

Normet SmartScan

Defining the future

UNDERGROUND

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SMARTSCAN SYSTEM

SmartScan and SmartScan Align are the latest developments in Normet's continuous effort to increase customer value and benefit the environment. SmartScan reduces costly overspraying with concrete and ensures efficient and easy documentation of the application.

PRODUCT DETAILS AND BENEFITS

Normet SmartScan is an advanced measuring system to measure and monitor the applied sprayed concrete thickness conveniently. It uses state-of-the-art scanning technology and is designed for harsh underground environments such as tunnel sites and mining operations.

The 3D LiDAR technology eliminates unsafe methods for manual probing of the layer thickness entering under fresh concrete, improves the efficiency of the concrete spraying process and the safety of underground personnel.

With the touch of one button, the nozzle operator triggers the measurement. The subsequent near real-time calculation of the concrete thickness by the onboard computer is displayed in con-

figurable colors on the screen, giving the nozzle operator immediate feedback on the area just sprayed. The use of the measuring device is easy to learn and simple to operate through a user-friendly touch screen interface.

The included SmartScan Desktop software allows rapid and advanced report generation and secure storage of the acquired profile data for extended data analysis.

The required concrete layer thickness is achieved quickly and before the concrete spraying machine is moved, thus preventing the need to come back and re-spray the area. This increases efficiency massively while maintaining quality and at the same time reducing the waste of material.

Scan the QR-code to see a customer testimonial of the SmartScan system.



Minimized unnecessary and expensive overspraying

Improves the safety of underground personnel

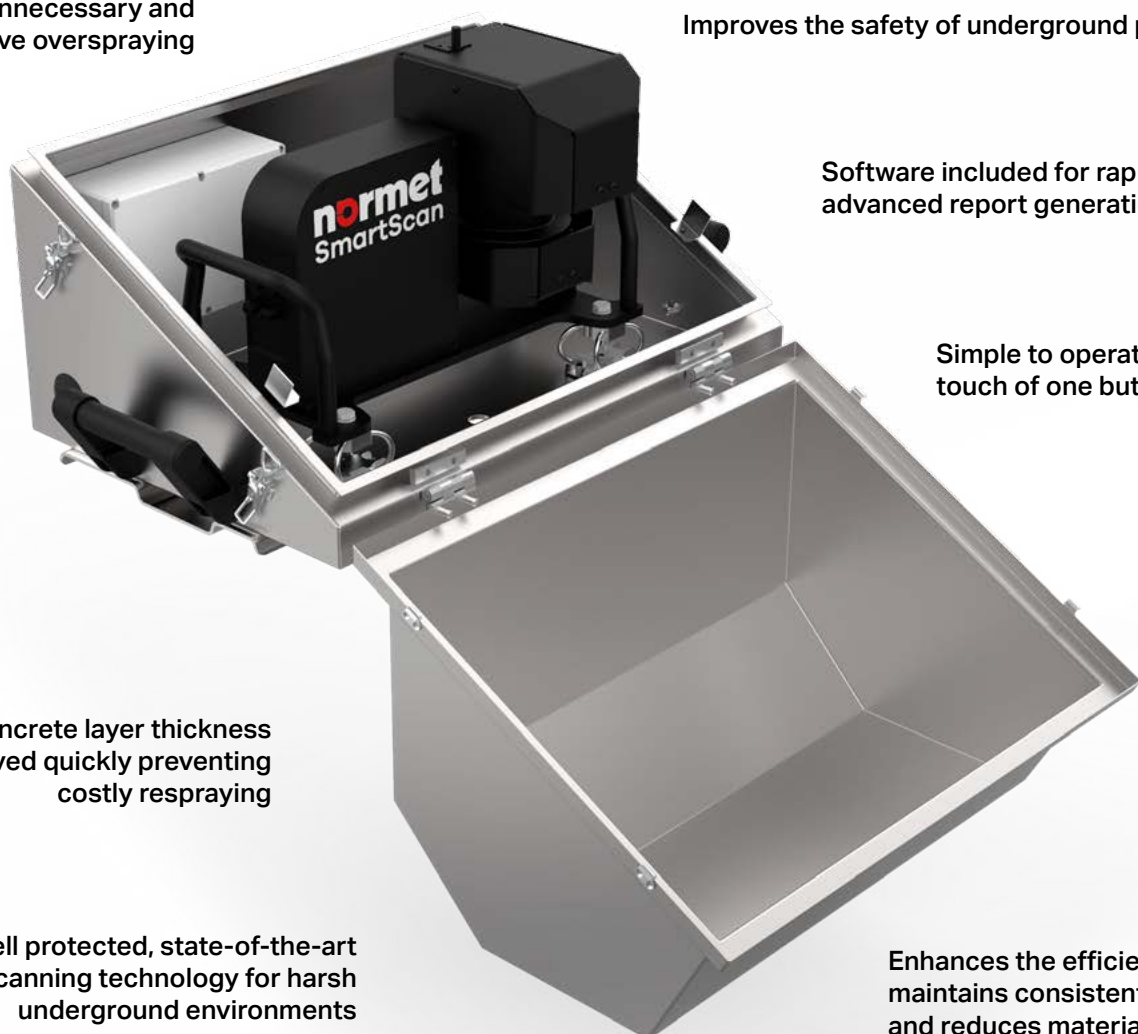
Software included for rapid and advanced report generation

Simple to operate with the touch of one button

Required concrete layer thickness is achieved quickly preventing costly respraying

Well protected, state-of-the-art scanning technology for harsh underground environments

Enhances the efficiency, maintains consistent quality and reduces material waste



TECHNICAL DETAILS

SMARTSCAN HARDWARE

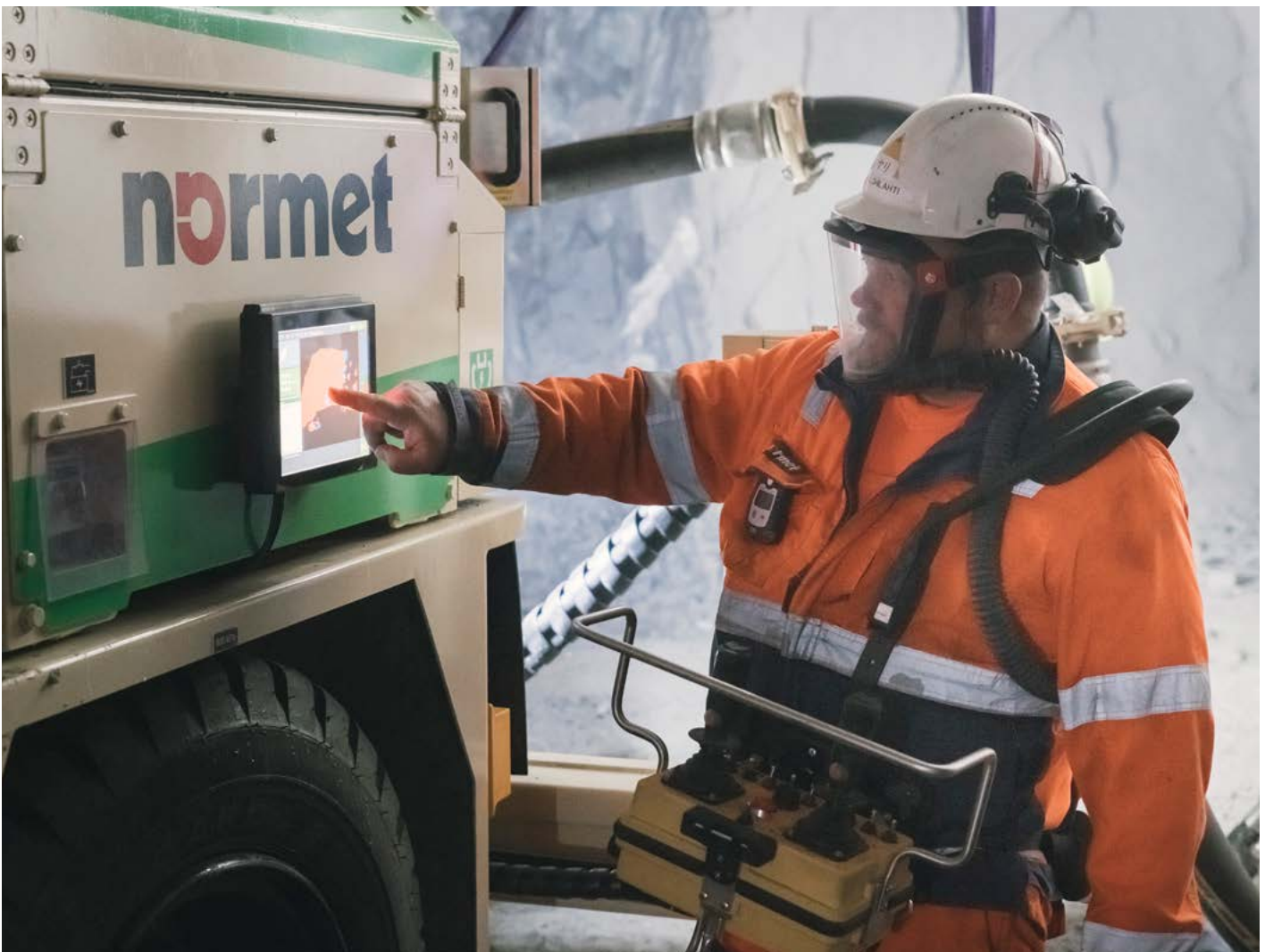
The hardware components of the SmartScan system have been carefully selected for use in harsh underground environments, such as tunnel construction sites and mining operations. They come with at least IP65 protection and withstand dust and often high humidity, temperatures, and vibrations.

The measuring unit is protected by a robust protective housing against concrete rebound during spraying and splash water during cleaning of the machine. For an optimal field of view and access, the SmartScan system is mounted on the front of the concrete spraying machine.

The operator interacts with the measurement system via a scratch-resistant touchscreen. The rugged vehicle terminal provides the necessary computing power for fast data processing of the sprayed concrete layer and display on the screen in 3D.

3D SENSOR PERFORMANCE DATA

Maximum Range (typical operating conditions)	50 m
Horizontal Scan Angle Vertical	0° to 180°
Vertical Scan Angle	-0° to +140°
Horizontal Angular Resolution	0.25°
Vertical Angular Resolution	0.25°
Power Supply	24 VDC
Temperature Range - Operating	0...+50°C
Temperature Range - Storage	-10...+50°C
Ingress Protection Rating	IP65
Laser class	Class 1 (1 (IEC 60825-1:2014, EN 60825-1:2014)), eye safe
Statistical error	< 5 mm



SMARTSCAN LIVE

The user interface was designed with focus on ease of use and speed. After the project parameters have been entered using the software keyboard, the operator starts the first scan with a single touch. The tunnel profile is captured by the scanner and immediately presented on the display for checking. After the application of sprayed concrete, the operator initiates another scan, from which the applied concrete layer thickness is determined in a short time and displayed in configurable colors in 3D.

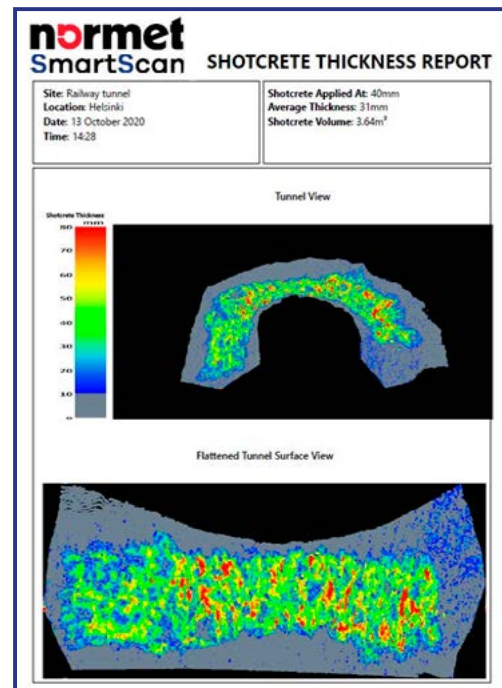
The operator thus receives immediate feedback on the effectively applied layer thickness. The colored areas allow the operator to re-spray sections with insufficient concrete until the required layer thickness is achieved, eliminating the need to return to the previously sprayed area for expensive rework.



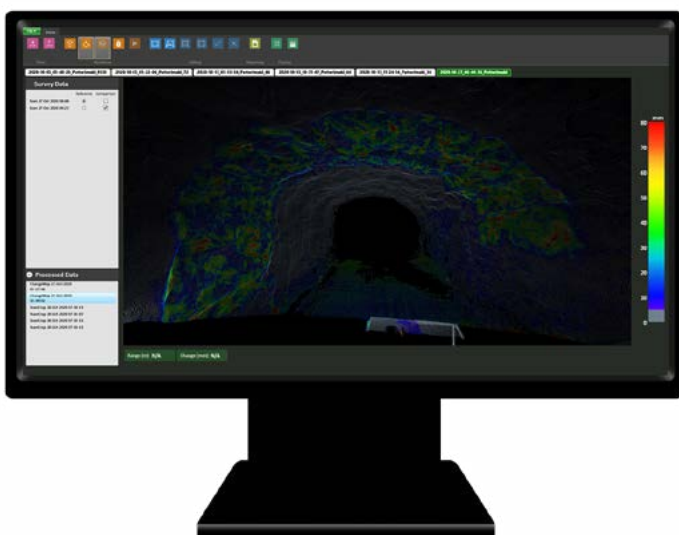
User interface showing first scan.

Key features:

- Easy to operate one touch operation
- Simple interface for project parameters
- Fast data processing
- User configurable color coded 3D visualization
- Automated generation of spraying reports
- Advance algorithms for alignment of scans
- No targets or illumination required



Sprayed concrete thickness report.



Desktop software showing a comparison scan result.

SMARTSCAN DESKTOP

The software allows advanced analysis of the profile data e.g. in a site office. The raw data can be analyzed more precisely, for example, cropped and reprocessed for documentation.

By adding the project data and the customer logo, meaningful reports are created which can be used for QA/QC purposes and for archiving or client submission.

Key features:

- Extended data analysis and exchange of 3D point cloud data
- Seamless creation of sprayed concrete thickness reports for QA/QC

GEOREFERENCED PROFILE DATA

SMARTSCAN ALIGN

SmartScan Align allows the transformation of the profile data from the SmartScan's local coordinate system into any coordinate system used in surveying. Allocating the profile data even after the concrete sprayer has been moved allows the data exchange with other equipment and systems operating in the same project.

Thanks to a simple calibration process, the distance between the two measurement systems is determined with minimal effort using the known position of targets in the tunnel profile. This process is only required when the measuring devices have been detached or otherwise moved or to ensure the systems are still well aligned.



With a data connection between SmartScan and the site office, the new profile data can be transferred continuously. Scan the QR code to see an animation describing the SmartScan Align system.

With the request for a new profile scan, the second LiDAR sensor, installed on the spraying carrier facing backward, locates the targets attached to the tunnel walls, allowing the SmartScan system to transform the profile data into the project coordinator data system.

Key features

- Automatic detection of standard retroreflective targets for localization of the machine
- Georeferenced profile data in customers coordinate system for seamless data exchange
- Uncomplicated process for recurring calibration and after changes to the hardware

RETROREFLECTIVE TARGETS

Retroreflective target 'tape' type with marked centroid	220 mm
Number of targets visible	4
Distance to target	10-80 m



SMARTSCAN RETROFIT KIT

The SmartScan retrofit kit allows new or existing sprayers to be equipped with the latest LiDAR measurement technology to measure and monitor the applied sprayed concrete thickness in underground construction.

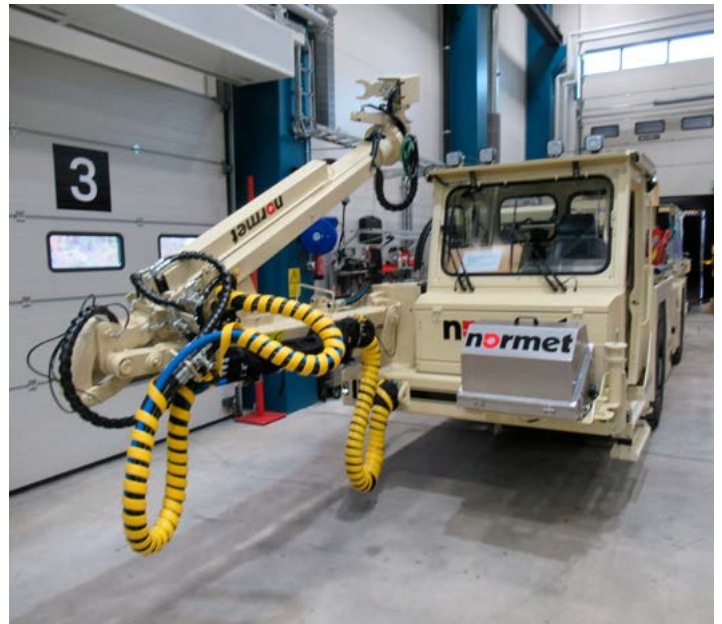
The kit, which is easy and quick to install, includes all the necessary components to increase the technological level of the concrete spraying equipment fleet, thus enabling even older equipment to be used in demanding projects with little effort.

The SmartScan system does not require calibration after installation and is ready for immediate use. Normet offers an installation service for the scanner system and training for the use of the system.

SmartScan retrofit kits are currently available for all Normet underground sprayers.

Key features

- Kit includes all components for easy and quick installation
- Economical option to upgrade older machines with the latest LiDAR technology
- Great savings potential thru minimized and expensive overspraying and less wastage
- Installation service and training by Normet available



SmartScan factory-fitted on Normet Spraymec MF 050.

SmartScan retrofit kit installed on Normet Alpha 30.



Scan the QR-code to see a customer testimonial of the SmartScan system.



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