The MultiSensor
The Internal Newsletter of Werth Messtechnik
May 2014

Turnkey solutions are a market trend in quality assurance

Dr. Ralf Christoph

Increasingly complex products with more stringent requirements for quality and reliability lead to new challenges for quality assurance. Higher precision and flexibility are expected from coordinate metrology. This has become possible with the use of multisensor systems and computed tomography. Users are also looking for complete turnkey solutions to a greater degree, including matching the machine technology to the specific application. Werth has responded to these trends and substantially contributed in providing these types of solutions in the past year. The holistic concept that combines outstanding technology with services, including launching processes at customers' sites, has produced double-digit growth rates for Werth once again in fiscal year 2013. This success makes us optimistic about future developments.

In this year's edition of the "MultiSensor", as we do every year, we present several new product innovations. One focus is expanding the capabilities of our multisensor units. Examples include new concepts for collision-free measurements using multisensors, new fiber probes, and new lighting systems.

In the area of coordinate measuring machines with X-ray tomography, the fields of application for this technology have been expanded with newly developed processes, such as Multi-ROI-CT and new, higher-performance X-ray sensors.

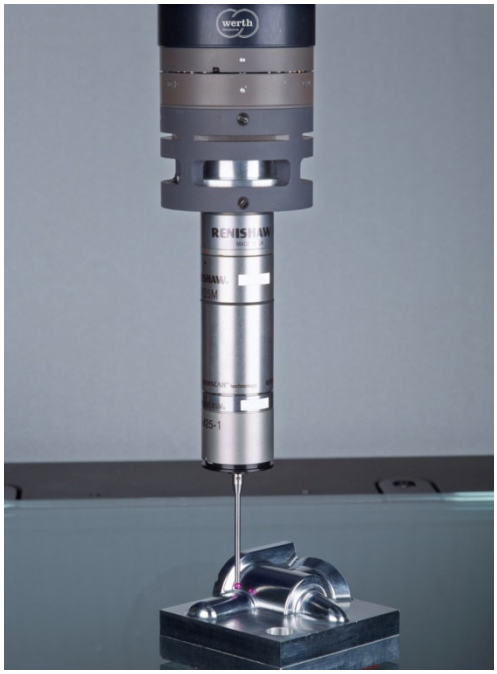
New software functions for both types of machines make them easier to use and provide the user with new solutions for measurement tasks. Among other things, the functions for CAD-based offline programming in image processing have been greatly expanded and the operator interface for tomography machines has been redesigned. Reports and suggestions about applications of our machine technology, along with news about the company, round out the technical information on Werth coordinate measuring machines.

Dr. Ralf Christoph

CONTENTS

A True "Multisensor"

Werth Messtechnik GmbH has once again blazed the trail and developed a true "multisensor." An image processing sensor and a laser distance sensor are integrated in a single measurement head. It utilizes the standard Werth magnetic interface and can also be used with the 3D fiber probe or the Werth Contour Probe, for example. The classical TP200 and SP25 mechanical probes and the WFP/S fiber probe have been newly integrated into the interface concept. The Werth Zoom can also be combined with all of these additional sensors.



„Multisensor“

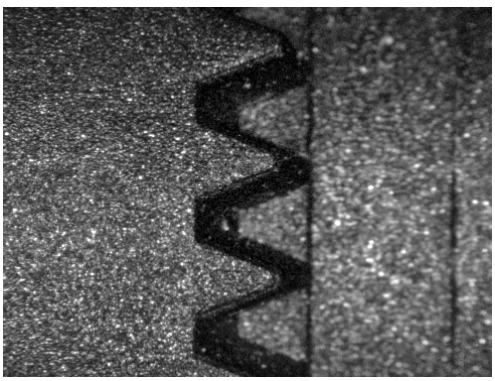
Measurements using various sensor principles in the same measuring program can now be performed not just on the same machine, but at the same sensor position. This means that the entire measurement range of the machine is available for combined measurements using all sensors, so that smaller measuring machines can be used. The risk of collision is reduced because no other measurement heads are involved. Even large objects can be measured without any collision issues. The various sensors can be changed out precisely and fully automatically using parking stations.

Integrated Brightfield Incident Light for Brilliant Images

Illumination using transmitted light, darkfield incident light, and brightfield incident light allows flexible measurement of workpieces. It is part of the standard equipment for all coordinate measuring machines with image processing sensors. The ring-shaped darkfield incident light illuminates the measured object at an angle of about 45°. The brightfield incident light, in contrast, illuminates in parallel with the beam path of the image processing sensor. This allows particularly good measurement of edges between horizontal and slightly inclined surfaces of the measured object. When coordinate measuring machines with image processing sensors are used at low magnification with an integrated brightfield incident light, reflections within the lens often interfere due to the reflectivity of the optical components.

Interfering reflection when measured with brightfield incident light

Some measuring machine manufacturers do not offer any brightfield incident light for this reason, or they use attachments that severely limit the working distance and thus reduce flexibility. At Werth Messtechnik GmbH, a special solution has been developed that specifically suppresses interfering reflections. A brilliant incident light image of the measured object is produced across the entire field of view. Therefore all edges can be measured reliably with a very low measurement uncertainty.



Result using the Werth lighting solution

New X-ray Tubes with 300 kV

For performing X-ray tomography on aluminum and steel components, the search for a solution for large-volume components is becoming increasingly important.

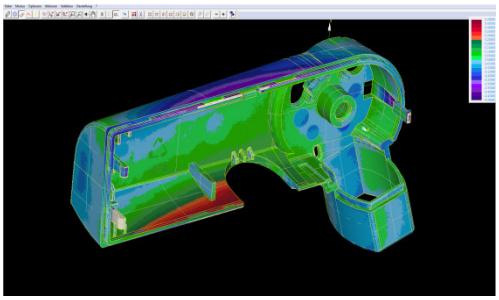
At the same time, very small features such as air pockets or cracks must still be reliably detected. Great flexibility is also required. More material must be penetrated with a higher acceleration voltage, but the focal point generated at the X-ray source must be as small as possible.

Previous X-ray sources in this power class often have a fixed focal point size in the range of tenths of millimeters. The new 300 kV microfocus tubes provide an optimal combination for a wide spectrum of parts.

With focal point sizes that can be reduced to a few micrometers, very high resolutions can be implemented at high magnification for measurements of thick-walled metal parts or assemblies made from very dense materials. This X-ray source is available for machines in the TomoScope® HV series.

Free Tool: Werth 3D CAD Viewer

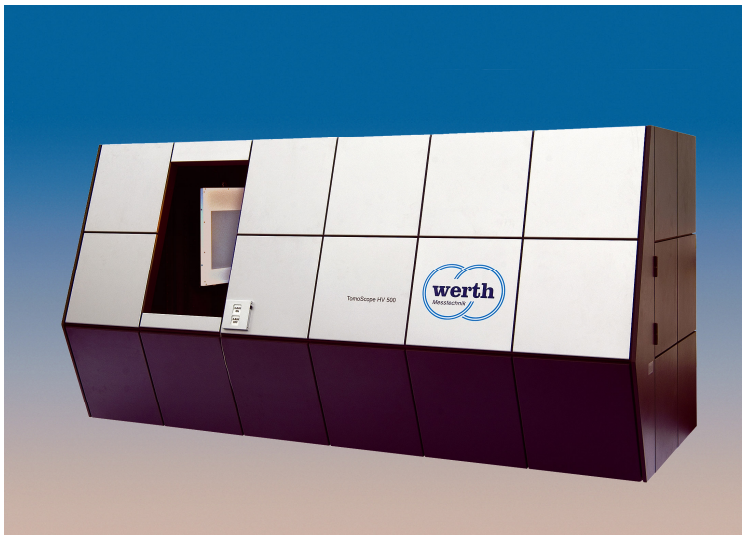
The Werth 3D CAD Viewer is now available for free download from the Werth homepage. For ten years now, the Werth TomoScope® 200, HV Compact, and HV 500 coordinate measuring machines have been used to measure workpieces "completely and precisely." After an interactive or automated analysis, the measurement results are available as numerical data or color-coded graphic plots.



Color-coded deviation plot in the Werth 3D CAD Viewer

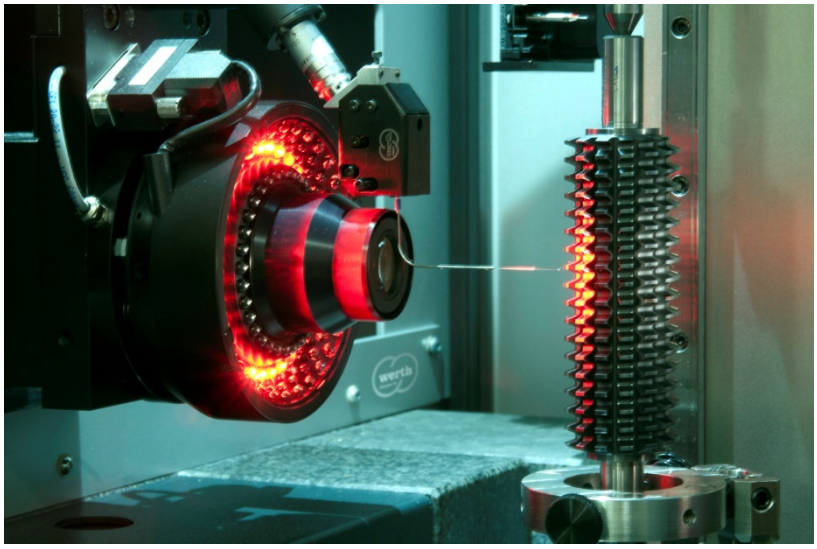
A flexible, interactive 3D view of the results on any PC can be useful for product analysis and developmental discussions. The 3D CAD Viewer from Werth Messtechnik GmbH is just such a tool. With a color-coded plot of deviations between the workpiece and the CAD data, the results can be easily observed and optimization measures (such as tool corrections) can be determined.

Numerical display of the deviations can also be controlled interactively. The measurement results are saved in advance in a special format and can then be displayed. The Werth 3D CAD Viewer is quick and easy to use. Simply install it, load the measurement data, and start analyzing the results.



TomoScope® HV 500

Werth Scanning Microprobe WFP/S New Probe Pins



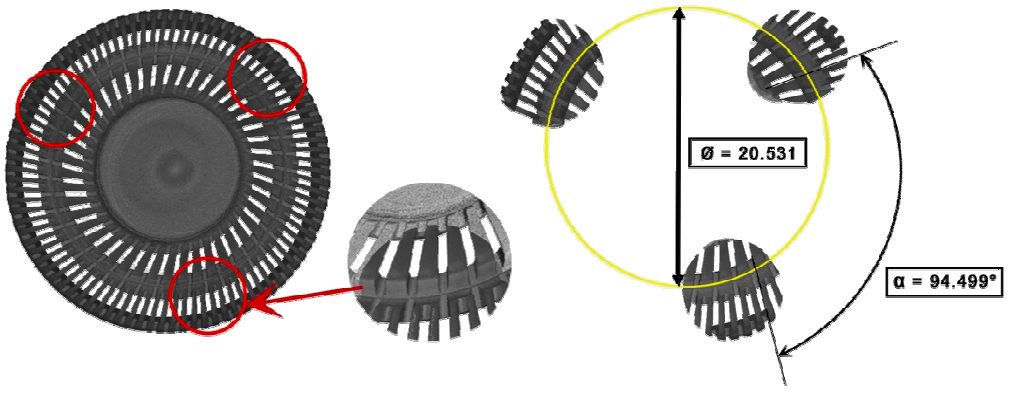
Werth MultiRing® and Werth Fiber Probe WFP

As the new Werth Fiber Probe 2D WFP/S measuring microprobe is introduced to the market, a new coating has also been developed for the probe spheres. Maximum service life and precise spherical form are now combined with optimal contrast conditions. The dimensions of the probe pin inserts have also been completely revamped. They are now available as special scanning fibers (more rigid) or fibers for deep features (large aspect ratio). The bottom portion of the shaft that is smaller in diameter than the sphere on the new standard fiber probe inserts is therefore either 1 mm or 5 mm for probe sphere diameters less than 250 µm. Custom probe lengths, shapes, or sphere diameters, are still available upon request.

Multi-ROI-CT

The quality of a tomographic image depends in many cases on the measurement parameter settings. Often, the requirement for high resolution cannot be met within the available measurement time. The amount of data needed for a high-resolution measurement of the entire workpiece is also substantial. In such cases, machine operators are often tempted to perform tomography that is not really correct. The resolution is set so high that parts of the workpiece are outside the image frame during the measurement. This causes noise and artifacts in the result.

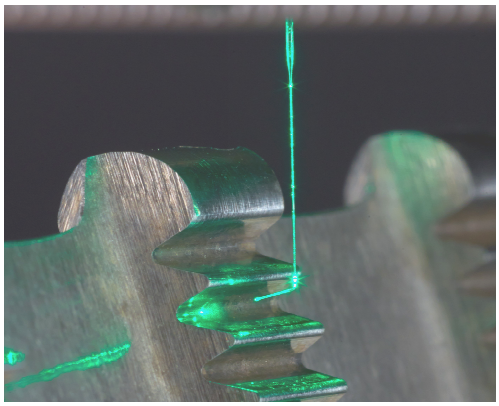
Now for the first time the new Multi-ROI-CT presented by Werth Messtechnik GmbH enables several regions within a workpiece to be measured at high resolution. The regions to be measured at high resolution are selected by the user and are then positioned automatically by the machine's measurement axes. By using a patented methodology the regions of interest are always in the center of the tomographic image as it is captured. The exact relationship of the regions to one another remains intact. After the tomographic scan, the data can be automatically merged into one point cloud for metrological analysis.



Multi-ROI-CT regions on an electric razor head

Werth 3D Fiber Probe Measures "Around the Corner"

The patented Werth Fiber Probe has opened up the world of microstructures for tactile coordinate metrology. Due to its outstanding features it is currently by far the most popular microprobe in the world. Its low contact forces, less than one millinewton, and its small probe spheres (20 µm for the smallest standard sphere diameter) makes the 3D WFP ideal for applications on precision-engineered components and for sensitive surfaces.



L-Probe insert measuring a broach

This potential, however, was previously available only with straight probe pins. The L-probes now available are perfect for measuring undercuts, small side bores, or even internal threads.

The L-probes have probe sphere diameters from 0.040 mm to 0.250 mm. The offset between the probe sphere and the shaft is about 1.5 mm. Other offsets are also available.

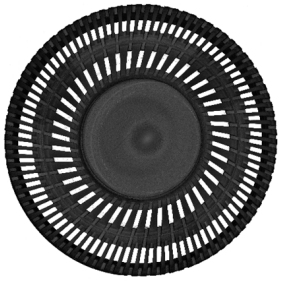
With modular integration in the Werth control and software environment, the new Werth Fiber Probe can alternatively be used in scanning mode or in touch trigger mode. In order to take advantage of the potential precision of the sensor, it is recommended for use with high-precision machines, such as the VideoCheck® UA, with a 3D maximum permissible error down to 300 nanometers.

what's new

Faster Reconstruction in Computed Tomography

Back in 2005 when X-ray tomography was introduced in the field of metrology with the launch of the Werth TomoScope® and TomoCheck® machine series, rapid reconstruction was always a need. At that time, all components and processes needed for X-ray tomography were already integrated in the WinWerth® measurement software. The computed voxel volumes were automatically provided to the operator as soon as the measurement was completed.

Since this time, the available X-ray components and measurement techniques have advanced greatly. The increasing requirements for higher resolutions when digitalizing workpieces can now be met by high-resolution 4000 x 4000 pixel detectors. Werth raster tomography can use volumes of 48,000,000,000 voxels (48 gigavoxels) in practice.
To still be able to process the enormous quantities of data in real time, the reconstruction hardware and software of the TomoScope® and TomoCheck® series machines have been optimized. For example, a standard "in the image" measurement with 4096^3 voxels can now be done in real time.



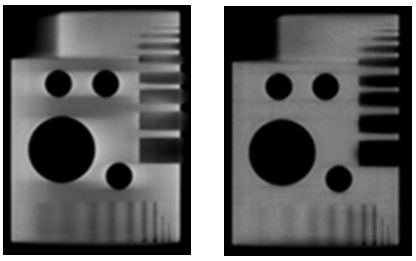
Cutting head of an electric razor with 48 Gvoxel – voxel size 1 µm

Autocorrection

Virtual, or Multisensor-Based?

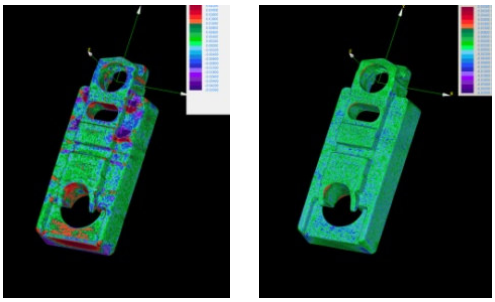
The term autocorrection was coined by Werth with the introduction of the first coordinate measuring machines with computed tomography in 2005. With corrections based on multisensor measurements, it became possible to guarantee traceable measurement results at the precision level of a coordinate measuring machine. Thanks to the greatly improved basic precision of CT, the autocorrection method (patent pending) is now used only for submicron precision measurements, such as fuel injection systems. Some workpieces are difficult to capture tomographically, such as those made of metal. Artifacts from beam hardening, cone beam effects, or scatter effect often have a great influence on the measurement uncertainty. For practical reasons, a somewhat greater measurement uncertainty is often accepted, or conventional measurement is used.

With virtual autocorrection, Werth Messtechnik now offers a solution for this problem. Comparative measurements using multisensors is replaced, for this method, with theoretical simulations under ideal (without artifacts) and actual (with artifacts) conditions.



Volume cross section through a 200 mm aluminum block – at left without virtual autocorrection, at right with

The difference between the two simulations provides the artifact-induced systematic measurement deviations used for correcting the measurement results. This method also leads to good results even if alternative methods (characteristic curve-based correction methods, multisensor Werth autocorrection) cannot be used due to insufficient data. Both for fast first article inspection and for production inspection, computed tomography (CT) is the ideal tool using this new correction method to expand the scope of applications.



Comparison of two measurements of a zinc die cast part in various positions – at left without virtual autocorrection, at right with

Werth StentCheck®

Quality Inspection of Lifesaving Stents

Stents are used to save lives in many medical operations. Whether they are used to stabilize blood vessels (treating heart attacks) or as means of attaching heart valves, they require one hundred percent product quality. Werth Messtechnik GmbH offers the StentCheck®, a specialized multisensor coordinate measuring machine for the high-precision, rapid, complete measurement of stents.

The StentCheck® optical-tactile 3D coordinate measuring machine is equipped with special illumination and a combination of rotating and tilting axis. The rotary axis and special support mandrels are used in conjunction with the new, Rotary OnTheFly® function (patent pending). The matrix sensor scans cylindrical surfaces very rapidly while the stent is rotated and provides 2D images or 3D data sets for analysis. Hundreds of geometric features, such as web widths, radii, and angles can be measured with micron precision in a few seconds.

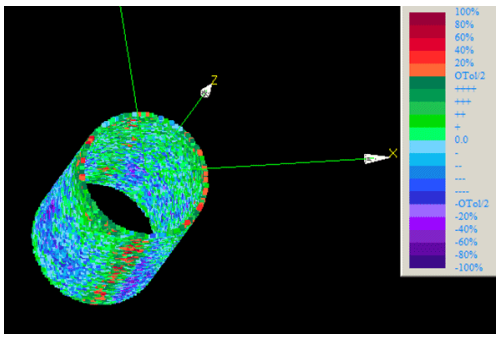
Werth StentCheck®

The powerful image processing system can also automatically evaluate defective structures. Specialized software tools prevent erroneous measurements caused by contaminants or by webs that deviate severely from the specified geometry. The tilt axis expands the scope of applications to include measurement of conical and other non-cylindrical geometries, such as those used for heart valve stents. The three-dimensional measurement principle allows spatial geometric features (such as the "bulge angle") to be captured. The multisensor concept and WinWerth® 3D measurement software also make it possible to take tactile measurements to determine the web thickness at exact positions on the stent previously located by the image processing system. The Werth Messtechnik GmbH complete portfolio of products for measuring and inspecting stents includes special solutions for measuring at body temperature and for measuring flat stents.

WinWerth® 8.33 for Upgrading

Since late last summer, all Werth measuring machines were shipped with the Windows 7 operating system. WinWerth® Version 8.33 has been expanded to include many new functions and is now available as an upgrade for existing machines as well. The switch to 64-bit processing gives an enormous speed advantage, particularly when working with multipoint sensors such as computed tomography or 3D patch functions.

Element macros for all sensors provide automated measurement of n-point elements. Standard geometric elements and their shape deviations are now shown in the 3D window (see illustration). There are new features for programming loops. Captured images can be saved with their calibration data for documentation purposes, merged to form large images (raster scanning), and measured again or have additional dimensions extracted at a later point in time.



Color-coded shape deviation

In addition, multipoint alignment (the RPS system) is improved, 2D CAD Online® has been revamped, and a function for determining profile and surface shape deviations has been developed. WinWerth® GearMeasure provides a solution integrated in WinWerth® for measuring gears using all sensors.

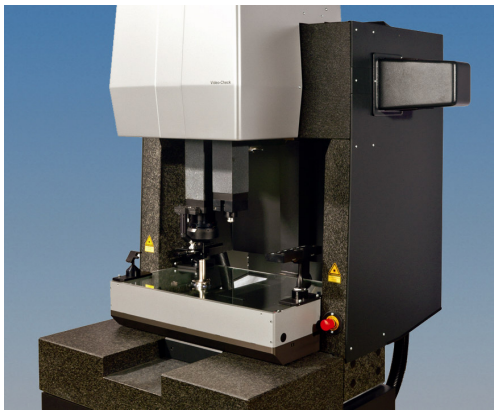
New mathematical approaches make the 3D Patch in the image processing sensor much more powerful. The CT sensor has many new features, such as point cloud segmenting, speed optimizations, and new functions for Region of Interest ROI-CT. If you would like more information about WinWerth® 8.33, please request our release information from:
vertriebsinnendienst@werth.de

VideoCheck® Bridge Type Machines

Multisensors Converge

For many years now the VideoCheck® coordinate measuring machines have proven the value of measuring with sensors mounted on two independent sensor axes. This design significantly reduces the risk of a collision between the sensors and the workpiece, because the sensors that are not in use are retracted out of the way. This is especially practical for large workpieces, or when mounting fixtures or rotary and rotating / tilting axes are used. For example, a probe can be mounted on one axis and an optical sensor on the other, or two different optical sensors can be mounted on both axes. Additional sensors can also be installed.

With the latest generation of the VideoCheck® bridge type machine with two Z axes, the specified measurement range is provided for both axes in multisensor mode. The offset of each of the two Z axes is now equal to two optical sensors mounted with a fixed offset on a single Z axis. This compact design offers more measuring range without a larger footprint than the previous VideoCheck® bridge type machine. The new VideoCheck® machine can also be equipped with just one Z axis and optional preparation for a second axis. The second axis can then be retrofitted later on site. The maximum permissible error MPE E for these VideoCheck® machines is specified as (0.9 + L / 400) µm and (0.5 + L / 600) µm (for VideoCheck® HA).



WinWerth® 8.34

Computed tomography is now more user-friendly

Complete integration of the whole CT process in the WinWerth® software is one of the great advantages of Werth coordinate measuring machines with X-ray tomography. This ensures that the CT data is processed seamlessly, so that the measurement results are also traceable. CT operation is much easier now and it allows tomography to be combined with other sensors in the same measurement program.

The new WinWerth® Version 8.34 integrates many new functions for computed tomography in the TeachEdit mode of the measurement software. TeachEdit mode allows the combination of teach-in mode and editing capabilities within a single measurement program that can be automatically repeated for identical parts. For example, all of the parameters for tomography can now be defined in an overview dialog. The standard view contains basic functions such as tube and detector parameters, while the expert view can be used to control region of interest (ROI) tomography, artifact correction, and raster tomography. An entirely new operating concept displays the automatically calculated raster positions. A "fast tomography" feature speeds up the teach-in of new programs.

The volumes captured by tomography can be thinned in TeachEdit mode, and undesired contaminants such as chips can be filtered out. The precise measurement of glass-reinforced plastics is also supported with special functions. The point clouds calculated can be analyzed to derive the desired dimensions, either with the familiar CAD support in WinWerth® or by using automatic segmenting. These new features make it even more convenient to perform measurements with the Werth TomoScope® and TomoCheck® machines. They are easily adapted to a wide variety of measurement tasks.

Expanded Market Presence

Founding of Werth Italia S.r.l

Under the direction of Mr. Sandro Telasi, Werth Italia S.r.l will now provide direct support and service for the Italian market. Mr. Sandro Telasi has been working with Werth multisensor coordinate measuring machines for many years. He is an expert contact for questions about any of the products and services that Werth Messtechnik GmbH provides. Werth Italia has worked with leading companies in the fields of aerospace, automotive, electronics, machine tools, medical technology, and aluminum and plastics extruders to implement the proven technology from Werth.

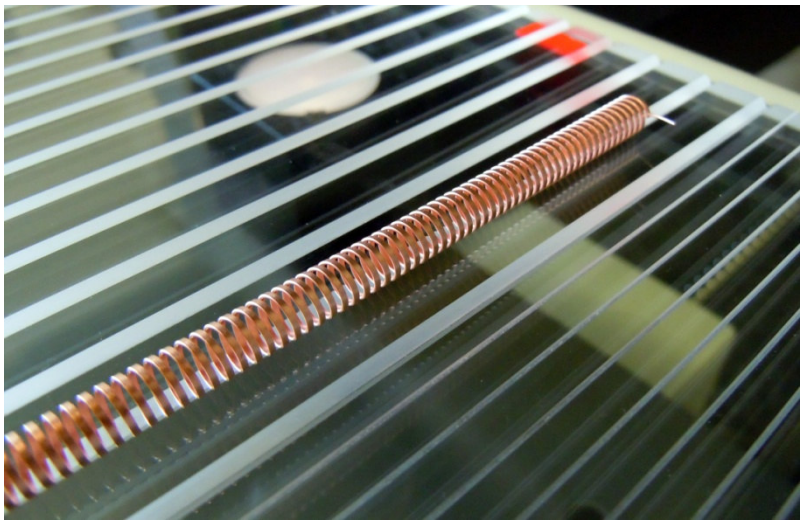
Sandro Telasi

Contact: info@werth-italia.it
Internet: www.werth-italia.it

Optimizing Wire Processing With Multisensor Coordinate Measuring Machines

Flying high with precision

When Thales Electronic Systems produces traveling wave tubes for amplifying signals in satellites, top quality and reliability are indispensable. The manufacturing process for the core component, the helical wire coil, incorporates 3D multisensory coordinate measuring machines from Werth Messtechnik. They can reliably detect very slight deviations from tolerances.



Wire coils for various models of travelling wave tubes used as signal amplifiers in satellites are produced in a complicated process with extremely high precision requirements at Thales Electronic Systems.

Without modern satellite technology, many areas of our daily life would be inconceivable, including TV reception, telecommunications, weather forecasting, and GPS navigation. The critical functions of these man-made heavenly bodies are often based on technology from Thales Electronic Systems in Ulm.

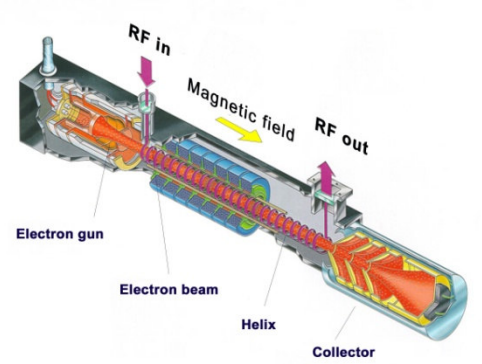
Bruno Wanderer is the head of the Wire Processing department at Thales. This is where the wire coils for a wide range of products are produced with extremely high precision requirements in a complex process that has been optimized over several decades. Every component must be shipped by the department according to a predefined schedule without the slightest defect. The 3D multisensor coordinate measuring technology from Werth contributes significantly to the fulfillment of this requirement. Wanderer is happy that he and his five colleagues have two Werth coordinate measuring machines that are manufactured in Giessen. He knows that precise metrology information about the component gives manufacturing more room to maneuver. Only precise knowledge of the actual dimensions prevents the already extreme manufacturing tolerances from being further limited by reserves for measurement uncertainty.

Efficient amplifier technology from Thales

The Wire Processing team produces about 20 different types of coils for traveling wave tubes. The unimposing structures, whose length is typically between a few 10's of mm and a few 100's of mm, consist of a molybdenum or tungsten wire wound into the shape of a helix. The heart of the traveling wave tube, this wire coil adapts the high velocity of the input signal wave (longer path through the coil) to the lower velocity (depending on cathode voltage) of the electrode beam guided along the coil axis in the tube. The coil geometry must be precisely matched for the input signal wave (traveling wave) to have the same velocity as the electron beam. The electron beam is modulated by the input signal, giving rise to the amplification effect. This technology is characterized by a very high efficiency level.

The order books are currently full, primarily thanks to satellite operators. Currently about 560 employees work in the "old tube plant" in Ulm, and the number is rising. In 2011 and 2012 alone, 100 new employees were hired. One single satellite typically carries several traveling wave amplifier tubes as it orbits. The satellites of the European navigation system Galileo, for example, are equipped with high-frequency amplification technology from Ulm. Their elementary function quickly makes it clear that the standard for the coils in the traveling wave tubes is perfection.

Wanderer says, "*We essentially perform one hundred percent testing. If a component has to be scrapped in our department, the cost is still reasonable. If the error is not detected until it is in the next assembly, however, then we already have relatively higher costs*." Wanderer estimates that the scrap rate for coil production is about 10% on an annual basis. The sources of defects are generally found in the raw material or in handling. Sometimes machine errors or the coating baths will cause the extremely tight tolerance limits to be exceeded. "*It is important to understand that our helical coils are coated with copper after they run through the winding machine, before they are measured again by one of the two Werth VideoCheck® machines*," says Wanderer.

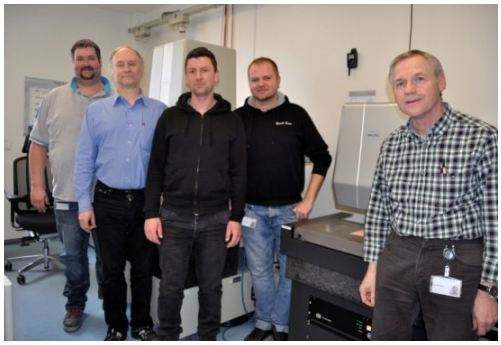


Principle construction of a travelling wave tube

In 1998, when a coordinate measuring machine from Werth Messtechnik arrived, it was like a mini-revolution for the company. A manually operated measuring microscope was replaced with a fully equipped CNC multisensor coordinate measuring machine. This investment was a huge step forward for the workers in the wire processing department. The measuring machine is equipped with a special high-precision, constant-tension guideway system. This makes it possible to achieve reliable precision on the order of a few microns, or even less than one micron, depending on the measurement task. The Werth image processing sensor has a very powerful contour image processing function. This not only affects the excellent precision of the measuring machine, but also ensures reliable automated functioning of the machine. Thales Electronic Systems has had very good experience with the coordinate measuring machine over time, so the company decided in 2011 to purchase another VideoCheck® machine.

Werth Messtechnik ensures quality

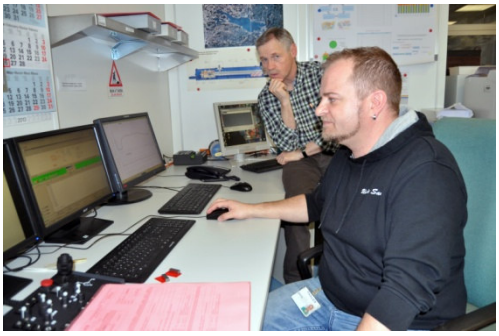
"*The reasons for our uncompromising accuracy requirements are certainly clear when you think about it,*" says Wanderer, "*because if the part doesn't work when it's up there in a satellite that costs millions, then we have a problem. You can't just pull into the shop like you do with a car, or send a technician to fix it.*" In outer space the temperature varies between extremes and the radiation is intense. Even a tiny defect can mean the failure of an entire mission. Wanderer says, "*Our requirements for a measuring machine are therefore maximum precision and suitability for the testing process. The tolerances are often just a few microns – so we need the measurement uncertainty to be about 0.5 µm to make sure the measurement process is capable.*"



The Wire Processing team finds that the two VideoCheck® machines from Werth have become an indispensable part of their daily work. From left: Peter Wöhrle, Stefan Nothdurft, Björn Bendel, Tobias Haug und Bruno Wanderer.

Wanderer and his colleagues have to pay special attention to make sure that the diameter, pitch, parallelism, and wire width do not wander outside of the defined tolerances. It takes about 30 to 40 minutes to inspect several hundred features of the coil using the VideoCheck® machines. The Werth VideoCheck® is typically loaded with a batch of 15 items. The machine then performs the measurements automatically overnight. The measured values are then immediately visible as a progression curve on the monitor. For the pitch inspection, tolerances of 6 µm must be maintained, while the tolerance for parallelism of the windings is only 3 µm.

Wanderer remembers well when the first VideoCheck® machine was installed. It took a while for the specific requirements to be developed and implemented together with the Werth engineers and technicians. "*Werth is very good to work with,*" says the department head. "*Not just during the installation phase; the same goes for running operations as well. If we have a problem at 2:00 in the afternoon, then the machine must be running again as quickly as possible.*" In these rare cases, Wanderer is happy to have the Service Hotline, where he can always reach Werth in Giessen. "*We get a call back right away, and the technicians for southwest Germany are on the spot quickly to tackle the problem. Weekends, too, if necessary.*"



Tobias Haug, an experienced operator of WinWerth® software, has many functions available to him. Deviations from specified values are immediately evident from a measuring data chart. Operation is graphically interactive and thus ideal for applications in the lab and the shop floor.

Because of this high level of satisfaction, a third VideoCheck® machine has been recently ordered for incoming goods inspection. The next investment is already planned. A few months ago, members of Wanderer's team visited Werth to get information about the patent-pending "Rotary On The Fly®" measurement method that can be retrofitted to the VideoCheck®. This is a process that is used to measure geometries on the surface of round components. Images are captured continuously as the part is rotated. This has the advantage of eliminating the typical start-stop cycles. Previous measurement times can be drastically reduced by applying this method. Werth's strategy of making new technologies available as upgrades to existing machines is another reason that the Thales team is in favor of partnering with Werth Messtechnik.

TomoCheck® HA 200

World's Most Precise CMM with CT Sensor

The new Werth TomoCheck® HA 200 computed tomography machine has exceeded previous precision levels with a granite base paired with high-precision components and air bearing technology. Like all coordinate measuring machines from Werth Messtechnik GmbH, the TomoCheck® HA 200 can be expanded to include every Werth multisensor the customer requires. The maximum permissible error of the machine is just MPE E1 = (0.5 + L / 500) µm when using tactile and optical sensors, and MPE E = (2.5 + L / 150) µm using CT sensors. The measurement deviations of the CT sensor are minimized using a patented process. The machine also offers very high resolutions of less than one micron, with an X-ray source plus high power target and a high-resolution detector.

WinWerth® 3D measurement software provides a comprehensive solution, from data acquisition to final results. Software tools for material analysis, such as for inclusion and crack checks, are available as well. The main area of application for the TomoCheck® HA 200 is precision and micro-components made from a wide range of materials.

news

Dr. Siegfried Werth Foundation Promotes Young Academics

The Dr. Siegfried Werth Foundation is a charitable foundation based in Giessen. Since 1988 it has annually promoted scientific dissertations in the field of metrology.

Dr. Siegfried Werth founded a machinery and engineering company in Düsseldorf that manufactured measuring instruments and measuring profile projectors. In 1958 the company – today's Werth Messtechnik GmbH – moved to Giessen. After Dr. Siegfried Werth's death, his widow, Maria Werth, founded the Dr. Siegfried Werth Foundation in 1987 as a memorial to her husband's life's work. In 1995, it was transitioned into a charitable foundation with legal capacity.

Dr. Siegfried Werth (1907-1982) at the HANNOVER MESSE in 1954

The foundation promotes and finances scientific dissertations in the field of non-contact dimensional metrology. The best dissertations of the year are given awards, particularly doctoral, diploma, and master's theses. Scholarships can also be granted to outstanding young scientists, for example, in pursuit of a doctoral degree.

Since 1988 more than 20 dissertations have been recognized. In 2014 the award will go to two young scientists from the Fraunhofer Institute for Production Technology and Automation (IPA, Stuttgart) and the Fraunhofer Institute for Production Technology (IPT, Aachen).

The awards are for the dissertations of Dr. Julia Kroll (IPA) for contributing to "Application-Specific Controlled Surface Extraction from 3D Computed Tomography Data" and M. Sc. Nicolai Brill (IPT) for developing an "OCT System for Measuring Semitransparent Layers".

Suggestions of other dissertations for award consideration can also be submitted via Werth Messtechnik GmbH.

COMMENT

Multisensor says...

One evening an applications tech told his family:

"Today I showed a customer a new cut feature for volumes." "Oh?" said his son. "Did one of your coworkers get a new haircut?"

"What? No! Nothing like that! To properly cut CT volumes is a feature which we call Volume Cross Section and it is a new measurement methodology that uses X-ray tomography to better analyze material boundaries."

This quickly brought the conversation to a close because, as usual, his family was not interested in the details.

The apps tech sees it differently, of course, because my company is giving technical specialists completely new capabilities.

I would say we are once again a step ahead here.

Hoping it stays that way in the future, we remain

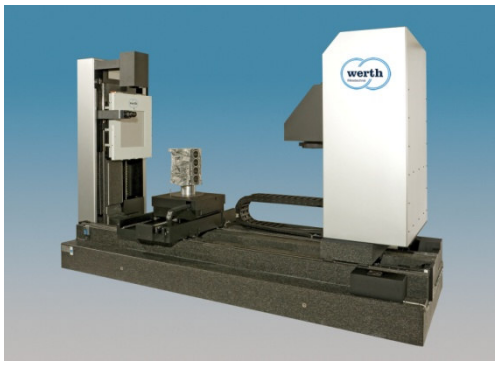
The Multisensor

On the Safe Side

DAkkS Calibration for TomoScope® and TomoCheck® Machines

Werth Messtechnik GmbH is the first and currently the only manufacturer to deliver coordinate measuring machines with X-ray tomography with an official DAkkS calibration.

The calibration of the TomoScope® and TomoCheck® machines provides the user with the assurance that performance testing conforms to recognized methods and that the measurement results are properly traceable.



TomoScope® HV 800

Specially trained personnel are assigned to perform these calibrations. It conforms to the applicable VDI guideline VDI/VDE 2617 Page 13 (also VDI/VDE 2630 Page 1.3). This defines the appropriate methods for testing the maximum permissible error and probing uncertainty for shape and size. The standards used are sphere standards and sphere distance standards. Bidirectional characteristic parameters are derived from the measurement of these standards to ensure comparability to the measurement of real workpieces. This corresponds to the familiar process used with conventional coordinate measuring machines using tactile or optical sensors.

+++ Newsticker +++ Newsticker +++

Follow us on YouTube

Videos of our measuring machines are available now on our YouTube channel:
http://www.youtube.com/channel/UCSXcwdcVNHIJ2-FMBb0vHkw

You can now even find Werth on Wikipedia under:
http://de.wikipedia.org/wiki/Werth_Messtechnik

Credits

The Multisensor
The Internal Newsletter of Werth Messtechnik
May 2014

The Multisensor is the in-house newsletter of Werth Messtechnik GmbH, Siemensstraße 19, 35394 Gießen
Telefon: +49 641 7938-0 Fax: +49 641 7938-719
www.werth.de mail@werth.de