline is. This ensures appropriate tensions are not exceeded and ensures maximum payload per cycle can be attained.

The tension monitor will be fitted to the hauler on Saturday 1st April by Spencer. Fitment includes fitting the tension sensor to the skyline and also mounting the display in the hauler cab.

Drone Technology

Drones are becoming very useful tools for the primary industry. Interpine will be attending the demonstration and will show case the latest drone technology and discuss the likely uses of drones for forestry applications. We will use the drone to give an up close view of the harvesting operation from the safety of the marquee.

Interpine will setup on Monday morning 10th April prior to 10am.

TIME TABLE

Action	Date	Time	Organiser/Presenter
Site visit	15/02/17		Spencer/Woody
Organise presenters	8/03/17		Spencer
Organise Marquee	10/03/17		Spencer
Write demo plan	14/03/17		Spencer
FFA notified of PPE Requirements	22/03/17		Dougall (FFA)
Commission Alpine Grapple	21/03/17		Spencer
Commission Skyshifter	23/03/17		Spencer/Don
Shift Skyshifter to Greenoch	29/03/17		Spencer
Shift Alpine Grapple to Greenoch	29/03/07		Spencer
Set up Alpine Grapple on Hauler	01/04/17		Spencer
Rig tail trees for Skyshifter	02/04/17		Spencer/Ray/Arnie
Setup up Skyshifter	02/04/17		Spencer/Ray
Crew practice with Alpine Grapple	03/04/17		Ray/Crew
Erect Marquee and build displays	04/04/17		Spencer/Dave Little
Delivery of Porta Loo (toilet)	07/04/17		Dougall (FFA)
Spare setup day	08/04/17		
Setup CutoverCam system	09/04/17		Paul
Mount TV screens/PA/Generator	09/04/17		Spencer/Keith
Buses arrive	10/04/17	10.30am	
Safety briefing	10/04/17	10.35am	Woody/Spencer
Welcome and Intro's	10/04/17	10.40am	Spencer/Dougall
CutoverCam demo	10/04/17	10.45am	Paul
HarvestNAV demo	10/04/17	11.15am	Hamish
Drone Technology view harvesting demo	10/04/17	11.30am	Interpine
FFA organising lunch and water/beverages	10/04/17	12.00pm	Dougall (FFA)
Skyshifter demo	10/04/17	1.00pm	Spencer
New PGP programme – presentation	10/04/17	1.30pm	Keith
MD of Waverly sawmill	10/04/17	2.00pm	Peter Martin
Bus leaves	10/04/17	2.15pm	
Pack up Marquee	10/04/17	4.00pm	Spencer/Dave etc.
Return Skyshifter to Rotorua	12/04/17		Spencer
Return Alpine Grapple to Rotorua	17/04/17		Spencer

SAFETY REQUIREMENTS

The demonstration site will be a safe zone however all participants will need a hardhat, hi-viz vest and sturdy boots.

NZ Farm Forestry Assn will ensure participants are notified of requirements.

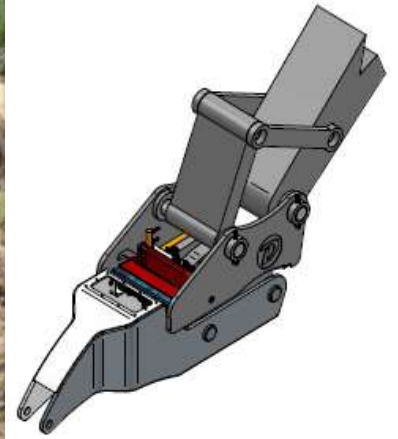
A full safety briefing to discuss demonstration plan and hazards will be held as soon as the buses arrive. Woody will cover the forest hazards and Spencer will cover the demonstration hazards.

Ray will sign everyone onto the site in the crew visitor book. GPS coordinates of Skid 24 will be displayed in the marquee.

Hazards	Mitigation
Logging trucks will be operating	No one to stand on road - roadway will be taped off
Skyshifter bight in ropes	Safe viewing distance to be maintained – taped off
Tail trees used in Skyshifter demo	Safe viewing distance to be maintained – taped off
Excavator used in Skyshifter demo	Safe viewing distance to be maintained – taped off
Drone landing location	Drone landing area will be taped off
Hot lunch	Be seated while you eat, take care
Poor weather	Visitors stay in Marquee
Access road	Each vehicle must have appropriate RT channel 19

OTHER EQUIPMENT NOT DEMONSTRATED

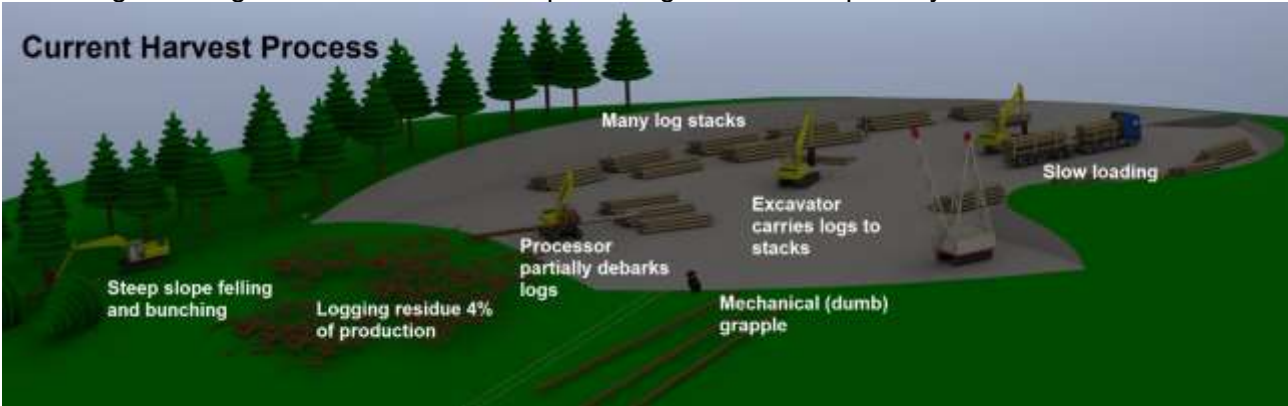
This demonstration will not include displays of the ClimbMAX or other tethering systems; the Teleoperation Control Systems (feller buncher or tail hold); the Doherty hydraulic quick coupler system and the grapple restraint system. We will cover these in a brief presentation as well as on poster boards displayed around the marquee.



FOREST VALUE CHAIN TRANSFORMATION

A small group of people have been preparing a new Harvesting Funding PGP bid called 'Automated Forestry Value Chains'. Keith Raymond will provide a summary of this programme after lunch. This is an equipment development programme that would help make small forest blocks more profitable.

From large landings and lots of machines producing 12-15 loads per day...



...to small in-forest landings producing 7 to 8 loads per day by taking the logs away to be sorted elsewhere. Sort facility supplied by 8 logging crews giving economies of scale (1900 tonnes per day) Analysis indicates a potential \$9.00 per tonne net benefit.

