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3D Videoscopes – Where does the next step come from?

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Feb 29, 2012

How Olympus Innovates towards the next 3D Videoscope and other RVI Technology

- Record of Innovation
- Basic Videoscope Structure
- Stereo Imaging
  - 3D Eye Trek
- Microscopic 3D mapping
- Zero Gravity Scope (VAU)
- Gravity Sensor
  - Location Finder
- Articulation Advances
  - Pneumatic Ariculation
  - Articulating Guide Tubes
  - Low force direct articulation IPLEX Ultralite

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Track Record of Innovation in Remote Visual Inspection

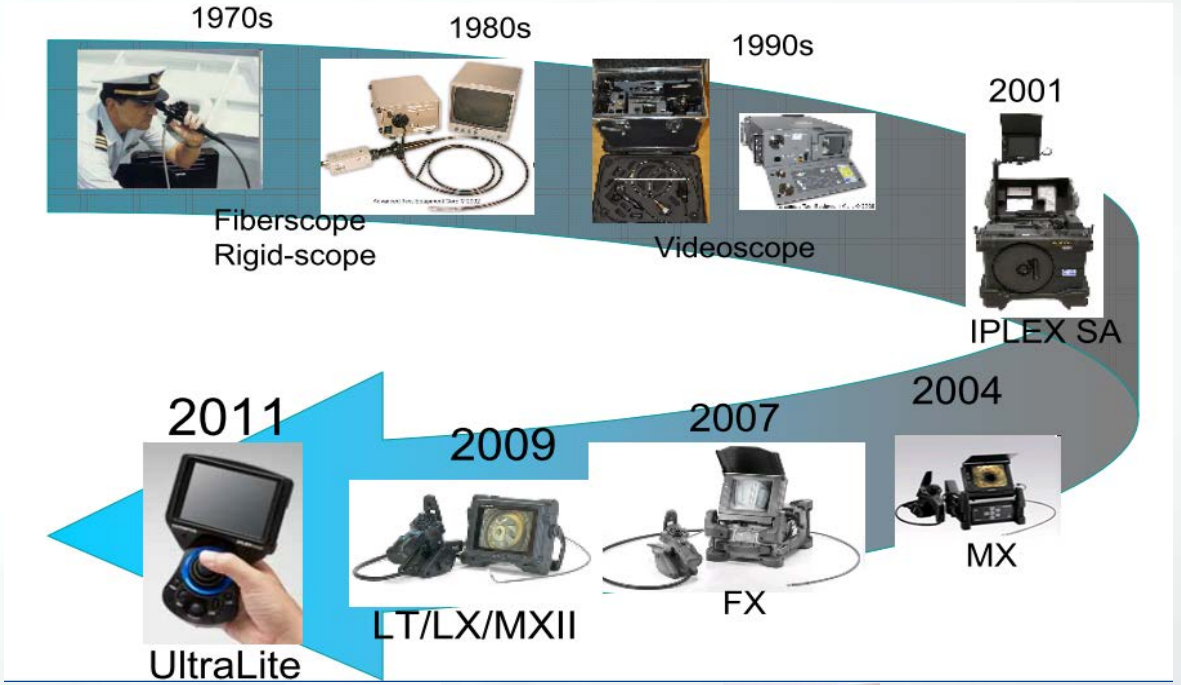
1949 – First Gastrocamera

1964 – First Gastrocamera With Fiberscope

1982 – First Medical Video And Ultrasound Endoscopes

2002 – First High definition Videoscope system

1999 Eye-Trek

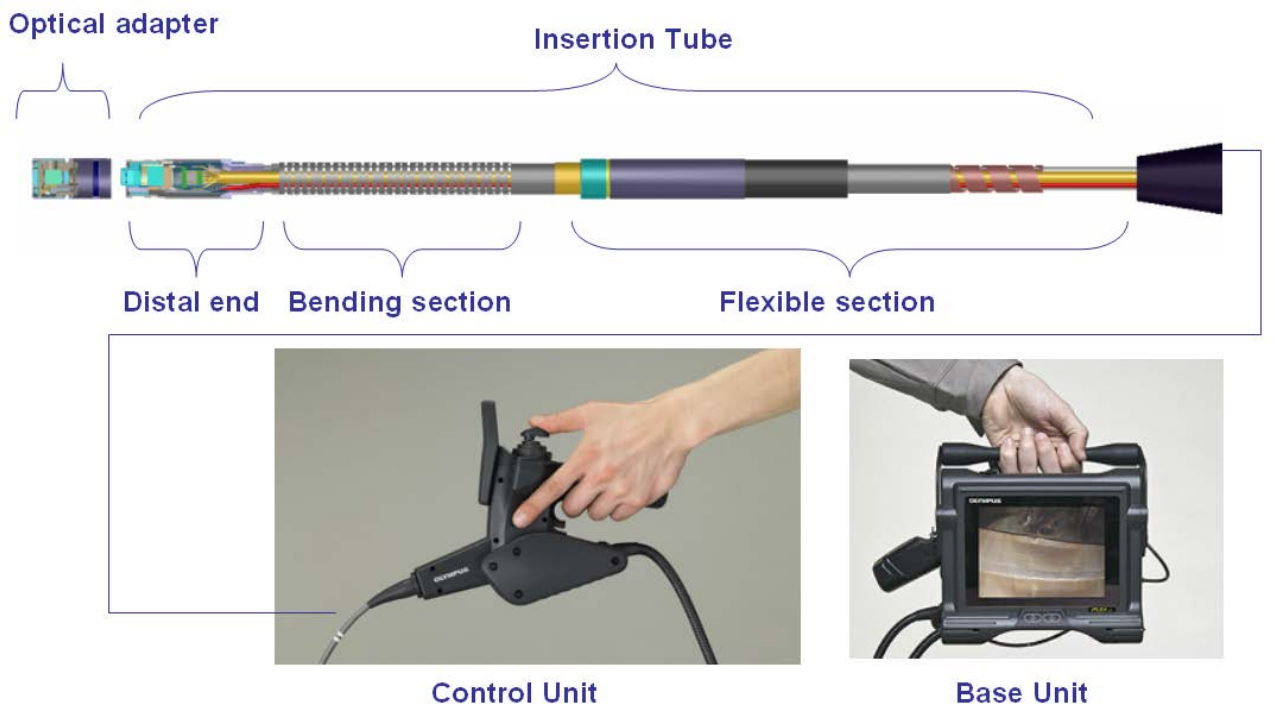


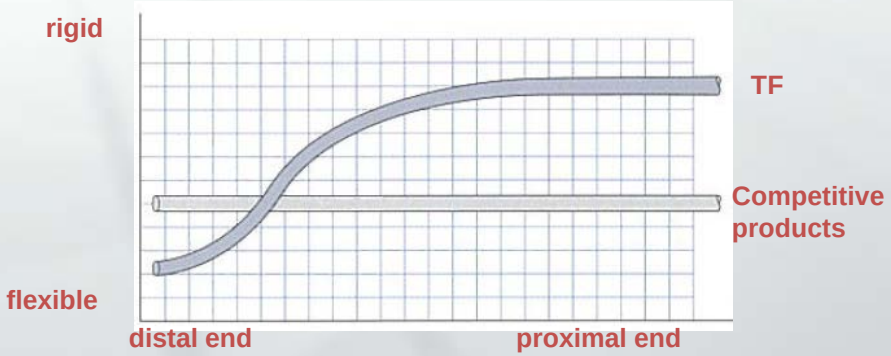
2009 – First 3D Measurement Laser Microscope

2007 – First High Resolution Capsule endoscope

Basic Videoscope Structure

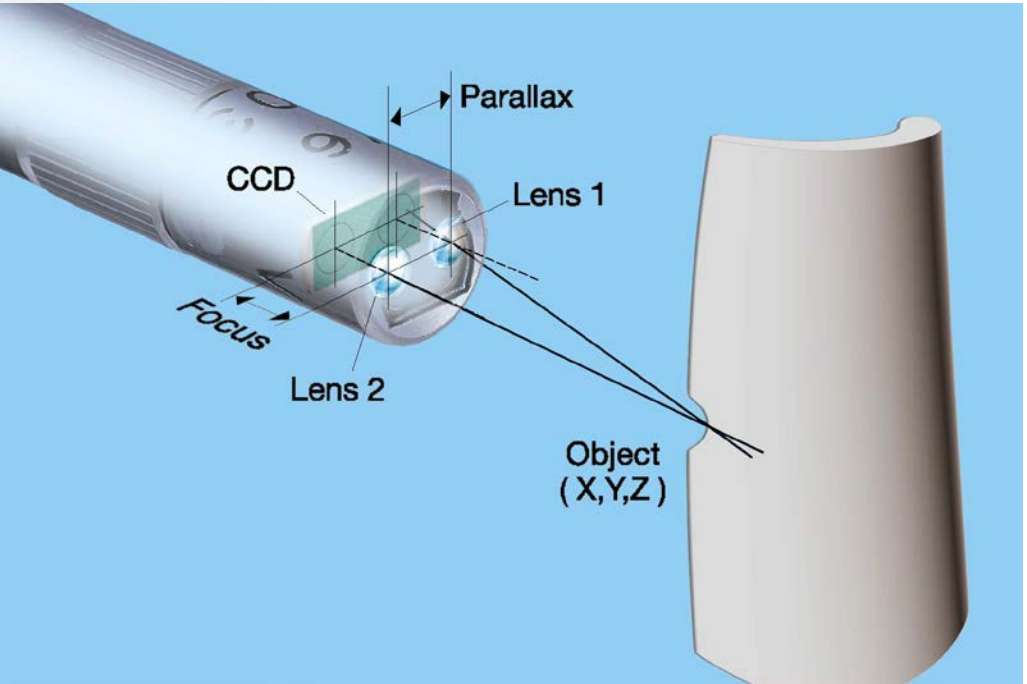
Olympus constantly fine tunes the basics of Videoscope Structure, with small advances to make scopes more user friendly. From power assisted True Feel Articulation to Taper Flex© Technology.



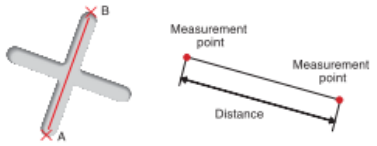


Stereo Imaging

- Well established
- Repeatable
- Provides 3D reference
- Precision largely depends on distance between lens.



A DISTANCE

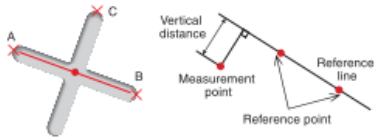


Distance mode is for measuring the line segment between two measurement points

1. Place the cursor on one end of the line segment and press MEAS/ENTER on the joystick to specify point A.
2. Place the cursor on the other end of the line segment and press MEAS/ENTER on the joystick to specify point B.

→The length of line segment A-B is displayed at the bottom of the screen.

B POINT-TO-LINE



Point-to-Line mode is for measuring the distance from a measurement point to the reference line defined by two points.

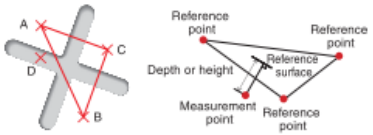
1. Place the cursor on both ends of the line segment and press MEAS/ENTER on the joystick to specify points A and B.

→Standard line A-B is shown.

2. Place the cursor on the point from which you want to measure the distance to standard line A-B and press MEAS/ENTER on the joystick to specify point C.

→The distance between standard line A-B and point C is displayed at the bottom of the screen.

C DEPTH



Depth mode is for measuring the distance from a measurement point to the reference plane defined by three reference points.

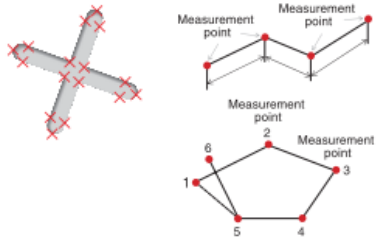
1. Place the cursor on points A, B and C to define the reference plane, then press MEAS/ENTER on the joystick to specify points A, B and C.

→Reference plane ABC will be shown.

2. Place the cursor on the point from which you want to measure the distance to reference plane ABC and press MEAS/ENTER on the joystick to specify measurement point D.

→The distance between reference plane ABC and point D is displayed at the bottom of the screen. A positive value (height) means the point is closer to the tip of the scope than the reference plane, and a negative value (depth) means the point is farther away.

D AREA/LINES



Area mode is for measuring the area defined by multiple measurement points. Lines mode is for measuring the total length of lines defined by multiple measurement points.

1. Place the cursor on points to define the area/lines and press MEAS/ENTER on the joystick to specify the measurement points.

→The total length of lines defined by multiple measurement points is displayed at the bottom of the screen.

Note: Up to 20 measurement points can be specified per measurement session.

2. When measuring an area, one additional cursor position must be positioned to define the complete subject outline. When the penultimate point has been placed (position 5 in the example above), ensure that point 6 is located beyond the first drawn line.

→The area enclosed by lines is displayed at the bottom of the screen.

E PROFILE

Profile mode is for displaying the surface profile of a line connecting two points.

1. Place the cursor on both ends of the line whose surface profile you want to inspect and press MEAS/ENTER on the joystick to specify the two points.

→The surface profile obtained by sectioning the target object with a plane defined by the line connecting two specified points and the optical center axis is displayed.
The surface profile graphics overlaid on the right screen show the profile viewed from the direction that is perpendicular to the optic axis.

F MULTI

Multi mode automatically detects and displays the measurement values of a region specified by two reference points. The width, depth and surface area of any missing material will be measured.

1. Place the cursor on each side of the material loss and press [MEAS/ENTER] on the joystick to specify the reference points. The region of missing material will be drawn in the left screen. The width, depth and area dimension of missing material will be displayed in the right screen.

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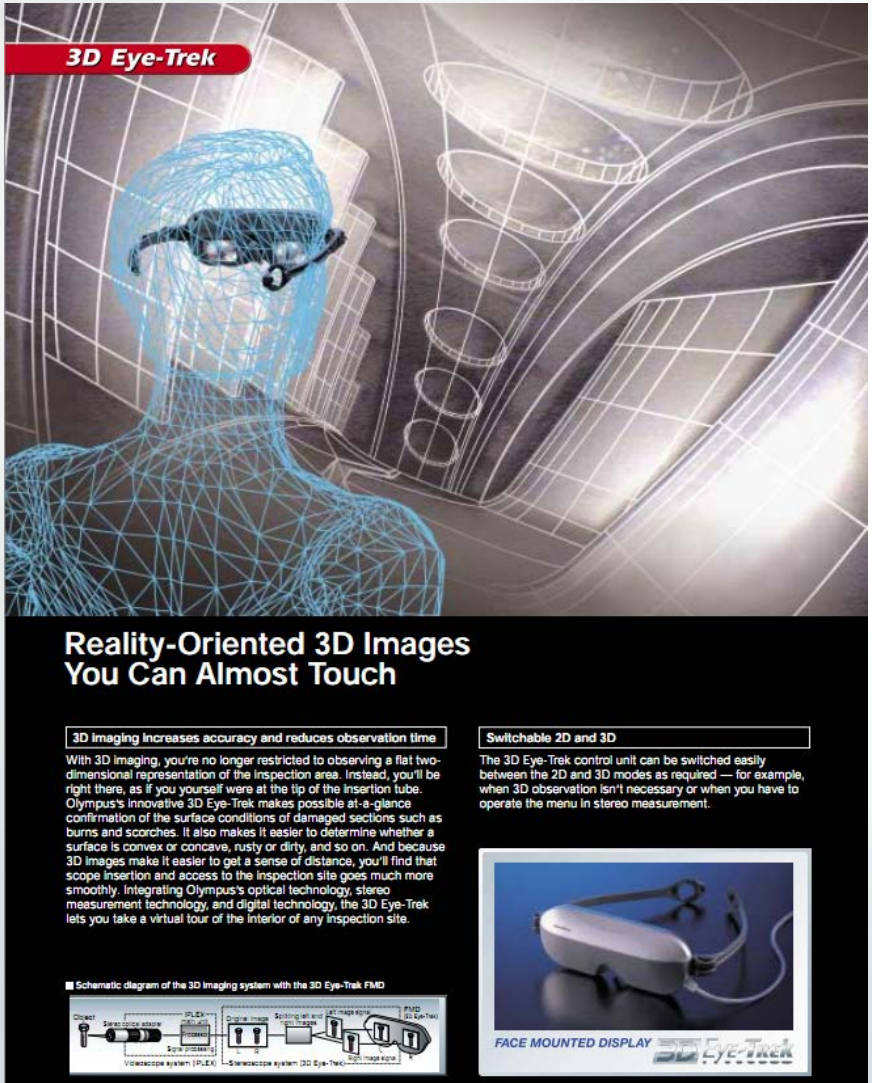
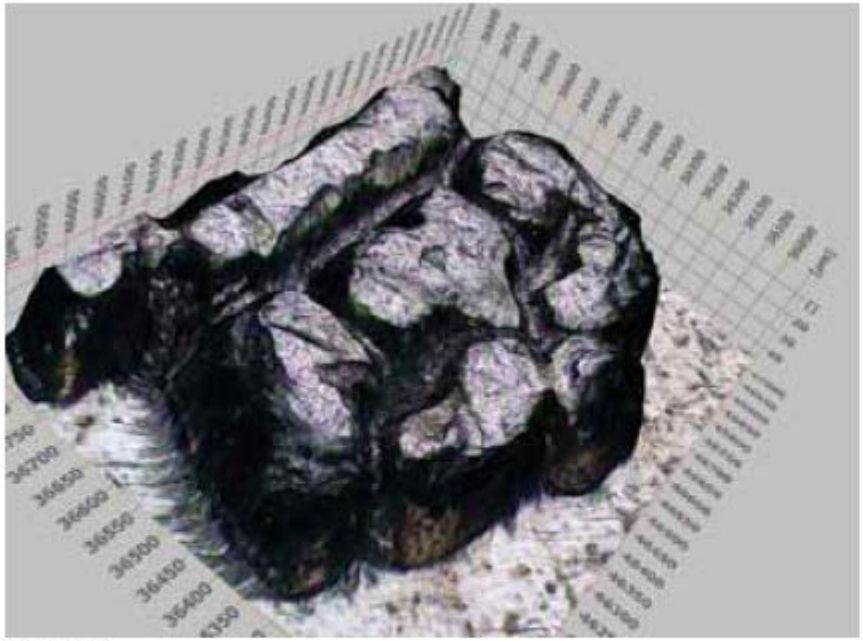
Stereo Imaging – 3D Eye Trek

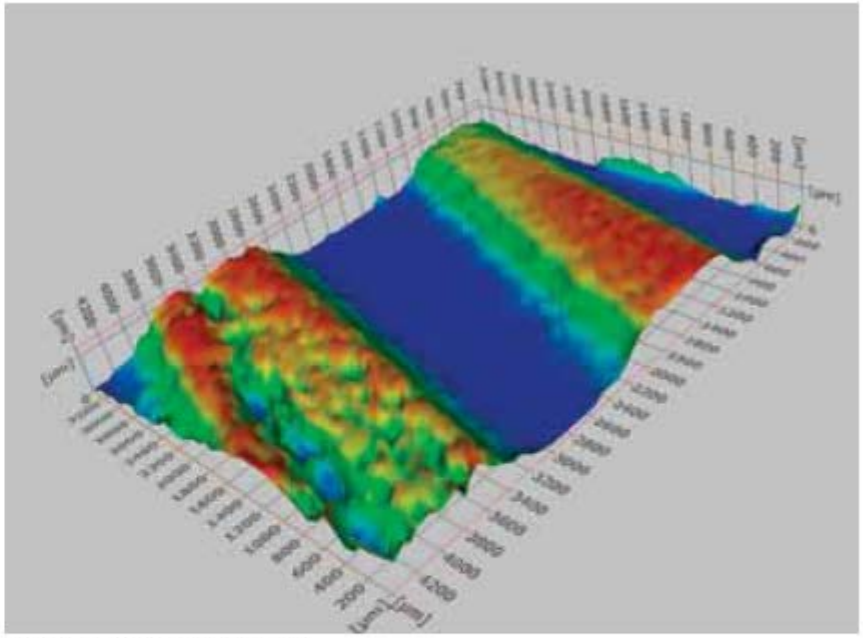


- 3D Eye Trek is nearly 10 years old
- Allowed the very first 3D head worn 3D view of an inspected area.
- Arrived before its time, inspectors had a tendency to move their head, not the scope.
- New technologies can give this Olympus Innovation new uses.

Microscope 3D Mapping



Coin detail



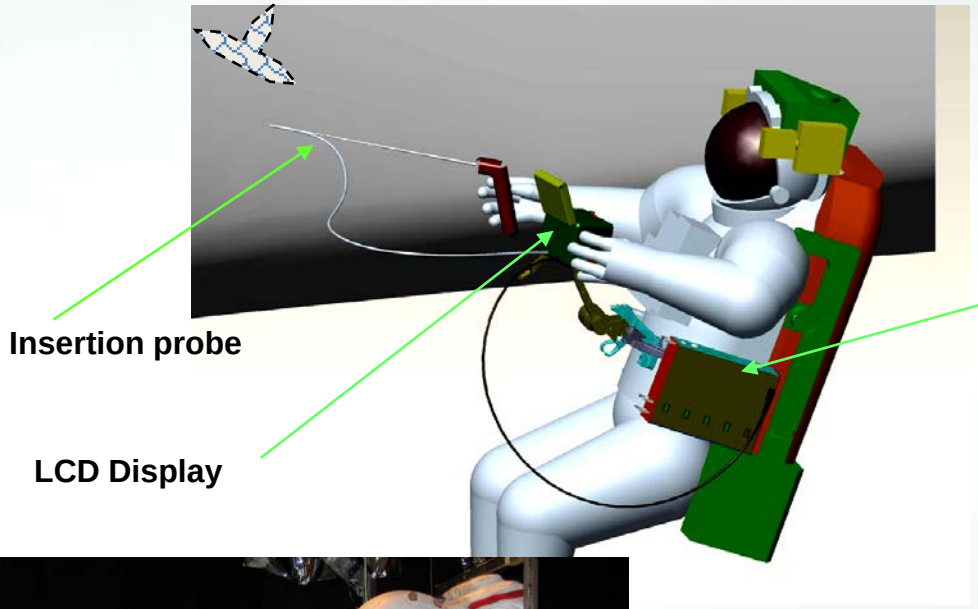
3D profilometry of wear track

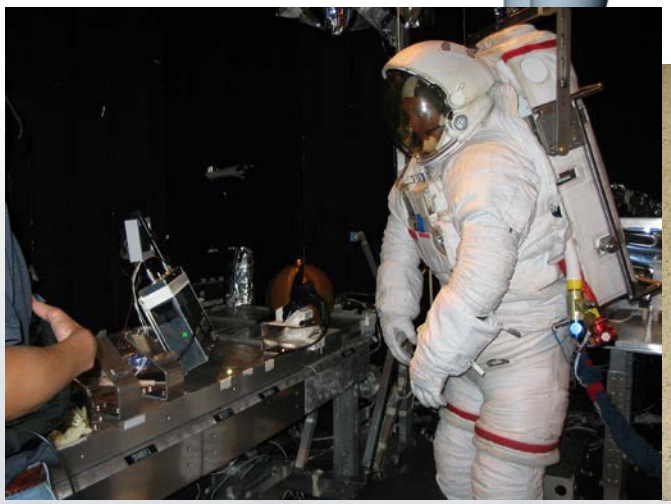
3D Image Creation

By using the a motorized focus unit, images with different focus positions can be recorded automatically. In addition, calibrated z-profile measurements using z-stack data and 3D image creation using the 3D-EFI function are made possible. The three-dimensional view of the sample becomes crystal clear with a few mouse clicks.

Zero Gravity – VAU Project

•Olympus has worked with NASA on Projects to advance the limits of remote visual equipment



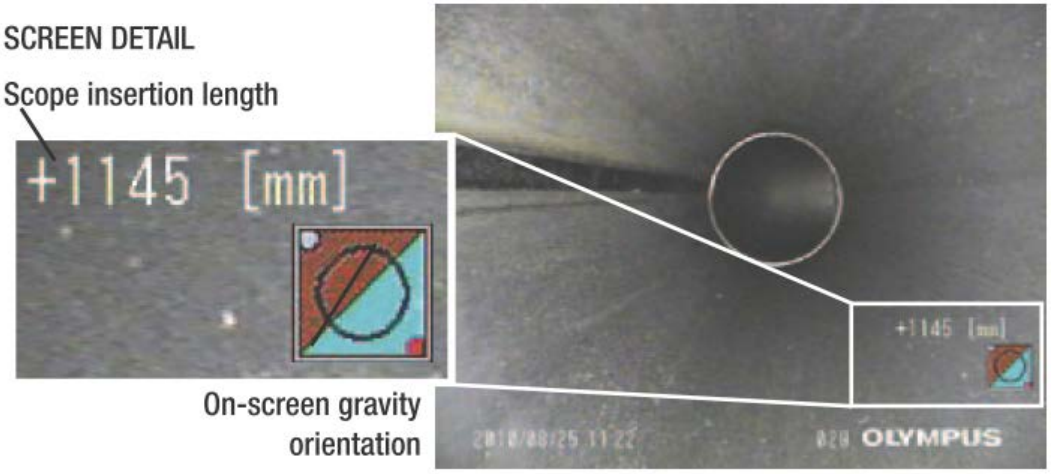


Gravity Sensor

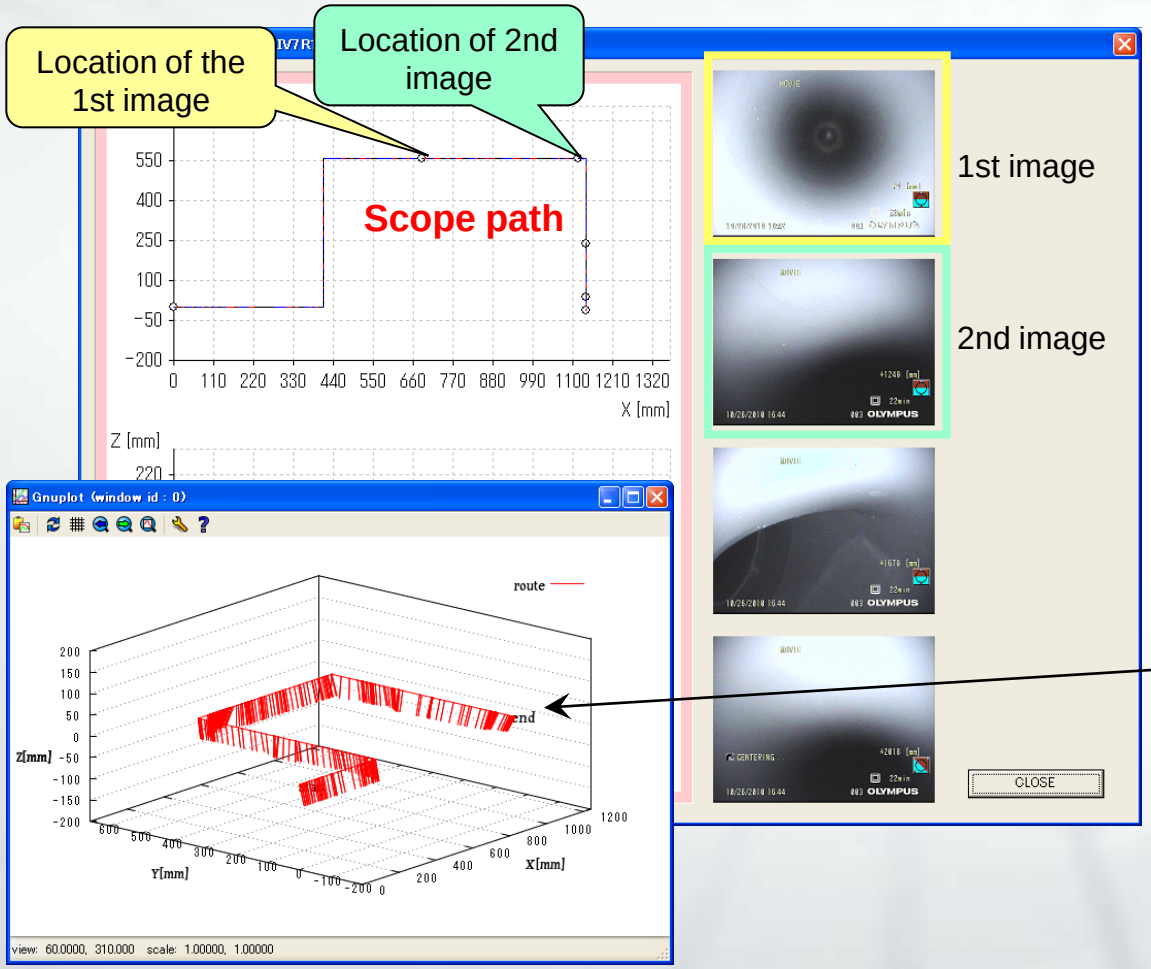
•Olympus has fitted its IPLEX YS with a micro gravity sensor, capable of 3 dimensional reporting. This gives feedback to aid in the understanding of the scopes location.

Direction and location of target are accurately revealed during inspections

During inspections, it is sometimes difficult to determine the area and direction being displayed on an inspected image. The IPLEX YS features an integrated gravity sensor that provides an on-screen orientation of the inspected image, clearly differentiating up from down. An optional length indicator can display the scope length inserted into an object on the screen; it can also be reset for a relative length from a given point in an inspection area. Utilizing these functions, you can confidently proceed with inspections knowing they will be able to clearly identify inspected positions.



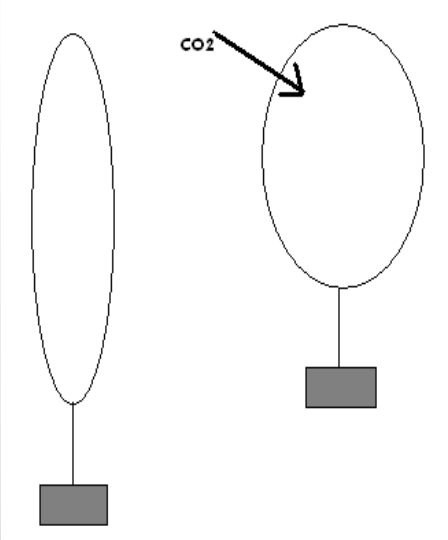
Gravity Sensor – Location Finder



- Records every turn direction and distance as a scope snakes into the object.
- Create path the scope went through.
- Can show image with its captured location on the map.
- Creates 3D map tracing scope end position.

Articulation Advances

- Pneumatic Articulation
- Articulating Guide Tube
- Reduced Force Articulation



Any Questions?

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