



Mitutoyo

# CUSTOM SOLUTIONS

Tailor-Made Measurement Solutions and Services 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 concept level to detailed implementation level, then propose the solutions—setting requirements and specifications for your custom equipment, reaching agreement on scope and detailing 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 your 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

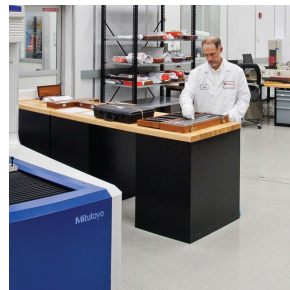
## WORLD-CLASS SUPPORT

From start to finish, we are able to support you for the lifetime of your equipment, backed by comprehensive services that ensure you make 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 are 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 every measurement 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 efficient use of your quality measurement 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
- Turnable 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 leveraging 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:

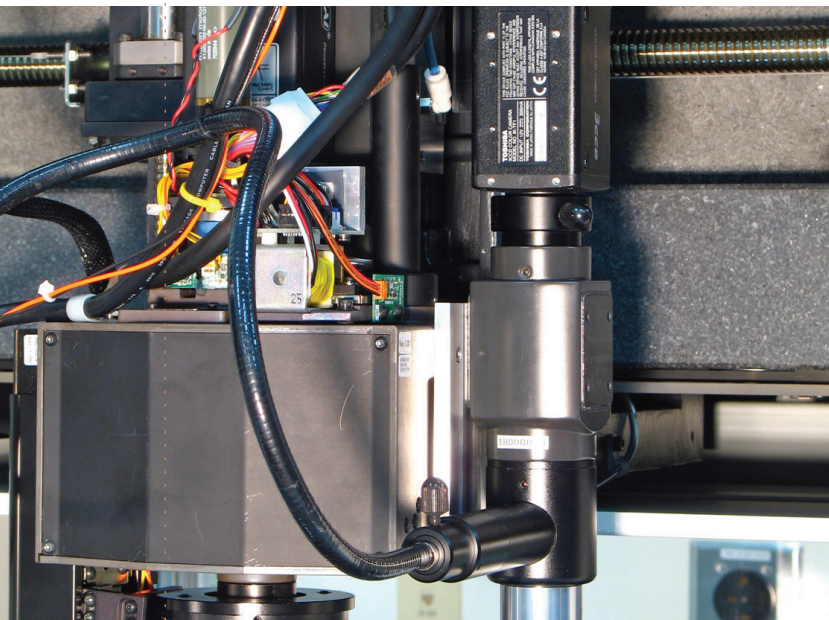
To fully automate inspection of thousands of microscopic holes, of complex shapes and in a specific pattern, using front and back lighting.

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

### RESULT:

**Robust & Automated  
Defect Detection system**



#3

## Near-Line Surface Finish Measurement

**Mitutoyo CNC Formtracer Extreme**

### **CHALLENGE:**

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

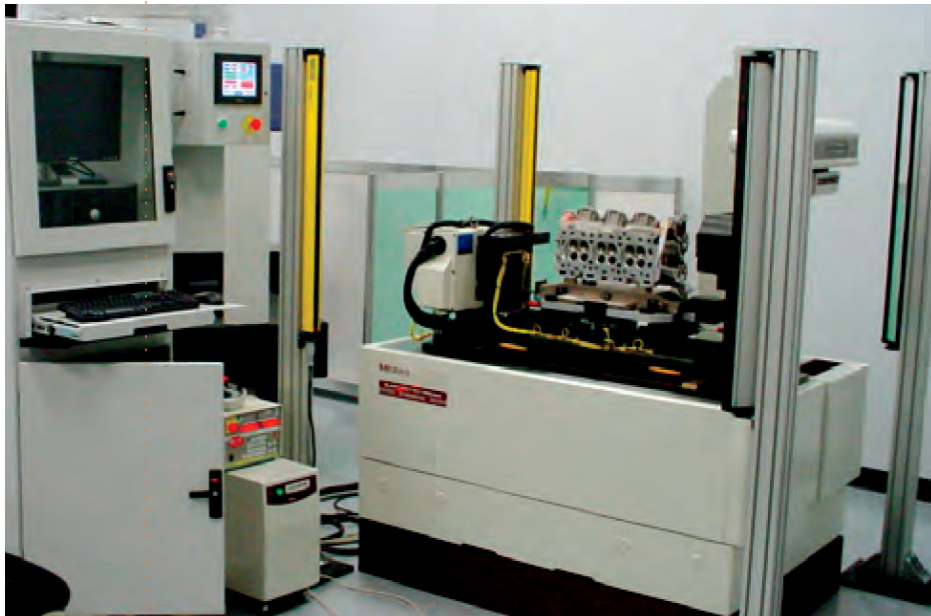
### **SOLUTION:**

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 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 Body, 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**

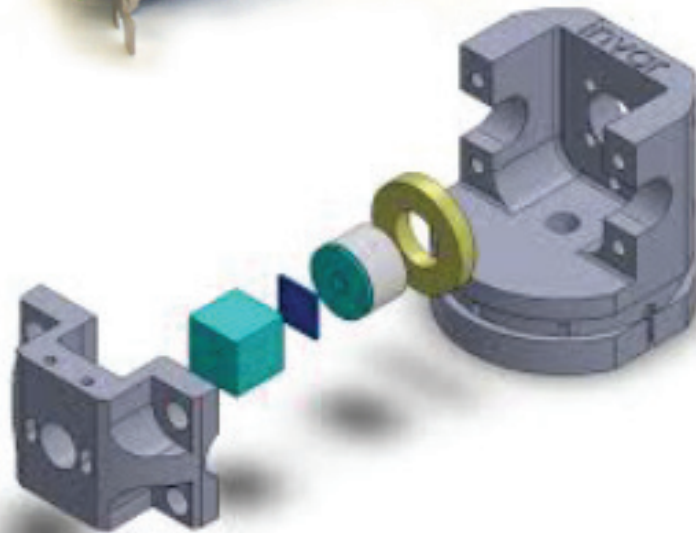
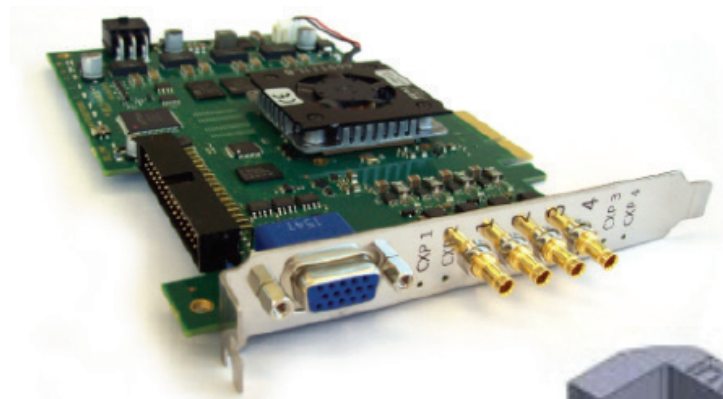
Molds, Bottles, Caps, Housings/Cases, Moldings, Parting Lines, Flash, Draft Angles

### **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, BGA, LGA, Solder Joints



## 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.

Call (888) 648-8869 or visit [Mitutoyo.com/CustomSolutions](https://www.mitutoyo.com/CustomSolutions)

**Note:** All information regarding our products, and in particular the illustrations, drawings, dimensional and performance data contained in this printed matter, as well as other technical data, are to be regarded as approximate average values. We therefore reserve the right to make changes to the corresponding designs. The stated standards, similar technical regulations, descriptions and illustrations of the products were valid at the time of printing. In addition, the latest applicable version of our General Trading Conditions will apply. Only quotations submitted by ourselves may be regarded as definitive. Specifications are subject to change without notice.

Mitutoyo products are subject to US Export Administration Regulations (EAR). Re-export or relocation of our products may require prior approval by an appropriate governing authority.

#### Trademarks and Registrations

Designations used by companies to distinguish their products are often claimed as trademarks. In all instances where Mitutoyo America Corporation is aware of a claim, the product names appear in initial capital or all capital letters. The appropriate companies should be contacted for more complete trademark and registration information.

# Mitutoyo

#### Mitutoyo America Corporation M3 Solution Centers:

Aurora, Illinois (Headquarters)  
Boston, Massachusetts  
Charlotte, North Carolina  
Cincinnati, Ohio  
Detroit, Michigan  
Los Angeles, California  
Birmingham, Alabama  
Seattle, Washington  
Houston, Texas