# Collection and application of *2D and 3D* panoramic imagery

CycloMedia Technology

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Collection and application of *2D and 3D* panoramic imagery

- Introduction CycloMedia
- 2D panoramic images
  - Recording principle, measuring principle, accuracy and applications
- Adding 3D to panoramic images
  - 3D advantages and applications .

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# *Large scale and systematic visualizations*

*Street level*

Databases with Cycloramas (digital, spherical, panoramic images)

- High resolution (4800 pixels hor., 0,075° res.)
- Well defined internal image geometry, no parallaxes
- Good georeference (10 cm) and orientation (0,1°)
- Selectable interval between recordings, std. 5 m
- Up to 80 km/h recording speed at 5 m interval
- World-wide patented recording technology
- Systematic and complete recording of cities, regions and complete countries
- Delivery through web hosting or local installation .

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# *Cycloramas – Present Recording Principle*

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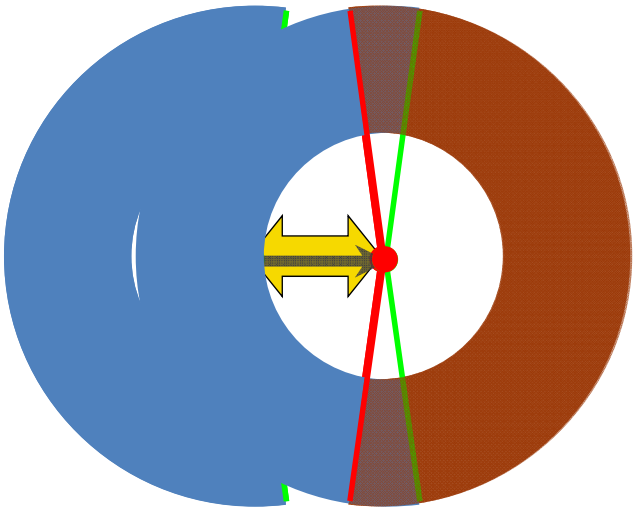
# Cycloramas – Present Recording Principle



***The only practical way to obtain photogrammetrically correct panoramic images***

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# Cycloramas – Present Recording Principle


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# Cycloramas – Present Recording Principle


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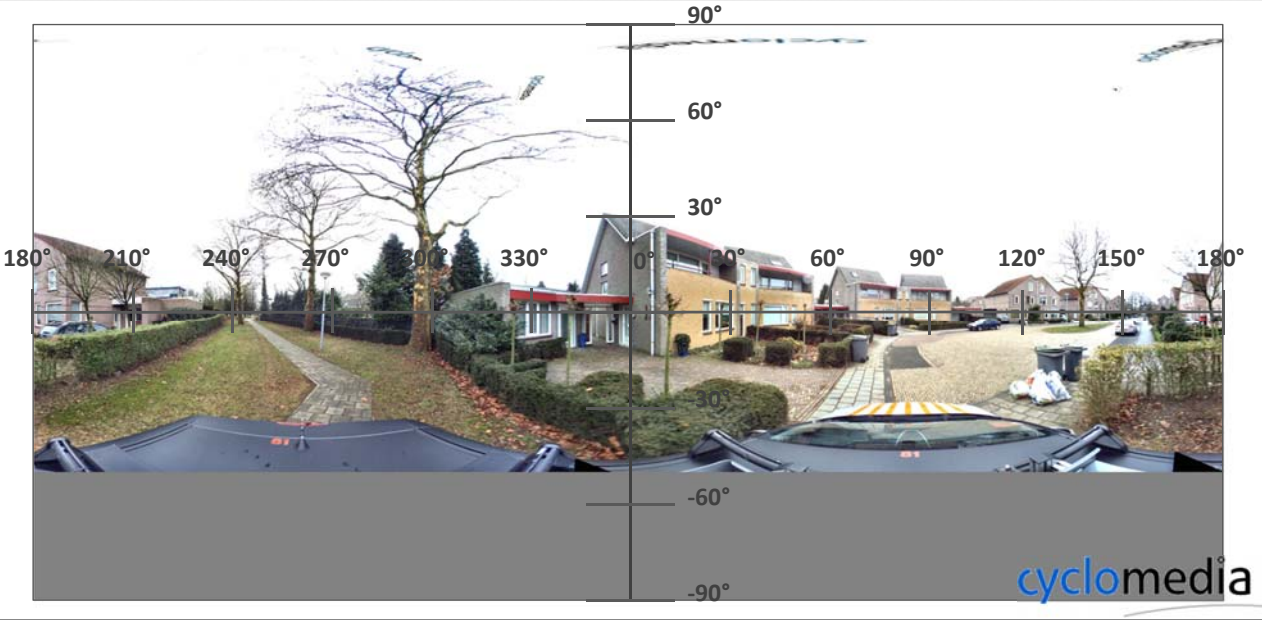
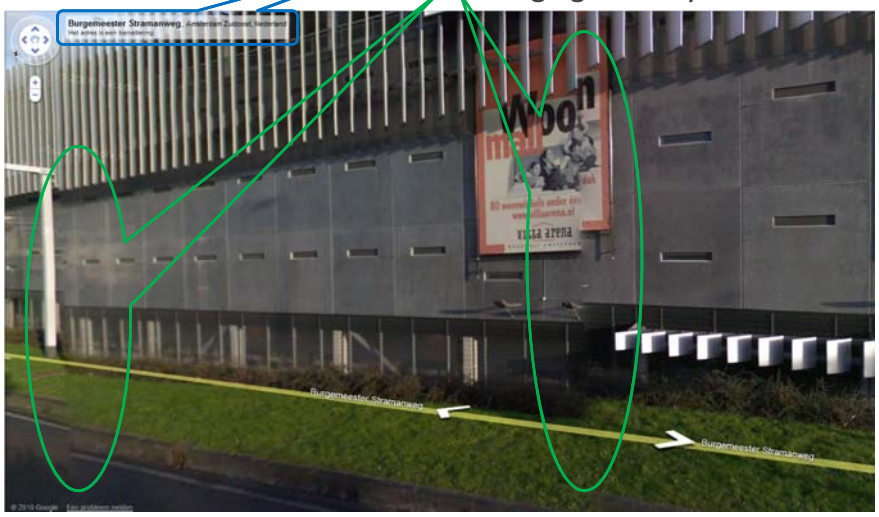
# Cycloramas – Measuring principle



# Comparison with 'alternatives'

- Large scale and systematic
- Up-to-date ?
- Precision recording location ?
- Image geometry ?

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# Cycloramas – Measuring Principle

- An ordinary Cyclorama is a flat image
- Every pixel represents
  - a spatial direction
  - with a known orientation
  - from a known recording position
- To determine the coordinates of an object point *at least two* Cycloramas are required .

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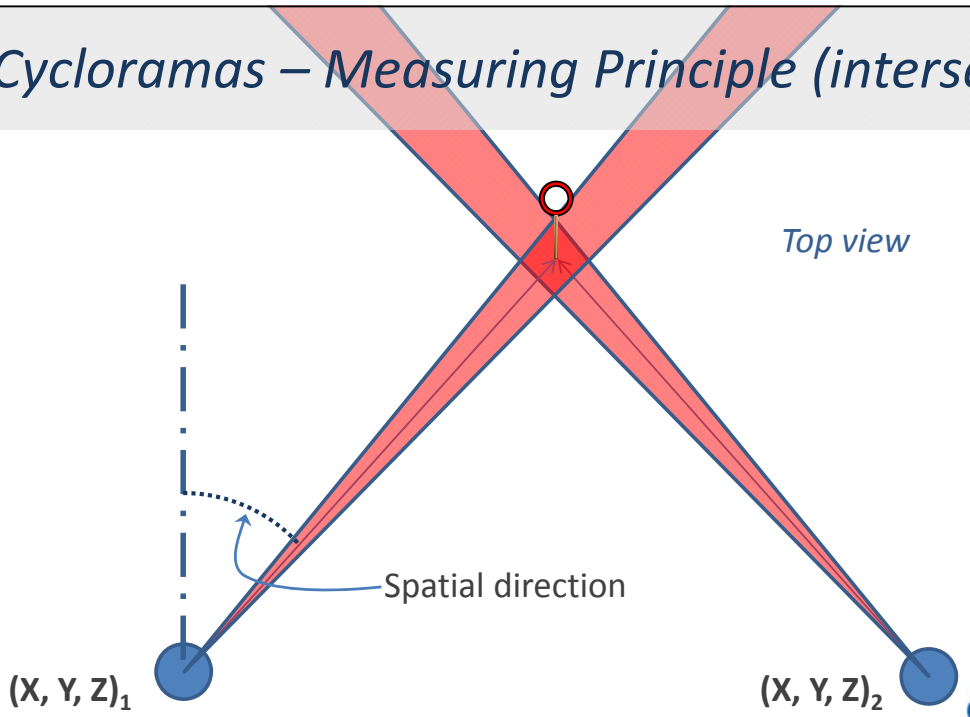
# Cycloramas – Measuring Principle (intersection)

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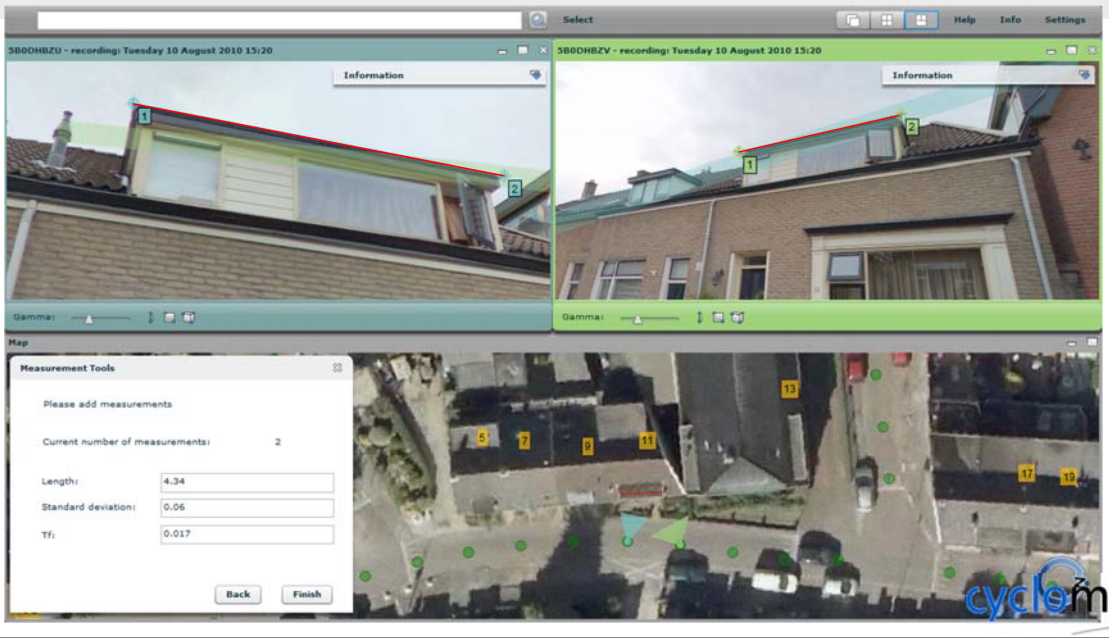
# Cycloramas – Measurements with GlobeSpotter

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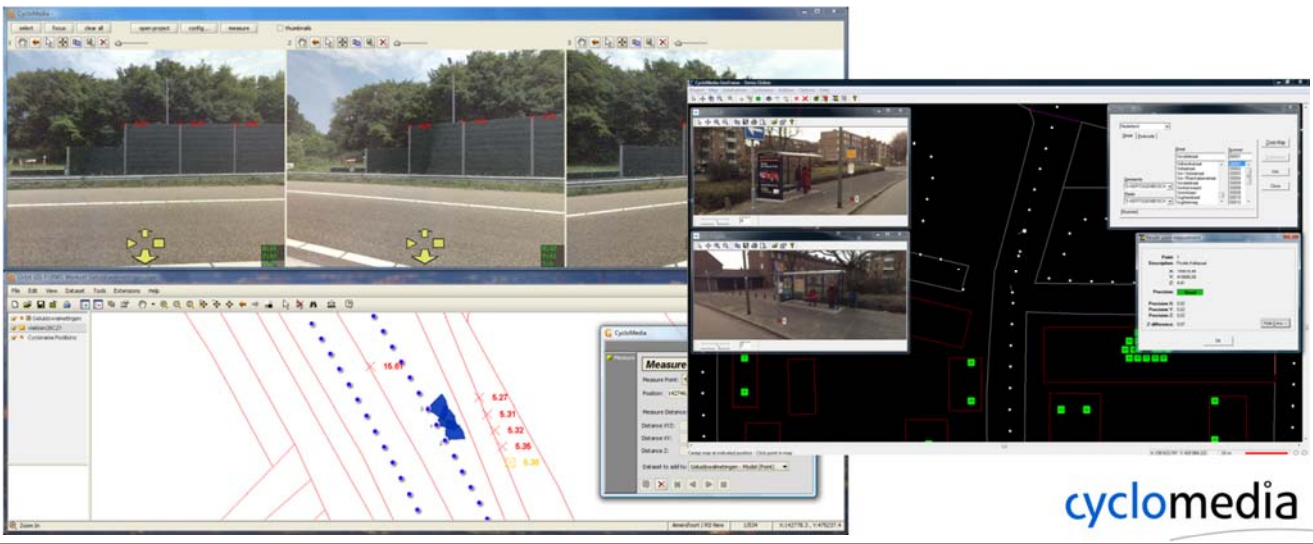
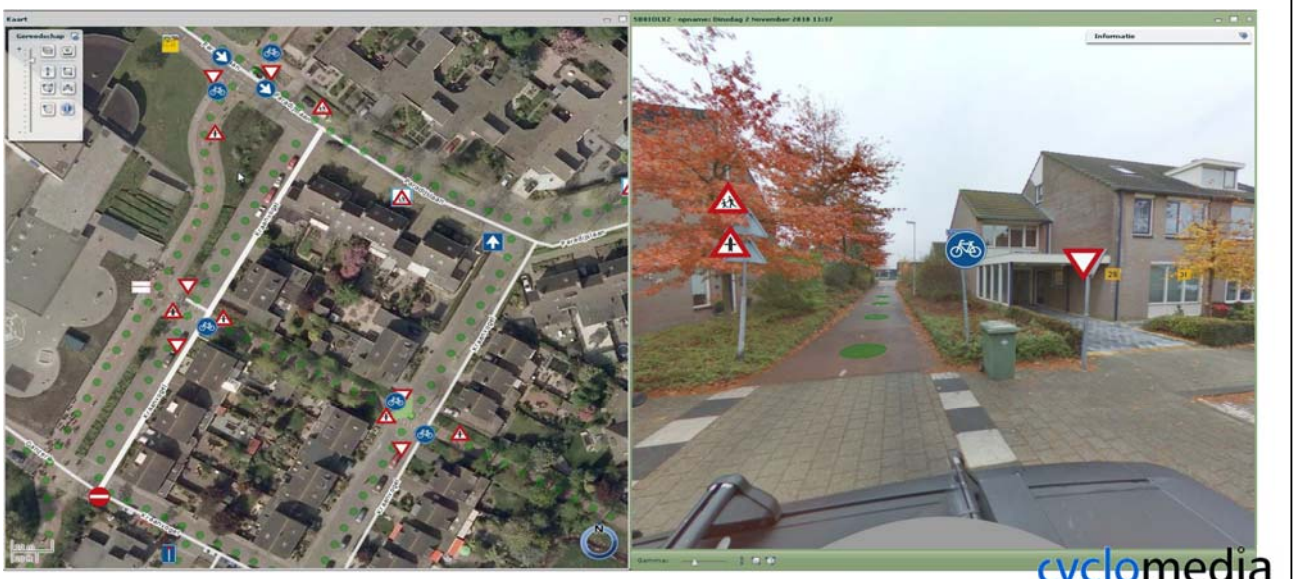
# *Applications - 3D Texturing with Cycloramas*


# *Applications – Determining location and height of objects*

Determining location and height of noise barriers, traffic barriers, street furniture etc.



## *Applications - Inventory of traffic signs*




## *Applications – 2D Projection*

# Applications – 3D Projection


# Applications – 2D Projection

# Applications – 2D Projection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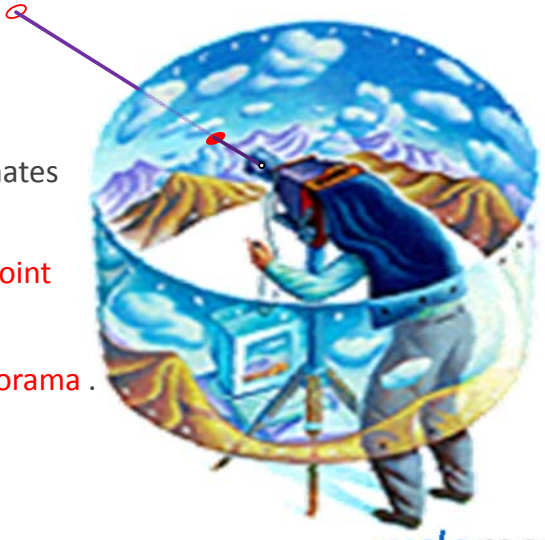
# That's why: 3D Depth Cycloramas

- A 3D Depth Cyclorama isn't a flat image
  - Every pixel also contains the distance to an object point
  - Every pixel thus represents the 3D coordinates of an object point
- To determine the coordinates of an object point *only one* Cyclorama is required
- 2D data can be draped in the 3D Depth Cyclorama .



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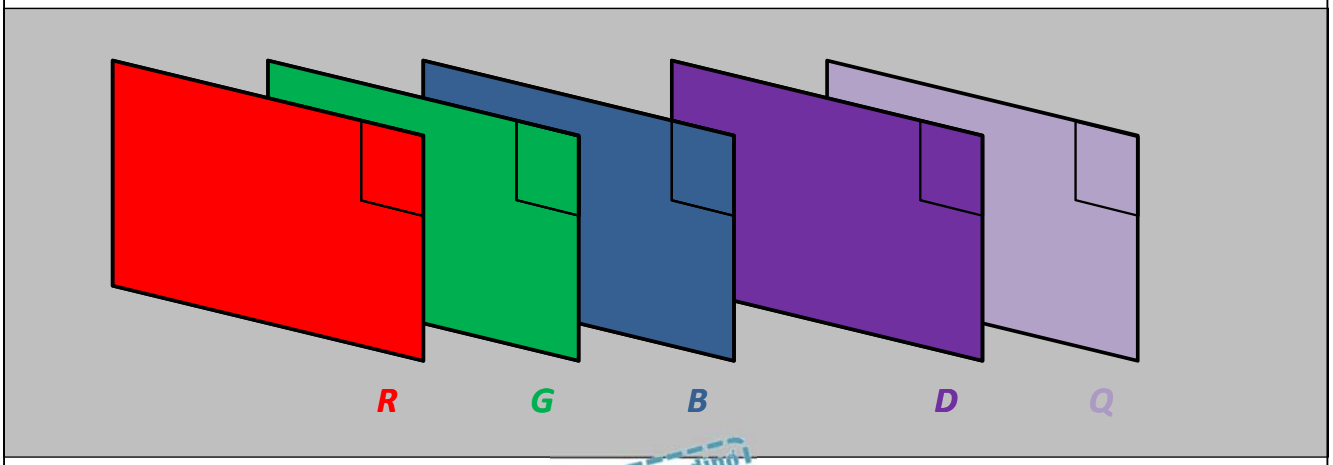
## 3D Depth Cycloramas - Principle




Patent Pending

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## 3D Depth Cycloramas

At present produced using LiDAR point clouds

Point cloud accuracy issues wrt. Cycloramas

- Density
- Positioning .

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Kaart viewer - Luchtfoto 2010 10cm
14
Pointer modes:
Cyclorama viewer - Donderdag 10 September 2009 ( 510WJTHX )
N
Beeld:
Metingen:
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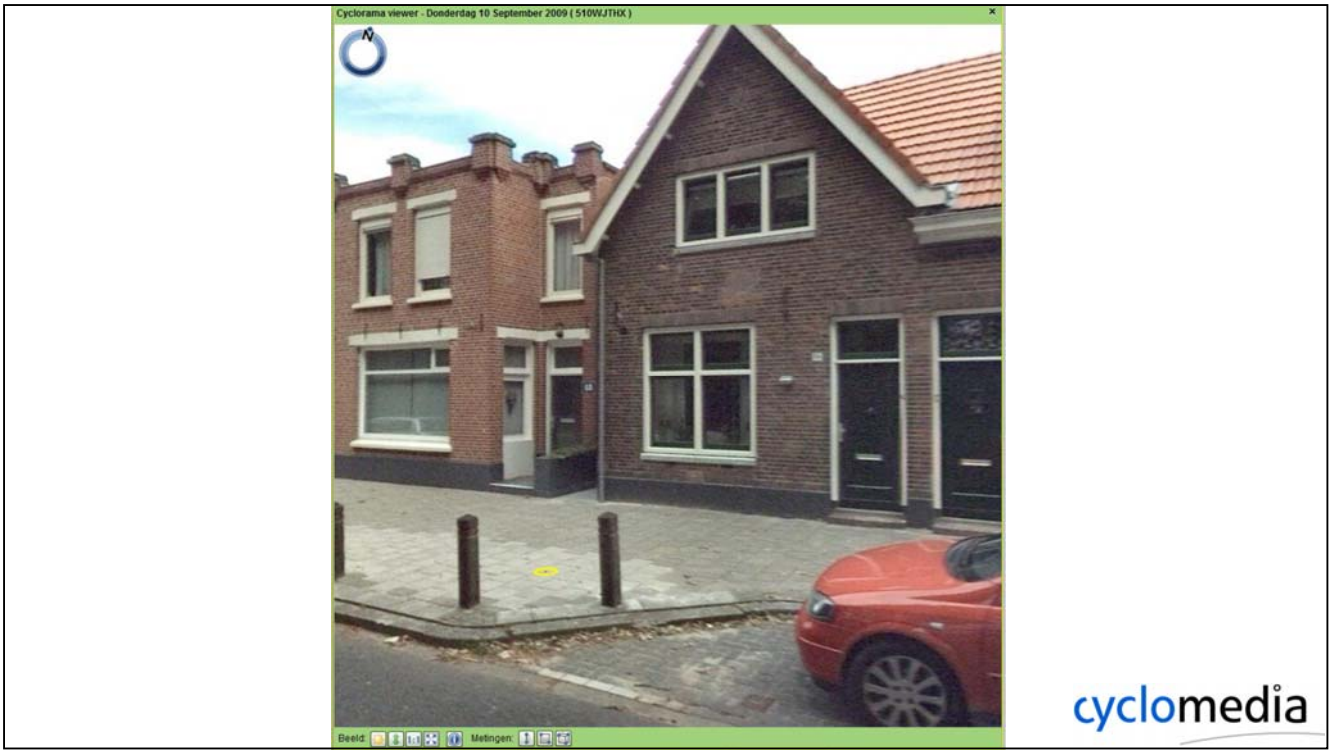
Cyclorama viewer - Donderdag 10 September 2009 ( 510WJTHX )
N
Beeld:
Metingen:
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# *Synergy: Cycloramas + LiDAR*

- Cycloramas
  - serve for interpretation and
  - photogrammetric quality
- LiDAR point clouds
  - serve for 3D information
  - are being *verified* and *if necessary corrected* from Cyclorama geometry.

Know *where* you make a measurement!

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# 3D Depth Cycloramas - Applications

Single image measurement of points, lines and areas


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Single image measurement of points, lines and areas


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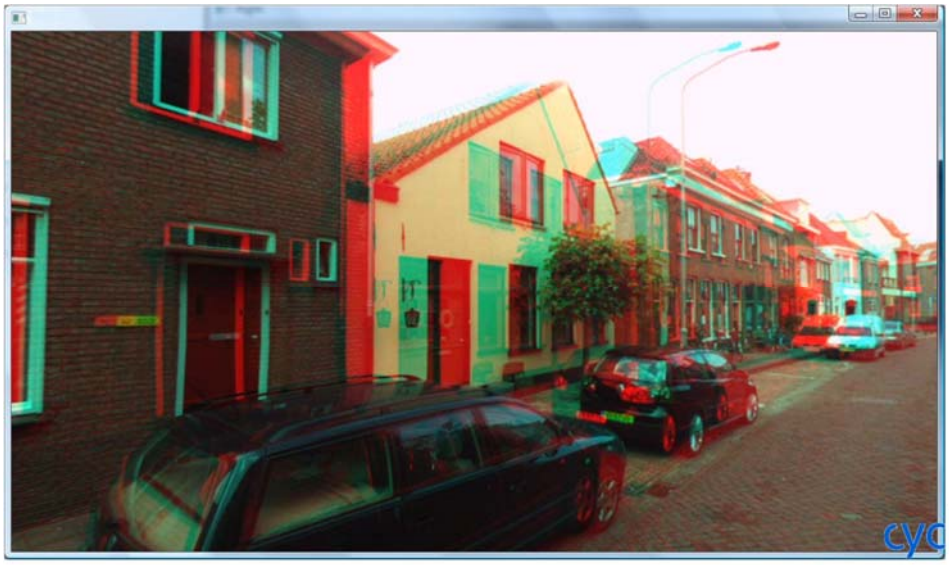
# 3D Depth Cycloramas - Applications

Stereo presentation: gives better interpretation (and measuring accuracy)



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# 3D Depth Cycloramas - Applications

Overlay of 2D and 3D plans with occlusion (hidden line/surface removal)


# 3D Depth Cycloramas - Applications

Overlay of 2D and 3D plans with occlusion (hidden line/surface removal)

## *3D Depth Cycloramas - Advantages*

- Simpler measurement and navigation
- Possibility to present in stereo
- Overlay of 2D and 3D plans with occlusion
- Through which:
  - precise 3D Modelling
  - easy cut out of textures
  - verification of 2D and 3D plans
  - quick and realistic visualization of plans .

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Thank you for your attention

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