

# DO MORE WITH SMARTRAY 3D

**3D IS NOW BEING USED MORE AND MORE  
BY MANUFACTURERS FOR:**

- | AUTOMOTIVE
- | ELECTRONICS
- | INDUSTRIAL
- | CONSUMER PRODUCTS

**1ST** | 20 examples of 3D Sensor applications

# **DO YOU KNOW WHAT 3D SENSORS CAN DO FOR YOU?**

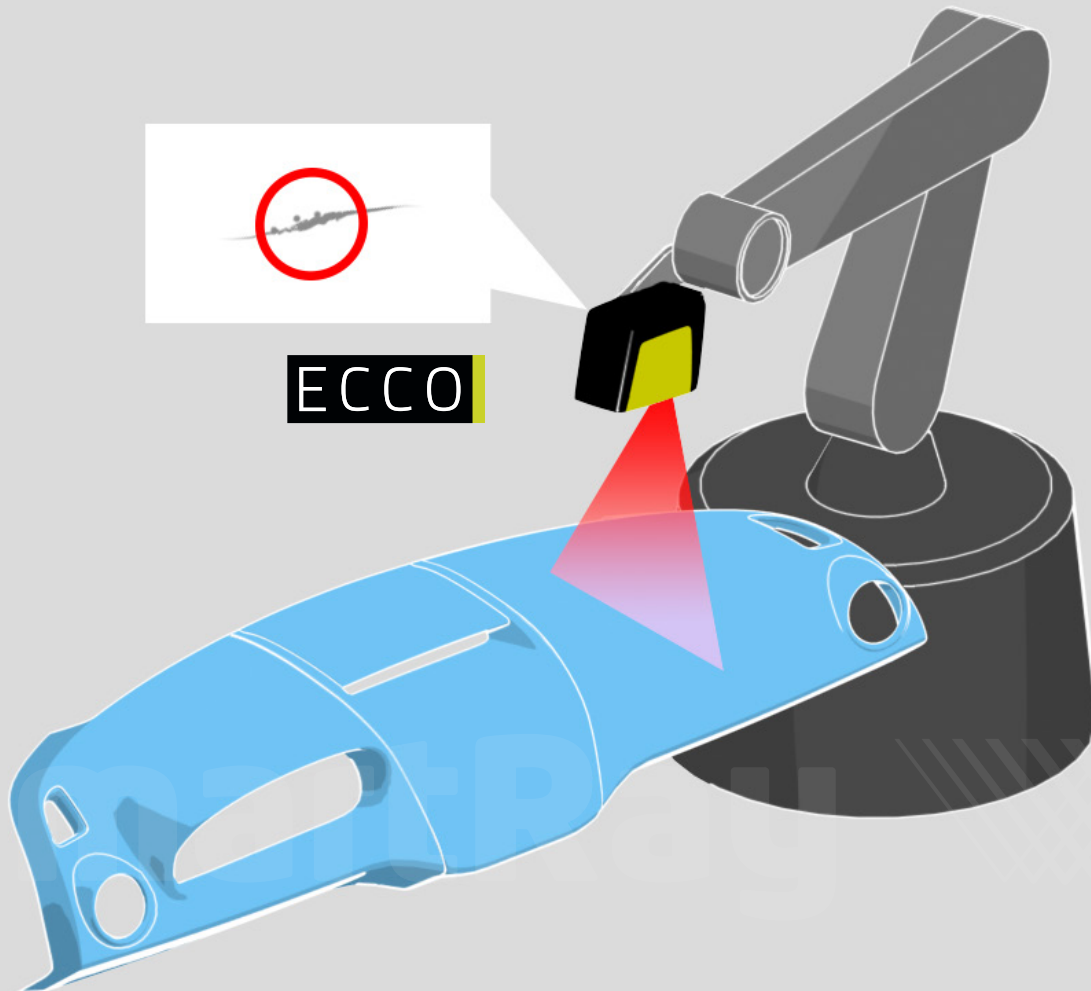
**FIND OUT HOW THESE COMPANIES  
ARE IMPROVING**

**PRODUCT QUALITY  
AND REDUCING  
MANUFACTURING COSTS.**

# AUTOMOTIVE | APPLICATIONS

**The Automotive Industry was one of the first to enjoy the benefits of using 3D for inspection, guidance and measurement.** SmartRay 3D Sensors are now being used to ensure that components, sub-assemblies and complete vehicles meet the industry's stringent quality and reliability requirements. The following examples give just a small insight into the wide range of applications where 3D Sensors are being used and where they are providing major advantages over traditional 2D based vision systems.

# AUTOMOTIVE | INSPECTION



## INTERIOR TRIM – SCRATCH DETECTION

Scratches on the interior trim of new cars are equally unacceptable to both consumers and vehicle manufacturers. SmartRay 3D identifies and quantifies scratches and other surface damage on both plastic and metal interior trim components.

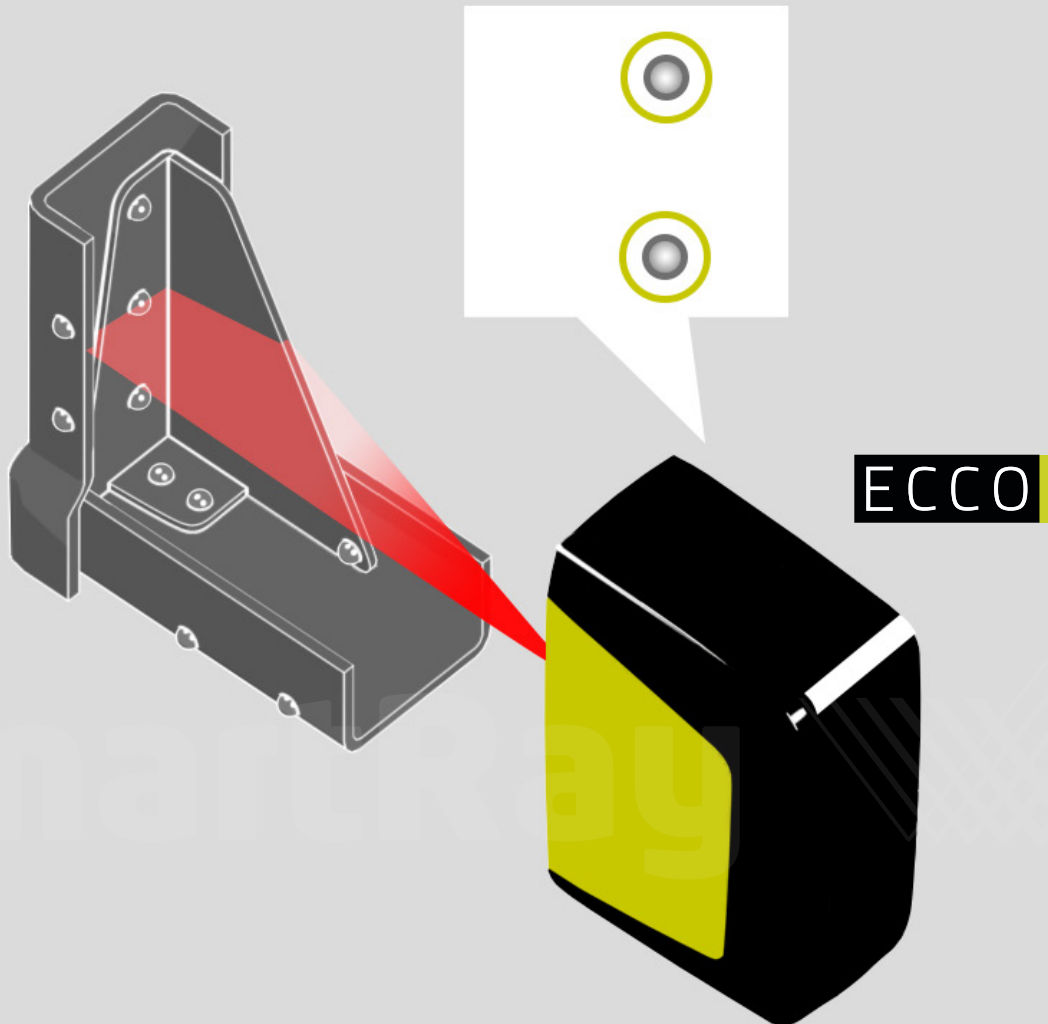
### Why SmartRay 3D?

- Checks length, width and volume of scratches
- Inspects complex shaped surfaces for defects
- Good images irrespective of surface colour and finish

### 3D Solution Benefits

- Quantative evaluation and results archiving
- Improved product quality
- Replaces subjective manual inspection

# AUTOMOTIVE | INSPECTION



## TRUCK FRAME – RIVET INSERTION

Joining sheet metal parts together with rivets forms a very strong assembly, but only if the rivets are correctly inserted and well formed. SmartRay 3D inspects the shape, height and profile of the rivet heads in a single inspection operation.

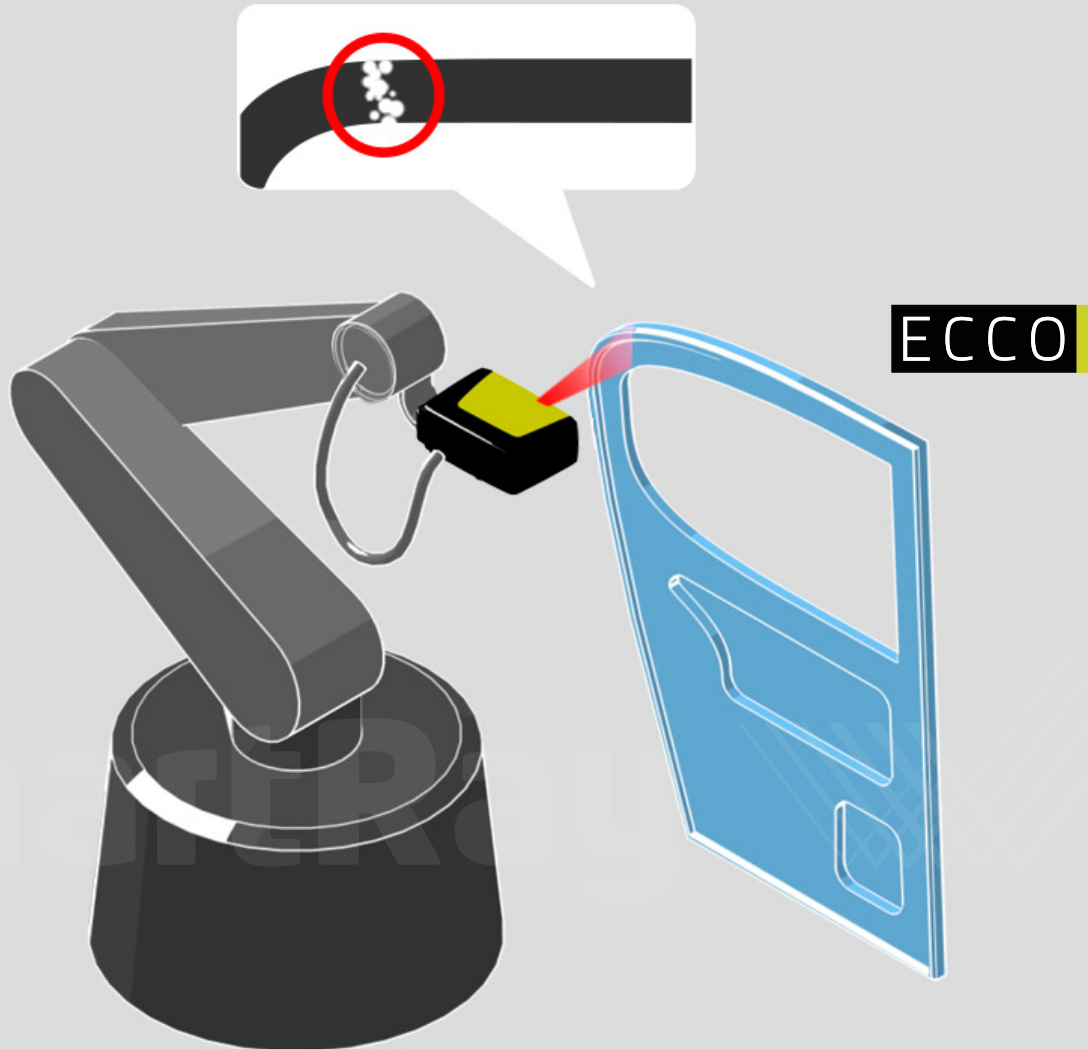
### Why SmartRay 3D?

- Inspects both presence and quality of riveting
- Light weight, compact 3D sensor
- Pre calibration required

### 3D Solution Benefits

- Improved product reliability
- Rapid system deployment
- Highly cost effective solution

# AUTOMOTIVE | GUIDANCE



## DOOR – WELD SEAM

The crashworthiness of any vehicle is dependent on high quality, consistent welding. SmartRay „WeldVision“ 3D solutions have been developed over many years to deliver high precision geometric inspection and defect detection of complex welded assemblies.

### Why SmartRay 3D?

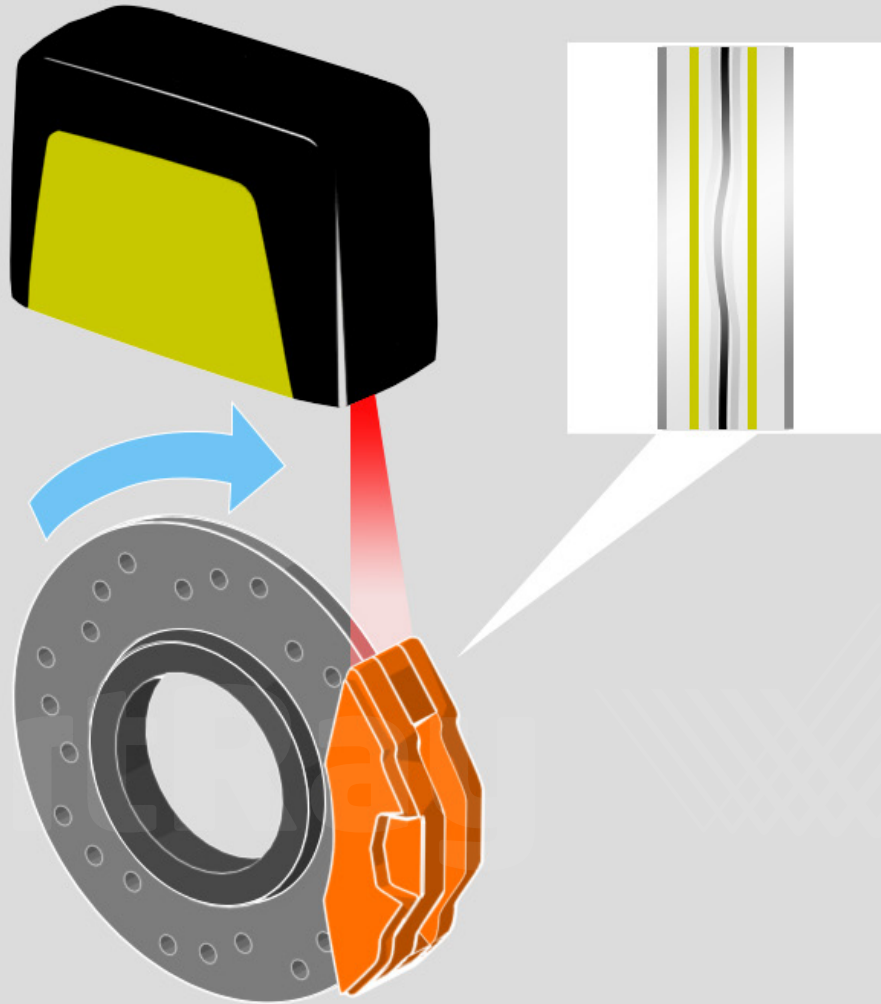
- Inspects for wide range of welding defects
- Dynamic real-time robot guidance
- Complete analysis of each category of defect

### 3D Solution Benefits

- Improved control of welding process
- Repeatable weld integrity
- Rapid teaching of new parts and inspection criteria

# AUTOMOTIVE | MEASUREMENT

ECCO



## DISK BRAKE – ALIGNMENT

To minimise brake wear, the alignment and position of the brake pads relative to the disk is critical. SmartRay 3D helps ensure that every brake pad is accurately assembled and correctly aligned in 3 dimensions, relative to the brake cylinder and disk.

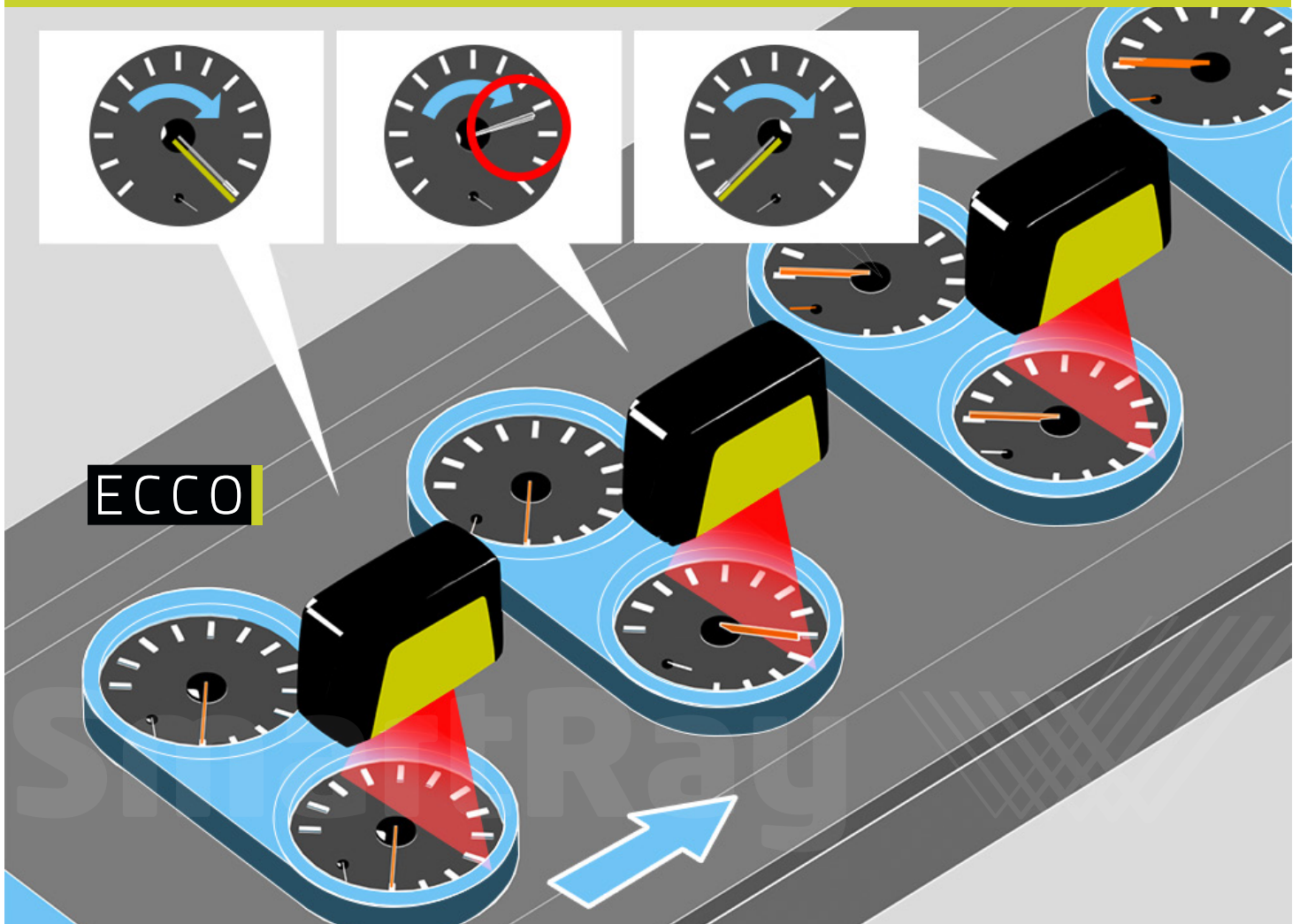
### Why SmartRay 3D?

- Checks alignment and excentricity of disk
- Full 3D measurement and visualisation
- Cost effective process improvement solution

### 3D Solution Benefits

- Improved product consistency
- Improves brake pad life and reduces wear
- Reduces warranty claims

# AUTOMOTIVE | MEASUREMENT



## INSTRUMENT PANEL – COPLANARITY AND ANGLE

Vehicle instrument panels are complex and detailed assemblies that must perform reliably and have an outstanding appearance. SmartRay 3D sensors check that instrument needles remain at the same height and parallel to the dial surfaces at all angles of operation.

### Why SmartRay 3D?

- All inspections carried out during instrument test process
- No calibration or additional lighting required
- Provides corrective feedback for final adjustments

### 3D Solution Benefits

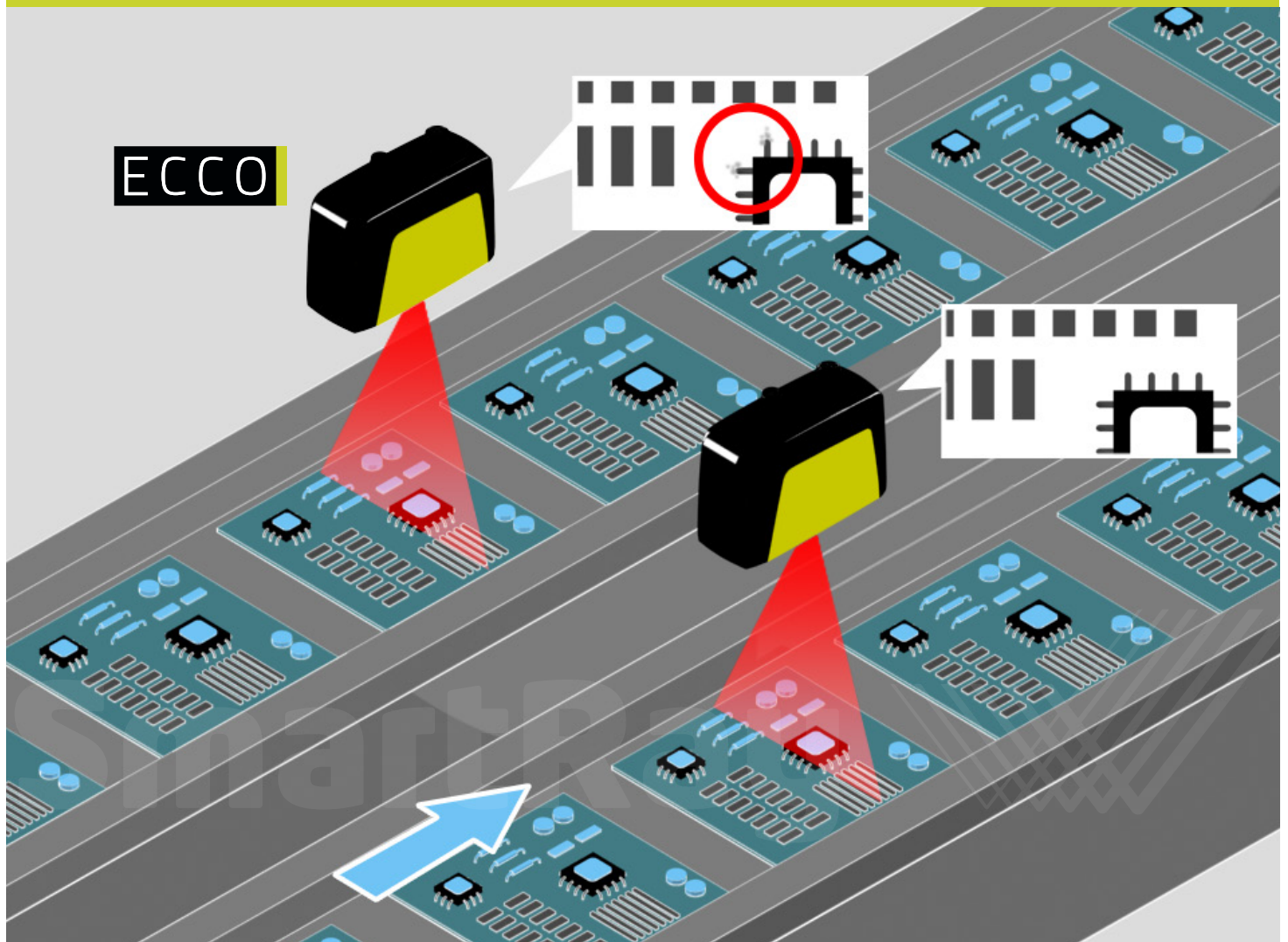
- Improved accuracy of instrument readings
- Enhanced appearance of instrument display
- Closed loop control of instrument manufacture



# ELECTRONICS | APPLICATIONS

**The Electronics Industry clearly understands how 3D can help improve product quality, reduce manufacturing costs and enable advanced automation.** The following examples show how SmartRay 3D Sensors provide the ideal solution for all kinds of inspection, guidance and measurement applications within the electronics industry. All of these applications benefit from the pre-calibration, integrated optics, built in laser lighting and high accuracy advantages of 3D Sensors over 2D vision systems.

# ELECTRONICS | INSPECTION



## PCB – COMPONENT ORIENTATION

With any PCB it is critical that every component is correctly oriented, is in the right position relative to the solder pads and is seated correctly on the board. SmartRay 3D carries out a complete check of the board and all components both before and after soldering.

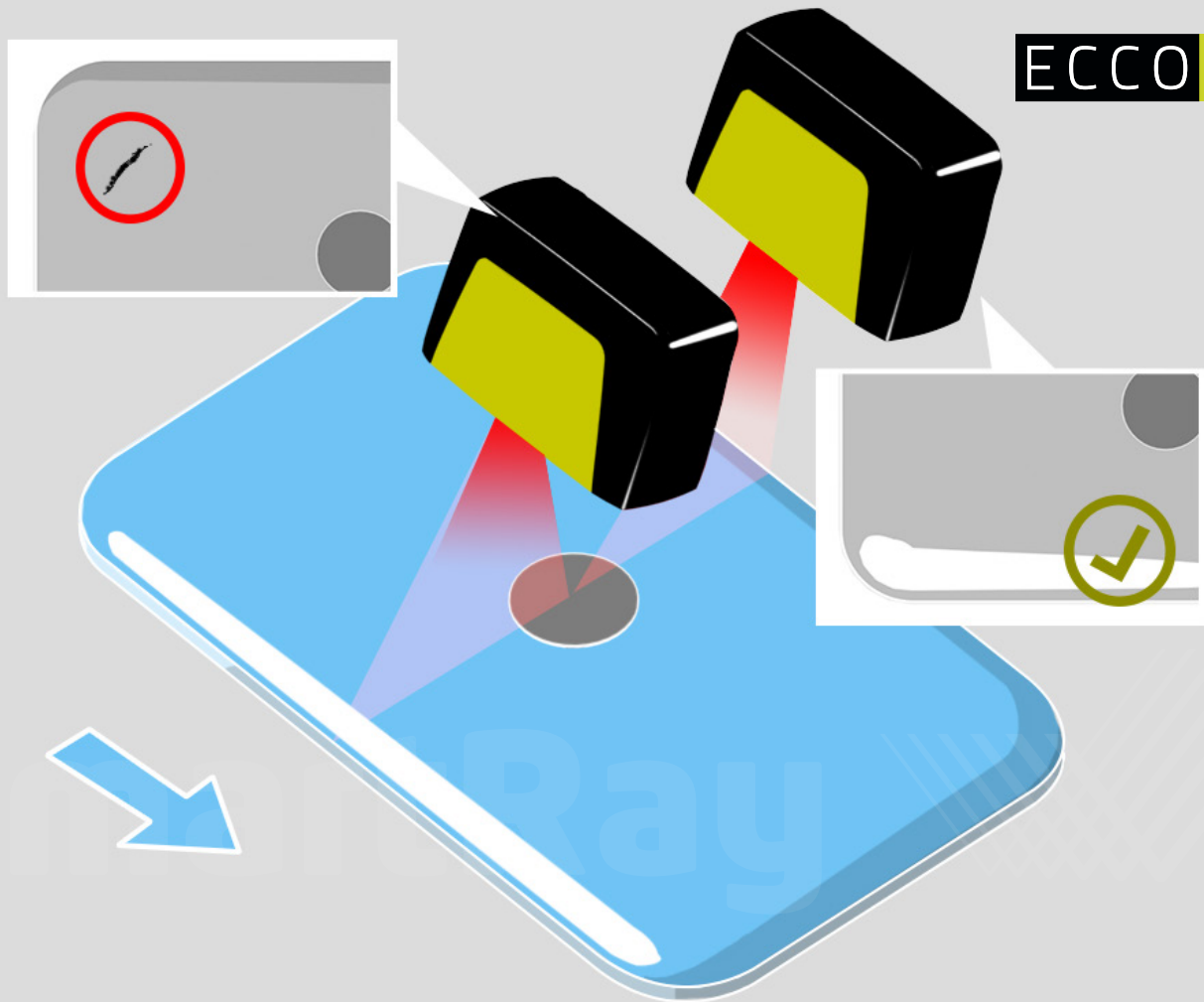
### Why SmartRay 3D?

- Checks parts are correctly positioned prior to soldering
- Checks parts are correctly positioned after soldering
- Helps identify incomplete soldering

### 3D Solution Benefits

- The key to “right-first-time” manufacturing
- Improves yields and reduces scrap rates
- Achieves the quality levels demanded by customers

# ELECTRONICS | INSPECTION



## TABLET COMPUTER – SURFACE FINISH

Customer expectations for the quality of tablets is very high. SmartRay 3D helps maintain exceptional quality levels by inspecting the surface finish of both the front glass of the tablet and the rear case, for surface defects and other surface defects.

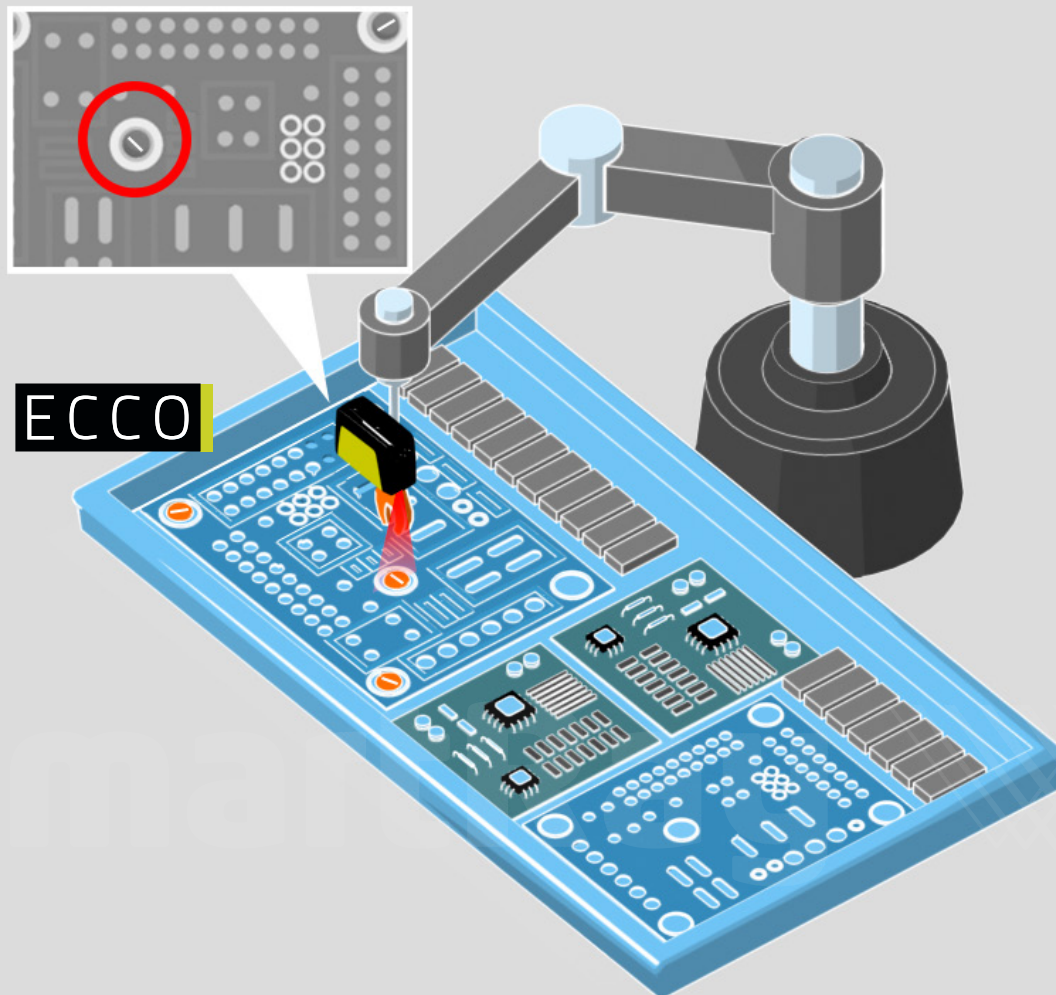
### Why SmartRay 3D?

- Quantifies surface defects and other surface defects
- Inspects metal, plastic and glass reflective surfaces
- High resolution and speed to detect the smallest defects

### 3D Solution Benefits

- Achieve the highest levels of product finish quality
- Ensure surfaces are defect free before packaging
- Eliminates subjective manual inspection operations

# ELECTRONICS | GUIDANCE



## TELEVISION – AUTOMATED ASSEMBLY

Using robots to assemble high volume products like TVs and Radios has helped drive manufacturing cost reductions. However, for some assembly operations robots need to be guided by SmartRay 3D sensors to ensure all parts are correctly inserted and positioned.

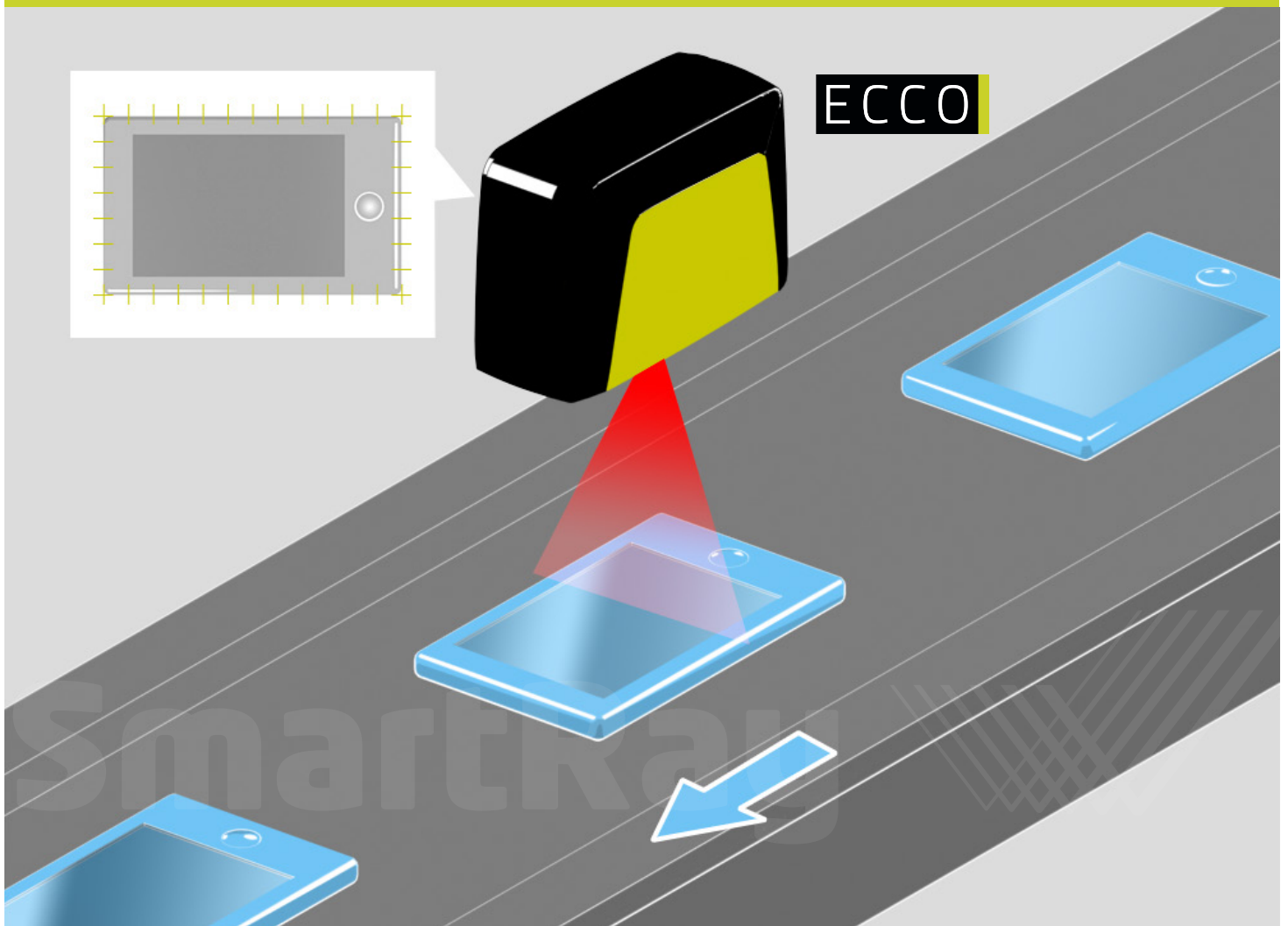
### Why SmartRay 3D?

- Ensures parts are assembled to correct position and height
- Guides robot path in 3D for inserting key components
- Compact 3D sensor built into robot gripper

### 3D Solution Benefits

- Ensures correct and accurate assembly
- Maximises product consistency and quality
- Replaces complex manual assembly processes

# ELECTRONICS | MEASUREMENT



## SMART PHONE – CASE ASSEMBLY

Smart phones are made to such exacting standards that automatic inspection of every stage of the manufacturing process is critical. SmartRay sensors measure critical gaps and the 3D alignment of key components at each step of the phone assembly process.

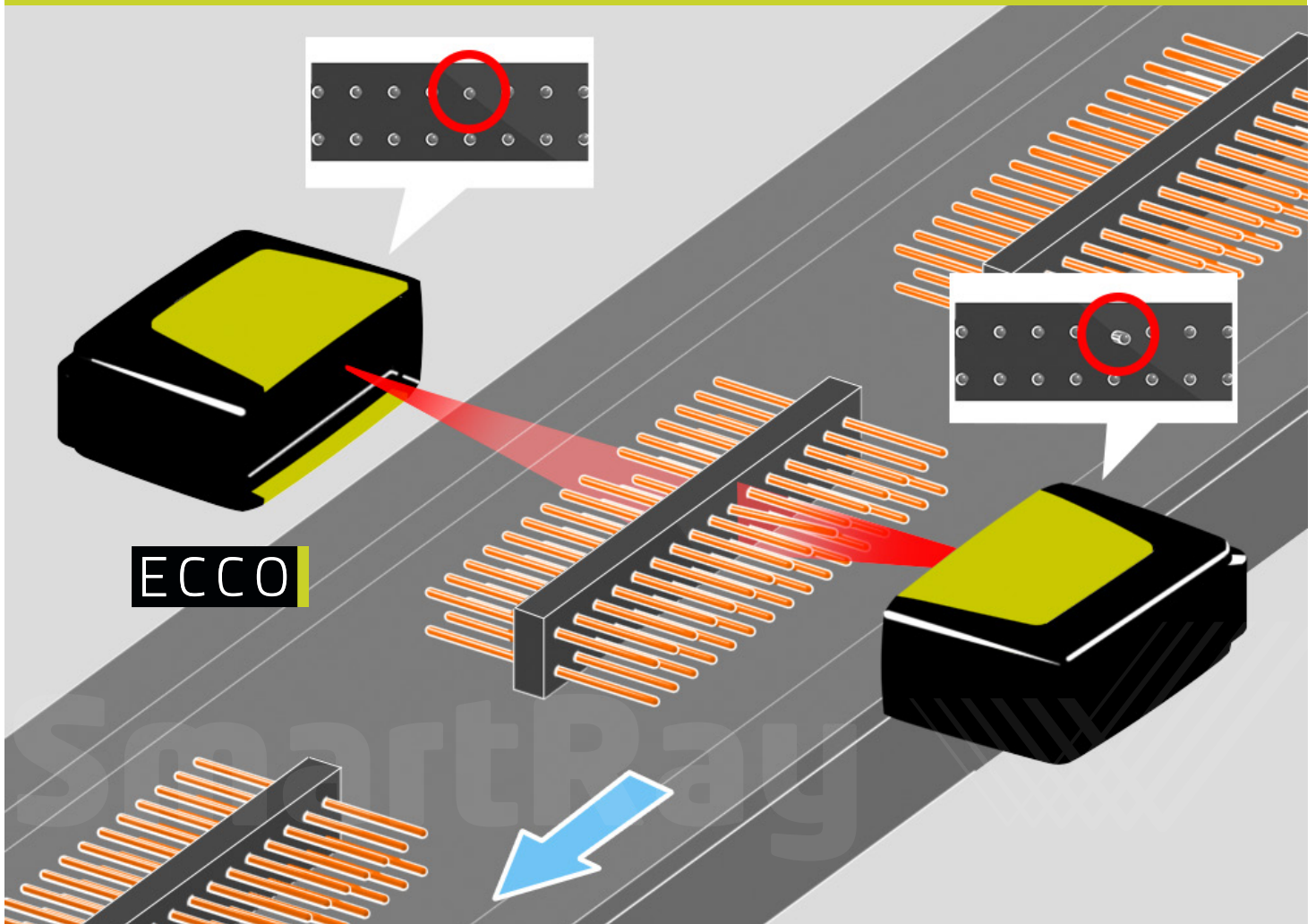
### Why SmartRay 3D?

- High precision gauging in all directions
- Measures part alignment and relative heights
- Compact 3D sensors can be fitted easily into production line

### 3D Solution Benefits

- Ensures correct assembly at every production stage
- Provides corrective feedback to production line
- Modular sensor solutions for flexible manufacturing

# ELECTRONICS | MEASUREMENT



## CONNECTOR – PIN ARRAY COPLANARITY

With multi-pin connectors, it is essential that all pins are completely aligned and accurately spaced so that they can be automatically inserted into any PCB. SmartRay 3D checks pin position, height and spacing, and also identifies broken, bent or missing pins.

### Why SmartRay 3D?

- Measures pin spacing, position, height and angle.
- Identifies missing, damaged or broken pins
- Fast processing for the high speed production lines

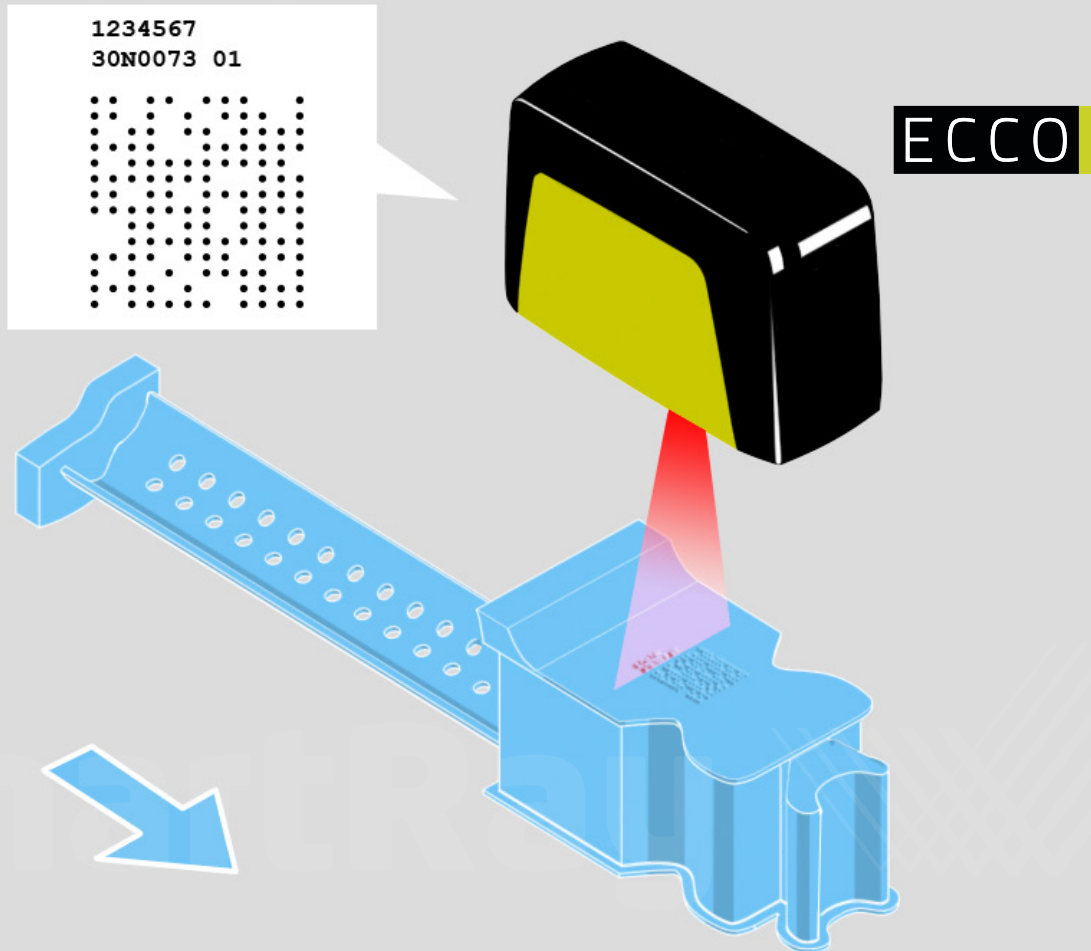
### 3D Solution Benefits

- Confirms that all connectors meet product specification
- Avoids faulty connectors being shipped to customers
- Provides total control of the manufacturing process

# INDUSTRIAL | APPLICATIONS

**The manufacture of virtually every Industrial Product can be enhanced with the application of 3D Sensors to improve product quality, optimise the manufacturing process and reduce production costs.** SmartRay 3D Sensors are already being used in a wider range of applications, by more companies than ever before. Due to their compact size and light weight, they are easy to fit on any production line. Being pre-calibrated and available in a large range of models they are simple to deploy and highly cost effective.

# INDUSTRIAL | INSPECTION



## TURBINE BLADES – READING 2D DOT PEEN CODES

Dot peen code marking is used on many jet engine components so they can be uniquely identified throughout their lifecycle. SmartRay 3D sensors obtain clear, consistent images of these 2D codes irrespective of the surface finish or temperature effects on the turbine blades.

### Why SmartRay 3D?

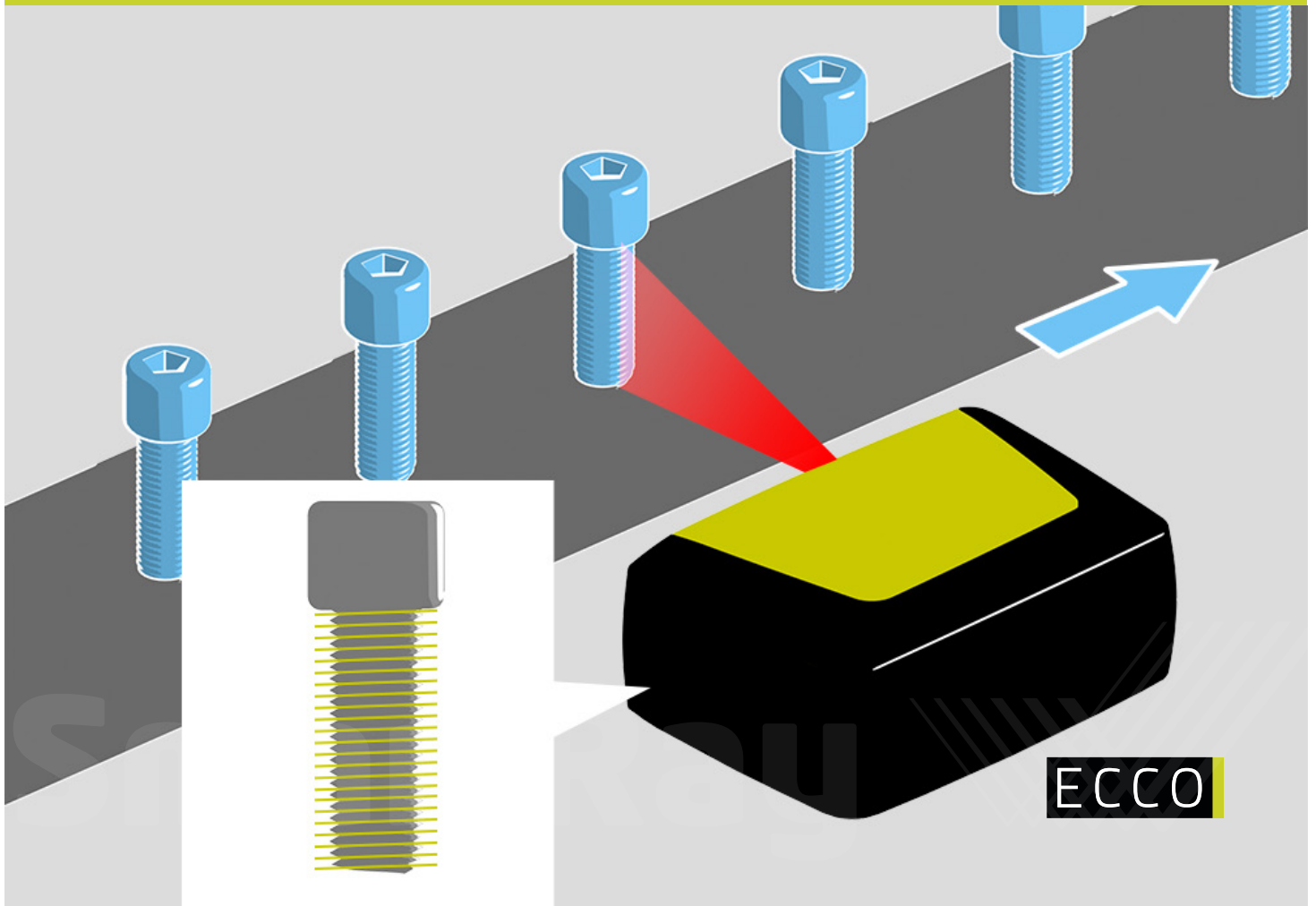
- Clear image of codes from low contrast surfaces
- No special or additional illumination is needed
- Feeds images directly to code reading software

### 3D Solution Benefits

- Reliable code reading over lifetime of blade
- Unaffected by changes in blade appearance
- Low cost 3D sensor solution



# INDUSTRIAL | INSPECTION



## BOLT – THREAD INSPECTION

Bolts are relatively low cost components, but if a bolt with a damaged or incorrect thread is screwed into a complex metal casting it can cause an expensive problem. SmartRay 3D sensors inspect threads for thread profile, damage and diameter in a single operation.

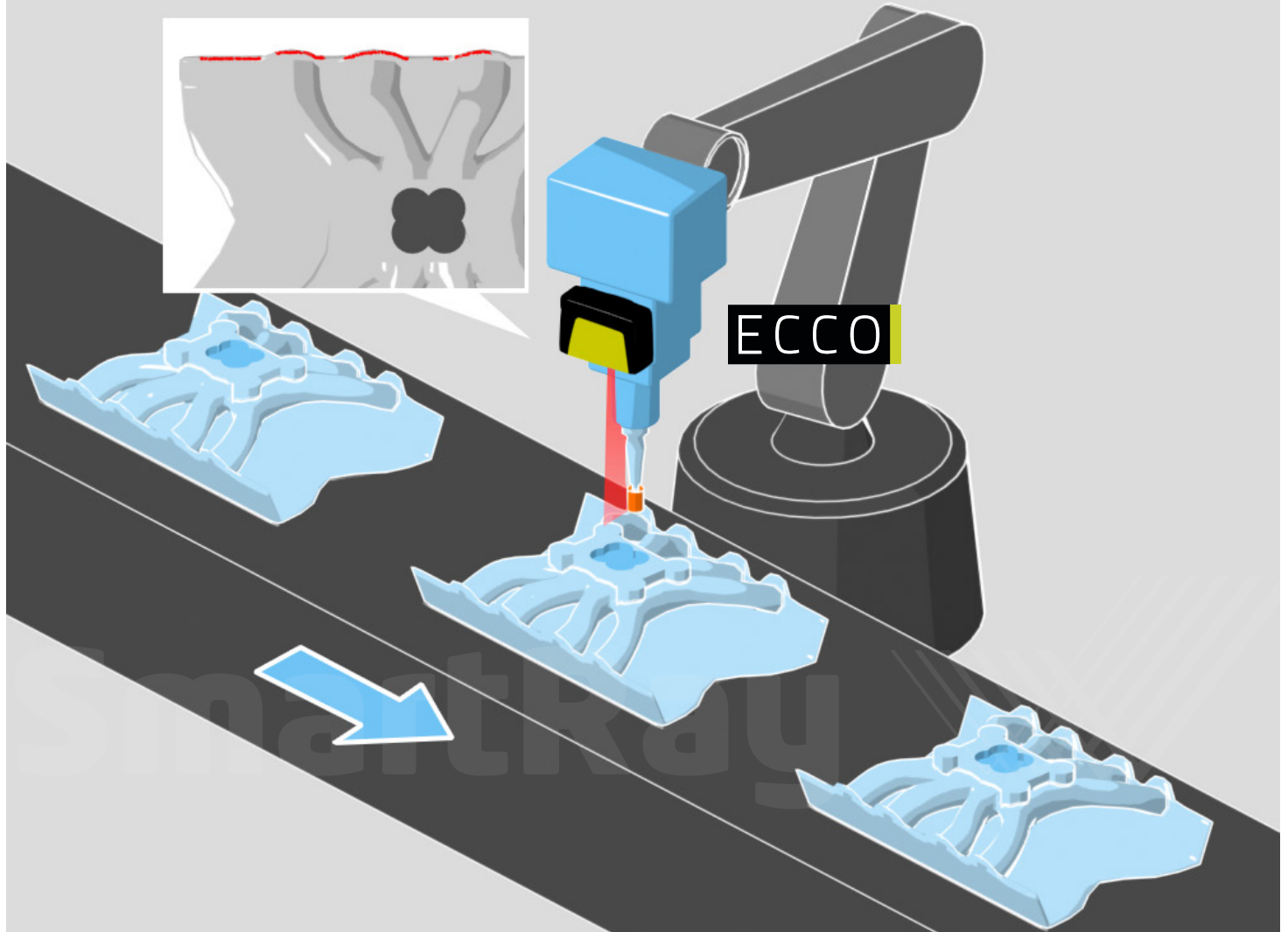
### Why SmartRay 3D?

- Detects incorrect and damaged threads
- Inspects thread size and profile
- Checks overall length of bolt

### 3D Solution Benefits

- Removes faulty bolts from production process
- Prevents damage and issues with assembled products
- Highly cost effective inspection solution

# INDUSTRIAL | GUIDANCE



## CASTING – DEBURRING TOOL CONTROL

There are inevitable variations in the shape and size of burrs on aluminium castings. A deburring robot fitted with a SmartRay 3D sensor automatically identifies the burrs to be removed and is guided to remove just the right amount of material.

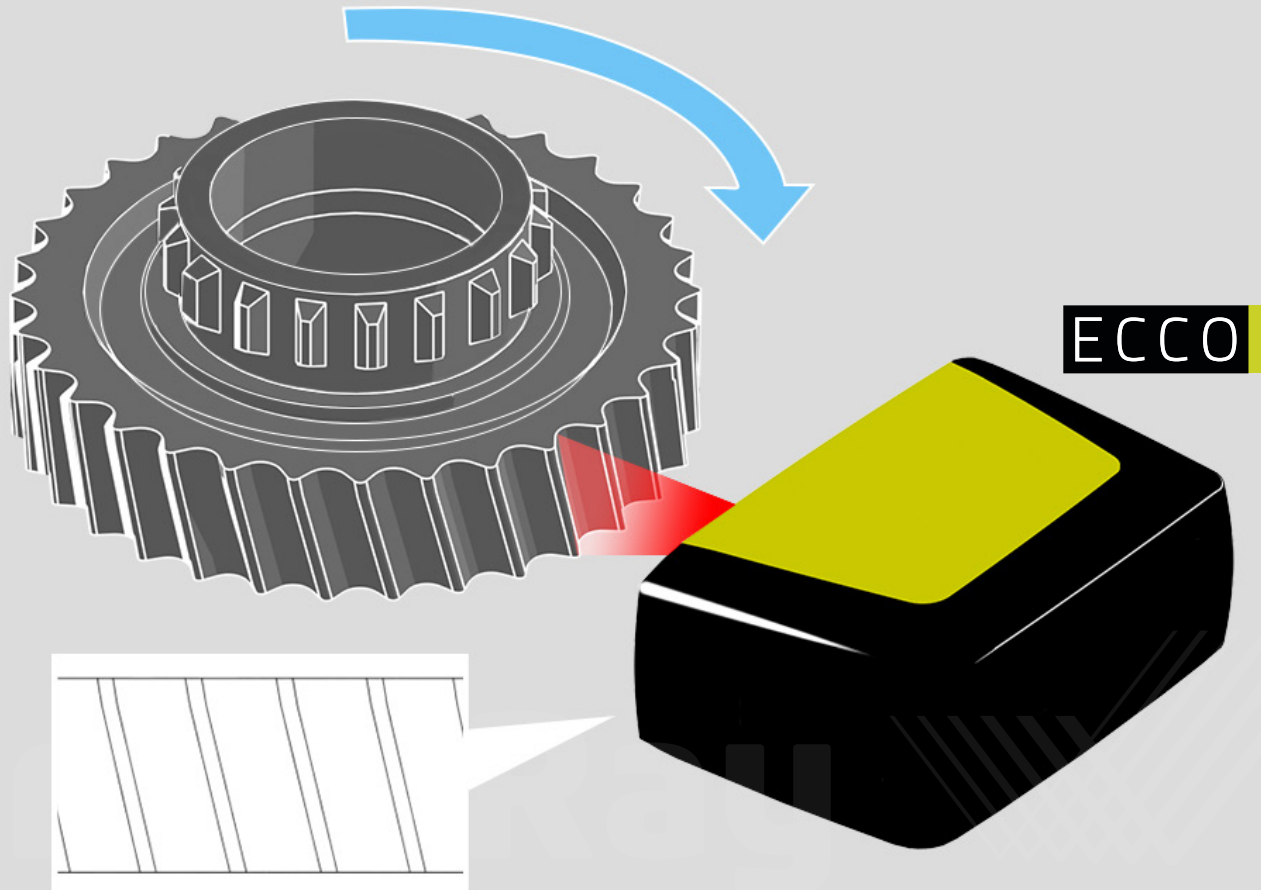
### Why SmartRay 3D?

- Precise measurement of burrs requiring removal
- Guides robot deburring path
- Inspects casting after deburring process

### 3D Solution Benefits

- Fully automated deburring process
- Compensates for variations in size of burrs
- Eliminates unpleasant manual process

# INDUSTRIAL | MEASUREMENT

**ECCO**

## GEAR WHEEL – TOOTH MEASUREMENT

Precision gear wheels used in high performance gearboxes have to be manufactured to very tight tolerances to ensure they operate smoothly and reliably. SmartRay 3D sensors provide the ideal solution for measuring the height and shape of complex gear teeth profiles.

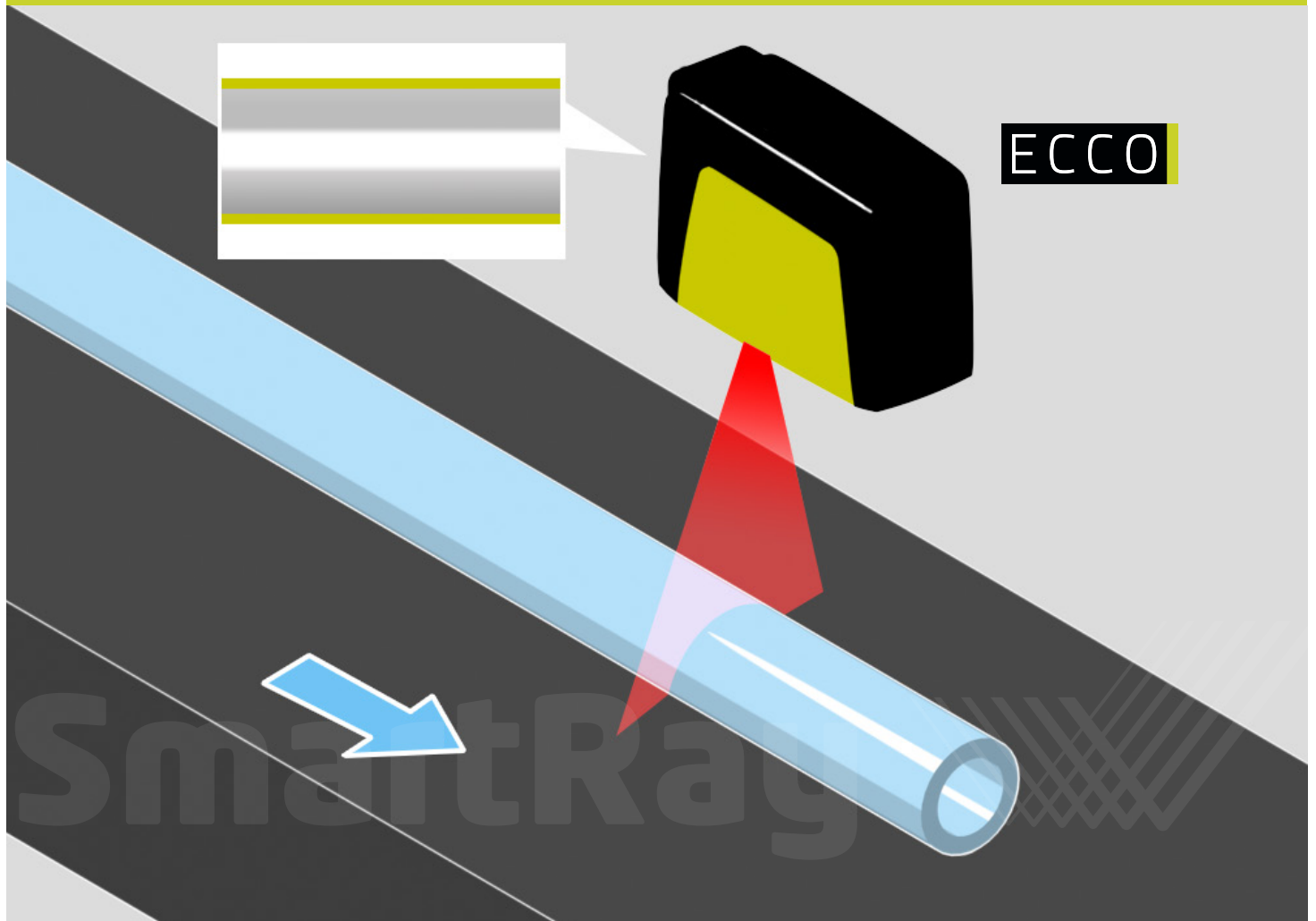
### Why SmartRay 3D?

- 360 degree measurement of the entire gear wheel
- High precision measurement of individual gear teeth
- Unaffected by machined surface finish

### 3D Solution Benefits

- Rigorous quality control of machining process
- Ensures all dimensions fall within tolerances
- Flexible solution for inspecting range of gears

# INDUSTRIAL | MEASUREMENT



## PIPE – STRAIGHTNESS

Stainless steel pipes used in high flow-rate process industries must be manufactured with a controlled level of straightness to avoid unnecessary flow turbulence when in use. SmartRay 3D measures the straightness of long lengths of pipe in all dimensions simultaneously.

### Why SmartRay 3D?

- High precision measurement over entire length of pipe
- Determines straightness of pipe in all directions
- Reflective surfaces do not effect measurement accuracy

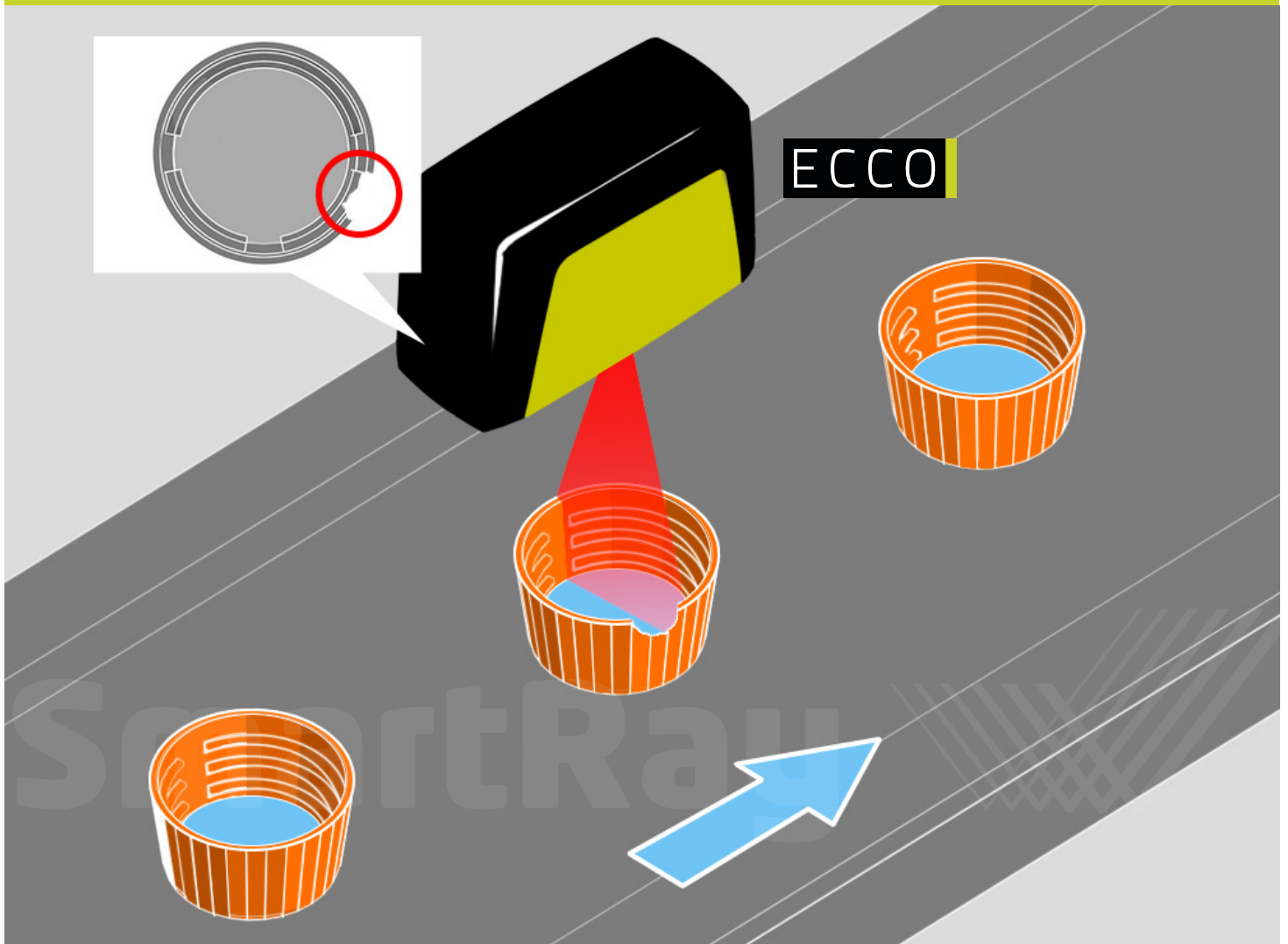
### 3D Solution Benefits

- Single sensor measures pipe straightness in all axis
- Rapid, high accuracy scanning process
- Non-contact measurement technique

# CONSUMER | APPLICATIONS

**Consumer Products are produced in higher volumes than in any other industry.** Achieving high quality levels, consistent appearance and reliable operation of these products is vital for maintaining customer satisfaction and growing market share. SmartRay 3D Sensors help an ever increasing range of Consumer Product manufacturers improve their manufacturing operations by inspecting their products, measuring critical dimensions and guiding advanced automation that reduces production costs.

# CONSUMER | INSPECTION



## WATER BOTTLE – CAP SHORT SHOT

An incomplete plastic moulded bottle cap can result in a failed seal and leakage from the bottle after manufacture. To avoid negative feedback from retailers and consumers, SmartRay 3D detects incomplete mouldings to ensure faulty parts never reach the filling line.

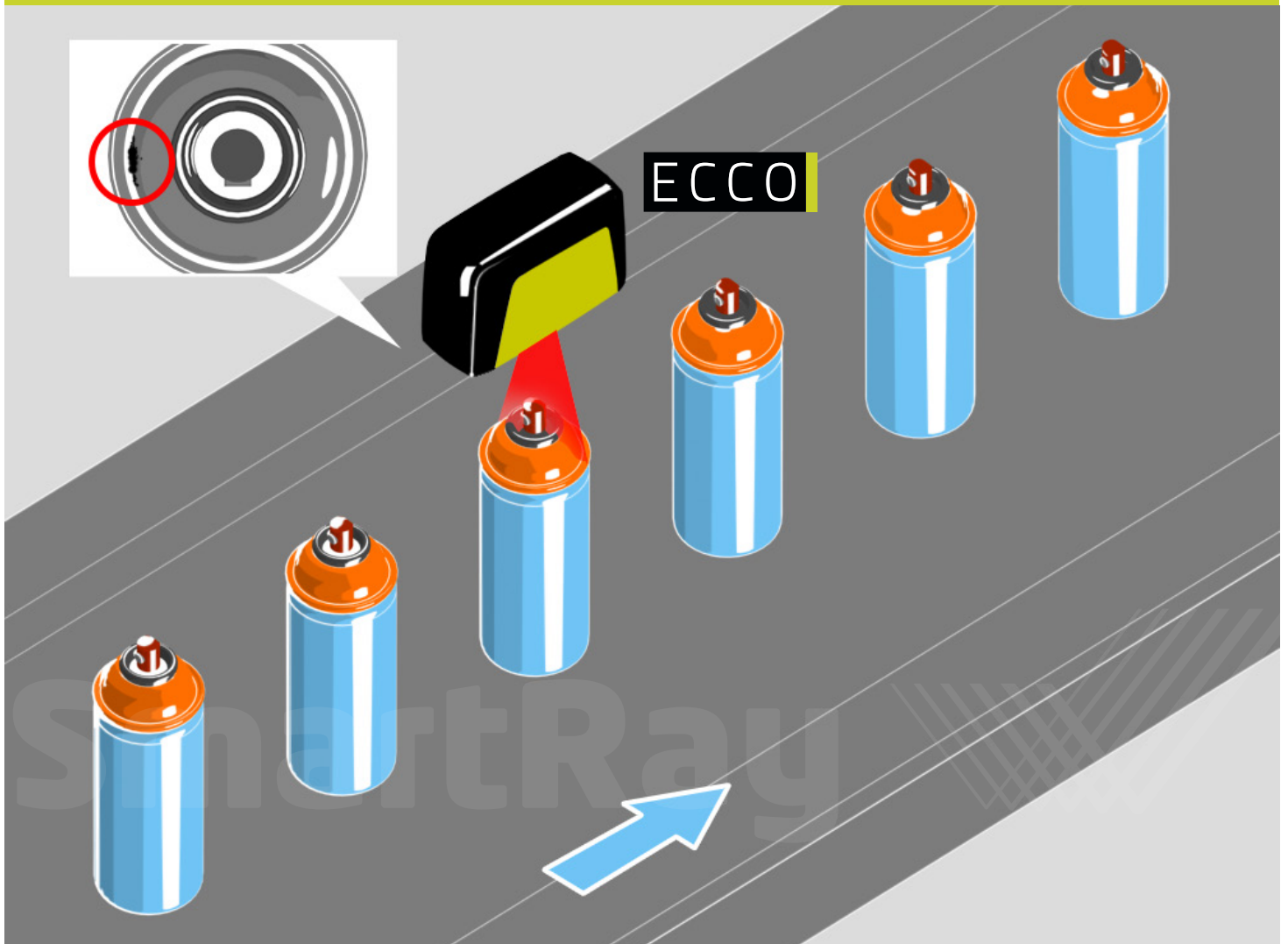
### Why SmartRay 3D?

- Checks the entire perimeter of the cap
- Operates reliably with any colour of bottle cap
- Cost effective inspection solution

### 3D Solution Benefits

- Prevents bottle leaks after filling and capping
- Improves production efficiency
- 3D sensor can be fitted to existing production line

# CONSUMER | INSPECTION



## AEROSOL CAN – DAMAGE AFTER FILLING

If the top of an aerosol can is damaged during the filling process there is a danger of leakage and it may be impossible to fit the cap to the can. SmartRay 3D is able to check the shape and profile of the top of the can to detect any damage that may have occurred.

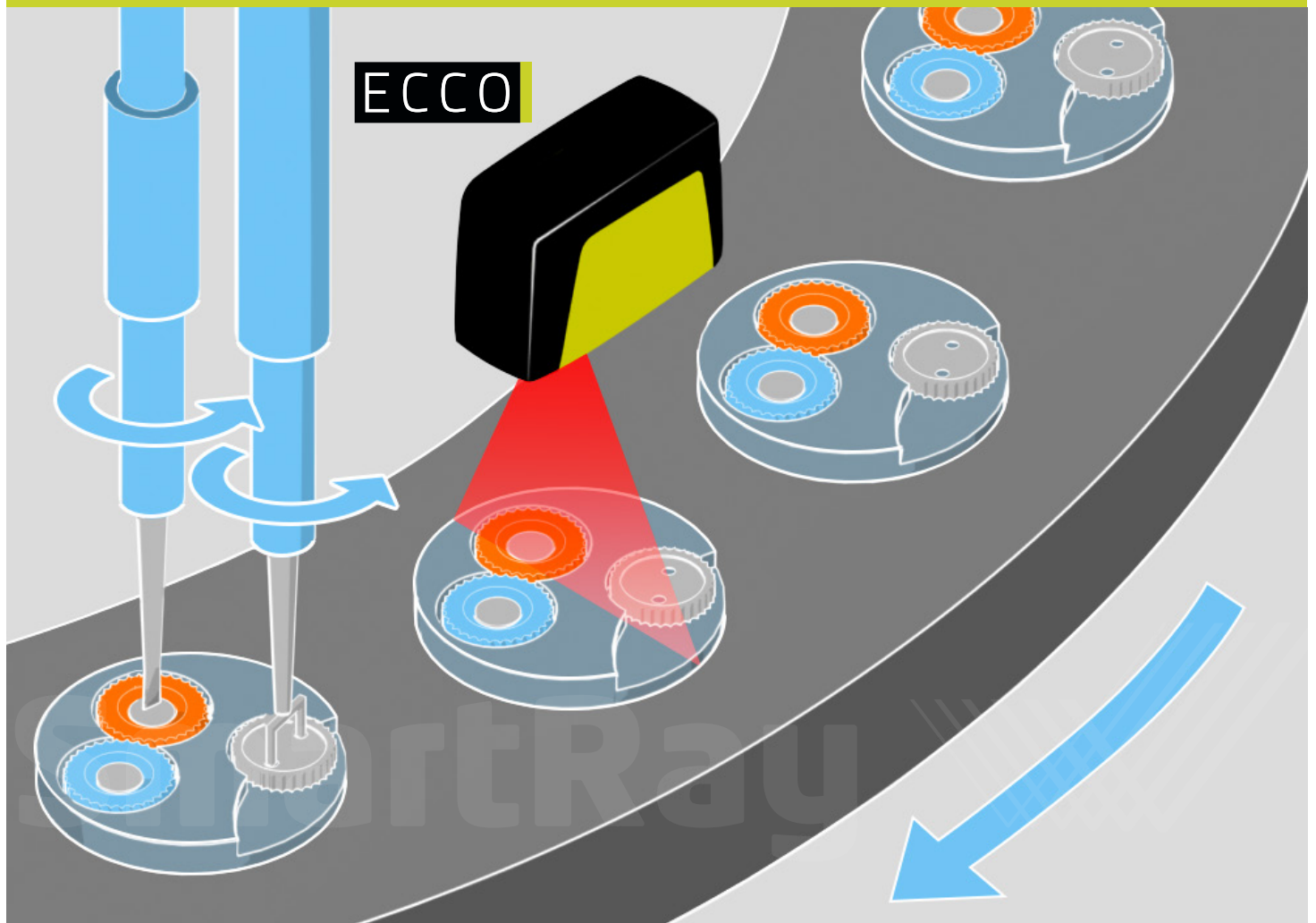
### Why SmartRay 3D?

- Identifies damage to the top of the can
- Detects distortion and unexpected height variations
- IP65 rated 3D sensor housing

### 3D Solution Benefits

- Minimises risk of leakage
- Makes sure that cap will fit to can correctly
- Ensures can will operate correctly after purchases

# CONSUMER | GUIDANCE



## WATCH – MECHANICAL CALIBRATION

Mechanical watches require careful assembly of delicate components and precise calibration of the final product to ensure accurate time keeping. SmartRay 3D inspects the position of key components in all dimensions and guides the mechanisms that control the calibration.

### Why SmartRay 3D?

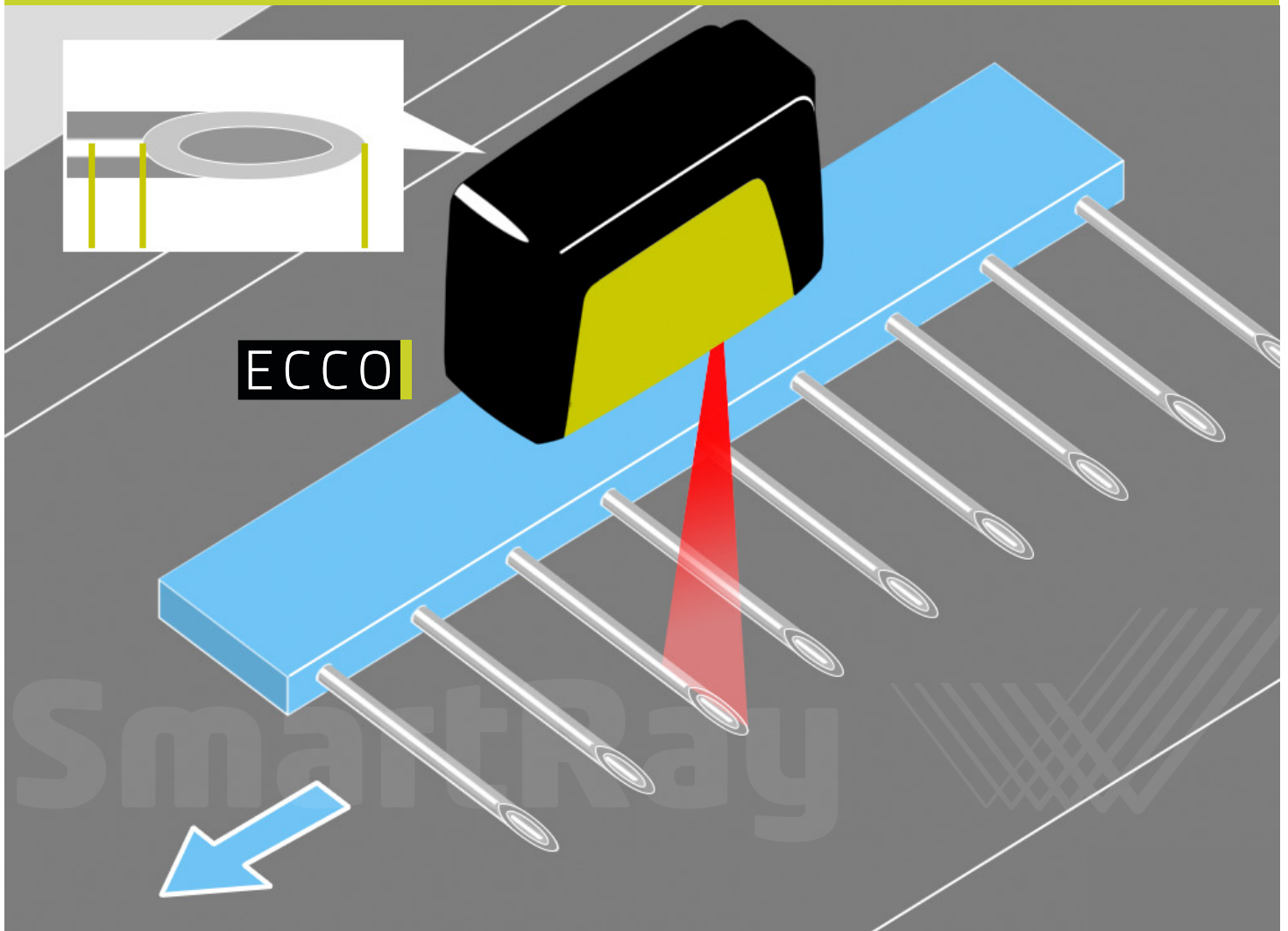
- Accurate 3D positioning of miniature components
- Precision guidance for mechanical adjustment
- Compact 3D sensors that can fit in small space

### 3D Solution Benefits

- Guidance and inspection for assembly automation
- Complements existing production processes
- Improved time keeping and product reliability



# CONSUMER | MEASUREMENT



## SYRINGE NEEDLE – SHAPE AND DIMENSIONS

To satisfy the world market for medical treatments, syringe needles are manufactured at high speed in very large volumes. To ensure that each and every needle tip is sharp and correctly formed SmartRay 3D sensors measure their shape and dimensions on the production line.

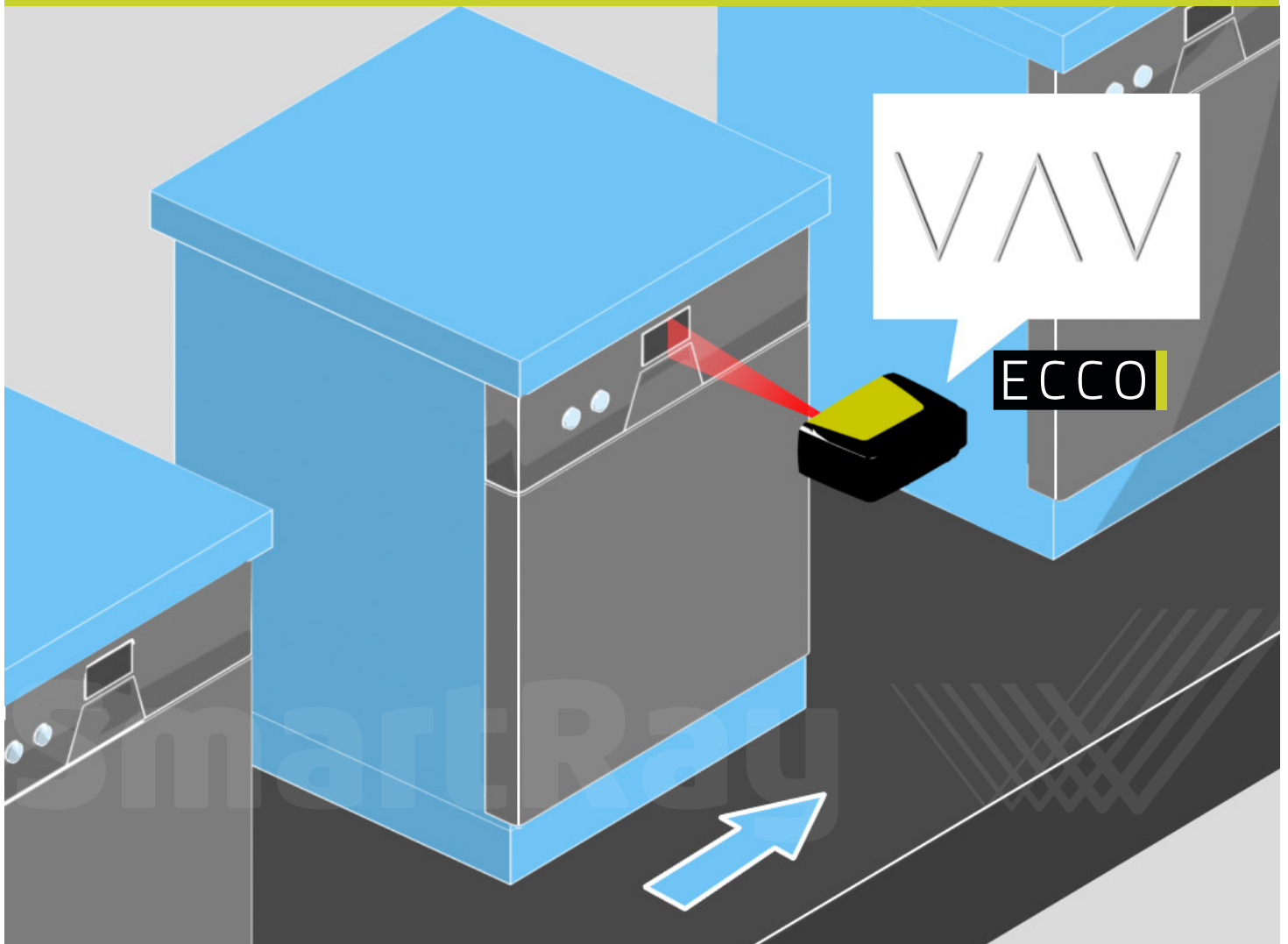
### Why SmartRay 3D?

- High speed, high-accuracy measurement of needle tip
- Detects damaged or deformed needle tips
- Non-contact inspection and quality control solution

### 3D Solution Benefits

- Meets demanding pharmaceutical standards
- Delivers consistent, high quality product
- Enhances reputation in medical profession

# CONSUMER | MEASUREMENT



## DISH WASHER – LASER ENGRAVING

Modern white good brands are differentiating themselves with curved shapes instead of the traditional white boxes. Inspecting logos created by laser engraving on curved surfaces is impossible with 2D vision systems. SmartRay 3D sensors check the engraving shape and depth.

### Why SmartRay 3D?

- Accurate measurement of engraving depth and shape
- Unaffected by complex curved surfaces
- Pre-calibrated sensor for rapid deployment

### 3D Solution Benefits

- Rapid feedback to laser marking system
- Low cost, off the shelf sensing solution
- High quality product finish

## **FOR MORE INFORMATION PLEASE CONTACT US:**

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