

Leica iCON alpine

3D snow depth measurement and snow management



icon
alpine



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Utilising snow as a valuable raw material in an optimal way

Snow is valuable as a raw material, man-made snow especially so. Whether it is natural or man-made, maintaining snow and utilising it in an optimal way until the end of the season is a challenge which harbours great potential for savings. This is why an increasing number of winter sport areas are relying on modern GNSS technology¹ for efficient management of their slopes.



Sustainable slope preparation for a longer skiing season

Cost-efficient

Well-founded and targeted slope management extends your skiing season, reduces operating costs considerably and allows you to work in a more environmentally friendly way:

- Less demand for man-made snow thanks to precisely planable snow production
- Lower fuel consumption
- Fewer vehicle hours and machine wear
- Fewer personnel hours
- Prevents penetration of the snow layer thanks to unique snow plough control
- Prevents collisions with water taps and other technical installations under the snow

Tried-and-tested technology

As a machine control system, Leica iCON sees daily use at many construction sites, where it ensures greater productivity and optimal resource utilisation. The tried-and-tested technology for snow depth measurement was adapted and further developed for Leica iCON alpine.



Compatible with snow groomer types from all manufacturers

Sustainable

Through systematic analyses and assessments, you have extensive knowledge of your skiing area and can thus sustainably ensure the quality of your slopes. Statistics enable long-term, multi-season planning:

- Early detection of weak points with low snow depths
- Identification of locations with extra snow
- Optimum, targeted snow making and preparation

In real time

The display in the snow groomer visualises the current snow depths under the snowcat and under the clearing plough in a 3D terrain model accurately down to the centimetre and in real time. Targeted slope management thus increases productivity.

- Precise snow making for neuralgic locations
- Targeted utilisation of snow depots
- Precise determination of the snow groomer position



Precise snow making thanks to knowledge of current snow depths



Targeted shifting of snow from snow depots

¹GPS, GLONASS, Galileo, Beidou

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Snow management from a single source

Snow management begins with slope construction, influences the technical equipment and placement of the snow guns and continues through to snow depth measurement and control during operation. Leica Geosystems offer a complete snow management system from a single source.

Modular in design

Our complete solution is comprised of the following components:

- **Snow depth measurement and visualisation**

Modern measuring technology is able to indicate snow heights under snowcats and under the clearing plough

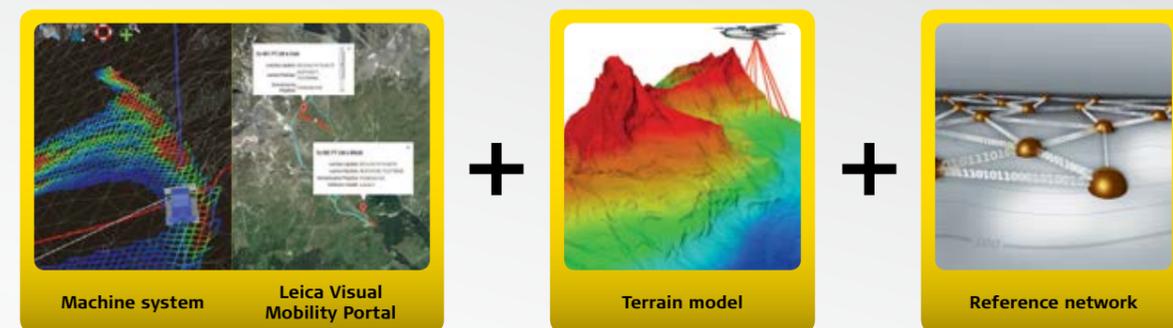
- **Terrain model**

A digital summer terrain model is used as the starting point for snow depth measurement. Alternatively, snow depths from previous ideal seasons, among other things, can also be saved

- **Reference network**

Your own GNSS reference station or reference network service guarantees the precision you need

Complete solution



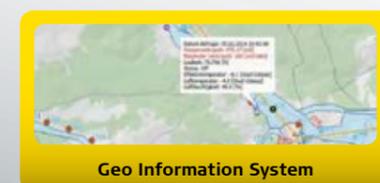
Optional:



E.g. fun park model

- **Additional basic information**

Depending on the need, the system can be enhanced with additional data such as a fun park model, slope edges, water taps, anchor points and shafts



Geo Information System

- **Assessment**

For detailed assessments, iCON alpine can be enhanced with a Geo Information System (GIS), e.g. alpinePRO

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An overview of the machine system

The iCON alpine system can be installed on slope groomers from all manufacturers. Select manufacturers offer their vehicles already outfitted with the required preinstallation set-up for Leica iCON. Existing vehicles can easily be retrofitted.

Comprehensive system

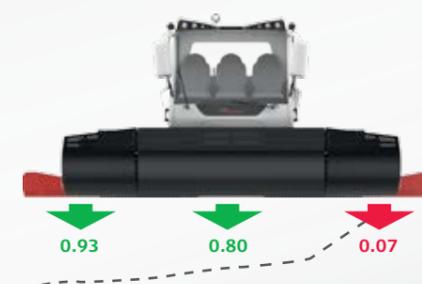
Based on the saved terrain model, the system indicates snow depths under the snowcats and under the clearing plough in real time.

- Calculates snow depth and distribution down to the centimetre
- Enables even distribution of the snow when constructing the snow surface
- Permits the clearing plough to be positioned optimally in relation to the terrain model
- Complex fun parks can be created efficiently
- Enables optimum distribution of remaining snow for snow retreat in the spring
- Streets can be cleared in a targeted way



Recording of the snow depth under the snowcats or the clearing plough

Indication of the clearing plough position enables precise uncovering of water taps



Three-point measurement under the clearing plough reduces the risk of collision



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Visualisations and assessments

The Leica Visual Mobility Portal visualises your measurement data and recordings. It serves as the ideal foundation for efficient maintenance, streamlined operation and simple analyses. For additional options, iCON alpine can be enhanced with alpinePRO, the geo-information system from Geocloud, if desired.

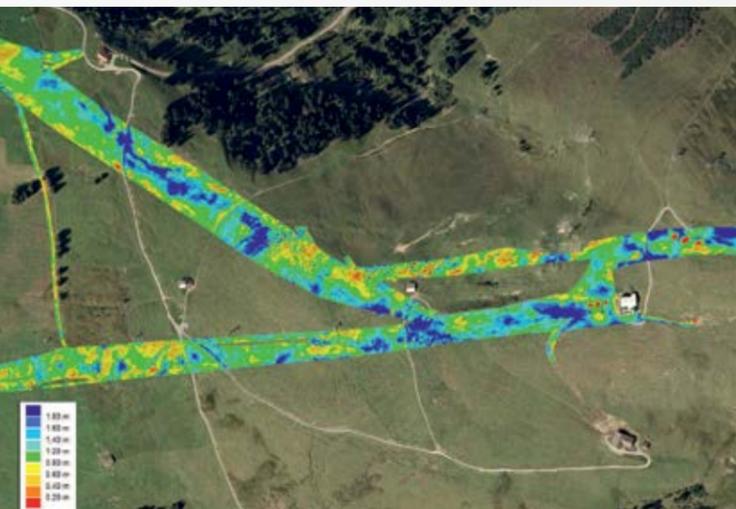
Leica Visual Mobility Portal

The Leica Visual Mobility Portal is an integral part of the system. In addition to the snow depth indication on the machine display, functions for maintenance, operation monitoring and analysis are available to the control centre:

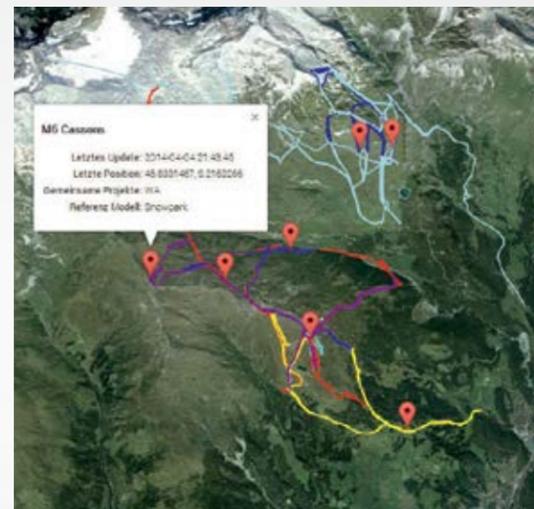
- Indication of the positions and traversal paths of the snow groomers in real time or retrospectively
- Transmission of snow depth data from all snow groomers at regular intervals
- Remote maintenance and support from Leica Geosystems



Display of the current snow depth on the machine display enables autonomous working



Terrain overview in the Leica Visual Mobility Portal with background data from Google Earth



Display of the positions and traversal paths of the snow groomers

alpinePRO

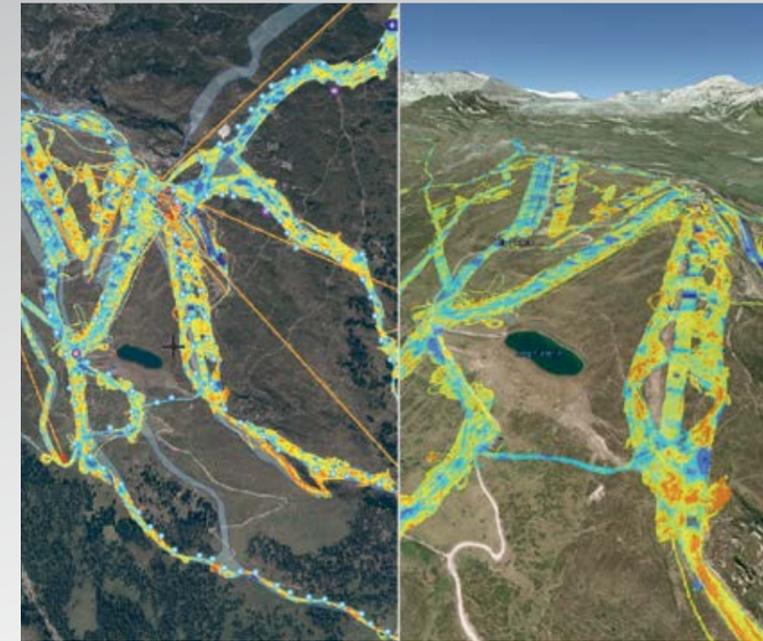
Analysis and planning



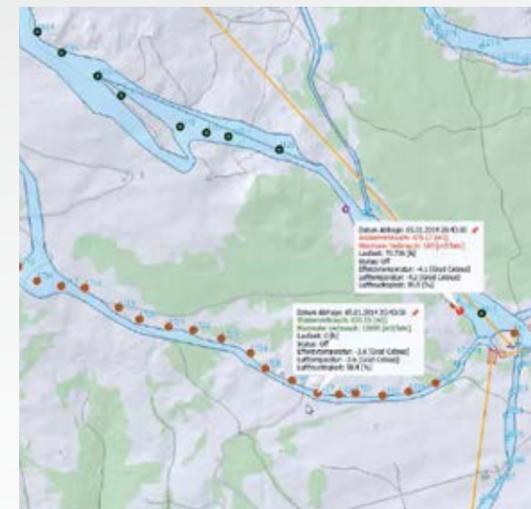
alpinePRO can be used to expand iCON alpine into a management system for your entire snow infrastructure with comprehensive analysis, assessment and planning functions. The web-based, modular geo-information system provides, for example:

- Snow depths across the entire region, punctually and continually
- Snow depths across several seasons for optimal snowmaking and slope planning
- Status indication of the snow guns
- Assessments of the snow heights (e.g. volume and differential calculations)
- Analysis of snow production superimposed over the actual cubic volume
- Assessment of the operating data of all vehicles, including vehicles with systems from other manufacturers
- Display and utilisation of any GIS data in 2D and 3D
- Open interfaces for available data (WMS server)
- Integration of additional data from third-party systems for networked analysis

We would be happy to provide you with more details on the possibilities of alpinePRO and the integration of your existing third-party systems.



Visualisation of the snow depths in 2D and 3D



Status indication of the snow guns



Operating data assessments of all the vehicles in the fleet network

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Leica Geosystems intelligent CONstruction.

Whether you are optimising snow management on ski slopes, buildings or streets or you want to build a snow park, you can profit from Leica intelligent CONstruction. Leica iCON is more than just a family of products and a software package, though. It enables you to solve your surveying and positioning challenges when building infrastructure in skiing areas and when setting up snow parks and enables you to work precisely and efficiently.

- Custom tailored
- Complete
- Simple
- Powerful

When it has to be right.



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