GPS/GIS Advances in Forestry

Adam Sutherland
UPM Blandin Forestry
April 5th, 2016
Outline

• Overview of UPM Blandin
• Blandin GPS/GIS History
• Field and Office GIS
• GPS for Operators
• What’s Next
Overview of UPM Blandin Paper

- Mill opened in 1901 (Itasca Printing Company)
- Purchased by Charles K Blandin and became the “Blandin Paper Company” in 1929
- World leading producer of lightweight coated paper
- 1400 tons of paper/day (25 tons/day in 1902)
- Acquired by UPM in 1997
  - Headquartered in Helsinki, Finland
  - Global leader in paper market
- Mill employs ~ 400 people
Overview of UPM Blandin Paper

- Blandin Forestry is responsible for supplying the paper mill with the timber it requires and for sustainable management of UPM forests. (Over 200,000 cords of high quality aspen, balsam, and spruce)

- UPM owns and manages 187,876 acres of forest land making it one of the largest private owners in Minnesota.

- Staff = forest manager, ecologist, 7 field foresters
Overview of UPM Blandin Paper

• Average distance <30 miles to mill
• Above average productivity potential

• 120 Miles of maintained system roads
• Well-blocked ownership
History Leading to Current Technology

- Traditional non-tech forestry tools have done the job for decades
  - Hand drawn maps
  - Compass and string box
  - What's your pace?
1990’s – Recognized a need for better mapping

• GIS – full speed ahead
  – Arcview software
  – Contracted with ProWest
  – Digitized all forest layers

• Continuous support from management to allow investment
• Constant support from outside contractors specializing in up-to-date techniques and equipment
Late 1990’s

Explored GPS
• GeoExplorer II (boat anchor #1)
• ProXR (submeter) (boat anchor #2)
Early 2000’s

Fully Utilized GPS with ArcPad
• HP Ipaq’s with Garmin
• GeoXT,s
• Still connected by wires, clunky, poor batteries
Today

No Wires!
• ArcPad v10.02
• Juno’s (9) – 3-5’ accuracy
• Geo7 (3) – sub foot accuracy
Office/Field Workflow

Shapefiles for Feature Mapping

Personal Shapefiles
- Points
- lines
- trails
- roads
- hydrology
- skidtrails
- road_Points
- Polys
- Etc....
Timber Sale Design

- 70% summer access
- Adherence to Site-Level Forest management Guidelines
- Protect site Resources
  - Hydrologic
  - Cultural
  - Wildlife
  - Productivity
- Summer Roads
- Skid Layout and trafficking
- Spatial accuracy in mapping
- Seldom travel the same ground twice

Forester Efficiency is Key!
GPS in Harvester
Cost

- Costs of installation vary greatly among applications
  
  - Handheld Trimble Juno with ArcPad software ~ $1000
  - Installation of GPS receiver on cab (JD or Ponsse) ~ $1000-1300
  - ArcPad (or similar software) alone ~$250
  - Simple handheld Garmin/IPAQ ~ $500 or less

  - Total costs typically range $500-2500

  - Started with one CTL processor in 2008, today we have over 30 machines working for us and utilizing GPS tech.
The Tracklog Feature
day 1; he cuts out the landing, the main skid trails and he cuts a little on the very back of the block.
Day 2, he goes back to where he left off and cuts out a pretty good sized patch. About 2 acres.
Day 3
Day 4, another 2 acres. You begin to see why the primary skid trail needs the best slash mat.
Day 5
Day 6

Sept 18, 2009 6:45am

Sept 18, 2009 8:54am
Day 7…a big day. Gets 3.2 acres. Machine worked from 6:35am to 4:20pm. Cuts a big block near the landing than heads back to the back again and starts cutting there.
Day 9 an interesting one. Cut in the morning to the east, but finished the day along the south property line.
Day 10, he cuts a main skid to the west and a pretty big pocket gets cut out. This area was saved to take advantage of dryer weather. The plan being to save the east area in case of some rain, and get working on ground that was a bit more sensitive, but now safely operable.
Day 11, He cuts to the west again, but the conditions are so dry, that the operator would like to harvest some aspen to the north across some previously marginal wet ground.
Day 12, After a short discussion with the forester, the work begins.
Day 14…finishes up north. Islands are now cut. And work continues to the west of the landing.
Day 17
Day 18
Day 19
The last 7 days, Days 22 thru 28. He finishes the east.
68 acres
2.5 acres cut/day
1800 cords
26 cords/acre
64 cords/day
What’s next?
Web based

No summary was provided for this group.

Group Content

All Results
- Maps
- Layers
- Scenes
- Apps
- Tools
- Files

Show ArcGIS Desktop Content

UPM Widskts Updated 1-20-2016
UPM timber permit info
Web Map by asuth_upmfbgr

Last Modified: March 27, 2016

(0 ratings, 0 comments, 840 views)
Web based – web connection in cab
Web based – smartphones/tablets
Finnish Technology
Logging Equipment - Measurement
### Matriisin käyttötarkoitus

Kuusitukki, kaikkialta

### Seurantajakso


### Tehdas

8630 ALHOLMAN SAHA

### Puutarhalaji

604 KUUSI

### Maks. pituus (cm)

618

### Maks. latvapaksuus (mm)

500

### Sall. poikk. ohjepituuteen

Alaraja (cm) 3
Yläraja (cm) 600

### Katko vapaasti

- Kyllä
- Ei

### Määräkohtaa saa tehdä

- Kaikkialta
- Vain tyvestä
- Vain muualta (ei tyvestä)

### Arvosuhde

265

### Arvonvaihtelu%

4

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**Matriisin tavoitearvot:** 1 - 100 = tavoitejakuma (%); 0 = apumitta, K = käsijako- kirjautumismitta

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**Harvester’s Logging Order**

![Map and data interface screenshot](image)

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<th>Start Date</th>
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**Location:** Turvetuotantoalue

**Map:** Shows geographical areas with different land uses.

**Technical Information:**
- **Map Scale:** 1:3700
- **Total Distance:** 2.639 km (1.9700)
## Feedback From Harvester

### UPM-Kymmene Metsä

**TUKKILUETTELO / KAPPALEHÄÄRÄT**

Ajalta 01.05.00-05.06.00

USEITA KAUPPOJA

Tehdas: LPRSA

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| !148          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| !150          | 16  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| !153          | 25  | 4   | 2   | 3   | 3   | 2   |     |     |     |     |     |     |     |     |     |     |     |     |
| !155          | 194 | 143 | 141 | 173 | 141 | 96  |     |     |     |     |     |     |     |     |     |     |     |     |
| !160          | 280 | 217 | 140 | 113 | 94  | 94  | 16  |     |     |     |     |     |     |     |     |     |     |     |
| !170          | 173 | 136 | 85  | 70  | 55  | 92  |     |     |     |     |     |     |     |     |     |     |     |     |
| !180          | 163 | 85  | 247 | 262 | 164 | 171 | 84  | 105 | 19  |     |     |     |     |     |     |     |     |     |
| !190          |     |     |     | 275 | 239 | 180 | 180 | 192 | 86  | 4   |     |     |     |     |     |     |     |     |
| !200          | 249 | 183 | 4   | 275 | 239 | 180 | 180 | 192 | 86  | 4   |     |     |     |     |     |     |     |     |
| !220          | 14  | 5   | 328 | 193 | 246 | 218 | 220 | 243 | 114 | 1   |     |     |     |     |     |     |     |     |
| !240          | 2   |     | 168 | 153 | 176 | 153 | 171 | 210 | 83  |     |     |     |     |     |     |     |     |     |
| !260          | 1   | 3   | 164 | 148 | 151 | 172 | 154 | 74  |     |     |     |     |     |     |     |     |     |     |
| !280          | 2   |     | 101 | 115 | 119 | 180 | 91  | 76  |     |     |     |     |     |     |     |     |     |     |
| !300          |     |     | 120 | 147 | 143 | 218 | 152 | 83  |     |     |     |     |     |     |     |     |     |     |
| !320          | 2   | 1   | 1   | 10  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| !340          | 2   | 1   | 1   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| !350          | 1   | 1   | 2   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| !380          | 1   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

| !kpl          | 317 | 16  | 39  | 888 | 966 | 611 | 1300 | 1592 | 1582 | 1116 | 867 | 684 | 863 | 14 | 4  | 4  | 1  |
| !n3           | 44.63 | 1.75 | 4.73 | 118.82 | 137.39 | 93.87 | 213.25 | 299.18 | 368.52 | 313.04 | 288.28 | 261.83 | 428.03 | 6.85 | 2.00 | 2.27 | .67 |
| %             | 2.9 | 1.1 | 0.4 | 8.2 | 8.9 | 5.6 | 12.0 | 14.7 | 14.6 | 10.3 | 8.0 | 6.3 | 7.9 | 1 | 1 | 1 | 1 |
Logging Equipment - Forwarder
Transport Equipment – Truck
Truck’s Transport Order
It must've been pretty boring back in the day... sitting around just staring at your hand.