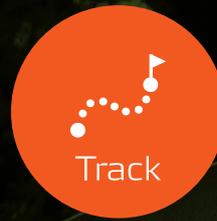


sScale™

Measure, track and trade



DRALLE
LogTracking since 2002



Testimonial

“Photo-optical stack measurement is more than just a measurement method: for the first time ever it is possible to create digital data used in trading and logistic processes directly in the forest in an efficient and transparent way. It is the most important innovation in forestry and wood industry for a long time. We evaluate all measurement systems according to their accuracy, transparency and traceability. With sScale Dralle provides highly professional development work and meets already now these three most crucial criteria when measuring industrial timber.”

Lutz Freytag
Head of Sales & Marketing
Bundesforst, Bundesanstalt für Immobilienaufgaben
2014

DRALLE – The company

Founded in 2002 by Kim Dralle, the Danish company DRALLE is a pioneer in photo-optical timber stack measurement and industrial wood logistics systems.

DRALLE develops and offers innovative Supply Chain Management (SCM) solutions for the forestry and wood industry sector. Amongst these are the sScale™ system - the subject of this brochure.

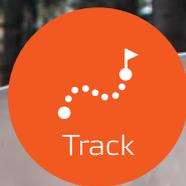
Based on more than 15 years of proven operational practice, the high efficiency and transparency provided by the DRALLE systems and services offer logistic benefits and great savings for all stakeholders.

sScale™

Measure, track and trade



Measure



Track



Trade

The DRALLE sScale™ system delivers high-volume, high efficiency, all-weather timber stack measurement combined with customer-adaptable timber tracking and invoicing database services. The system is scalable, allowing each customer to track, manage and trade timber measured by many sScale™ mobile units. Our present customers include state and private forest estates in Germany and Denmark, managing more than of 5.000.000 hectares of productive forest. In 2017, more than 7 mill. m³ of logs were measured, sampled or traded through by DRALLE sScale™ systems and services.

DRALLE works with leading providers of forest IT-solutions, such as SAP, and we assist our customers in establishing an integrated system that spans the whole supply chain from felling, timber measurement, transport order, supply tracking and sales invoicing.

The sScale™ system – Measure, Track and Trade

The sScale™ system combines a mobile measurement unit with registration, tracking, stock management and invoicing services.

The sScale™ system combines a mobile registration and measurement system (the sScale™ mobile unit) with registration, tracking, stock management and invoicing services (the sScale™ administration module).

The sScale™ administration module forwards and receives field data from the sScale™ mobile unit online and stores measurement results for documentation, administration and invoicing. All data are mapped and easily retrieved online, and data requirements and interfaces are customizable to fit your own stock management and trading system.

All the key tasks in managing the raw timber value chain, from felling to selling, are handled by the sScale™ system:



Measure your timber

Registrating, locating and measuring timber stack volumes.

1. The stack location and order for measurement is submitted to the sScale™ mobile unit in the field, by the sScale™ snap-stack app or from your office - through the sScale™ administration module.
2. The timber stack is measured quickly in a drive-by operation, by day or by night, in all types of weather by the high-performing, high-precision, car-mounted sScale™ mobile unit.

A single mobile unit, operated by one person, can measure up to 300.000 m³ per year, with a documented and certified accuracy of +/- 3 %.



Track your timber

The sScale™ administration module keeps track of all your incoming and outgoing timber and stores everything for later reference:

1. Measurement results and photo documentation of the timber stack are received automatically from the sScale™ mobile unit.
2. Data are stored in a user-friendly, map-based database, where you can find all your timber using all relevant parameters (date, species, customer, length, location, sScale™ mobile unit etc.).



Trade your timber

The sScale™ mobile unit and administration module deliver all the data and documentation you need to finish your task of delivering your timber to your customers.

1. You may export all raw measurement data to your own CRM-system or directly to customers in a customizable data format. We help all customers setting this up.
2. You can send your own customized delivery sheets including photo-documentation, location, stack volume and more directly to the transport company and the wood buyer.





Measure, Track and Trade

This section provides you with more detailed information about the sScale™ system.

The first part, MEASURE, is about the benefits and technology of the sScale™ mobile unit.

The second part, TRACK, is about the sScale™ administration module and its advanced features regarding data management.

The last part, called TRADE, is about documentation generated from the sScale™ system.

Covering all three key tasks, the sScale™ system delivers unmatched accuracy, transparency, traceability and user-adaptability, based on years of operational practice and adaptation to customer needs.

sScale™
Measure, track and trade



The benefits of the sScale™ mobile unit

The sScale™ mobile unit is the core of the DRALLE system. With stereo-camera vision it delivers high precision, fixed-scale measurements, based on a 3D model of the timber stack surface. The unit is specially built, using a stainless steel weather-proof casing, for rugged use on forest roads, in all-weather, day and night conditions. Mounted on a SUV, the unit will allow one full-time employed operator to deliver high precision timber stack measures for up to 300.000 m³ per year.

The technology & functionality

3D stereovision technology gives high precision fixed-scale measures.

The stereovision of the mobile unit means that the pictures are “born” fixed-scale and the 3D positions of log-ends are identified in the stack, leading to a high precision analysis. There is no need for applying yardsticks, scale measures or manual operations to assist in finding the correct metrics of the images.

The stereo camera concept enables drive-by operation

The sScale™ mobile unit records a “film” of stereo pictures (11 images per second) while the operator drives past the timber stack, at a maximum speed of 30 km/h. And the stacks can be as long as you make them. From 5 to a 100 meters - it’s all still a one-take drive-by operation with the sScale™ mobile unit. From this stereo film, a 3D model of the stack front is calculated. This is unique in the market of photo-optical stack measurement. Other systems using single cameras require many single shots by the operator and long stacks may cause problems. Due to the use of the stereo camera concept even stacks which are stacked sloppily can be measured reliably. In contrast to mono camera systems, logs which are out of alignment aren’t neither over- nor underestimated.

Using the sScale™ mobile unit, stacks can be measured under different viewing angles, distances and driving speeds.

All analysis results are available right after the drive-by and can be inspected and validated straightaway. The sScale™ mobile unit is especially strong and performance competitive on medium and big stacks compared to alternative systems on the market.



The sScale™ administration module

All sScale™ operations are supported by the administration module with several tools located for easy stack handling, measurement planning, driver scheduling and data management. Via an API (Application Programming Interface) and SOAP (Simple Object Access Protocol) services a fully automatic data exchange between the administration module and third party software is also possible.

DRALLE provides a web-server with the administration module for each customer. Each customer may have many users and easy user rights management is included with the administration module.

Easy stack registration and stack management

If the administration module is used as a stand-alone SCM system, the logistic process starts with the registration of ready-to-measure stacks in the administration module or using the sScale™ snap-stack app. The stack registration is easy to learn and could be done by as many users as the customer would like to give access.

The administration module provides the well-known Google Maps user interface

This makes it really easy to find the exact stack location. Once you have found the right place, you can register the stack with one mouse-click. A tailor-made user interface pops up and shows a list of needed administration data, such as stack ID, assortment length, tree species, buyer etc. From now on the stack has its own unique ID and is always traceable, while the actual workflow status from registered (red flag), in process (yellow) and finally to measured stacks (green), ready for delivery, is shown.

The administration module supports you with several filters for an easy stack/data retrieval and management. Filter and sort according to measuring date, stack size, tree species, source and destination of stacks and many more. Since the mobile unit returns data immediately after measurement in the forest, a real-time inventory overview is just a few clicks away.



Documentation for transparent timber-trading processes

The DRALLE system provides fully documented and customizable timber delivery data sheets. For transport and for invoicing as well as for trading your timber. The electronic documentation saves time and money and minimizes human error while filling in forms by hand. This document is also your proof and your guarantee, in the event of uncontrollable circumstances happen (for example theft of parts of the stack). The wood seller is able to prove how the stack looked like when it was measured.

This way, trading is made transparent and it is easier to find fair solutions between business partners.

In addition to all administrative data and measurement results a picture of the stack including the measuring polygon and control heights is shown as well as a map of the stack location. This helps the transport company finding the stack easily and the wood owner, as well as the wood buyer, gets all information about the stack in a clearly arranged document.

DRALLE of course provides fully automatic data export interfaces (an API), so that you can deliver digital stack measurement and location data directly to your own and your costumers SCM-systems. And it is also possible to create export files, such as PDFs or ELDAT, .xml, .csv or .txt for easy information exchange with the customer. The content of these export files is always customized.



The new sScale™ mobile unit

From the beginning, the sScale™ mobile unit was designed to fit the real conditions of being used in the forests. It operates under adverse weather and road conditions as well as problematic light conditions.

We are proud to mention that some of the systems have been up and running in the Bavarian public forests since 2009 without failures or breakdowns, having been used to control more than 15 million m³ with a standard variation of +/- 3 % in comparison to the mill's laser measurement.

Incorporating 7 years of experience, and now introducing the new generation hardware, the sScale™ mobile unit is extremely resistant and more robust than ever, minimizing service and maintenance.

Features

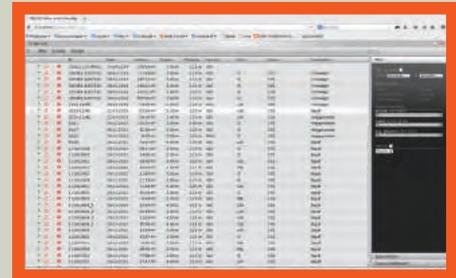
The sScale system is continuously improved through the feedback from our customers and the experience gained through continuous production in the field.

The newest, improved version of the sScale™ mobile unit includes:

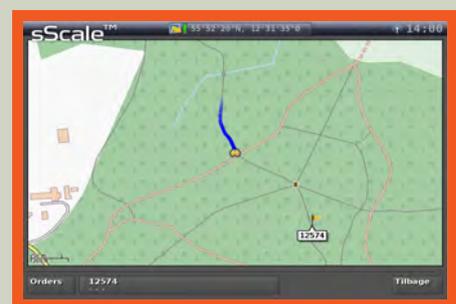
- a complete new hardware construction all-in one, compact, rugged new rooftop box with removable, easy to service camera box leading to minimum service time.
- new stereo cameras
- built-in new powerful LED flash-lights make it possible to run the sScale™ mobile unit under nearly all weather conditions (except heavy snowfall), during twilight (short days in spring and autumn) and even at night. This allows the use of the sScale™ mobile unit with a high and constant level of measuring quality also in shift operation during peak times of timber supply.

Using the DRALLE sScale™ mobile unit in 6 easy steps

1 **Receiving measurement orders on sScale™ mobile unit.**
Measurement orders are planned measurements of stacks organized in the sScale™ administration module or stacks registered by the sScale™ snap-stack app. These orders are forwarded to the sScale™ mobile unit automatically and listed besides the navigation window.



2 **Navigation to the stack**
Using the GPS position from the measurement order you can navigate to the stack in the forest. These GPS positions could also be exported to special forest navigation software offered from a third party vendor.



3 **Get ready to measure the relevant order**
Select the relevant order from the order list and all administrative data, such as stack ID, tree species, assortment, length or buyer are shown on the working screen.

4 **Drive-by and record the stack**
Drive-by the stack and the sScale™ mobile unit records images automatically. Afterwards all images are stitched together into to one single overview picture and a polygon that describes the contour of the front area of the stack is created.



5 **View the results and verify the measurement**
After the automatic analysis of the images the operator can refine the polygon manually if needed. Polygon and log count and even control heights are generated to give buyers the possibility to control the measurement results.

As a first step, the mobile unit calculates the total volume of the stack. Secondly, the mobile unit estimates the density factor of the stack (the ratio between timber and air in the stack). If the stacking quality is poor and if other parameters are affecting the density factor, which the system isn't able to see, the operator may adjust the density factor. All changes to the results are documented.



6 **Add your own administrative information and submit the results**
Additional data could be recorded such as wood quality, navigation hints or road conditions. Once the operator submits the measurement results all data are send back to the administration module via GSM. After submission all data are fixed to the stack ID and neither the polygon nor the density factor or the log count could be manipulated anymore. The stack data is now available for being used by authorized persons and could be forwarded via standardized interfaces to be processed individually.





Tests and validation of the documented output of the sScale™ system

At the start of 2016 sScale™ certified by the “Physikalisch Technische Bundesanstalt” (PTB) in Braunschweig. The PTB is the federal agency for measurement techniques in Germany. The certification approves sScale™ measurements as a basis for trade and the PTB guaranties a maximum measurement variance of +/- 3% under all thinkable conditions.



The sScale™ mobile unit: 1 driver - 1 car - 1 unit

- 3D technology based on stereovision.
- Drive-by operation - no tape measure, yardsticks, scale measures or manual operations needed. Just drive by.
- Built-in LED flash lights enable night time use.
- All-weather, all season measurement and logtracking.
- Measures offline - uploads when you are back online.
- Low staff costs, maximum efficiency, maximum reliability - minimizes human errors and standard variation.
- Up to 300.000 m³ a year per unit/person.
- Compact, rugged new rooftop box with removable, easy to service camera box leads to minimum service time.

DRALLE systems are made for professionals. With DRALLE systems you get solid return on your investment, year after year. With DRALLE systems you are sure of getting your timber measured on time and our professional team is looking forward to discuss your logistic and measurement challenges.

Testimonials

“The forest owner association Elbeholz puts around 100.000 m³ of solid timber to the market yearly. So far timber measurement is time-consuming and afflicted with many error sources. Instead it should be efficient and credible. Therefor the sScale system of DRALLE is tested. Beyond the credibility, efficiency and transparency of the measurement, we see further obvious advantages. Particularly the documentation of the measurements for invoicing, as well as the efficient support of all logistical processes by the data management of the administration module is an advantage. Everything points to establish the photo-optical stack measurement done by sScale as the standard practice for timber trading at the FBG Elbeholz in the future.”

Dr. Markus Ziegeler
Member of the board of FBG Elbeholz, 2014

“Since 2012 the Landeszentrum Wald Sachsen-Anhalt is working with the sScale system. Within this period it has been established as a state-of-the-art measurement procedure for industrial timber. The transparency between forest owners, wood buyers and the support organization is to be pointed out. Furthermore the operational processes were handled much faster and leaner by using sScale.”

Jörg Borchardt
Head of wood marketing and environmental education
Landeszentrum Wald Sachsen-Anhalt, 2014

“Since 2010 the stack measurement and data provision could obvious be made easier and standardized with the help of sScale for 65 forest rangers of the Landesbetrieb Forst Brandenburg (LFB). Subjective measurement uncertainties while measuring manually could further be eliminated. That led to real-time, exact and transparent documented measurement results provided by sScale for the staff of LFB as well as for the customers of the wood working industry. In the last three years the mutual trust in the measurement results has developed increasingly positive.”

Thilo Noack
Head of sustainable production
Landesbetrieb Forst Brandenburg, 2014

“Since 2007 Bayerische Staatsforsten (BaySF) are applying the photo-optical procedure sScale provided by DRALLE. In the meantime all measurement units are connected via a special interface to our SAP system. Already more than 15.000 stacks with a volume around 740.000 m³ were measured in the current financial year. Since years thereby sScale provides day by day geo data, photo documents and detailed stack descriptions which enables us to shorten through-put times significant within the logistical process. Because of their advantages for all participants of the timber supply chain fotooptical procedures become more and more important and will become sooner or later integral parts of the forestry and wood practice.”

Martin Müller
Head of logistics
Bayerische Staatsforsten, 2014

“Since sScale was implemented at ThüringenForst in 2009 it has been evolved to an important part of the timber logistics. This led to a considerable relief of the forest rangers on site as well as internal data provision got speeded up. With the future automated integration of sScale to the in-house forestry IT the single steps of stack measurement as well as all downstream processes of data management are realized timely and efficient. The photo-optical measurement will replace all the work-intensive manual measurements with an objective, transparent and automatable procedure.”

Sascha Schlehahn
temp. Head of timber market/ logistics
ThüringenForst, 2014

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