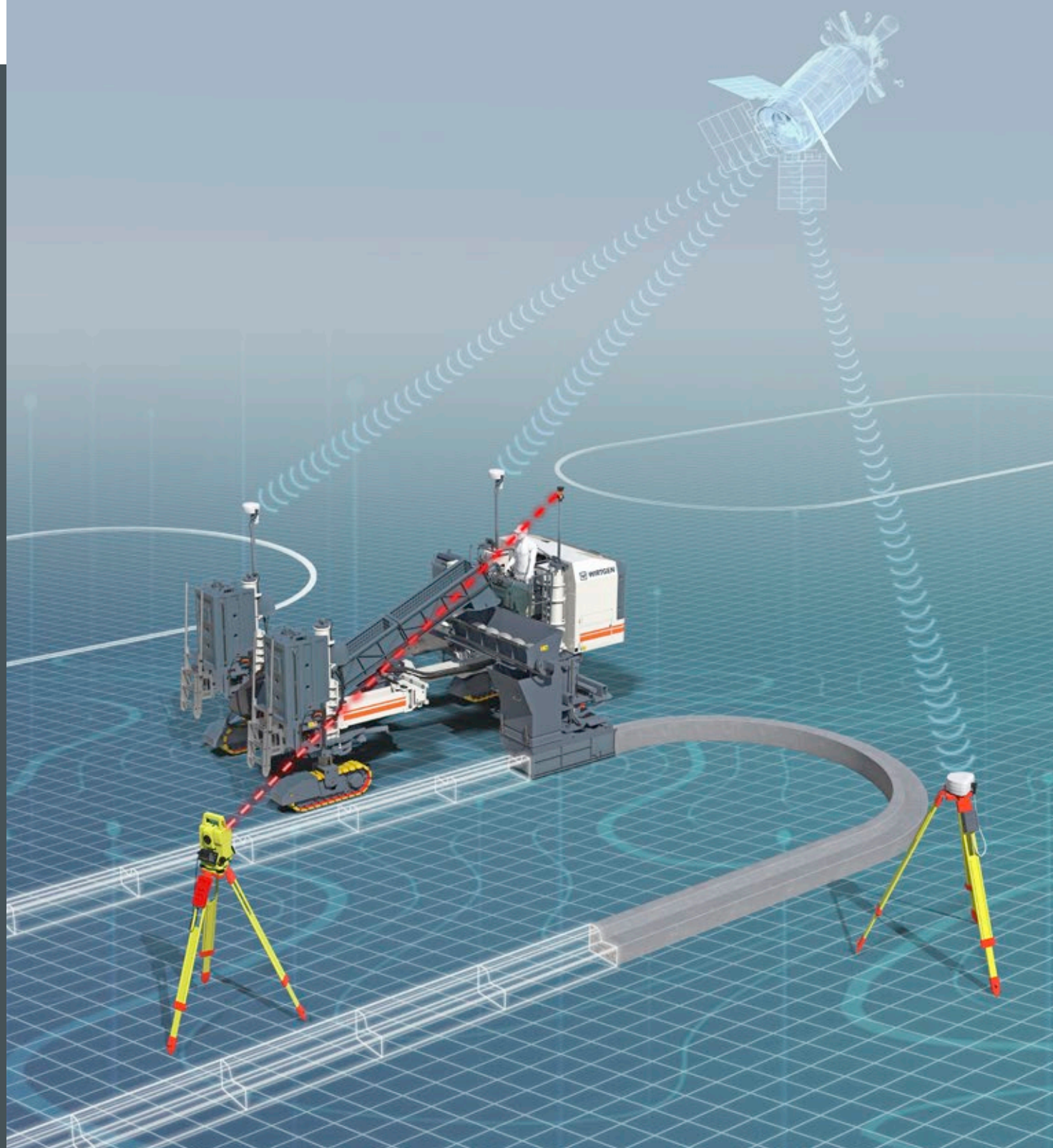


Automatic 3D Control System

AUTOPILOT 2.0



AUTOMATIC 3D CONTROL SYSTEM



Specially developed for WIRTGEN machines, the AutoPilot 2.0 system provides precise, stringless control of selected slipform pavers and ancillary equipment to enable automated paving of, for example, concrete safety barriers or curb and gutter profiles.

Relevant object points on the construction site are recorded with what is known as the Field Rover survey pole or can be imported directly from external 3D models to generate the

digital data model that is processed to create a virtual string-line that guarantees precise machine control.

As time-consuming surveying operations and the installation and removal of physical stringlines are no longer necessary, the entire workflow becomes faster, more productive, and more cost-efficient and simultaneously enables the paving of complex geometries such as tight radii or S-bends.



Stringless concrete paving removes the risk of tripping over a stringline cord, makes the work of the paving crew on and around the paver safer and easier, and significantly reduces the site logistics otherwise required.

AutoPilot 2.0 assures a better overview and greater safety on the construction site, while professional product training programs hosted by specialists from WIRTGEN ensure that its users quickly become familiar with the system's functions and features.

WIRTGEN SLIPFORM PAVERS



OFFSET SLIPFORM PAVERS

- > Offset paving width up to 4.0 m¹⁾
- > Offset paving height up to 3.0 m¹⁾



PLACER / SPREADERS

- > Inset paving width up to 12.0 m¹⁾
- > Inset paving height up to 500 mm¹⁾



INSET SLIPFORM PAVERS

- > Inset paving width up to 16.0 m¹⁾
- > Inset paving height up to 450 mm¹⁾



TEXTURE CURING MACHINES

- > Working width up to 18.0 m
- > Working height up to 500 mm



AUTOPILOT 2.0 3D CONTROL SYSTEM

¹⁾ Special paving widths, paving thicknesses, paving heights, and other options available on request



WIRTGEN

OVERVIEW OF HIGHLIGHTS

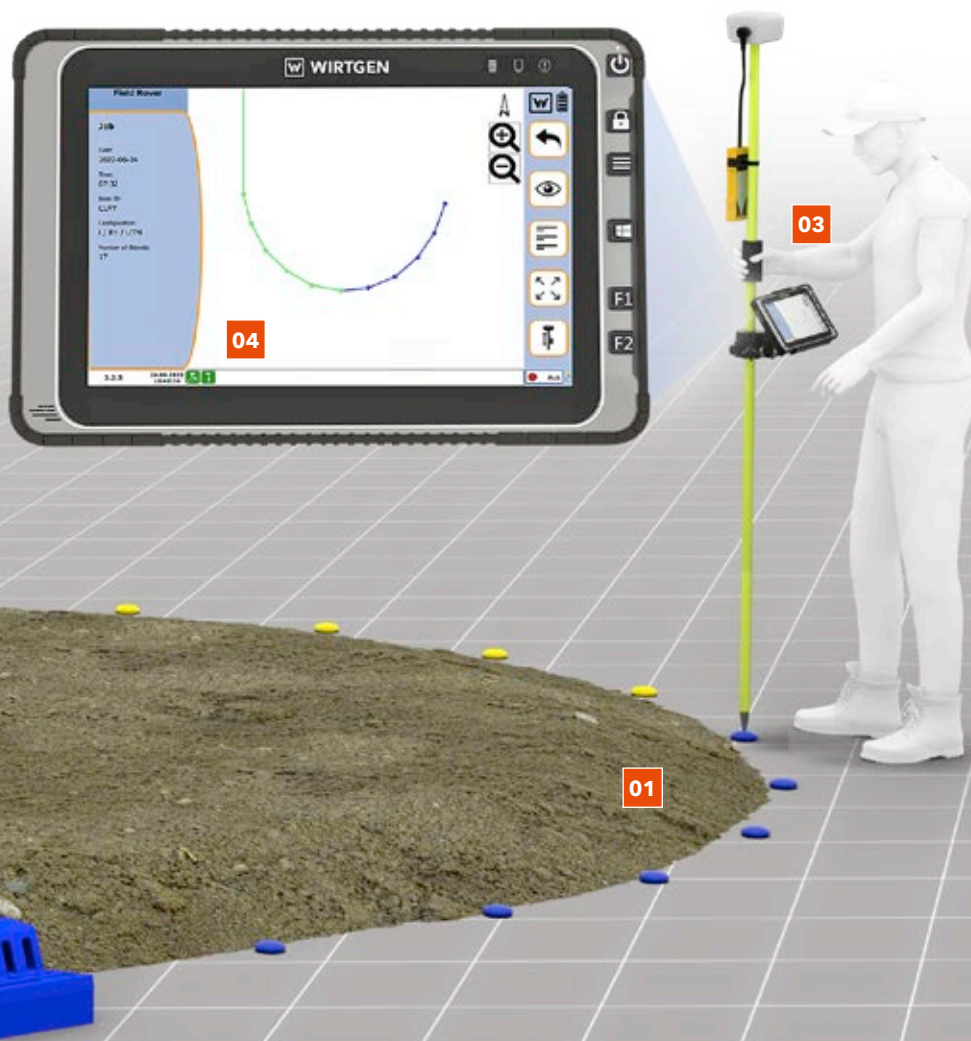
Perfectly Equipped

01 Stringless Concrete Paving

- > No time-consuming installation and removal of physical stringlines
- > No costs for stringline and support pins
- > Enables paving of complex geometries such as tight radii or S-bends
- > Increased safety and optimized logistics on the construction site

02 Everything from a Single Source

- > Perfectly coordinated, field-proven combination of 3D system, machine, and support
- > High functional reliability thanks to control and software precisely tailored to WIRTGEN machines.
- > Optimal, fast workflows
- > Field-proven ruggedized operating tablet
- > Quality assurance of paving results with the Field Rover survey pole



03 Intuitive Operating Concept

- > Easy and intuitive handling of the entire paving workflow
- > Innovative Field Rover survey pole with easy handling for registration of the measured points on the construction site
- > Intuitive operating tablet with process-oriented graphic representation of the entire construction site
- > Consideration of actual site characteristics
- > No prior knowledge of site surveying required

04 Easy Handling of 3D Data

- > Generation of a virtual 3D stringline on the basis of actual site conditions
- > Easy import of externally created 3D models
- > Automatic checking and correction of data quality with respect to paving viability
- > Data import capability with numerous intuitive checking and editing functions

05 Exemplary Customer Service

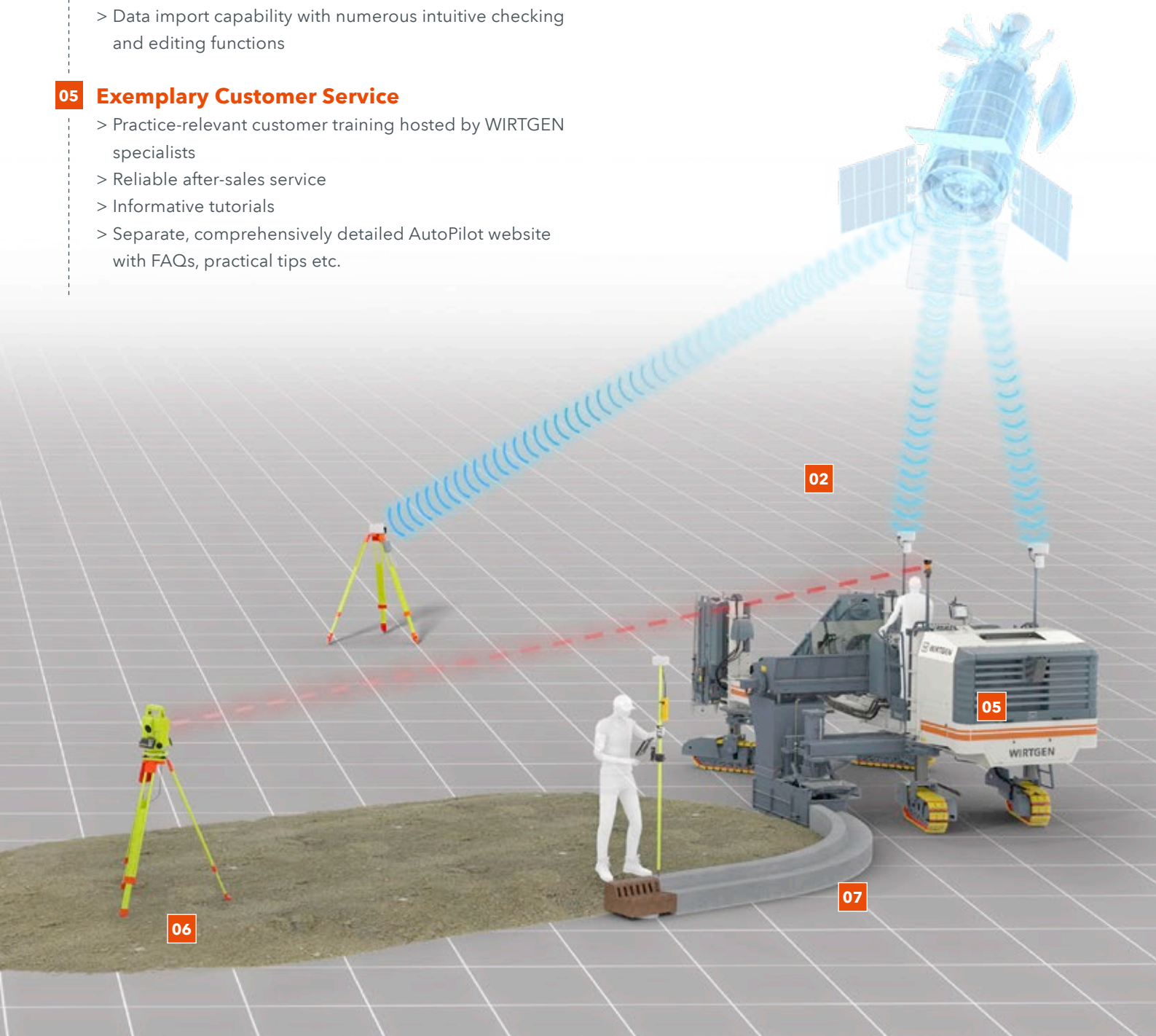
- > Practice-relevant customer training hosted by WIRTGEN specialists
- > Reliable after-sales service
- > Informative tutorials
- > Separate, comprehensively detailed AutoPilot website with FAQs, practical tips etc.

06 The Ideal Height Sensor for Every Application

- > Sonic-Ski Height sensor for scanning an existing reference
- > High-precision total station for flexible use – also without a usable existing reference

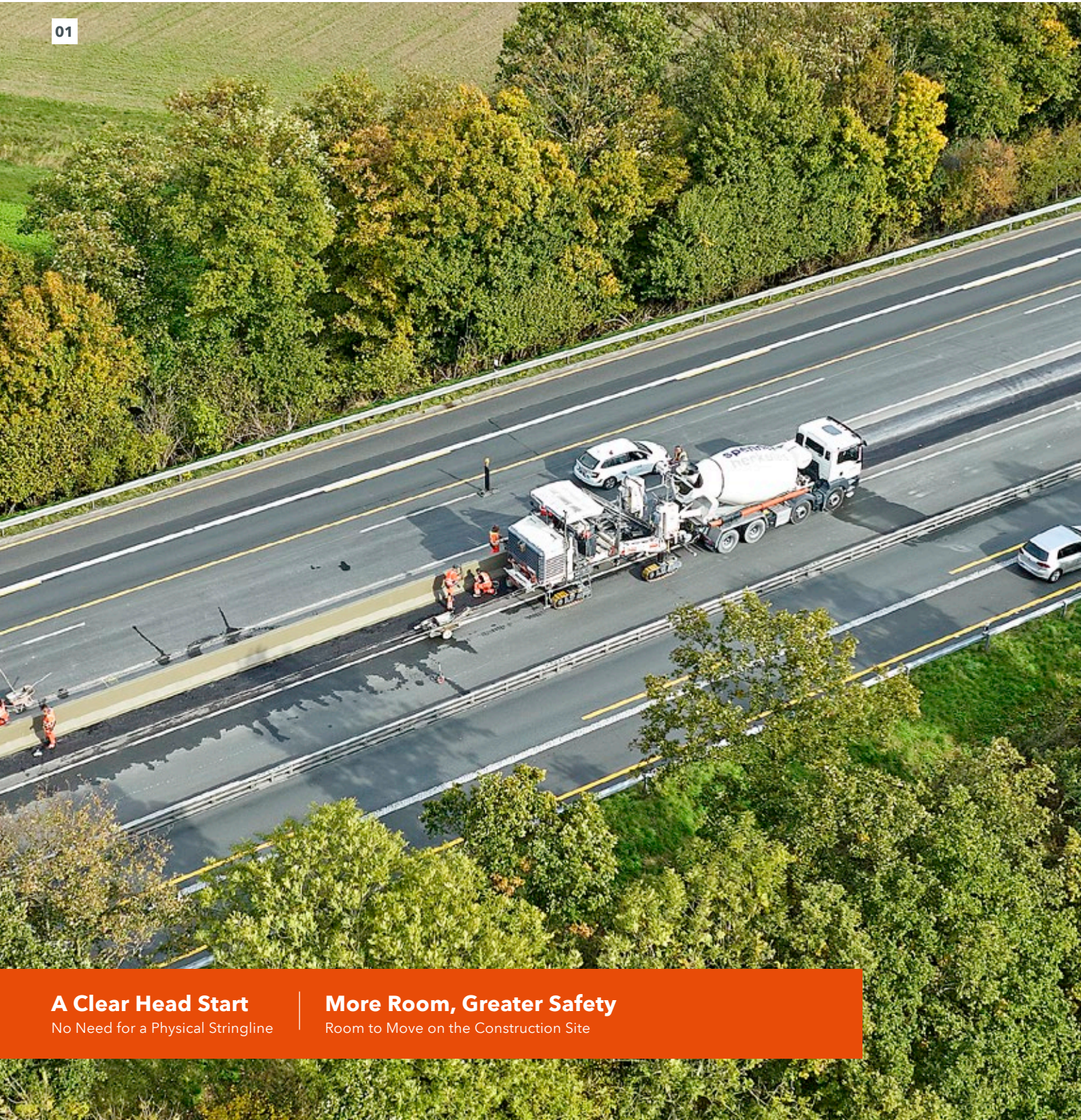
07 Broad Spectrum of Applications

- > The AutoPilot system is also available for WIRTGEN ancillary equipment TCM and WPS
- > An AutoPilot 2.0 system is usable without any problems on a variety of suitably pre-fitted machines



STRINGLESS CONCRETE PAVING

01



A Clear Head Start

No Need for a Physical Stringline

More Room, Greater Safety

Room to Move on the Construction Site



No Time-consuming Installation and Removal of Physical Stringlines

On average, the creation of a virtual stringline saves 80 - 90% of the time otherwise required when using a conventional stringline. This makes the overall workflow faster and more cost-efficient

No Costs for Stringline and Support Pins

Further cost-efficiency factors are the saved procurement and transport costs and the warehousing costs for stringline and support pins.

Paving of Complex Geometries Such as Tight Radii or S-Bends

In contrast to conventional methods, stringless paving significantly improves the ability to pave tight radii and complex geometries such as S-bends.

Increased Safety and Optimized Logistics on the Construction Site

More room to move on the construction site Thanks to stringless paving, the risk of tripping over a physical stringline on the construction site is eliminated and the crew on and around the paver can move more freely and safely. Concrete mixers arriving at the site have more room for unhindered maneuvering, which makes the transportation of material to the paver easier and faster.

- 01** Sufficient free space in front of the machine as a result of using a virtual stringline allows unhindered maneuvering of concrete mixers, increases on-site safety, and enables more cost-efficient concrete paving.

ALL FROM A SINGLE SOURCE

Perfectly Coordinated, Field-Proven Combination of 3D System, Machine, and Support

WIRTGEN is a one-stop provider for the GNSS (Global Navigation Satellite System) based AutoPilot 2.0 System, the machine, and corresponding services. For customers, this means only one central point of contact, qualified all-round advice, high planning reliability, and smooth and seamless procedures. The optimal interplay of 3D system, machine and support prevents incompatibilities, assures maximum productivity, and guarantees absolute precision of the paved concrete profiles. In short: Customers receive reliable support from a single source. The overall process of data collection, data processing, and the workflow on the construction site can be easily displayed via AutoPilot 2.0 and the Field Rover survey pole.

High Functional Reliability Thanks to Control and Software Precisely Tailored to WIRTGEN Machines.

The continuous advancement of our internally-developed control and software solutions guarantees maximum operational reliability. The control system and the software are precisely tailored to the various WIRTGEN offset slipform pavers, placer / spreaders, and texture curing machines. The control system and software integrated in the machine enable a more flexible and higher level of machine functionality in terms of the range of applications and individual customer requirements.

01



02



01 The AutoPilot 2.0 system, machine, and support services are ideally matched to one another.

02 After successful definition and assessment of the virtual stringline, the tablet is clipped into the dedicated docking station on the operator's platform.

03 The Field Rover survey pole allows the paving crew to define relevant points on the construction site and perform precise paving quality checks without the need for a surveyor.

Optimal, Fast Workflows

A virtual 3D stringline can be created on-site with the aid of the Field Rover survey pole. As an alternative to this, it is also possible to automatically import externally created 3D data models. In both cases, the input data is automatically analyzed to verify its suitability for the paving process. Possible errors are displayed and can be easily corrected by hand. The Field Rover survey pole can also be used to check the precision of every paved profile immediately after paving.

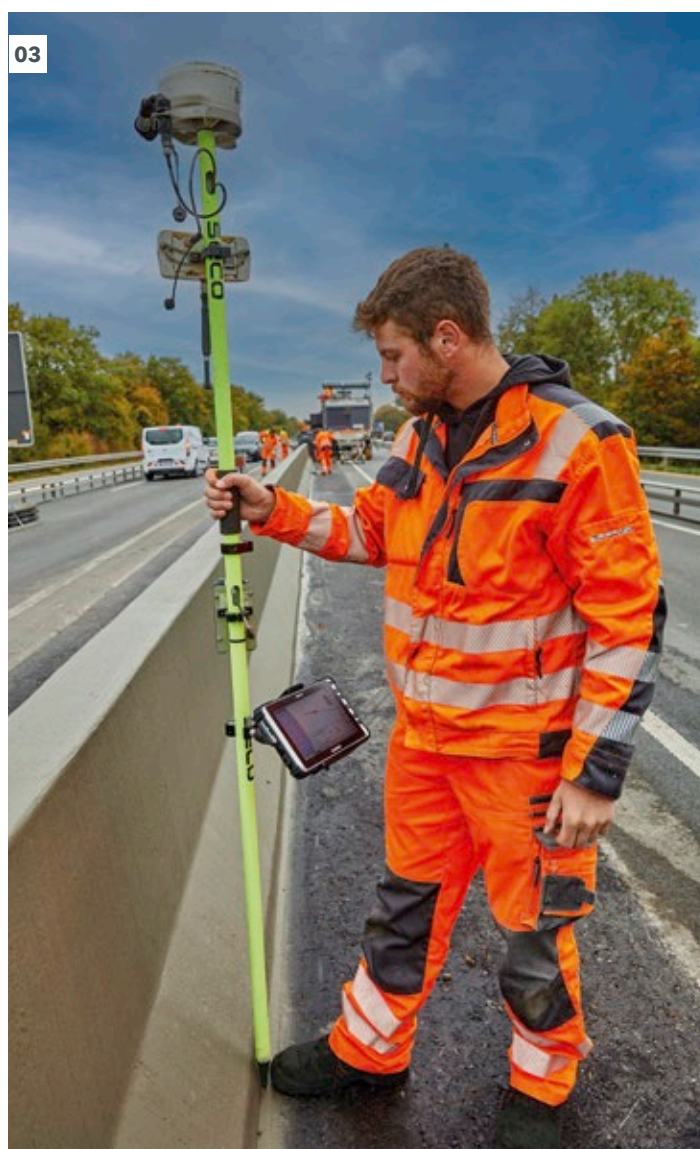
Field-Proven Ruggedized Operating Tablet

The field-proven ruggedized operating tablet with intuitive software can be quickly and easily detached from the Field Rover survey pole and clipped into the docking station on the operator's platform, e.g. on a WIRTGEN slipform paver. After this, the saved parameters can be used without any additional intermediate steps. A further option allows the use of a second tablet to enable simultaneous utilization of the machine control system and the Field Rover survey pole.

Quality Assurance of Paving Results with the Field Rover Survey Pole

The Field Rover survey pole can also be used to check the precision and quality of every paved profile immediately after paving. It also enables quick and easy checking of the correct position and size of existing objects such as storm drains, hydrants, etc.

03



INTUITIVE OPERATING CONCEPT

01



01 The Field Rover survey pole is used beforehand to define the virtual object points for the virtual string-line.

02 The software then computes the ideal steering line for concrete paving from the measured object points.

It's Nothing to Be Afraid Of

3D Concrete Paving Made Easy

No Extra Costs

The Paving Crew Does the Surveying

02



Easy and Intuitive Handling of the Entire Paving Workflow

Based on the GNSS (Global Navigation Satellite System), AutoPilot 2.0 utilizes either an existing data model or a new digital data model created on the construction site with the aid of what is known as the Field Rover survey pole.

Innovative Field Rover Survey Pole with Easy Handling for Registration of Measured Points on the Construction Site

For the creation of the digital data model on the construction site, the operator registers relevant object points with an operating tablet with internally-developed software mounted on the Field Rover survey pole. The Field Rover survey pole is light, robustly constructed, and easily portable.

Intuitive Operating Tablet with Process-Oriented Graphic Representation of the Entire Construction Site

The parameters read in from the Field Rover survey pole are saved and can then be used without any additional intermediate steps. The operator has all important parameters in view

on the display of the operating tablet and can intervene in the automated paving process at any time. The menu navigation is self-explanatory, and profiles and figures on the construction site are clearly visualized in graphic form.

Consideration of Actual Site Characteristics

Planning data do not always reflect the actual situation on a construction site. The Field Rover survey pole enables a comparison of nominal and actual values for objects on the construction site with regard to position and size and allows direct optimization of the values with the software of the operating tablet.

No Prior Knowledge of Site Surveying Required

With the Field Rover survey pole, trained site personnel can quickly and easily define relevant points on the construction site without prior knowledge of surveying.

EASY HANDLING OF 3D DATA

Real object points on the construction site are either recorded with the Field Rover survey pole or imported directly from external 3D models to create the virtual stringline. In case 3D data from a surveyor are already available, or should their creation by a surveyor be preferred, this data can of course also be used with WIRTGEN AutoPilot 2.0. At the same time, the system delivers numerous other advantages.

Generation of a Virtual 3D Stringline on the Basis of Actual Site Conditions

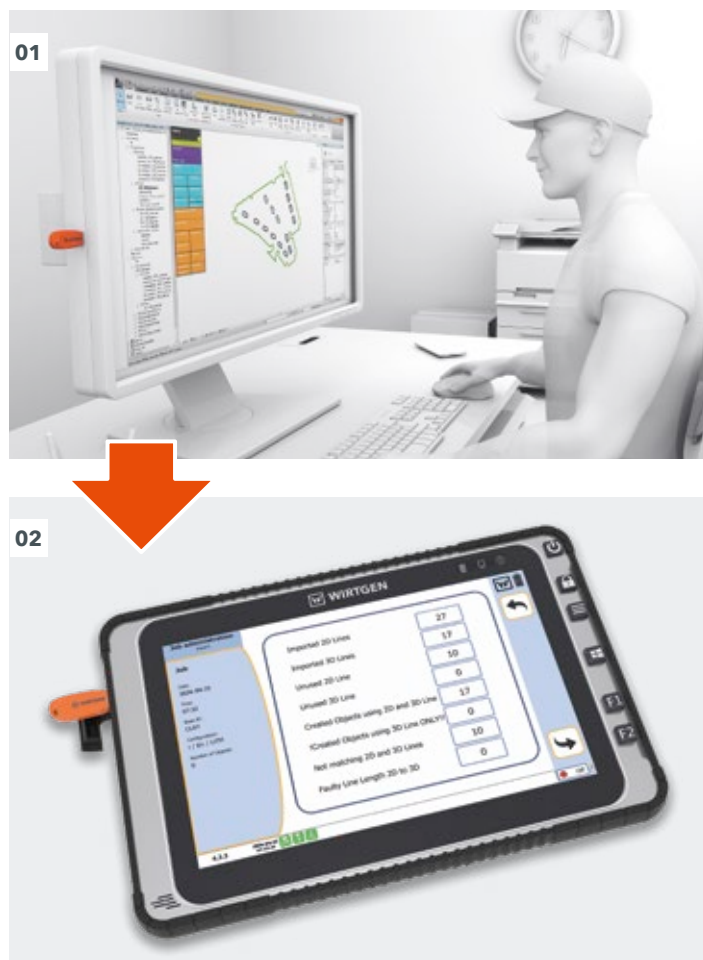
The paver operator can easily create a virtual 3D stringline on site using the intuitive software on the ruggedized tablet computer by independently defining relevant points on the construction site with the Field Rover survey pole. Measurement on site additionally enables existing objects such as storm

Optimal Workflows

Convenient Importing of 3D Models

Fast Checking and Correction

Precise Optimization of Data Quality by the Operator



drains, hydrants, or lampposts to be taken into account. Once programmed, defined profile data can not only be saved, but also retrieved and edited at any time later.

Easy Import of Externally Created 3D Models

Fully automated import of externally created 3D data models is also possible. Files in the commonly used DXF format can be imported quickly and without errors. Here, the data are checked for plausibility with respect to the paving quality for the slipform paver. After completion of the import process, a detailed report is created and possible deficits are precisely visualized.

Automatic Checking and Correction of Data Quality to Ensure Suitability for Paving

In order to guarantee the best paving quality, the quality of the input data is automatically checked after importing or the creation

of the virtual stringline to assess its suitability for paving – e.g. checking for kinks in the steering line or the height control profile.

Data Import Capability with Numerous Intuitive Checking and Editing Functions

After importing the data, the entire construction site including all objects to be paved is displayed in Map View. The object to be paved is selected graphically by the paver operator. Each object can be viewed in detail by simple zooming and panning. Graphic editors can be used to simply remove or smooth out kinks identified in the model data and to correct kinks in steering lines and elevation profiles.

The data can also be easily adapted to take existing objects that often do not precisely match the original plan of the construction site into account.



- 01** External 3D construction site data on a USB stick from a project planner can be...
- 02** ... imported to the tablet and corrected and edited.
- 03** Graphic editors enable easy checking or on-screen correction of kinks, e.g. in the elevation profile.
- 04** Map View displays an overview of the entire construction site and permits detailed examination and editing of each individual object.
- 05** All objects of a project are checked, for example, for kinks in the elevation profile or the steering line.

EXEMPLARY CUSTOMER SERVICE

Practice-Oriented Customer Training Hosted by WIRTGEN Specialists

When customers first purchase the AutoPilot 2.0 system, we recommend that they take advantage of an additional product training program, the content of which focuses on the respective levels of existing knowledge and experience. Specially trained experts from our sales and service organizations and dealerships share their theoretical and practical technical expertise on the subjects of how to use and operate the system and its technologies with the respective personnel. We also recommend a hands-on instruction and training session on one of the customer's construction sites.

Reliable After-Sales Service

We continue to support our customers after their purchase of AutoPilot 2.0 with a comprehensive range of services that enable them to fully exploit the system's potential. If required, this can be carried out on the actual construction site by one of our service technicians in order to resolve more complex problems or avoid errors when using the system.



Informative Tutorials

Over 30 video tutorials provide detailed and illustrative explanations of the functions and components of the AutoPilot 2.0 system – either beforehand as refresher courses, or on the actual construction site to provide concrete support. The video tutorials are accessed by scanning a QR code and cover subjects such as setting up the machine, importing external data, the use of the Field Rover survey pole and more.

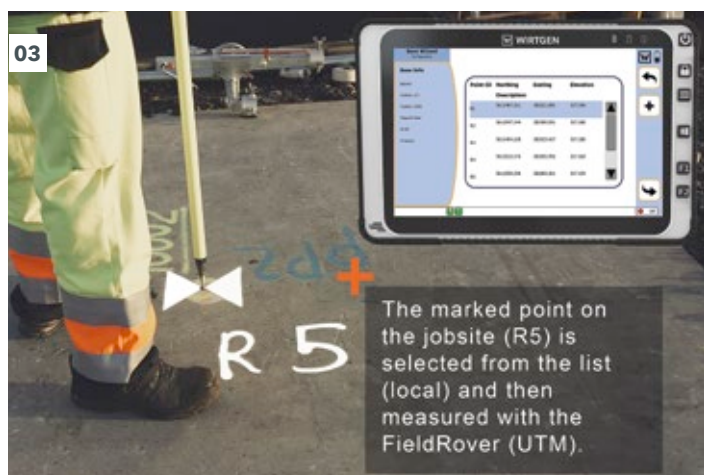
Separate, Highly-Detailed AutoPilot Website with FAQs, Practical Tips and More

Customers visiting the separate AutoPilot 2.0 website can find comprehensive product information such as FAQs, numerous tutorials, special animations, and a detailed user manual.

- 01** We offer practice-oriented training courses that help our customers unlock the full potential of the AutoPilot system.
- 02** In-depth video tutorials...
- 03** ... get users fit for optimal use of the system on the construction site.
- 04** FAQ's: Here, you will find a list of frequently asked questions.



Please scan the code for more information about AutoPilot support, videos, and FAQs.



AutoPilot FAQs

Here, you will find a collection of frequently asked questions about the Wirtgen AutoPilot 2.0 system. The questions are ordered according to subject priority:

- **Support:** Here is where you can find general information and answers to general questions
- **Overall system:** Here, we provide answers to general questions about the functions of the system, e.g. about height regulation
- **Total station:** Here is where you can find information to answer questions about the use of the total station, e.g. getting it ready for use
- **Base station:** The base station chapter provides answers to questions about the range of the RTK signal and factors that could influence it
- **Tablet:** Here is where you can find information about the tablet, in particular about problems that could be encountered with it during use
- **Field Rover:** Here is where you will find questions and answers about the Field Rover survey pole
- **Importing external data:** Find out all you need to know about importing external data

Please feel free to contact us if you couldn't find an answer to your question. .

Support

FAQs about support for the AutoPilot system

Who should I contact if I do not receive any AutoPilot reports?

Where can I find other QR codes?

QR codes can be found in the following locations: on the AutoPilot display screen, on the tablet and base station cases, on the operator's platform of the machine, in the training documents and in the instruction manual.

Which machines can be retrofitted with an AutoPilot system?

Who should I contact regarding repairs to or calibration of hardware components.

FAQs about the overall system

What kind of accuracy can be achieved with the AutoPilot system?

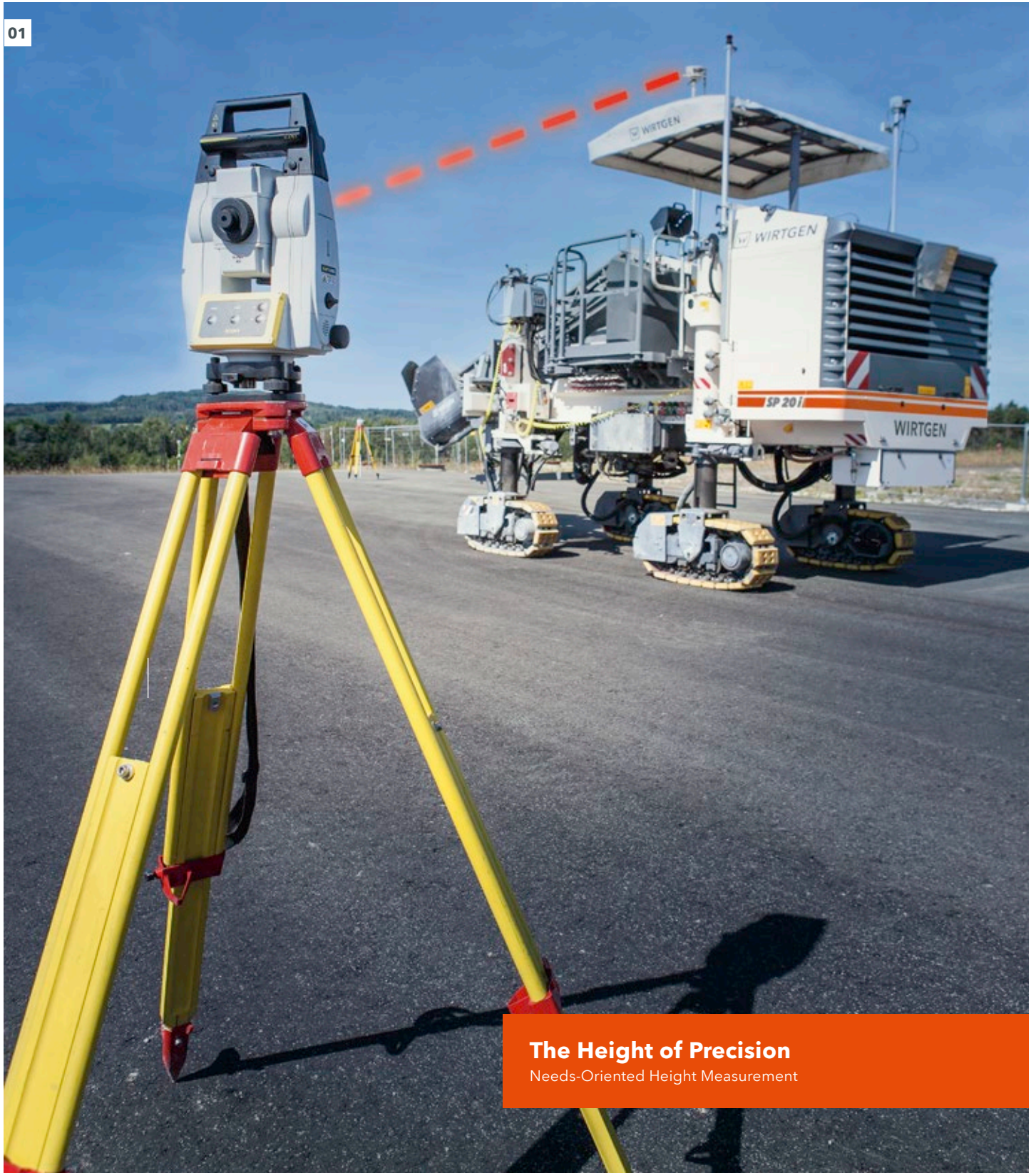
What kinds of elevation/height sensors are available for the system

Can the GNSS signal be used for machine height regulation?

AutoPilot is displaying an error message, what do I do now?

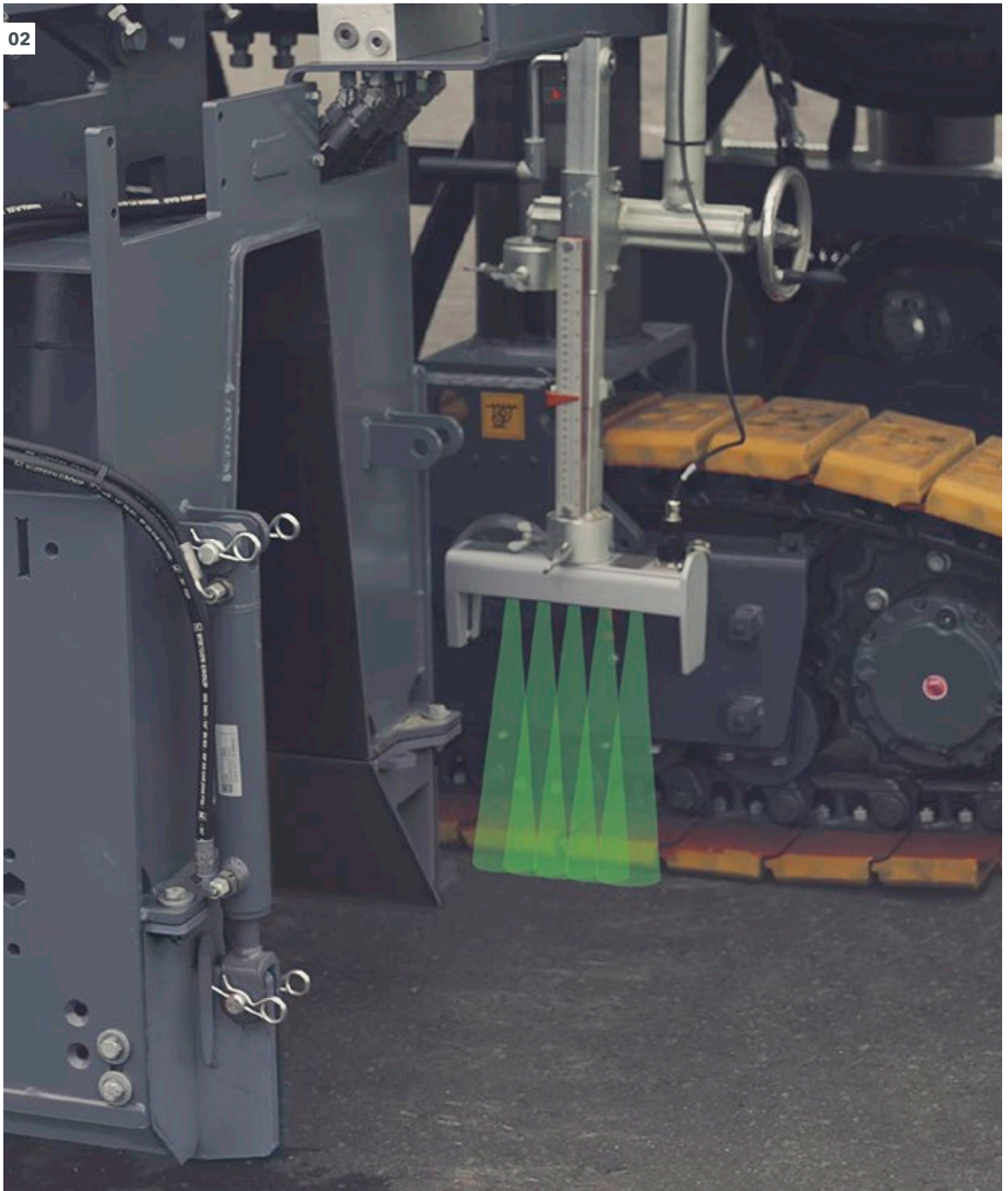
THE IDEAL HEIGHT SENSOR FOR EVERY APPLICATION

01



The Height of Precision

Needs-Oriented Height Measurement



01 Total station for profiling surfaces with uneven subbases.

02 Sonic-Ski with ultra-sonic sensor for copying surfaces with even subbases.

Sonic-Ski Height Sensor for Scanning an Existing Reference

The simple, field-proven Sonic-Ski height sensor on the paver performs contact-free scanning of an existing, even sub-base and thus ensures precise height regulation. An ideal reference for the Sonic-Ski height sensor would be, for example, an existing road surface when paving a concrete safety barrier or when paving offset profiles on a parking lot.

High-Precision Total Station for Flexible Use - Also without a Usable Existing Reference

The robotic total station does not require a usable reference surface: The total station continuously measures the position of a prism mounted on the paver and transmits this data to the AutoPilot 2.0 system. The system compares the nominal and actual values, processes the data to provide exact height corrections, and thus ensures an extremely precise machine height throughout the entire paving process. The total station reliably and accurately handles all typical applications.

BROAD SPECTRUM OF APPLICATIONS

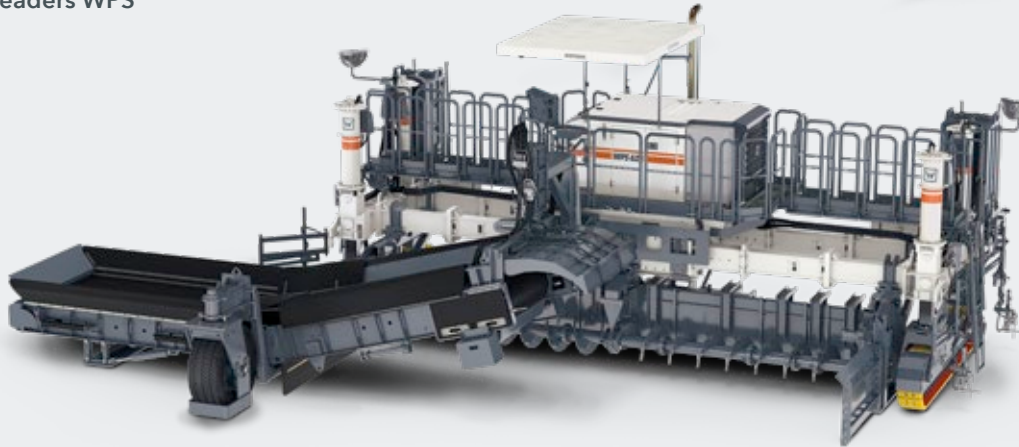
01 Slipform Pavers SP



02 Texture Curing Machines TCM



Placer / Spreaders WPS



The AutoPilot System Is Also Available for WIRTGEN Ancillary equipment TCM and WPS

WIRTGEN offers AutoPilot 2.0 not only as described for SP offset slipform pavers, but also for WPS placer / spreaders and TCM texture curing machines. The GNSS-based AutoPilot 2.0 system is an attractively priced 3D system that provides the required precision for applications with SP, WPS and TCM machines. It eliminates the need for an additional height sensor on all such machines.

What's more, the system can also be easily retrofitted on already operational machines at any time.

The AutoPilot 2.0 System Is Usable without Any Problems on a Variety of Suitably Pre-Fitted Machines

The AutoPilot 2.0 system is a one-time purchase, but it can easily be used on several suitably pre-fitted machines as required. At the end of the day, this leads not only to even greater flexibility, but also to higher machine utilization rates.

01 AutoPilot 2.0 is designed for use with numerous offset slipform pavers...

02 ... and ancillary equipment.

High Machine Utilization Rates

Can Be Used with a Variety of WIRTGEN Machines

**WIRTGEN GmbH**

Reinhard-Wirtgen-Str. 2
53578 Windhagen
Germany

T: +49-2645-131-0
F: +49-2645-131-392
M: info@wirtgen.com

 www.wirtgen.de



Please scan the code for further information.