



Vision Inspection for Tablet & Capsule

Next Generation
PLANET 6GP

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Tablet and Capsule Vision Inspection

Tablet and Capsule Capability
Free Shape Tablet Application
Time Saving New Product Setup
Rapid Changeover
cGMP Design

Enclony Produces

Tablet and capsule inspection machines,
Empty hard capsule inspection machines and
Tablet UV Laser printing with inspection machines.

Enclony is committed to continuous research and development of equipment that contributes to world-class product at pharmaceutical manufacturing facilities.



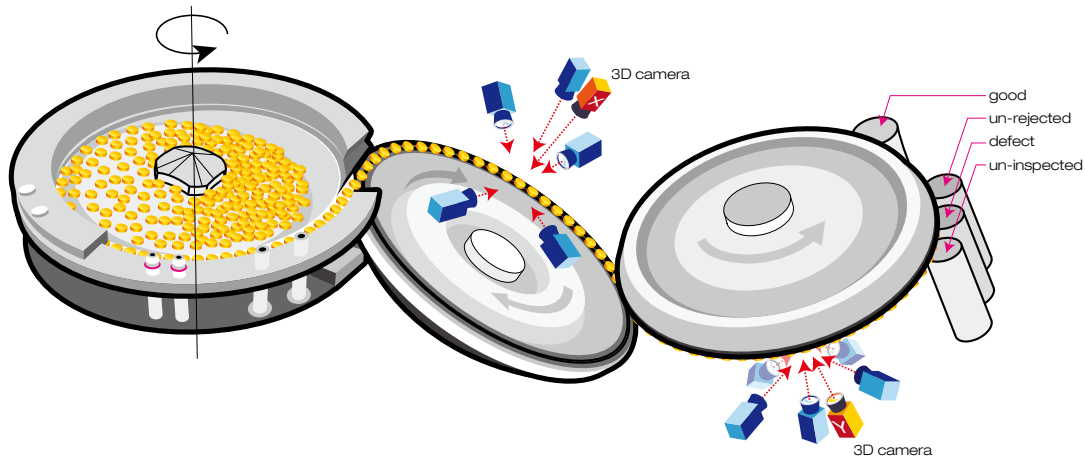
Planet 6GP

PLANET 6G series

-  **PLANET 6G/T** for **T**ablet
-  **PLANET 6G/C** for **C**apsule
-  **PLANET 6G/TC** for **T**ablet and **C**apsule
-  **PLANET 6GP** for **T**ablet and/or **C**apsule

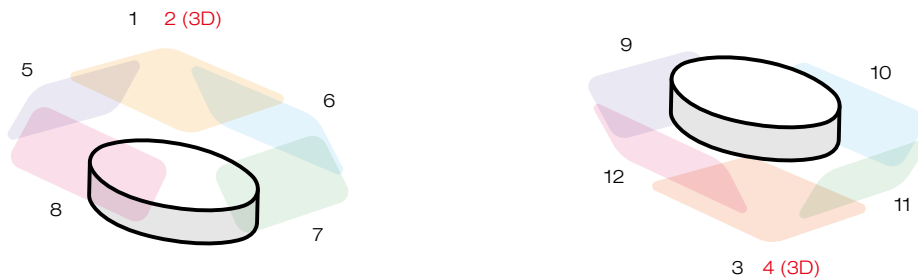


A clean cGMP design is the key concept for PLANET 6G



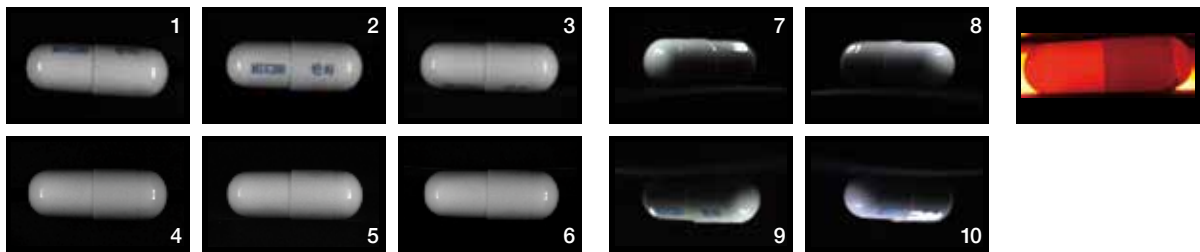
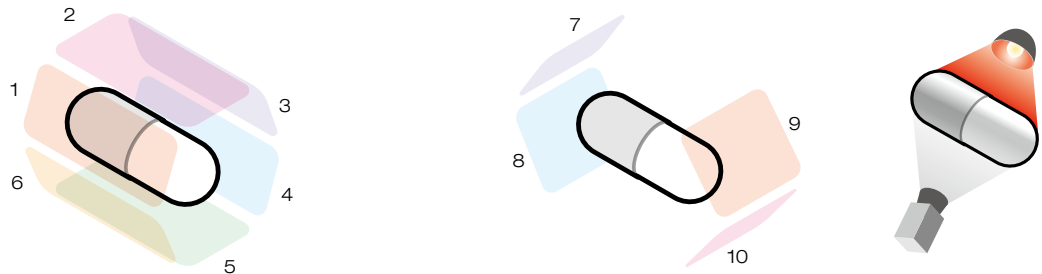
Tablet Inspection

Each tablet is inspected by ten interdependent 2D cameras capturing the complete surface area. Two additional 3D cameras capture the surface image of both the top and bottom of each tablet.



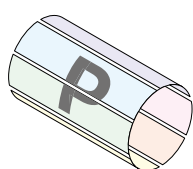
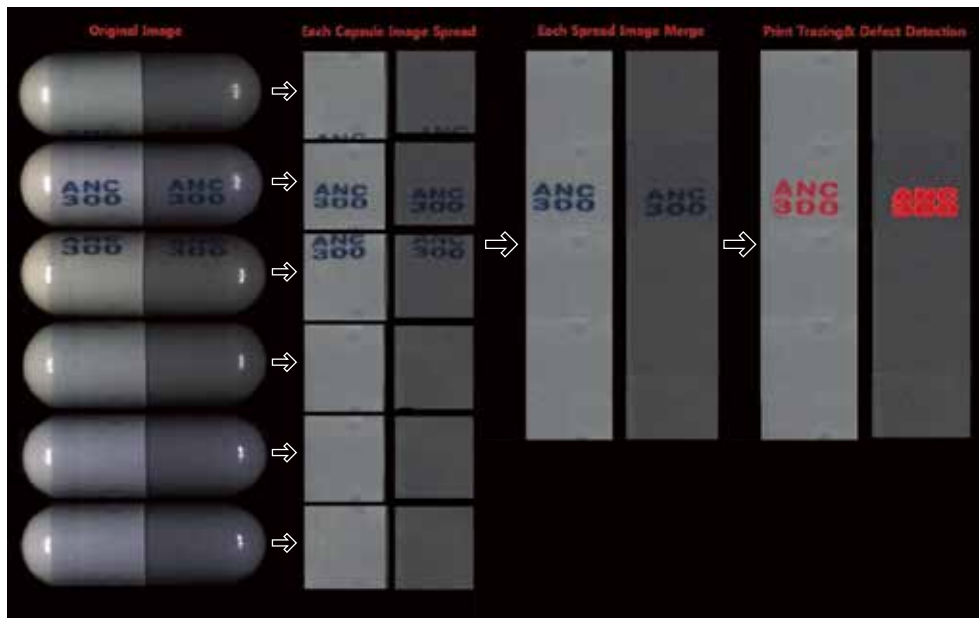
Capsule Inspection

Each capsule is inspected by ten interdependent 2D cameras capturing the complete surface area. An additional infrared camera identifies empty capsules and checks for filled volume.

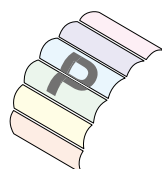


Cylindrical Part

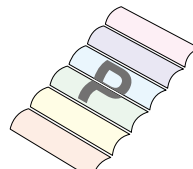
6 images of cylindrical parts are combined and made as a banded image through several steps of image reformation algorithm which is essentially required for detail image analysis.



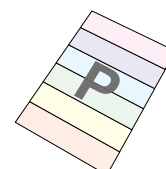
surround six images of cylindrical parts



cut circle for band image



flatten every image



complanation of each and complete band image

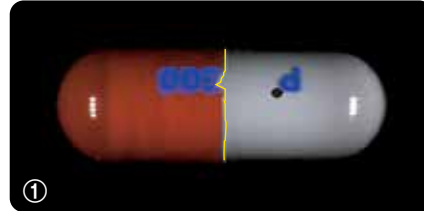
Powerful Capsule Inspection by PLANET

Example 1, Letter Tracing

Print image does not effect to identify defects on capsule.



split in cap cutting area and hole defects

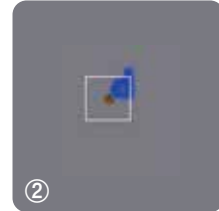


①

PLANET clearly identified

① split defect just beside of print ('300')

② hole just beside of print ('P') analyzed on band image



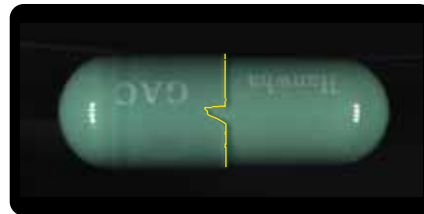
②

Example 2, Joint Line Tracing

PLANET traces joint line on single color of capsule.



split defect on single color



PLANET clearly identified joint line

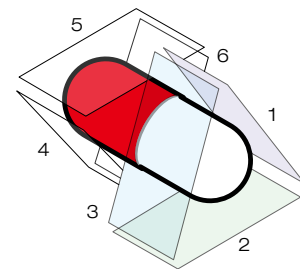
Example 3, Widely Different Brightness of Cap and Body

PLANET has a special algorithm to divide cap and body to get an optimized image as per specific color on each part. It works well in identifying capsules with widely differing brightness of cap and body.

image for body, lighting sets for bright color (white)

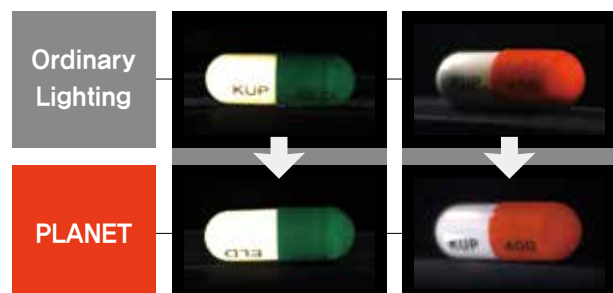


image for cap, lighting sets for dark color (dark red)



New Lighting System

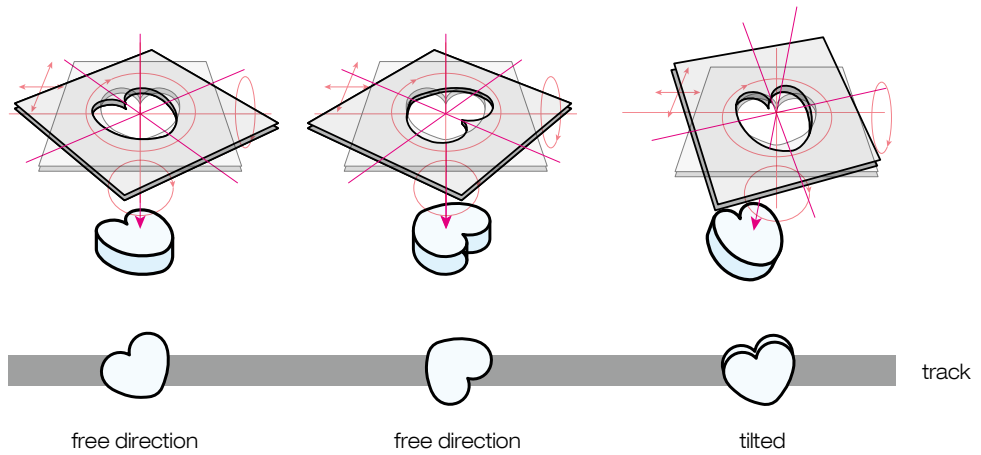
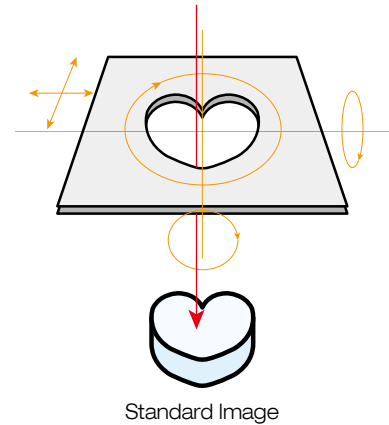
New lighting system makes almost equal brightness to everywhere of capsule which minimizing of shadow.



Analyzing Algorithm

Shape Tracing

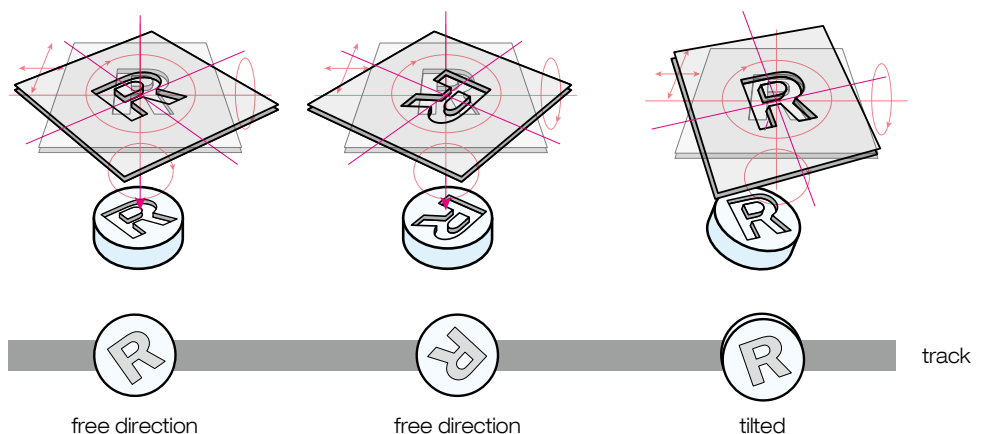
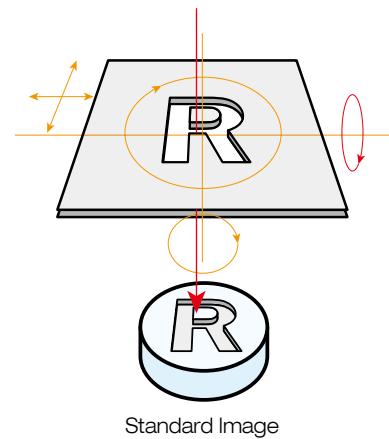
Shape tracing is the first key to the analysis algorithm of PLANET. The most critical and important issue of vision inspection is how to reform the camera images of an object. PLANET uses an algorithm, with five dimensional shape tracing technology. Vision analyzation is fulfilled through comparison of reformed images with the standard image.



Letter Tracing

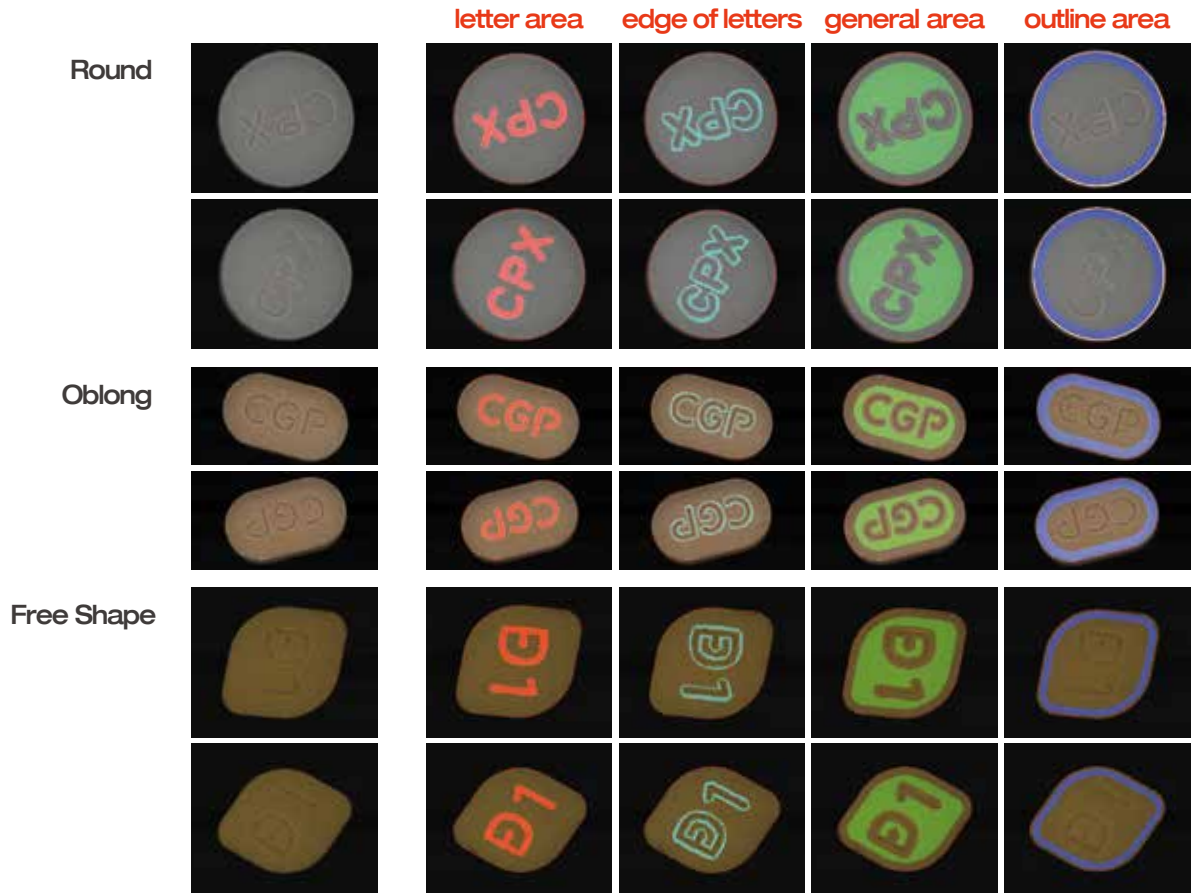
Tracing of letters, printed or engraved, is the next important technological step for precise inspection of letters on the tablet or capsule. Again, PLANET uses five dimensional tracing technology for letter tracing.

Both Shape and Letter Tracing are essential processes for Section-ization and Geographical Analyzation.



Sectionization

One single image is sectionized as shown below.



Geographical Analyzation

Every reformed object image by shape and letter tracing is compared with a standard one, pixel by pixel. This algorithm distinguishes the areas where the letter should be and should not be.

- no letter image where should be
- letter image where should not be

All above are 49 pixels.

Traditional analyzation

Pixel counting technology gets inspection result as same letters for left images because all of them have same quantities of colored pixel.

Job Change-Over

PLANET is designed for compact Job change-over in less than one hour. Dismantling (5 min.), cleaning and reassembly (5min.) are done without tools



Change Parts

The Planet is only mechanically dependent on the width/diameter of the product. With each set of tools covering 1mm of width/diameter, most products can be inspected with 4 to 8 sets of change parts.



one set of size parts



Auto-Setting of Mechanical Gaps

Product dimensions are programmed through the Smart HMI. All these parameters are saved in each product recipe for easy recall later.

New Product Setting in 30 Minutes

No factory support is required. The intuitive Smart HMI guides the operator through the process of programming a new product. These 6 steps can be completed within 30-35 minutes.



Setup Product



Once a product recipe has been created, it's a short 3 step process to start an inspection.

128 Multi-Core DSP Board

PLANET's Image Processing Board that is integrated in high density with DSP (Digital Signal Processor) can calculate complex image processing algorithm in real time.

With specialized OS developed by Enclony, it makes maximum inspection capability without error or time delay. Image Processing composed of total 128-Core is, in effect, equivalent to the capability of 30 sets of PCs loaded with latest CPU (on Intel i5 basis).



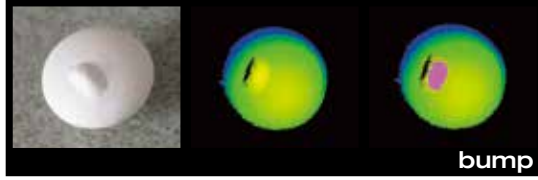
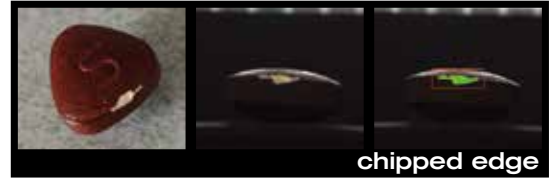
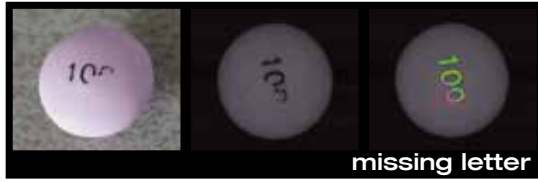
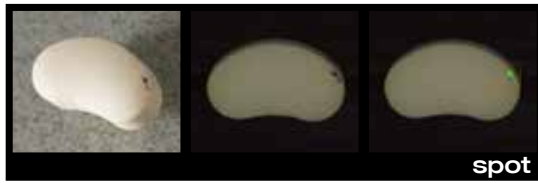
Compliance with regulations

FDA 21 CFR Part 11, CE, EU GMP, GAMP, UL and so on as option

Defects

Tablet

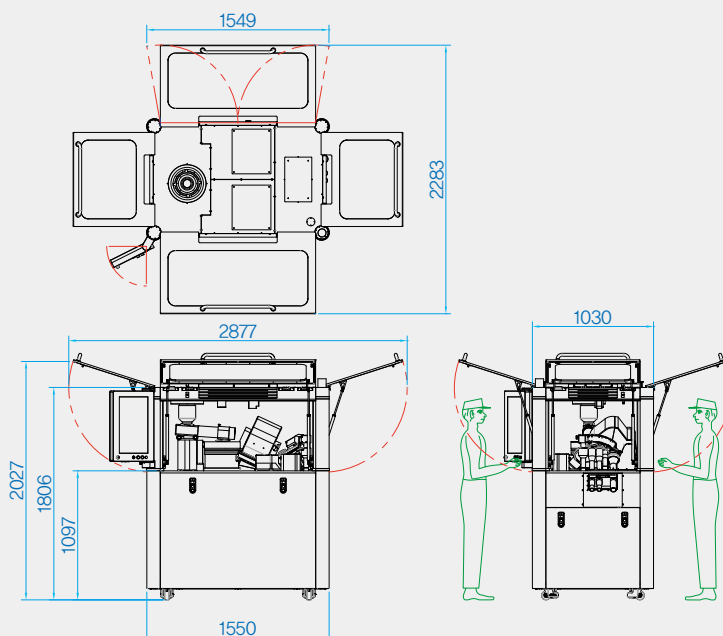
human eye camera image analyzed



Capsule



Ergonomic Layout



Effective Output



Round tablet

dia. 5mm : up to 350,000 tab./hr
 dia. 7mm : up to 240,000 tab./hr
 dia. 9mm : up to 200,000 tab./hr
 dia. 10mm : up to 180,000 tab./hr
 dia. 12mm : up to 150,000 tab./hr



Oblong and Oval tablet

length 10mm : up to 200,000 tab./hr
 length 14mm : up to 160,000 tab./hr
 length 17mm : up to 130,000 tab./hr
 length 21mm : up to 100,000 tab./hr



Capsule

no. 4 : up to 150,000 cap./hr
 no. 3 : up to 140,000 cap./hr
 no. 2 : up to 130,000 cap./hr
 no. 1 : up to 110,000 cap./hr
 no. 0 : up to 100,000 cap./hr
 no. 00: up to 90,000 cap./hr

Free shaped tablets are restricted as per above dimension. Custom size may require discussion for custom tooling. Actual output is subject to product specific characteristics.

PLANET 6G series



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