

## CUSTOM SOLUTIONS

TAILOR-MADE MEASUREMENT SOLUTIONS AND SERVICE SPECIFIC  
TO YOUR APPLICATION



# MITUTOYO CUSTOM SOLUTIONS

With Mitutoyo Custom Solutions, you can customize Mitutoyo products and technology to meet the demanding needs of your specific application. Our U.S.-based team incorporates a wide range of advanced technologies and process improvements to find the optimal solution for your unique challenges.

Our group of highly skilled engineers uses decades of combined experience, working directly with you to design and build custom fixtures, sensors, part loading/holding systems, optics, algorithms, firmware, user software, and fully-automated closed-loop solutions to incorporate precision measurement and inspection into your manufacturing process.

## HOW IT WORKS

**Our mission is to provide you with value-added solutions, helping you realize the full potential of Mitutoyo products and services. We follow a detailed process to determine the custom solution that will work best for your specific needs.**



### DISCOVER

Our experienced engineers work hand-in-hand with you to assess your unique measuring needs and manufacturing application. We gain a deep understanding of the challenges you're looking to solve, brainstorm at a conceptual level, and chart possible paths forward.



### DEFINE

We identify existing Mitutoyo products, algorithms, and software that can be modified (with non-Mitutoyo parts, if needed) to best suit your needs. We refine the possible options from the concept level to the more detailed implementation level, then propose the solutions—setting requirements and specifications for your custom equipment, reaching agreement on scope, and detailing the next steps.



### DEVELOP

Our team begins implementation—constructing the custom mechanical components and optimizing embedded software and firmware elements. When appropriate, we provide 3D CAD drawings or prototypes as a proof of concept.



### DELIVER

We install and integrate your tailor-made solution into your existing production process at your facility. This ensures that the system is working properly per the project scope—then provide training and documentation to set you on the pathway to success.



### SUPPORT

Following Mitutoyo's commitment to service, we provide ongoing training, troubleshooting, calibration, and ongoing service to keep your equipment running and performing at its peak.

# COMPLETE SOLUTIONS COMPLETELY CUSTOMIZED

Leveraging a catalog of over 8,500 products in tandem with non-Mitutoyo components, technology, and software, we can provide custom solutions that seamlessly integrate measurement systems with your production line and process.

## SERVICES & CAPABILITIES

### General Capabilities

- Turnkey measurement solutions
- In-line inspection systems
- Non-contact and tactile sensor development
- Embedded vision
- Custom gauging
- Temperature compensation
- OEM and ruggedized sensor development
- Sensor customization for extended speed and range
- Customized and embedded software interfaces
- Environmental and safety protection systems

### Design

- Optical
- Electrical
- Mechanical
- Fixturing
- FEA
- FPGA & firmware
- AI software

### Integration

- Robotics
- Motion control
- Material handling
- Conveyance
- Production software
- System monitoring
- Traceability input
- RFID/barcode
- External I/O devices

## WORLD-CLASS SUPPORT

From start to finish, we are able to support you for the lifetime of your equipment, backed by comprehensive services that ensure you make the very best use of your custom solutions.



## CUSTOM CALIBRATION

With the broadest scope of any commercial lab in the country, our calibration services allow us to provide the highest accuracy and lowest measurement uncertainty for your custom equipment—so you can be certain that your solution is performing at its peak.



# END-TO-END CUSTOM SOLUTIONS

Mitutoyo's expansive selection of metrology products is designed to meet the needs of a variety of industries. However, when an application has unique requirements or must be integrated into a specialized process or system, our experienced team will work with you to customize and integrate our broad spectrum of technology and services into your application.

From shop floor/lab CMM's and Form inspection equipment to non-contact Vision measuring systems and other instruments, Mitutoyo can develop a custom solution for virtually any measuring need.

## CMM

With the flexibility to use the same technology on the shop floor as in the lab, a custom CMM solution can be integrated directly into your process, shorten inspection times, and increase efficiency, helping to reduce scrap and increase profits.

- CMM customization options include:
- Automate setup of part coordinate system by add-on optical system
  - Additional stages
  - Smart factory integration
  - Additional sensor technology

## FORM

Whether it's surface finish, micro contours, thread inspection, roundness, or other fine feature measurements, form solutions can meet almost every need. With the addition of custom technologies, we help you maximize the efficiency use of your quality assurance investment.

- Form customization options include:
- Adding non-contact sensors such as Mitutoyo's Chromatic Point Sensor (CPS) or non-Mitutoyo sensors for specialized needs
  - Customized SW/UI for easy implementation in your factory

## VISION

By using our CNC line of Vision machines, we can implement high-speed automated inspection of features too small to measure using conventional touch-probe technology. Additionally, additive features can be incorporated into your vision system, enhancing the mechanical, optical, electronic, firmware, and/or software capabilities.

- Vision customization options include:
- Alternative wavelengths (ex. IR)
  - Additional optical heads for enhanced resolution or field of view
  - Tunable liquid lens to enable high-speed 2D/3D imaging and measurement without moving parts
  - Custom ring lights
  - Specialized part holding
  - Specialized algorithms
  - Specialized part path programming
  - Custom motion control platform
  - Custom user interface

## CUSTOM PLATFORMS & SENSORS

Add expanded measuring capabilities by customizing your solution:

- Integrate QV optical heads on a custom platform (large-format, small-format, high-speed)
- Integrate non-Mitutoyo sensors on Mitutoyo platforms
- Modify Mitutoyo sensors for higher resolution, speed, FOV

## MAJOR INSTRUMENTS

Many of our other standard products can be customized and incorporated into an automated inspection process; including Optical Measurement, Sensor Systems, Hardness Testing Machines, Linear Encoders and DRO Systems, Small Tool Instruments, and Data Management Solutions. By applying these products and our deep expertise, we can build a fully customized measurement solution that matches your unique needs.



# CASE STUDIES

#1

## Custom Large Format Optical Inspection System

**Quick Vision Optical Head + Custom Motion System + Control Software**

**CHALLENGE:**

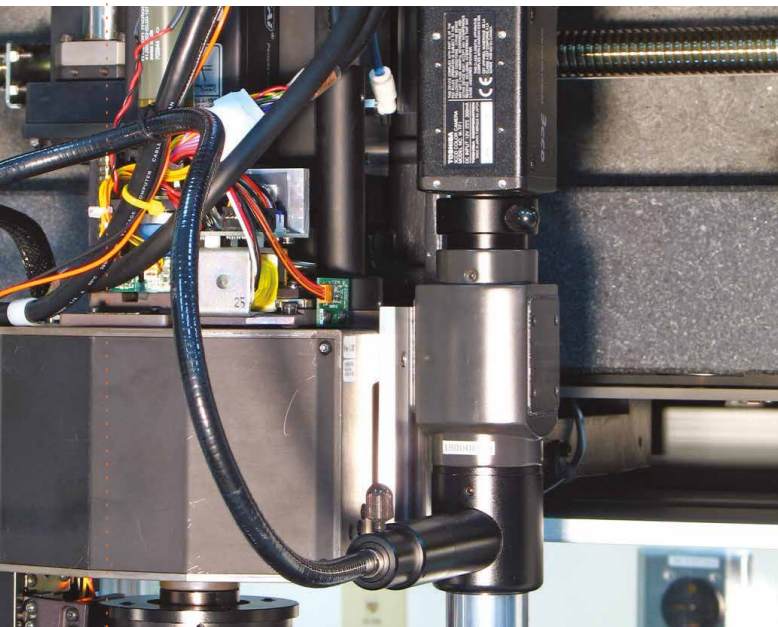
To fully automate the inspection of thousands of microscopic holes and complex shapes in a specific pattern, using front and back lighting.

**SOLUTION:**

A high-speed lighting system integrated into a Mitutoyo Quick Vision Stream system paired with a custom part inspection program.

**RESULT:**

**100X**  
enhancement  
of inspection throughput



#2

## Robust Optical Imaging Probe on a Robot Arm for Aerospace (ROBOTAG)

**Mitutoyo TAGLENS + Robot + Custom Interface**

**CHALLENGE:**

Strict requirements from the aerospace industry necessitated the development of a robot mounted optical inspection system, capable of imaging defects in critical components.

**SOLUTION:**

ROBOTAG, the optical inspection system powered by Mitutoyo's Tunable Acoustic Gradient Index of Refraction Lens (TAGLENS) varifocal system, provided a large field of view (FOV) and extended depth of focus (EDOF) imaging for dimensional measurements and defect detection. Our software engineers then developed a custom user interface to display and catalogue images, as well as interface with a generic robot coupling.

**RESULT:**

**Robust & Automated Defect Detection system**



#3

## Near-Line Surface Finish Measurement

**Mitutoyo CNC Formtracer Extreme**

**CHALLENGE:**

To perform automated surface finish measurements more quickly, while safely reducing operator-induced errors.

**SOLUTION:**

A Mitutoyo Formtracer Extreme system, customized with extended axis capabilities allowed for all complex feature locations to be accessed by the detector and stylus.

**RESULT:**

**65%** cycle time  
reduction  
with greatly improved repeatability in  
feature location and measurement results



# INDUSTRIES & APPLICATIONS

Mitutoyo Custom Solutions serve a variety of industries. If you don't see your specific industry or application listed below, contact us to learn how we can develop a customized solution tailored to your needs.

**AUTOMOTIVE/ATV/MARINE**

Rocker Arms, Pump Housings, Alternator Housings, Motors, Bearing Races, Pistons, Piston Rods, Gears, Filter Assemblies, Wheel Hubs, Brake Components, Throttle Bodies, Fuel Lines, Castings, Powdered/Sintered Metal

**MEDICAL/DENTAL**

Implants, Impellers, Pumps, Drills, Mobility Assist Apparatus, Bone Screws, Filters, Syringes, Surgical Instruments

**AEROSPACE**

Blades, Fir Tree Geometry, Instrumentation, Fittings, Flanges, Fuel Supply Components, Cooling Holes, Sheet Metal, Airframe Components/Structures

**ENERGY**

(Oil/Gas/Solar/Wind/Nuclear) Flanges, Fittings, Pumps, Housings, Couplings/Connections, Hardware

**INJECTION MOLDING**

Molds, Bottles, Caps, Housings/Cases, Moldings, Parting Lines, Flash, Draft Angles

**MACHINE MANUFACTURING**

Sheet Metal, Fasteners, Guide Ways, Inserts, Drills, Collets, Saw Blades, Abrasives, Thru Feed Centerless Grinding

**ELECTRONICS**

PCBs, Wafers, Semiconductors, Electrodes, IC Chips, Circuit Traces, Flex Circuits, BGAs, LGAs, Solder Joints



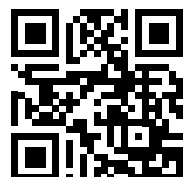
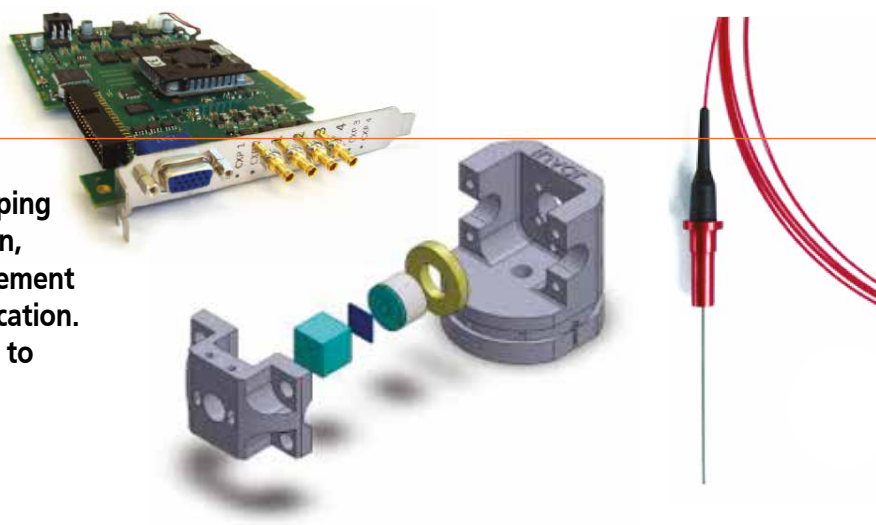
**Whatever your challenges are, Mitutoyo supports you from start to finish.**

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed up by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver bespoke measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

## FIND YOUR CUSTOM SOLUTION

From customizing an existing product to developing completely new equipment, Mitutoyo can design, build, and implement an inspection and measurement solution that perfectly fits your needs and application. Schedule an assessment with a Mitutoyo expert to discuss your unique needs.



Find additional product literature and our complete catalogue here.

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

**Note:** Product illustrations are without obligation. Product descriptions, in particular any and all technical specifications, are only binding when explicitly agreed upon. MITUTOYO, DIGIMATIC and MICAT are either registered trademarks or trademarks of Mitutoyo Corp. in Japan and/or other countries/regions. MeasurLink is a registered trademark of Mitutoyo America Corp. in the United States and/or other countries/regions. Microsoft, Windows, Windows Vista and SQL Server are either registered trademarks or trademarks of Microsoft Corp. in the United States and/or other countries. CATIA is a registered trademark of Dassault Systèmes. SolidWorks is a registered trademark of Dassault Systèmes SolidWorks Corp. Other product, company and brand names mentioned herein are for identification purposes only and may be the trademarks of their respective holders.

# Mitutoyo

**Mitutoyo Europe GmbH**

Borsigstraße 8-10  
41469 Neuss

Tel. +49 (0) 2137-102-0  
Fax +49 (0) 2137-102-351

[info@mitutoyo.eu](mailto:info@mitutoyo.eu)  
[www.mitutoyo.eu](http://www.mitutoyo.eu)