



LANDMARK
Spatial Solutions, LLC

INTRODUCTION

Thank you for your interest in **LandMark Spatial Solutions**. Our simple goal in business is to help companies like yours become more profitable through the use of technology. We have developed industry-leading **GPS and Forest Inventory** solutions that are helping our clients minimize errors and be **more ACCURATE** in their acreage and timber volume estimations, tree count, and tree measurements, be **more EFFICIENT** in the field and office, and achieve **more PROFESSIONAL results** at the end of the day. Please keep reading if you need help or are interested in any of the following areas:

- Using a GIS to help manage and inventory your forest and make better maps
- Using GPS under dense forest canopy to get accurate acres and navigate to cruise plots
- Cruising more timber per day
- Getting accurate tree heights and borderline tree measurements
- Electronic Load Ticketing and Reporting to expedite weekly reconciliations
- Fast and Accurate Chip pile and log deck estimations

For the past 18 years, we have been helping design, sell, train, and support technology-based solutions that have helped almost 2000 forestry and resource management companies and agencies all across the US be more competitive and profitable. We have formed significant partnerships with over 40 companies that make rugged and compelling products that integrate together to form our solutions. We now have offices in MS, GA, and WV so that we can offer our solutions to foresters all over the Eastern half of the US.

We appreciate you taking the time to read this document and believe it will be well worth the effort. If you have any questions, would like to talk to us, or would like for us to show you what our solutions can do for you, please do not hesitate to contact us via the information on the last page. Thank you very much.

Johnny Thompson, Darian Yawn, Mark Books, and Steven Stuart

IF YOU BUY TIMBER,



the **first** and most important way we can help you is to **eliminate most of the variability and uncertainty in your bids or negotiations caused by acreage estimation**. Week in and week out, our solutions are helping our customers accurately estimate acres in stands, SMZs, roads, bug spots, etc. For example, if you bought 2000 acres worth of timber next week with an average value of \$1500/acre and our GPS equipment helped you be even 1% more accurate in your acreage estimates, you could either save money by not buying 20 acres of timber that wasn't there but still cost you \$30,000 or you could be more successful in your procurement by increasing your bids to match the total volume of timber that actually was there. In most cases, our equipment can help you be even more accurate than 1%, so the savings are even larger. Either way, our customers tell us that most systems pay for themselves in the first 4 sales, and that **using GPS for acreage determination is the fastest return on any investment that they have ever had**. Moreover, we have solutions that work very well under any forest canopy so you don't have to sacrifice productivity for accuracy. Just how accurate are we talking about? In a large, 3 state GPS test, our 1-3 meter GPS solutions averaged 0.9% difference from survey acres on stands that were an average of 33 acres. If you have tried to use GPS in the past and are frustrated by not being able to track satellites under canopy or by having to post-process your data before you know your acreage, you need to try one of our systems. They work!!

A **second** way our solutions can help you is to **be more efficient in how you cruise**. Our RTI system allows you to use GPS to navigate to your cruise plots so you can take the path of least resistance and avoid thick, brushy areas. Moreover, RTI lets you see both your data as you collect it and yourself moving on top of digital photos or topos in the field instead of having to guess where you are on a paper map. Recently, one company told us that they were able to cruise an area in 5 hours that would have normally taken them 1.5 days. Our systems also give you the ability to quickly tally or enter cruise data in the field on a plot by plot basis, eliminating the need to reenter it in the office and giving you a better estimate of the variability in your cruises.

Back in the office, we can help you generate cruise volumes and make great-looking maps in a few clicks of the mouse. There's more about RTI on page 5.

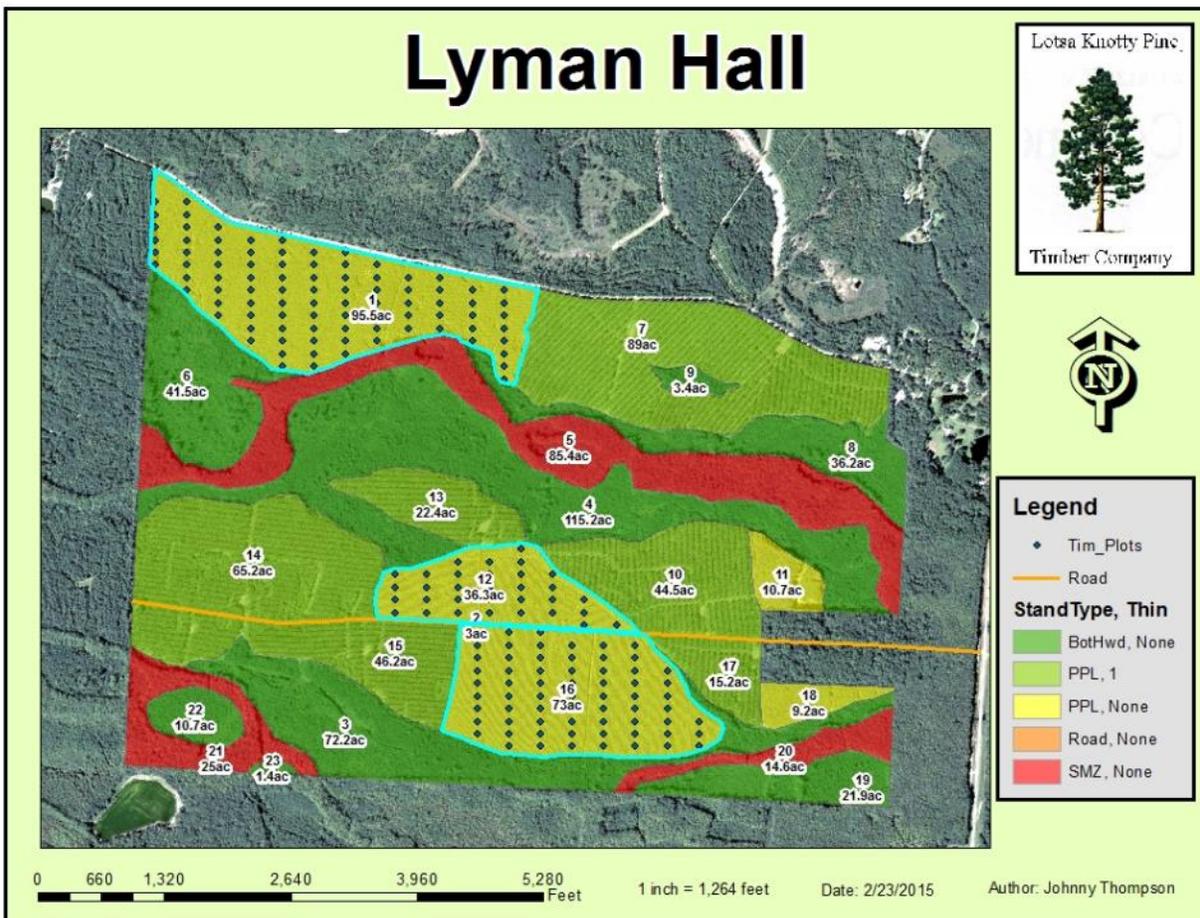
IF YOU MANAGE TIMBER,

we can teach you how to make meaningful maps that tell a story and deliver constructive info to your clients. Our EZ-Plot toolbar, detailed on page 8, allows you to allocate plots to in one or multiple states and create waypoint files for Solo. Our GPS systems allow you to take your GIS layers to the field and map out accurate acres on site prep, food plots, smzs, roads and other silviculture applications.

ArcGIS is the industry standard GIS program, and the current version allows you to stream in high-res photos, topos, road layers, and hundreds of other layers from ESRI's warehouse of GIS info on ArcGIS Online. You can even upload your data to the cloud and make meaningful maps that your clients can download and use on their mobile devices. We are currently developing an online training course on how to migrate from ArcGIS Desktop to ArcGIS Pro, ESRI's next-generation Desktop GIS program.



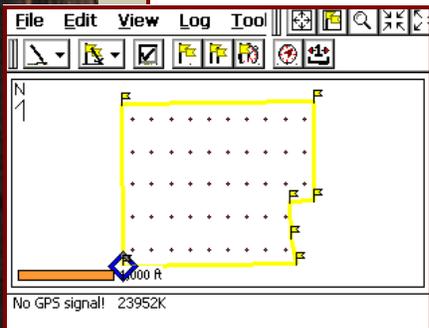
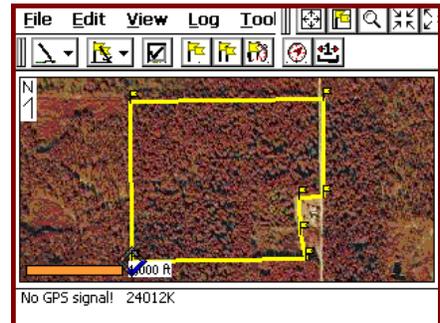
Lyman Hall



WHAT IS REALTIME INVENTORY?

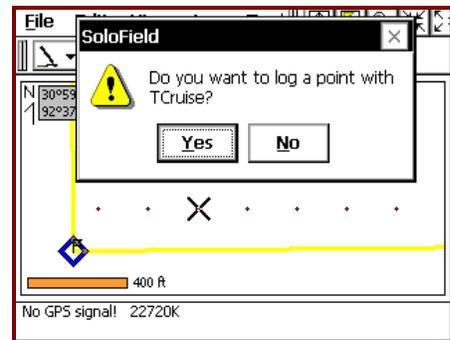
In a nutshell, RealTimeInventory, or RTI, is the integration between the industry-leading, field inventory software, TCruise, and Trimble's GPS data collection/verification software, Solo Forest. It is the **only** forestry solution that allows you to do both GPS and inventory work on the same data collector and have the data from both programs linked to each other. It is a patented process, so there won't be anything else like it for a long time. Here's how RTI works.

1. Create a Stand Boundary—This can be done in the office **or** field by digitizing on a photo, **or** by using our GPS systems to traverse the stand in question.

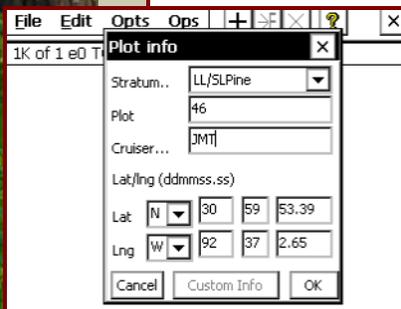


2. Create a Cruise Grid—In the office or field, you can specify the grid spacing and orientation and even begin the grid 1/2 the distance over and up from a known corner.

3. Navigate to a Plot—Select which plot you want to go to and use GPS to navigate there. When you get within a specified distance from plot center, Solo Field will automatically alert you that you are near plot center and ask you if you want to collect data with TCruise.



4. Enter Plot Data—If you answer "YES", a link will be established between SoloField and TCruise, the plot ID and Lat./ Long. will be sent to TCruise, and you will be automatically "switched" to TCruise. You can then enter Plot Info and then go to the data entry screen.



5. Enter Tree Data—The last step is to tally the trees and save the plot in TCruise. You can enter trees in a tally card or spreadsheet format, both of which have your species, products, and merchandizing specs built in to them. Your products will be automatically assigned by dbh unless you override and assign them manually.

spcCd	no.	dbh	hm	tm	prd	TCrinn
PIN	1	12.0	40		AA	Leav
PIN	1	16.0	64		AA	Leav
RO	1	16.0	56		AA	Leav
HIC	1	12.0	32		AA	Leav
PIN	1	7.0	32		AA	Leav
PIN	1	8.0	36		AA	Leav
PIN	1	16.0	48		PW	Leav
PIN	1				AA	Leav
PIN	1				AA	Leav
PIN	1				AA	Leav

6. Do It Again—When you finish the first plot, you simply go back to Solo Forest, select the next plot and keep going. All cruised plots are marked in Solo Forest as "Visited".

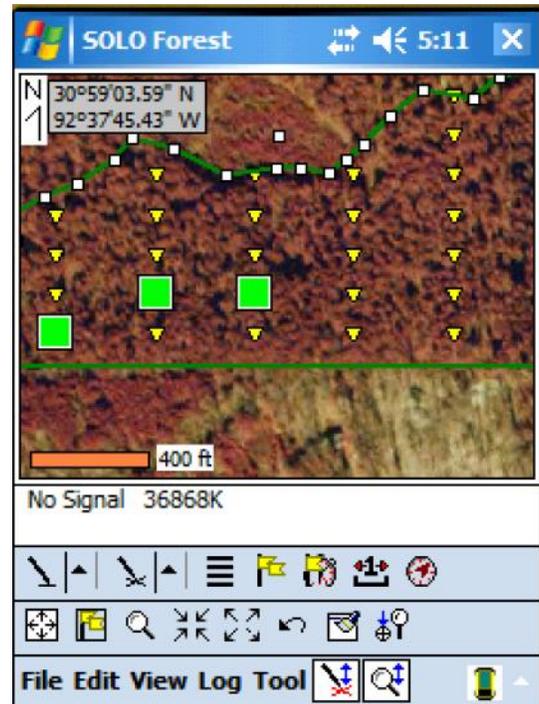
WHAT ABOUT OUR SOFTWARE?

We have integrated 2 fully independent software programs to create RTI. If you only want to do GPS, you only have to buy Solo Forest. If you only want to cruise timber, you only have to buy TCruise. If you want to do one now and add the other on later, it is simply downloading another program to your field computer and getting trained.

WHAT DOES SOLO FOREST DO?

In our opinion, Trimble's Solo Forest software is the **BEST** GPS data-collection software on the market today. It is very easy to learn and has intuitive menus and dialog boxes like your Windows system. The following is a partial list of what you can do in Solo Forest:

- Map points, lines and areas
- View data as it's collected
- Map offset points, lines and areas
- View static "spread" as the data is collected
- Log dynamic features by time or distance
- Log lines/areas statically, dynamically or both
- Average point data
- Edit data in the field
- Quick in-field calculation of distances and areas
- Heads-Up-Digitize in the field
- Create custom cruise grids in the field
- Navigate to plots using GPS
- Direct data export to shapefiles, DXF or ASCII
- Send plot ID and Lat/Lon to TCruise in the field
- Split and merge polygons and create buffer zones in the field
- Display shapefile, photo, or topomap basemaps and position yourself on them



WHAT DOES TCRUISE DO?

In our opinion, TCruise is the **BEST and Most Complete** cruising software on the market today. It is powerful and very flexible. The following is a partial list of what you can do with it:

- Specify an alpha/numeric species code up to 5 characters in length
- Auto-assign products based on DBH classes, eliminating the need for specifying product
- Perform any plot, point, double-point (VBAR), 100%, strip, or stump cruising method
- Turn any columns on or off
- Automatically perform height subsampling
- Use built-in profile functions for over 100 species or user-defined equations
- Define capabilities for DBH-Merchantable height equations, DBH growth equations, Form Class equations, or stump diameter to DBH equations
- Specify stand, tract or any strata and a unique plot ID for each plot
- Generate custom reports and a variety of industry-standard reports
- Generate value reports and statistics based on user-defined prices
- Conduct multi-product grading of individual trees
- Collect age and growth information for site index and growth calculations
- Automatically do in-field error checking
- Accept Lat/Lon and plot ID for each plot from Solo Forest
- Conduct audit or remeasurement cruises
- Automatically export all data to Access with our LandMark Export Module
- Calculate tree or log average cruises

TCruise Pro Optional Modules

The all new TCruise Pro version includes optional modules listed below which are add-ons and cost \$300/module. Users may update to the new version without enabling any of the new modules and without incurring any additional costs. When making the TCruise Desktop update, registrations will only be required for those who implement the optional modules. Users migrating to the new version can also rest assured that their old configuration settings will be maintained. The new TCruise Pro version will be the only supported version after June 2017. Users who do upgrade to this new version will also need to update the mobile (field) version of TCruise for compatibility. Updating TCruise for Mobile Devices is free for existing users and will not require re-registration. The previous versions of TCruise Desktop and TCruise for Mobile Devices will remain posted for those who do not wish to update, but be aware that those versions will no longer be supported for bug fixes or customizations.



New TCruise Pro Optional Modules:

1. Pro Toolbar with following functions:

- A. Sample size estimator - designed for stratified, multi stand cruises to help users determine samples needed to meet defined allowable error requirements based on cruise method, stand size, and standard deviation estimates for each stand/strata.
- B. Plot allocator - creates cruise grid based on several allocation types for single stands. Batch allocation is also possible when parameters are defined in the stand/strata shapefile. Sample size for each stand can also be estimated based on CV, cruise method, and stand/strata area.
- C. Overlay tool - this tool can apply stand/strata ID's by loading in a projected polygon shapefile that overlays the plots. The polygon shapefile must contain a StandID or StrataID field (text) along with an Acres field. Cruise plots must have a Lat Long coordinate assigned which is automatically applied when using RTI or the GPS capture button in TCruise for Mobile Devices. This tool can also automate the entry of Stand/Stratum land area in TCruise Desktop Pro.

2. **Excel Reports/Excel Import Tool** - 20+ Excel worksheets with a variety of standard report types and tables for analysis or for joining to GIS layers. To implement the new reports, users will need to make a few minor updates to their existing templates and TCD files. These reports include an Excel import tool that allows you to format legacy cruise data into a preformatted spreadsheet and then import that data into an existing TCruise template for further analysis in TCruise.

3. **Audit Cruise Module** - Users can create audit cruises directly on a handheld device or on the PC. Blind or paired audits can be created. When all audit data has been collected, use the HH Simulator to Process the audit. The audit routine allows users to choose how to weight each cruise field entry for scoring. Statistically valid reporting.

4. **Update GIS Database Utility** - Allows your Stands GIS layer to have volume variables automatically input or updated. Compatible with ESRI Personal Geodatabases (Access) or File Geodatabases. User defined field list allows custom field naming and species grouping or volume attributes. This utility will also capture "by DBH" volume variables in tables that can be related to your GIS Stands.

5. **Access Report Module** - For large multi-stand cruises that are too large for the TC Excel based reports to handle. Same reports as TC Excel Reports. Stand and Tract level versions. Faster processing. Compatible with cruises from different templates and cruise types (merch, repro, and submerch). Includes SuperGroup assignment and re-assignment. Compatible with latest Access accdb format.

6. **MB&G CSV Import/Export** - Allows MB&G Mobile Map users to import CSV files from Inventory Manager for processing in TCruise Desktop. Raw Tree Data and Merchandized Stand Summaries can also be exported back out of TCruise as CSV files for import into Inventory Manager. (\$1200)

7. **Growth & Yield utility** - COMING SOON. This utility will use models from Mississippi State (MSU), PTAEDA (VA Tech), USFS and others and will automate loading of stand table data, applying parameters, and database output.

EZ-Plot Toolbar for ArcGIS

LandMark Spatial Solutions is proud to announce our very own EZ-Plot Toolbar for ArcGIS. This easy-to-use solution for ArcGIS 9.x and 10.x provides inventory planners with the following tools for plot allocation and way-point conversion:



- Work with Shapefiles or Feature Classes
- Allocate plots on one or multiple stands
- Specify units
- Specify chain by chain spacing, exact number of plots, or read the number of plots from the stand attribute table
- Control grid orientation, outputs, and anchor points
- Easily convert grids to Solo Waypoint files for use with RTI applications in TCruise

The price for the EZ-Plot Toolbar is \$400 for one copy or \$350 for two or more. Call us for a demo or to request a quote.

MG&G MobileMap and InventoryManager

We recently partnered with Mason, Bruce, & Girard, to be able to provide our clients with an ESRI-based, cloud-based, Android-based solution that provides GPS and Forest Inventory data collection in an easy to use format. You can start in ArcGIS, publish a feature service in ArcGIS Online, allocate plots in the MB&G InventoryManager application, collect point, line, polygon, and plot/tree data in the field with MobileMap, and then sync that data back to ArcGIS Online. The plot and tree data can be exported out of Inventory Manager and imported directly into TCruise desktop for compilation and reporting. This highly integrated tool is being used by medium to large forestry companies and agencies all around the country and we are working to simplify it for smaller clients as well. Please contact use for a demo and pricing.



WHAT ABOUT OUR HARDWARE?

1-3 Meter GPS OPTIONS

A. Nautix X8—by the Handheld Group is significantly raising the bar on how to collect data efficiently in the woods. Right out of the box you can see it is different: - Huge 4.7", sun-light-readable, capacitive touch screen that is chemically strengthened to prevent breakage and reduce downtime - IP 67 = RUGGED - USB Host, micro USB, and RS-232 ports for easy data transfer and external device integration - Lightning fast 1.5 GHz dual core processor (most other units only have 800 MHz) - Industry-leading 1 GB RAM (2-4 times what other units have) - 8 MP autofocus camera with LED flash - Accurate U-Blox GPS that averaged 3.5 meters off mark in our latest GPS test under dense canopy

B. Trimble Juno T-41G—uses SBAS and a GPS Accuracy Algorithm to provide dramatic improvement termed Enhanced GPS. Under the correct conditions, Enhanced GPS allows data collection with 1-2 meter accuracy in real-time, and using the GPS L1 band, offers reliable performance in reduced signal environments. The T1 series has a large 4.1" Gorilla Glass display that is virtually indestructible. This unit is perfect for those that want really accurate data, but cannot afford sub-meter.

C. Juniper Systems Archer 2— with integrated GPS+Glonass antenna has a large 4.1", high-visibility screen, a glove-friendly numeric keypad, a 20 hour battery, a 1 GHz processor, and a super rugged IP 68 rating. This handheld is very easy to use and see in all lighting conditions.

D. Juniper Systems Mesa 3 is a Windows 10 rugged Tablet that has 7" high visibility screen, 10 hour battery, 2-4 m GPS, 8 GB RAM, 128 GB SSD, and is IP 68 Rugged. Amazing unit.

E. Janam XM5— is a smaller resistive screen unit that has a good keyboard, a good battery, and works well in all weather conditions.

Sub-Meter GPS OPTIONS

A. Trimble 7 with Floodlight, combines **submeter** or decimeter GPS that tracks GPS and GLONASS with a high quality photo capture system into one rugged unit. This system lets you concentrate on what's important: collecting and maintaining high-quality data for your GIS. No cables or vests to wear, just you and the handheld! A great solution where accurate acreage is essential. The new 7 model also has an optional integrated laser rangefinder for the hard to reach locations.

B. Trimble PG200 - rugged, submeter, GNSS, external Bluetooth receiver that connects to Windows, Windows Mobile, iOS, and Android devices. The PG200 tracks the GPS and GLONASS constellations, and even allows operators to achieve global sub-meter accuracy real-time if they subscribe to optional cellular or satellite corrections.

C. Juniper Systems Geode— is the cheapest rugged, submeter, GNSS, external Bluetooth receiver that connects to Windows, Windows Mobile, iOS, and Android devices that perform s well under canopy. Most of our clients will mount this unit to a small hydration backpack.

D. Trimble TDC 150—this new Android-based handheld will collect data at submeter, subfoot, and sub inch levels depending upon which level of subscription you have. Our clients using this unit use the Trimble TerraFlex software to collect point, line, and polygon data with amazing accuracy.

E. Trimble R2— Trimble's newest GNSS antenna that is programmable from submeter, to sub-foot, to sub-inch. It will work with Windows, Windows Mobile, iOS, or Android.



WHAT ABOUT CRUISING TOOLS?

Haglof EC-II Clinometer D

A revolutionary technique allows you to measure the heights and inclination that you need, using an instrument so small, that you will never notice carrying it. The New Haglöf Electronic II Clinometer features your measuring results directly in a display, processed by the instrument, eliminating any risk of calculation errors.



Haglof DME 360

The omni-directional capacity (360 degrees) makes the Haglof DME instrument ideal for measuring fixed radius plots. By placing the transponder at plot center you are able to quickly and accurately determine if the object is "in" the plot. By allowing you to work the plot from the outside in, your production per plot is greatly increased not to mention eliminating the error of misjudging "borderline" trees. You can also enter your BA factor and use this as a reverse prism to know the distance from plot center and minimum diameter to be included in the plot.



Haglof Vertex 360 Hypsometer

The Vertex IV allows you to fasten the T3 transponder to the tree at any height, walk a distance of your choice and measure up to six different heights on the tree. With the new "Reverse Prism" function you are able to use the Vertex IV on prism cruises as well. By selecting one of the built in BAF's you are able to be at the tree and determine its minimum diameter to be included in the point. This function allows you the ability to Prism cruise on tracks with thick underbrush that you could not do with a standard prism.



Haglof Vertex Laser VL Geo

With the proven accuracy of the Vertex hypsometer and the advantages and speed of laser technology, this multi-functioning instrument is the only device you will need for your height, distance and angle measuring work. The Geo unit now includes a Compass for side to side measurement routines and a GPS so you can add a spatial measurement to your tree locations. Measuring tree heights and plot radius in dense vegetation and rough undergrowth - perfect timing for the Vertex! When sighting is clear and you need to measure longer distances, the Laser method is superior in speed and simplicity. The NEW VL Geo unit has an improved laser that can now measure close trees and far trees with greater accuracy.



LTI Trupulse Laser (200L, 200, 360, 200X)

Compact and lightweight, the Laser Technology TruPulse™ series features "thru-the-lens" viewing so you know the laser energy is traveling directly along your line of sight. Because measurements are shown in the display, you never have to take your eyes off the target! Take distance measurements up to 1,000m away without a reflective target. An integrated tilt sensor allows you to measure horizontal or vertical distance and calculate an object's height instantly by using the built-in three-shot routine. The 360 model features a built-in electronic compass which allows the user to stand at one location and instantaneously map features into a GPS software like Solo or ArcPad. The 200X model is accurate to +/- 1.5" at 600 meters.



4Loads Electronic Load Ticketing Application

4Loads™ forestry application is a mobile ticketing solution that simplifies the creation, access and sharing of harvested timber data for timber dealers, loggers, foresters, and haulers. The newest version of the program allows a timber dealer or TIMO to set up multiple loggers on multiple contracts going to multiple destinations by multiple haulers all at the same time.

Harvest operators enter load data on their iOS or Android mobile devices in the field, which automatically synchronize with the Trimble mobile cloud service for timely access to data via the Trimble Forestry Mobile Website. Forestry stakeholders can log in to the mobile site to view data, run reports and customize mobile form menus. 4Loads provides real-time access to harvest load data that historically has been captured via slower manual processes that can take weeks or months to produce data. This real-time insight into remote operations can shorten reconciliation cycles and provide clear load traceability.

Call Steven or Johnny for a web demo. We can get set you up on a 30 Day Trial in about 1 hour. This exciting new product is easy to use and extremely cost effective.

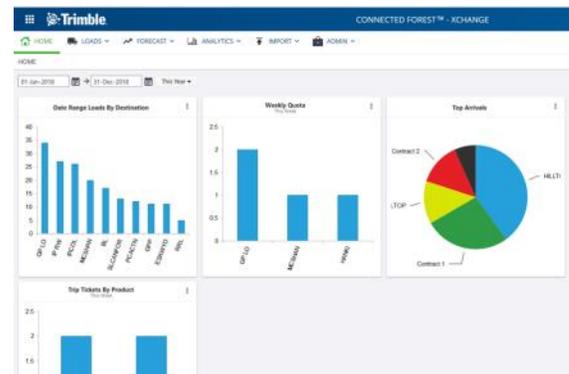
Contract No.	SS Contract
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Load Seq No.	112
Load Slip/Security No.	
Destination	Weyco Bruce
Species	Pine
Product	CNS
Haul Company	D&P Trucking
Driver	Danny
State	MS
County/Parish	Choctaw
Load Date	3/9/17
Load GPS	44.839657,-68.744824 Est. Accy: 213.3 ft
Logger/Crew	Fulgham 1
Send Load To	Johnny Thompson

CFX Data Portal for Data Exchange, Reconciliations, Reporting, and Analysis

- Access through secure website with login
- Receives data from 4Loads and Scale sites
- View load information
- Verify 4Loads scale data with scale ticket photos
- Reconcile loads with weigh scale data
- Create forecasts, reports, views, widgets, charts, pivot tables to analyze data

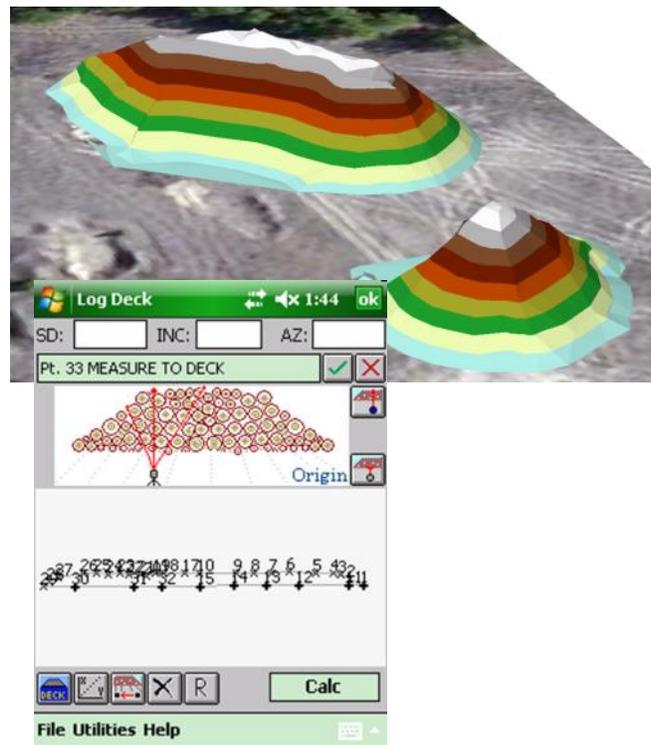
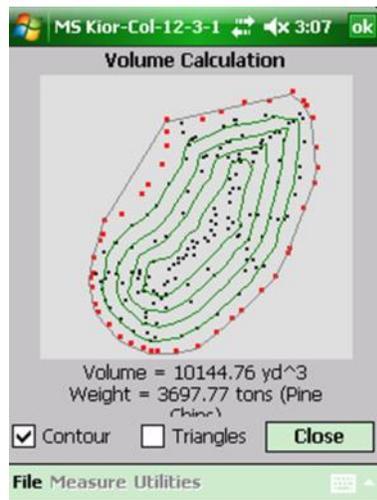
Load	Load Date	Scale Ticket	Receipt Ph.	Load Photo	Status	Contract	Contract Name	County Name	Prod/Stat.	Net Weight	UOM	Verified	Crew	Crew Name	Destination
13270001	08-May-2018	87947			COMPLETED	CON1	Contract 1	Livingston	LA	25,800	Yard		C1	Crew 1	MLL1
13270002	08-May-2018	508045			COMPLETED	CON1	Contract 1	Livingston	LA	28,800	Yard		C1	Crew 1	MLL1

- Create Custom Widgets
- Specify Date Range
- Monitor Quotas and Production
- Bar Charts, Pie Charts, Pivot Tables, Pivot Grids, etc.
- Multi-dimensional Analysis, Filtering, Aggregating, etc.
- Standard and Custom Reports



Stockpile and Log Deck Measuring

Measuring stockpile volume using Landmark Spatial Solutions Stockpile Inventory Solution is by far the quickest, safest, most cost effective, and most accurate methods available. The LMS Solution employs reflectorless laser technology in the form of a TruPulse 360R electronic rangefinder and compass manufactured by LaserTech International (LTI). Whether it's aggregate, coal, wood chips, log decks or anything else you need to inventory, this system has the ability to accurately measure almost any surface without the need of a reflector and the additional crew member required to hold it.



UAV/Drone Solutions for Forestry

LMSS has been working with several different UAV hardware and software providers since 2015 to help determine the viability and effectiveness of drones in the forest industry. Basically their use seems to follow three distinct paths:

1. **Inspections**—it is very easy and cost-effective to buy a simple quadcopter like the DJI Mavic 2 Pro and fly missions to inspect or help in the following areas:

- Forest Health
- Logging Inspections
- SMZ Compliance
- Planting/Regen
- Drainage/Beaver
- Pre-Cruise
- Controlled Burns



2. **Mapping for GIS**— LMSS has partnered with Drone Deploy cloud processing service to offer our clients a great way to delineate areas of interest and then fly them autonomously and have Drone Deploy process the data so that you can drop it into ArcGIS and create amazing Orthomosaics.



DroneDeploy



3. **Infrared Drones**— LMSS also sells DJI Mavic 2 Enterprise Dual drones which feature a 12 MP RGB camera and a Thermal camera for detecting heat signatures and thermal differences for fire and search, search and rescue, and wildlife applications.



Call us for a pricing and a demo.

WHAT ABOUT TRAINING AND TECHNICAL SUPPORT?

LandMark Spatial Solutions offers cost-effective **bimonthly training sessions** for Solo Forest, TCruise, and ArcGIS in both MS and GA. If you buy technical support, training at one of our facilities is generally included. We can also do specialized on-site trainings upon request, but these are more costly. We have very detailed training manuals that come with your equipment.

Technical Support is an area to which we pay special attention. Many other technology-based companies have gone under because they did a lousy job supporting the "great" product that they developed. We have professional foresters on staff who handle all of our tech support calls, so you can talk to someone who understands your application. We offer several different competitively-priced tech support packages, depending upon what level of technical and computer skills you already have.

WHO ARE OUR BUSINESS PARTNERS?

To make our solutions as successful as possible, we have partnered with the following companies that are leading the industry in their respective fields. We rely most heavily on these partners, but are constantly developing new solutions to stay abreast of the current technology.



HOW CAN I GET MORE INFORMATION?

Please go to www.landmarkspatialsolutions.com to get additional info, or call or e-mail us if you have questions or need a **web** or **on-site demo**.

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