

# Optimized Delivery and Logistics Planning in Forestry

*What's Possible?*

Remsoft & Geocom

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## Introduction

- Delivered wood cost is significant
- Approximately 40% to 60% of final product cost
- Transportation cost approx. 30%
- Tends to be most variable cost item
- Fuel costs are rising
- Environmental concerns – GHG emissions
- Too many empty miles
- Complex supply chains

## Agenda

- Introduction
- Background
  - Geocom and Remsoft
- Problem definition
- Solution concept
- Benefits
- Questions

## Company backgrounds

### Geocom

- Founded in 1995
- Headquartered in Munich / Bern
- Customers in 24 countries
- Focus on OR and infrastructure management
- Domain expertise: logistics, utility networks, industrial plants
- Esri Platinum Partner



### Remsoft

- Founded in 1992
- Headquartered in Fredericton, Canada
- Customers in 20 countries
- Focus on OR & forestry planning
- Domain expertise: optimization solutions for hierarchical forest planning





## Strategic

Portfolio, Estate, Property

## Tactical

Portfolio, Estate, Property

## Operational

Estate, Property

## Delivery & Logistics

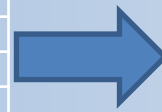
Property

Business Use

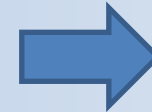
Wood Supply Analysis
Financial Analysis
Buy and Sell
Policy Evaluation
Risk Analysis
Land Management
Valuation
Integrated Nursery Planning
Capital Planning
Biomass
Certification
Harvest Scheduling
Hydrology
Environmental Impacts
Habitat Analysis
Facility Location
Woodbasket Analysis
Multi-use Planning
Carbon
Silviculture Strategies
Portfolio Analysis
Investment Planning



Wood Supply Analysis
Financial Analysis
Establishment planning
Road planning
Integrated Nursery Planning
Capital Planning
Biomass
Production Scheduling
Capacity Planning
Woodflow Planning
Budget Planning
Crew Planning
Delivery Planning
Sales Planning

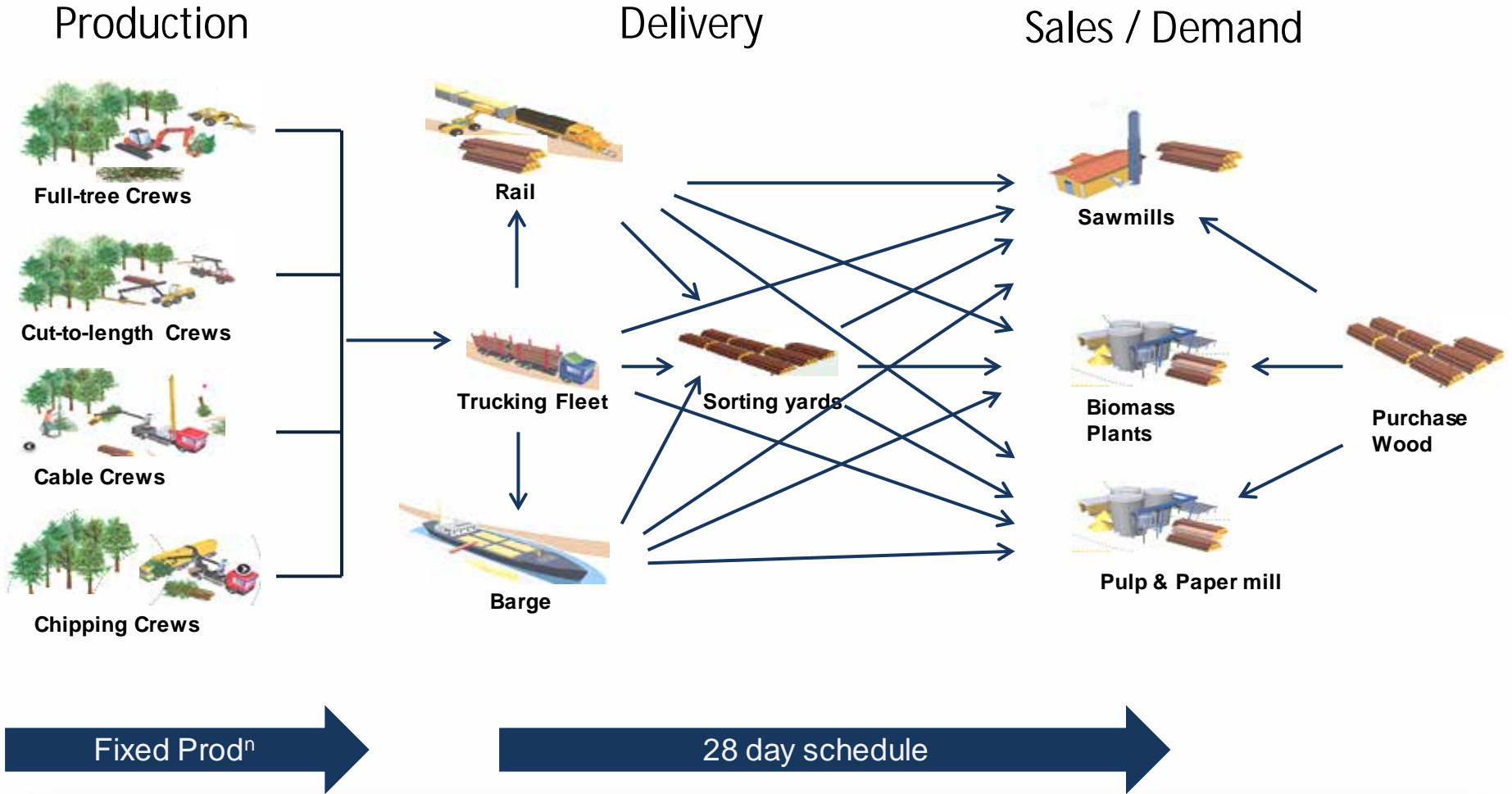


Financial Analysis
Production Scheduling
Capacity Planning
Woodflow Planning
Budget Planning
Crew Planning
Delivery Planning
Sales Planning
Activity Sequencing



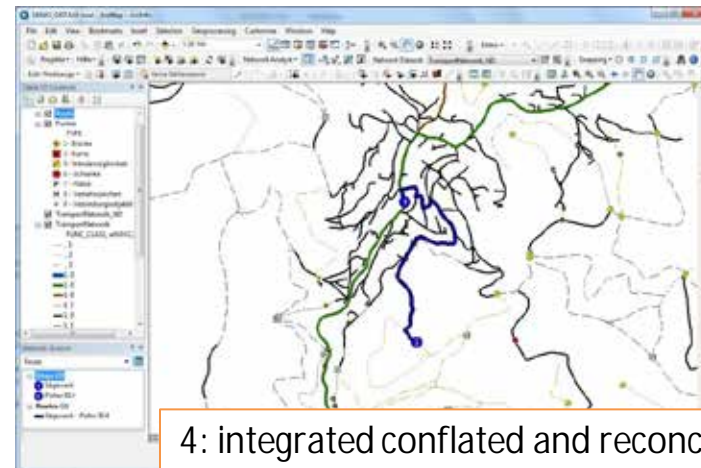
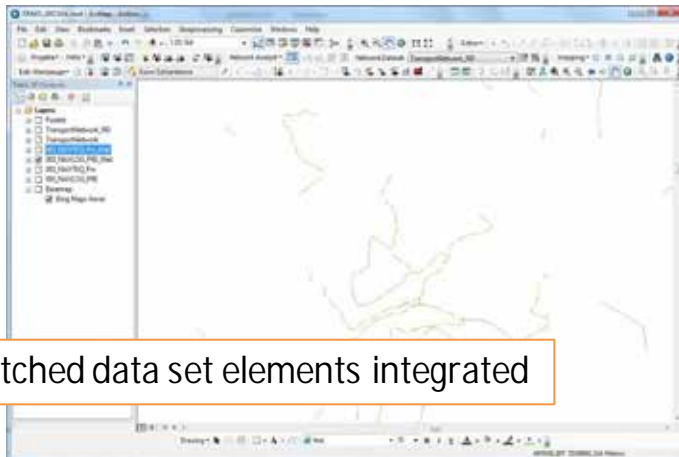
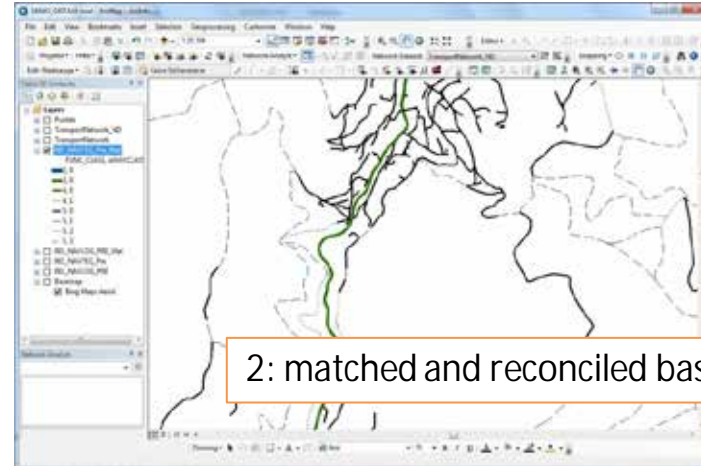
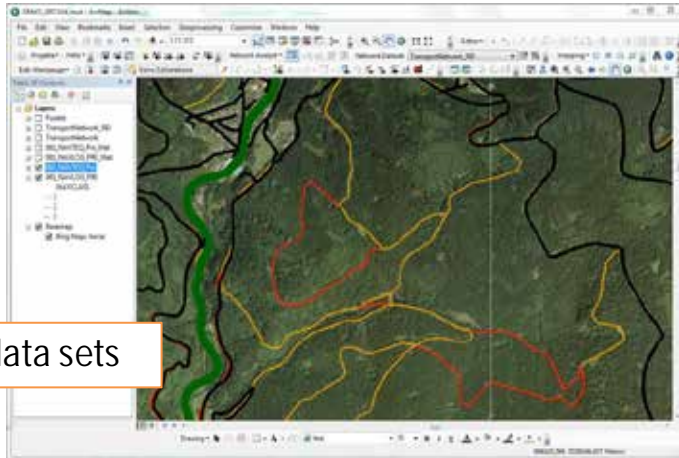
Delivery Scheduling
Resource Allocation
Route Planning
Automatic Vehicle Location
Delivery Tracking

# Delivery Planning



# GEONIS Street Network Manager

## Integrating available street data and forest roads





# Logistics Scheduling: GIS-based optimization

OR and GIS combined

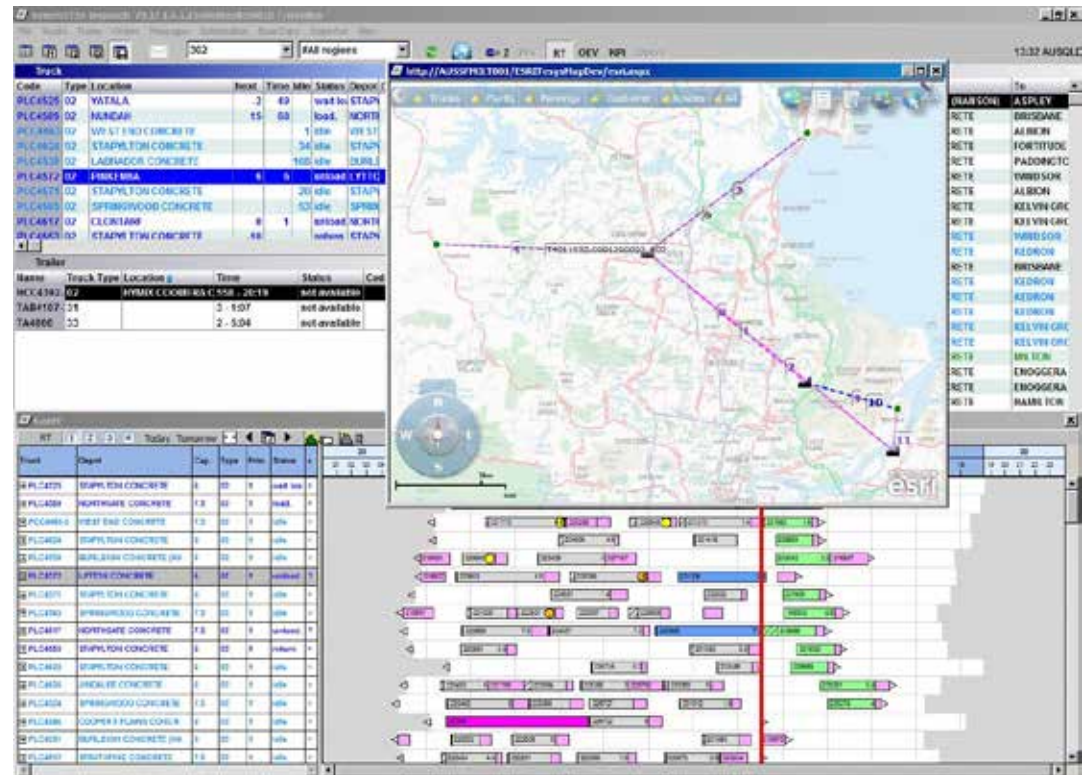
Step 1:

Allocation and Sequencing  
Optimization

Step 2

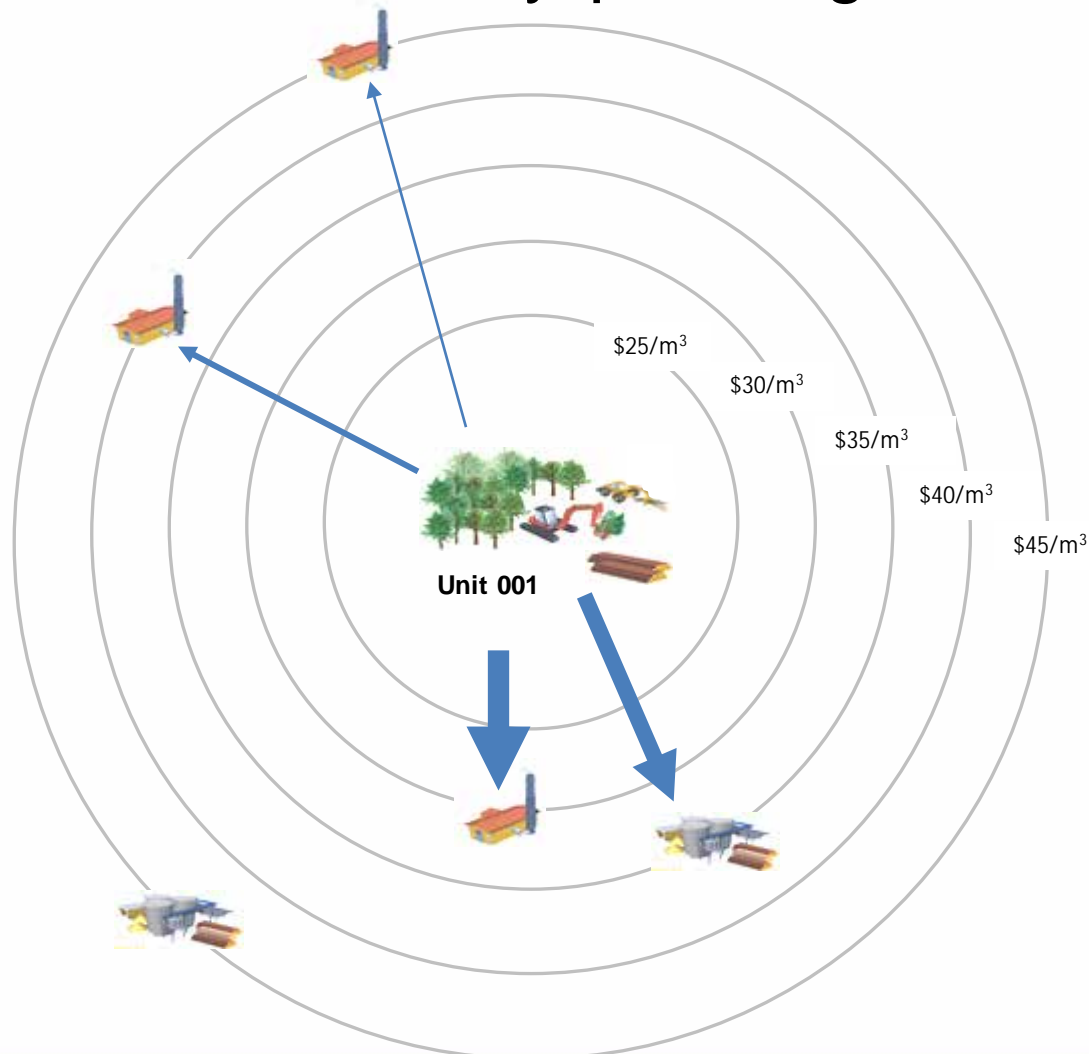
Routing and Telematics

Dynamic, real-time scheduling

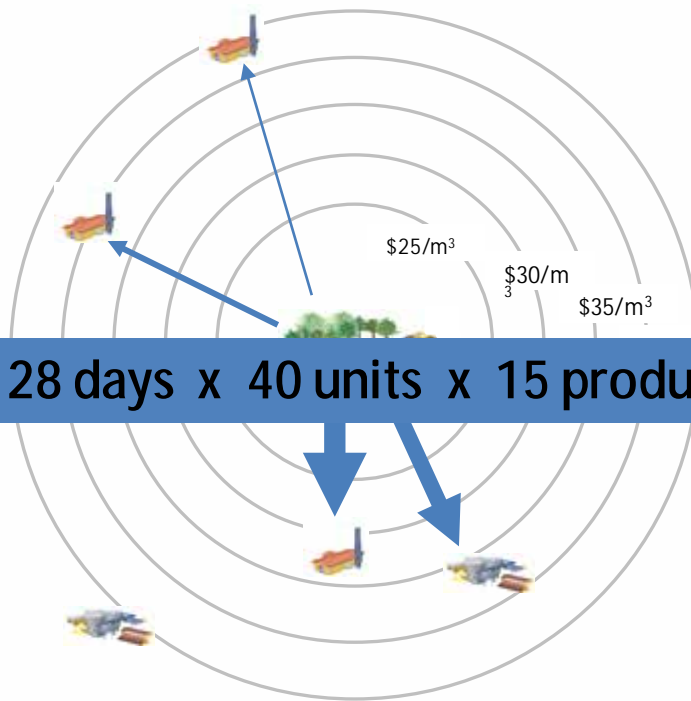




# Problem definition: Delivery planning

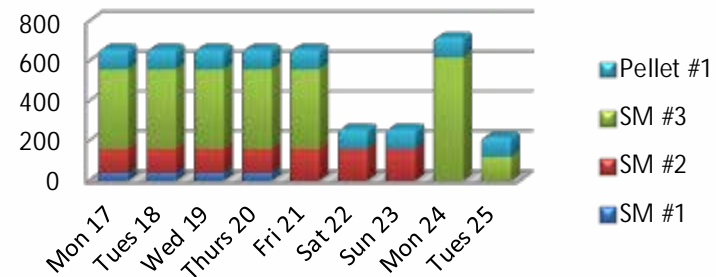


## Problem definition: Delivery planning

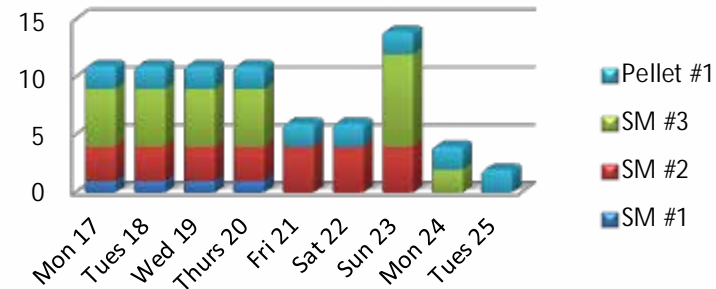


28 days x 40 units x 15 products x 2 modes x 5 purchase x 7 destinations =

### Daily Delivered Volume



### # of Trucks





## Problem Definition: Truck routing & sequencing

- Identifying the optimal routes
  - Between all units and destinations
- Regulation compliance - weight restrictions; time of day
- Terrain constraints
- Fleet capacity constraints
- Truck configuration and product match
- Shift limits
- Loading and unloading bottlenecks

# Solution Concept

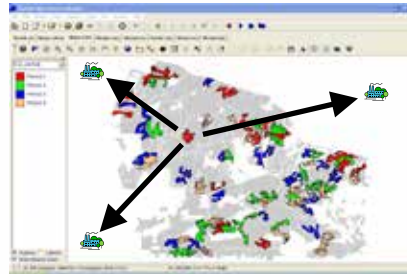
## 1. Network Data Prep



- SNM



## 2. Delivery Planning



- Optimized delivery
- Schedule...what, where, when
- Frequency?



## 3. Truck Sequencing



- Optimized truck routing and sequencing
- Frequency?



## Benefits

- Maximizing supply chain value
- Transportation capacity management
- Reduction in fuel costs and transportation costs
- Reduction in GHG emissions
- Increased payload
- Reduction in wait times
- Planning agility
- Increased plan transparency





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