

# MAC MATTERS

**The new U-Wave wireless system** improves efficiency by eliminating the need for data cables. Design enhancements offer functional improvements including; IP-67 rated protection, a communication range up to 60ft, easy data transfer to software, and an expandable system that will support up to 1600 gages. See page 6 for details.



## In this issue

**From the Field** ..... 1, 4  
Software & Customer Support assure that customers get the most from their Mitutoyo metrology solutions

**From the President** ..... 2

**Inside Story** ..... 2, 3  
Surface Analysis: "Surf's Up!"

**State of the Technology** ..... 5, 6

- New Mitutoyo ID-C Digimatic® Indicators
- New Mitutoyo Digimatic® Height Gage sets new standards
- U-Wave® provides wireless link from hand-held measuring tools to PCs

**Next Up** ..... 6  
Education Courses Calendar  
Upcoming Trade Shows

**Contact Us** ..... 6

## From the Field

"From the Field" offers a take on Mitutoyo technologies and services from the perspective of folks who provide them to end-users, distributors and internal staffs. In this issue, we talk to Siva Chinnasamy, Manager, Software & Customer Support Department (left), and Tony Romero, Technical Support Specialist. They'll tell us about how Software & Customer Support operates to assure that customers get the most from their Mitutoyo metrology solutions.

**MAC Matters:** Is it correct to say that the newly named Software & Customer Support Department consolidates two pre-existing customer support operations. If so, why the new approach?

**Siva Chinnasamy:** That's right. Software Support and Technical Support have been brought together under a single organizational structure. Software Support is Mitutoyo's customer service arm supporting CNC-driven and other software intensive instruments (CMMs, vision equipment, and many surface and form test machines) while Technical Support provides assistance to anyone using handheld tools and medium size instruments. The idea is to leverage resources and share best practices across the two operations to maximize responsiveness.

Overall, the goal is to add as much value as we can to our customers' Mitutoyo equipment.

**Tony Romero:** Many operational features of both Software and Technical Support are the same, so it's natural to manage and develop them jointly. At its most basic, all customers call the same toll free number: 888-MITUTOYO (888-648-8869). On another level, the way the phone support queue is organized and scheduled is the same. Also, we've begun cross-training so that eventually any of the staff will be able to take the point on most products. And, a Knowledge Base is being developed to enable the entire organization to respond quickly to frequently occurring customer issues.

**MAC Matters:** Could you describe exactly who a customer reaches when they call 888-MITUTOYO?

**Siva:** Well, first of all let me define what we mean by a customer. Of course there is the end user of a Mitutoyo product. *continued on page 4*

# President's Message



Mr. Mikio Yamashita, President

The global economic situation over the last year has been difficult, creating challenges for us here at Mitutoyo and for our many business partners as well. We are observing another evolution in our industry and recognize the need for continued change and improvement in our approach to how we do business to stay competitive for the future.

While change is inevitable, I am pleased to say that Mitutoyo continues to offer a full range of precision measuring tools, instruments and equipment valued globally for high quality and long life. We remain a comprehensive metrology organization with a dedicated sales team, dependable product and technical support, state-of-the-art calibration and repair services, and highly trained field service engineers. Our global network of research and development laboratories continues to bring us new technologies and allow us to offer several new products to our customers each year.

Mitutoyo is committed to providing our customers reliability in the face of change and continuing as the number one metrology organization in the world. I thank you all for your continued support and look forward to sharing with you prosperous days ahead. **M**

## Inside Story Surface Analysis: "Surf's Up!"

### Understanding the waviness profile and its impact on process control. Mitutoyo SurfTest<sup>®</sup> SJ-500 surface roughness tester

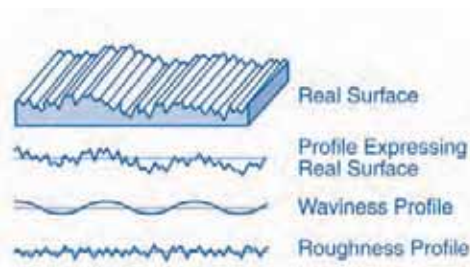
By the Form & Surface Product Specialist Group, Mitutoyo America Corp.

Today, the majority of manufacturers have come to understand and accept the roughness profile, Ra (Roughness parameter). But how much does industry understand the importance of the related waviness profile, typically Wt (Waviness parameter)? As the waviness profile is becoming more common in process control, users should learn how to ride the swell and not wipe out!

#### Separating waviness from roughness

"Picture yourself looking out over a landscape of rolling hills covered in lush, green grass." So begins Drew Klaber, Application Engineer, Mitutoyo America, in describing the relationship between roughness and waviness. Klaber continues, "The hills are analogous to the waveform, it's the waviness you're seeing. And the grass you see covering the hill is analogous to roughness."

To provide a sense of the scale of these features, in about 75% of measurement routines undertaken, surface profiles with a wavelength of 0.030" or shorter are classified as roughness while surface features with wavelengths greater than 0.030" generally fall into the category of waviness.



Roughness is characteristic of tool marks left in the wake of a machining pass which are caused by both the cutting action and surface non-uniformity. Waviness is most often the result of small fluctuations in process conditions such as changing distances between the cutting tool and the surface of the workpiece. These fluctuations may be caused by cutting tool wear or worn machine bearings, both of which generate unbalanced conditions, chatter, vibration and instability in the machining set-up.

Since in most cases roughness and waviness are caused by different aspects of the manufacturing process, evaluating each individually is useful for process control and diagnostics wherein the overall objective is to hold the machining process towards the upper limit of the spec for improved economics.

Today's stylus-based surface measurement instruments are capable of capturing both roughness and waviness information; the trick is to separate one from the other.

*continued on page 3*



SurfTest® SJ-500 Surface Roughness Tester

### Filtering

Filtering surface profiles involves running the primary data (data that describes the “real surface”) through a smoothing filter. The degree of smoothing is determined by selection of a filter cutoff wavelength. The filter cutoff specifies the wavelength that a given analysis will use to separate roughness from waviness. The choice of cutoff is based on the particular process characteristics that one desires to monitor. Shorter wavelengths (with a greater frequency and smaller amplitude, i.e., the “grass”) will appear in the roughness profile while longer wavelengths (with a lower frequency but larger amplitude, i.e., the “rolling hills”) will appear in the waviness profile. Both ASME B46.1-2002 and ISO 4288-1996 include tables providing standard cutoff values that enable designers, engineers, production and quality people to be on the same page when specifying waviness parameters.

According to Eiji Okada, Senior Product Support Specialist, Mitutoyo America, “The filtering process can be likened to a sieve wherein the coarseness of the screen selected (per ASME or ISO standards) is analogous to the cutoff value. In this analogy, the primary data expressing the real surface profile is made up of all sizes of large and small stones, fines and dust. All this material is run through the screen. Stones too large to fit through the screen remain on top; they represent the waviness data. The small stones, fines and dust pass through the screen for collection below; they represent roughness data.

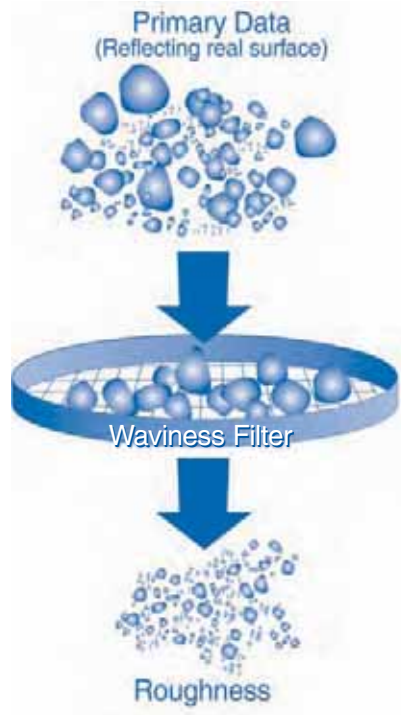
### Productivity wave

Waviness measurements are usually part of the inspection regimen implemented after major metal removal operations are complete. Waviness parameters are most often used to predict how effectively one surface will seal against another surface, either when in direct contact or with the use of intermediate gaskets.

In simplest terms, you check waviness to

prevent leaks—critically important in automotive, powertrain, aerospace, medical manufacturing, hydraulic/ pneumatic and other applications where cases, chambers and similar components must mate and seal.

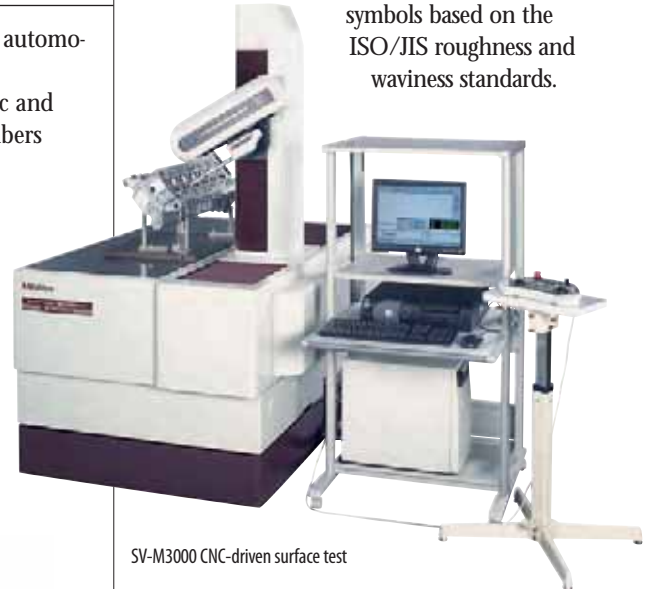
Klüber offers a current application example, “Recently, one of the Big Three automakers had a situation wherein a gasket manufacturer offered to guarantee the performance of their gaskets if the automaker could meet or exceed target waviness parameters on engine block gasket seating surfaces.”



Mitutoyo worked with the automaker to develop a waviness measurement routine utilizing Mitutoyo’s SurfTest® portable surface roughness tester (capable of measuring waviness as well as roughness) and Mitutoyo SURFPAK® surface texture analysis software. The waviness inspection routine kept the process within parameters and the gasket maker did guarantee product performance.

The latest Mitutoyo portable surface roughness tester, the SurfTest® SJ-500, is designed to make operations like these as easy as possible. The machine features a 7.5" display with color-coded icons and touch panel control. The tool is equipped with a joystick for comfortable, precise stylus positioning and includes a built-in printer. Additionally, the SJ-500 features a user-friendly input device that

complies with drafting symbols based on the ISO/JIS roughness and waviness standards.



SV-M3000 CNC-driven surface test

Installation of CNC-driven surface test instrumentation gives Ray Sellner, Application Engineer, Mitutoyo America, an additional perspective on waviness testing productivity. According to Sellner, “We’ve been working on a project with the manufacturer of one of today’s most advanced V-6s. We’re using a Mitutoyo SV-M3000 CNC-driven surface test machine to evaluate numerous texture parameters including waviness. In this case, the waviness parameter is critical to deck surfaces of the combustion chamber head that mates to the engine block, as well as for exhaust fit-up. The speed of the SV-M3000 CNC allows waviness to be monitored much more frequently – having cut inspection time from the previous 1.5 days to only 45 minutes! This enables the process to take better advantage of the entire tolerance window which translates to faster machining and much more economical production.” **M**

For more information on surface roughness inspection equipment visit [www.mitutoyo.com](http://www.mitutoyo.com)

# From the Field...

continued from page 1

But the Distributor is also our customer, as is our “internal customer,” the Sales Representative. Sometimes we’ll field conference calls from a combination of these folks.

But to address your question, 888-MITUTOYO, which is available from 8:00 AM Eastern time through 8:00 PM Eastern time, accesses a phone queue. Prompts direct the caller to either software or tech support. The software support queue is staffed by three Systems Engineers located at our headquarters in Aurora, Illinois. Similarly, a small tools customer calling for Technical Support will reach one of three Technical Support Specialists, who are backed up by a rotation of six M3 metrologists located around the country (reference sidebar). There are always at least five technical support experts scheduled to be on-queue.

**MAC Matters:** Is pricing ever a subject of discussion?

**Siva:** Our department does not get involved in pricing. If asked, we explain that the customer has options including talking to the Distributor, Rep or our Inside Sales Department, depending on circumstances.

**MAC Matters:** Siva, can you describe how you use communications technology to leverage the process of helping customers with software concerns?

**Siva:** GoToMeeting® web conferencing can be a powerful tool for working tough troubleshooting issues. Let’s say we’ve spent 30 minutes with a customer and still haven’t resolved a situation with a CMM controlled by MCOSMOS software. We’ll log-in to GoToMeeting and provide the customer with an access code. Then together with the customer, we’ll actually look into the CMM’s computer and remotely change hardware settings as well as MCOSMOS software settings. Sometimes it’s just a simple matter of observing that the customer has some sort of anti-virus or other type of installed software that’s interfering with MCOSMOS.

**MAC Matters:** Doesn’t this procedure raise security flags with customers?

**Siva:** Well, the process is transparent to the customer who watches everything we do. Even so, some companies do say, “No!” In that case we’ll take an alternate route, for example, jointly referencing manuals.

**Tony:** Sometimes a lot of information, drawings, etc., will be transferred back-and-forth with a customer. Web conferencing, emails, faxes and phone calls all may be used – particularly if we’re adapting or innovating a new tool. A situation like that may develop when a customer calls and says, “I’m not able to find a tool capable of measuring XYZ. Can you make me one?” That’s when we’ll send a formal request to the Technical Service Department to see if it’s practical to develop a custom solution. If we do move forward, all project activity is logged to the customer’s database for regular follow-up to ensure a satisfactory outcome.

**MAC Matters:** Can you address future initiatives that will impact how the department operates?

**Siva:** Our Knowledge Base is newly available to the small tools side – and is constantly improving. Think of the Knowledge Base as a troubleshooting database focused on Frequently Asked Questions. It’s really a “corporate memory” of solutions to past customer problems. It has been populated by the historical record and is now continually being added to. It’s searchable to make everyone a lot smarter and dramatically improve our responsiveness.

**Software Support:** software.support@mitutoyo.com  
**Tech Support:** tech.support@mitutoyo.com  
**Toll Free Number:** 1-888-MITUTOYO  
**Queue Direct:** 1-630-820-9785

#### Software Support System Engineers:

Jim Curtis  
Mark Lovik  
Mack Elmishad

#### Technical Support Specialists:

Tony Romero  
Mike Larsen  
Chris Birnbaum

#### M<sup>3</sup> Specialists:

Boston:	Gus Gustafson	(Sales Region A)
Detroit:	Calvin Pace	(Sales Region B)
Cincinnati:	Tom Zaremba	(Sales Region B)
Aurora:	Miguel Portillo	(Sales Region C)
Los Angeles:	Greg Bradach	(Sales Region D)
Charlotte:	Ernie Jarvis	(Sales Region F)

**MAC Matters:** Earlier you stated that Software and Customer Support does not get involved in pricing. But what about pricing for the support services themselves... don’t you quote that?

**Siva:** 888-MITUTOYO support is totally free. This represents a really significant cost advantage for our customers, especially on the software side. Unlike with other manu-



facturers of CMMs, vision and form equipment, you do not need a separate support contract because there are no costs. Mitutoyo customer support has been free ever since we put our first software-driven machines in the field. That represents an important value-add for our customers and speaks to the confidence Mitutoyo has always had in its technology. **M**

## M<sup>3</sup> Solution Centers

Mitutoyo tools and instruments can be seen and demonstrated conveniently at any one of six M<sup>3</sup> Solution Centers nationwide. These resource centers are fully equipped, featuring operational models of the latest Mitutoyo tools and instruments. M<sup>3</sup> Solution Centers are staffed by highly skilled application engineers who can demonstrate the latest in technology, or work with you to develop application-specific solutions. Contact the M<sup>3</sup> Solution Center near you for an appointment, or just stop by for a visit. (Refer to the back of this newsletter for locations and contact information.)

For more information on Mitutoyo’s Product Knowledge Base visit [www.mitutoyo.com](http://www.mitutoyo.com)



# State of the Technology

## New Mitutoyo Digimatic® Height Gage sets new standards for functionality, ease of use

A new line of Digimatic® Height Gages is available from Mitutoyo America Corporation. These gages incorporate ergonomic advancements focused on ease of operation and enhanced functionality.

Ergonomic innovations include a slider-handle control wheel that is offset from the slider-handle body by 10°. The offset provides a more natural, comfortable hand position for easier operation. In addition, the display includes a large character height of 11mm to avoid eye strain. Control buttons are large, with most frequently used buttons positioned for easiest access. The base is even shaped to function as a hand grip.



Besides improved ergonomics, the new Digimatic Height Gages offer outstanding accuracy, from  $\pm 0.001''$  ( $\pm 0.02\text{mm}$ ) to  $\pm 0.003''$  ( $\pm 0.07\text{mm}$ ) depending on model, with a repeatability of  $.0005''$  ( $0.01\text{mm}$ ). Resolution can be set to  $.0005''$  ( $0.01\text{mm}$ ) or  $.0002''$  ( $0.005\text{mm}$ ). A convenient pre-set function reduces set-up time by enabling two reference planes to be set relative to the surface plate datum plane.

These Digimatic Height Gages also feature the Mitutoyo Absolute® measuring system which eliminates the need to re-set the origin after power-off saving time and improving repeatability. The new height gages can connect to an optional Digimatic handheld digital processor or to a PC via an optional input tool.

The new Digimatic Height Gages are available with either standard Digimatic output or multi-function Digimatic output (which uses a bidirectional touch signal probe capable of measurement in two directions for even faster measurement). All versions of the new height gages employ rugged double-column construction for enhanced stability and smooth, trouble-free operation. **M**

For more information on Digimatic Height Gages visit [www.mitutoyo.com](http://www.mitutoyo.com)

## New Mitutoyo ID-C Digimatic® Indicators

Mitutoyo's newly redesigned ID-C Digimatic® indicator combines numerous advances to create the category's most user-friendly digital indicator.

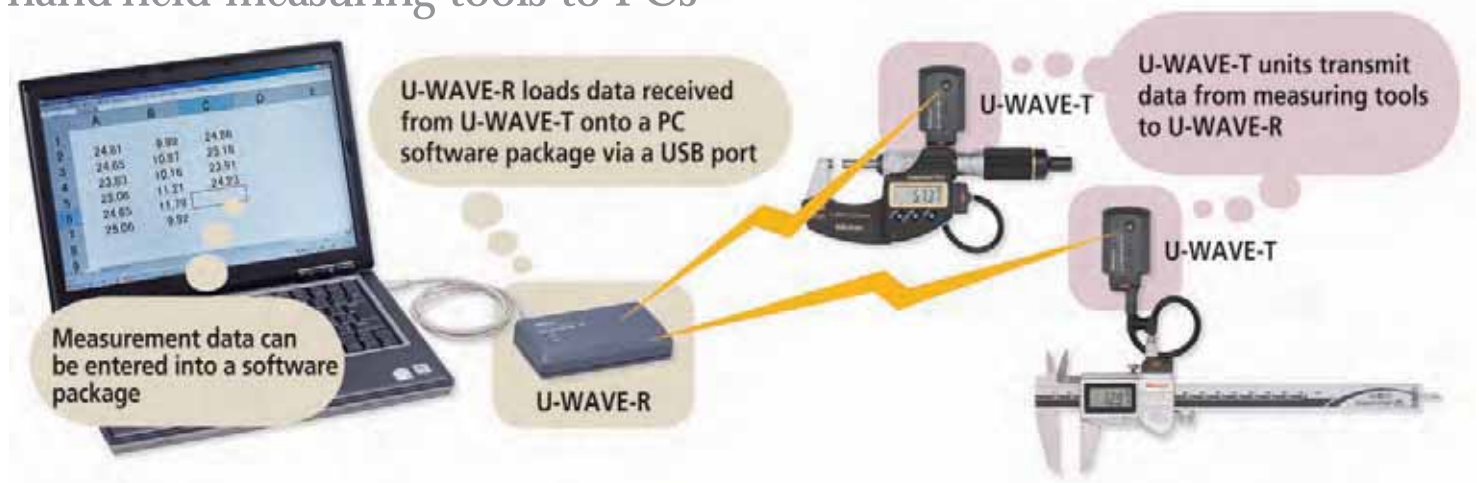
The new ID-C indicator starts with the foundation of Mitutoyo's Absolute® measuring system eliminating the need for re-setting the origin at power-on, improving efficiency and repeatability.

Key improvements include: Variable resolution settings, and a calculator function - all functions now accessed via three, large color-coded buttons. To improve readability and usability, the display area has been enlarged by 50%; the plunger release stroke has been extended; and the lifting function expanded. Data-hold and data-output functions have also been added to the new ID-C indicators enhancing the operator's ability to manage measurement results. These data functions include a lock feature to prevent mis-operation. **M**



For more information on Digimatic ID-C Indicators visit [www.mitutoyo.com](http://www.mitutoyo.com)

# Mitutoyo U-Wave<sup>®</sup> provides wireless link from hand-held measuring tools to PCs



Mitutoyo America Corporation announces availability of the new U-Wave<sup>®</sup> system which enables easy, simple-to-use, wireless data communication from a hand-held measuring tool to a PC. With a cordless range of up to 60', the system increases the flexibility of measurement data recording in a wide variety of situations.

With U-Wave, the measurement station and PC no longer need to be adjacent enabling more freedom in determining the layout of inspection facilities and shop floor areas. Also, since the U-Wave is free of cable-to-PC

constraints, operators can perform measurement on large workpieces with greater agility. And, by eliminating cabling issues, the U-Wave is ideal for use with long measuring tools which may require special care in handling – thus improving the operator's data capture throughput.

In operation, the U-Wave-T sends Digimatic tool's output (the U-Wave-T may plug directly into the Digimatic port or attach via a short cable) and sends it to the U-Wave-R which loads data into Excel or SPC software via included U-Wavepak software.

The IP67-type U-Wave-T is dust and water ingress protected and can be used in combination with other IP67-rated metrology tools for use in demanding production floor environments. Up to 100 measuring tools can be connected via one U-Wave-R while up to 16 U-Wave-Rs can be connected using commercially available USB hubs. **M**

For more information on U-Wave visit [www.mitutoyo.com](http://www.mitutoyo.com)

## Next Up Course Schedule

### Dimensional Metrology (2 Day Course)

Oct. 20-21, Jackson, MS  
Nov. 3-4, Boston, MA  
Nov. 10-11, Charlotte, NC

### Gage Calibration Systems and Methods

Oct. 22-23, Jackson, MS  
Nov. 5-6, Boston, MA  
Nov. 12-13, Charlotte, NC

### Integrated GD&T (4 Day Course)

Oct. 27-30, Jackson, MS  
Nov. 10-13, Boston, MA  
Dec. 1-4, Charlotte, NC

### Estimating Measurement Uncertainty

(2 Day Course)  
Oct. 20-21, Boston, MA

### Hands-On Gage Calibration

(3 Day Course)  
Oct. 6-8, Elk Grove Village, IL

**Attend a class between  
now and December 31,  
2009 and receive a  
Mitutoyo 6" Digital  
Caliper Free!!  
(a \$140 value)\*\***

### Upcoming Trade Shows

**MD&M MN 2009**  
Oct. 21-22, Booth 1511  
**ISTFA 2009**  
Nov. 17-18, Booth 100

### M<sup>3</sup> Solution Centers

**Aurora, Illinois**  
(Corporate Headquarters)  
(630) 978-6495

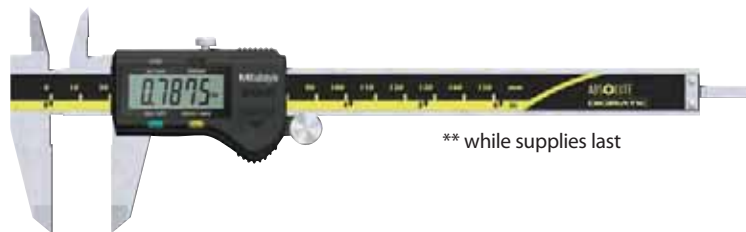
**Westford, Massachusetts**  
(978) 692-8765

**Huntersville, North Carolina**  
(704) 875-8332

**Mason, Ohio**  
(513) 754-0709 x4314

**Plymouth, Michigan**  
(734) 738-5534

**City of Industry, California**  
(626) 961-9661 x4215



\*\* while supplies last



### On-Site Courses

Our courses can be conducted at your location. Save money and get more people in your organization trained. All of our on-site courses are customized to meet your specific needs. Contact us to learn more at (630) 978-6469.

# Mitutoyo

[www.mitutoyo.com](http://www.mitutoyo.com)

Mitutoyo America Corporation  
965 Corporate Boulevard  
Aurora, Illinois 60502  
1-888-MITUTOYO (1-888-648-8869)

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