FORESTRY 4.0.
CONNECTED FORESTS – TRUCK AUTOMATION IN FORESTRY

Texas A&M – Transportation Technology Conference
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About FPInnovations
ABOUT FPINNOVATIONS

OUR COMPANY AT A GLANCE

Not-for-profit R&D world leader that specializes in the creation of scientific solutions in support of the forest sector’s global competitiveness.

- **Know-How**
  - Since 1918

- **Employees**
  - 450

- **Funding**
  - $80M

- **Location**
  - Canada
Key roles

- Competitiveness of the forest industry
- Transformation and diversification of the forest sector

Delivering value & impact

- Supporting the industry’s development
- Creating collaborations to increase market growth
- Commercial scaling-up novel industrial technologies
Automation of the sector
AUTOMATION OF THE SECTOR

KEY CHALLENGES FACING THE SECTOR

1. People
   - Finding people
   - Attracting people
   - Retaining people

2. Fibre costs and value
   - Improving productivity
   - Improving utilization
   - Increasing value

3. Safety
   - Improving the industry safety performance by removing people from hazardous environments.

4. Sustainability
   - Maintain the industry’s strong environmental performance.
FORESTRY 4.0
AUTOMATION OF FOREST OPERATIONS

$ 40 M
Planned investments

2025
Target for highly automated operations

Driven by the
Industry and the government
AUTOMATION OF THE SECTOR

COMPONENTS

AUTOMATED HARVESTING  AUTONOMOUS TRANSPORT  IN-FOREST CONNECTIVITY
AUTOMATION OF THE SECTOR

FROM CONCEPT TO FIELD DEPLOYMENT

TECHNOLOGICAL GAPS IDENTIFICATION
From the proof of concept data, establish where the technology lies

DEVELOPMENT
Technology development

FIELD DEPLOYMENT AND OPERATION USE OF THE SOLUTION

PROOF OF CONCEPT
Confirm the potential of the technology
Showcase of the application

DEVELOPMENT PLAN
Development plan required to adapt the technology for a forest use

TESTING
Off and On-Site solution testing of increasingly complex use-cases to confirm the technology performs as expected
CHALLENGING OPERATIONAL CONDITIONS

• Heavy loads: Up to 150 metric tons
• Temperature ranging from -50 °F to +100 °F
• Dust, snow, mud, hail, ice, wind
• Gravel roads (ruts, potholes, washboarding, …)
• Limited GPS reception in certain areas
• Steep grades, tight turns, no lane markings
Our Approach - Transportation
APPROACH

AUTONOMOUS TRANSPORT

• Long term objective to operate autonomously from the cut-block to the mill

• Leverage two existing technologies
  • Platooning
    • Autonomous truck / Autonomous driving

• Promote a step-by-step approach

• Main focus on the safety of operations
WHAT IS TRUCK PLATOONING?

- Platooning is the operation of collaborative pelotons of electronically connected trucks
- Concept developed for highway use with fuel savings in mind
- The forest sector is interested in the driverless operation of the trailing truck(s)
- Platooning is a stepping stone toward autonomous trucking in the forest industry

RADIO COMMUNICATION
Vehicles are electronically linked

GPS ANTENNAS
Provide real time positioning

RADAR
Forward objects detection and range measurement

GPS
Provide real time positioning
**APPRAOCH**

**WHY CONDUCT A PLATOONING TEST ON FOREST ROADS?**

- **Viability of the Concept**
  
  Put a system in conditions it was not designed for, in order to evaluate the potential of the technology.

- **Pave the Way**
  
  Identify technological gaps existing between where the technology stands today and what it should be able to accomplish for operational use.
Approach

**TEST PARAMETERS**

- SAE Level 1, Two-Trucks Platooning
  - Human driver controlling the steering, throttle and brake in the lead truck
  - Human driver controlling the steering in the following truck
- Over 400 km driven with the platooning mode engaged
- Following distances ranging from 100 ft to 300 ft
- Traveling Speeds of 40 mph and higher
- Unloaded forest trailers for safety reasons
KEY FINDINGS

1. The system used performed above expectations.
2. Technological gaps were identified to allow the use of platooning in daily forest operations.
3. Items such as the brake usage, impact of grade and performance of the system in GPS challenged zones will need to be further evaluated.
4. DSRC communication was not an issue.
THANK YOU FOR YOUR ATTENTION

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