About Trimble

• Trimble is a leading provider of advanced positioning solutions that maximize productivity and enhance profitability across a variety of industries.

• Forestry Automation is a business area within Trimble formed to develop technology-centric solutions specific to the Forestry Industry.

• Current Forestry Automation solutions include:
  • Outdoor rugged mobile computers
  • SOLO Forest – Mobile GIS
  • Blue Ox – Forest Products Transportation

Matt Lehman
Sales Manager

Blue Ox
Forestry Transportation Management System
Transportation: A Critical Component of Forest Production

Forest Products Transportation

Depending on region, “landing to mill” transportation can be the most expensive aspect of wood production.

I. Planning, survey, site prep, planting, growth & yield, inventory 7%

II. Harvesting 42%
   "Stump to Landing"

III. Transportation 51%
   "Landing to Mill"
Transportation Cost Factors

Historically, forest products transportation costs have been weighed down by a number of common issues:

- Inconsistent operations with very low efficiency (hub-and-spoke)
- Questionable operating habits/customs (start times, routing)
- Increasing energy costs
- No consolidated industry effort to perform large-scale transportation operation optimization

Key Elements of Wood Transportation

- Transportation performance (loaded miles)
- Back-hauling (reduce dead-head miles)
- Truck dispatch and scheduling (idle time)
- Capacity and quota
  - Fleet Configuration
  - Fleet Maintenance
  - Fuel costs
  - Road design – Network connectivity

✓ Signifies areas where Trimble provides Solutions
Industry Observations & Analysis

- Industry average of 42%-44% loaded truck miles ratio
  - Direct result of the “hub & spoke” transportation model
    - ![Diagram](M --> C, C --> M)

- Untimely responsiveness to high levels of variability
  - Weather Events
  - Mill closures / shutdowns
  - Mechanical failures

- Non factoring of unloaded miles at the beginning / end of day

- Bottlenecks (race to the woods / mills)

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### Human Dispatch Factor

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<th>Loads</th>
<th>Trucks</th>
<th>Possible Dispatch Solutions</th>
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What does the industry need?

Reduced transportation costs
- Increased production by maximizing transportation capacity
- Reduced loading time and bottlenecks by having trucks in queue
- Increased loaded efficiency / reduced idle time
- Increased driver safety through monitoring driver habits
- Reduced losses from theft through load tracking
- Increased supply chain control
- Reduced administration through automated dispatching
- Increased backhaul opportunities
How it works in the loader

- Operator enters loads available
- Satellite modem ensures connectivity to server
- Trucks are scheduled and the system informs operator of truck ETA
- System informs operator which loads go on which trucks
**How it works in the truck**

- Driver is informed of starting time for the first load of the next day
- Route to pick-up is displayed and audible turn-by-turn directions are provided
- After loading, route to destination is displayed and audible turn-by-turn directions are provided
- After unloading, driver enters Scale Ticket and Load ID
- Driver requests next load or end of day
- Process repeats throughout day within operating hours

**How it works in the office**

- Manage by exception with active dashboards, alerts and messages
  - Downtime events
  - Schedule discrepancies
  - Safety issues
- Manage databases (new landmarks, quotas, contracts)
- Monitor operation efficiency
  - Turn times
  - Productivity reports
  - Hours of operation
Reporting

Blue Ox generates several scheduled and on-demand reports:
- Settlement Reports
- Productivity Reports
- Efficiency Reports
- Safety Reports

Case Study

- East of Dallas, Texas
- Two geographical areas (2 phases) North and South
- Currently phase 1 – North (phase 2 to be launched shortly) – *up and running since March 15th, 2010*
- 35 trucks operational (34 available on average)
- Currently more than 600 loads available on a weekly basis
- 10 operational mills (90% of deliveries to 3)
Case Study

Baseline Operations Data

Before Blue Ox – 1 Weeks Data
Truck Days – 203
Loads – 456
Loads/Truck Day – 2.25
Average Haul Distance – 48.76
Miles/Truck Day – 318.22
Loaded Ratio – 39.78%
**Installation**

**Blue Ox Operations Data**

After Blue Ox – 1 Weeks Data
Truck Days – 169 (-34)
Loads – 538 (+82)
Loads/Truck Day – 3.18 (+.93)
Average Haul Distance – 58.55 (+9.79)
Miles/Truck Day – 363.5 (+45.28)
Loaded Ratio – 51.22% (+11.44)
Implementation Hurdles

Cultural Acceptance
- Landowner
  - Load priorities
  - Contractor relations
- Loggers
  - Truck availability
- Truck Drivers
  - Starting times
  - Operating hours
  - Free flowing

Technical
- Landowner
  - Settlement
  - Routing

Overcoming Hurdles

First Week
- 78 Alerts
  - Wrong Harvest Site
  - Wrong Destination

During the first week several of the drivers and loggers periodically reverted to hub-and-spoke methods in lieu of using load assignments from Blue Ox.

Fourth Week
- 8 Alerts
  - Wrong Destination

By the fourth week alerts were significantly reduced. Most are the result of load prioritization issues rather than driver/logger acceptance.
What next?

Harvest process optimization with direct feed into Blue Ox transportation optimization.

Harvest scheduling with input from Blue Ox optimization and scheduling engines.

Enhanced timber security and load tracking.

Questions?