

Technical Specification

- Max. speed in operation: 60 km/h
- max. 4 DSLR EOS 450D 12M.Pix. , max Field of View 200 deg
- 2 GPS Receiver with max. 5Hz data acquisition
- VectorNav with accuracy 0.1deg for 3-axis IMU
- LAPTOP for Processing: remote shutter, data storage, GPS, digital photography, and close-range photogrammetry
- Grid Object for Camera Calibration to reduce the geometry error up-to SUB-PIXEL
- Imagery resolution can be varies, generally: $\leq 1\text{cm}$
- Effective object measurement: $\leq 20\text{m}$
- Shutter camera interval: $\leq 10\text{ sec}$
- Connection between exposure position using feature based matching.

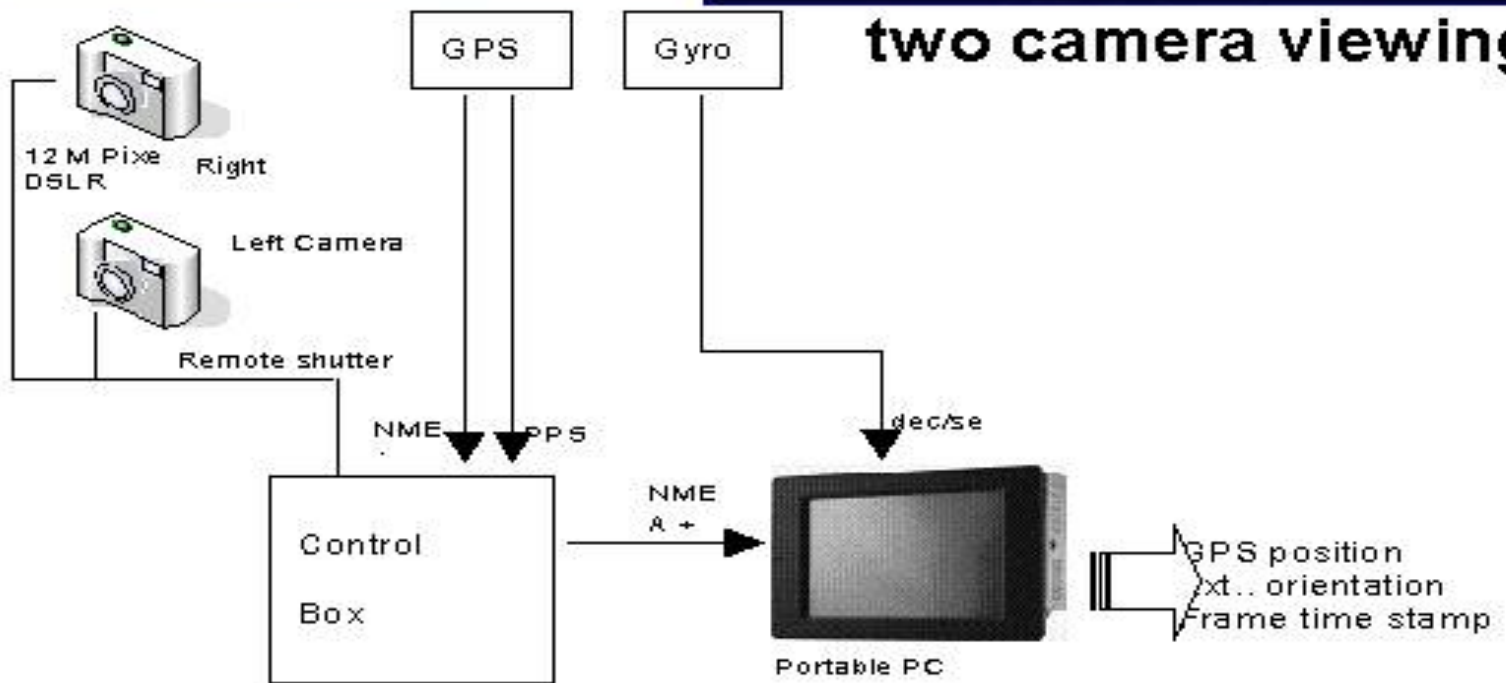


HOW IT WORK ?

How It Work ?



two camera viewing



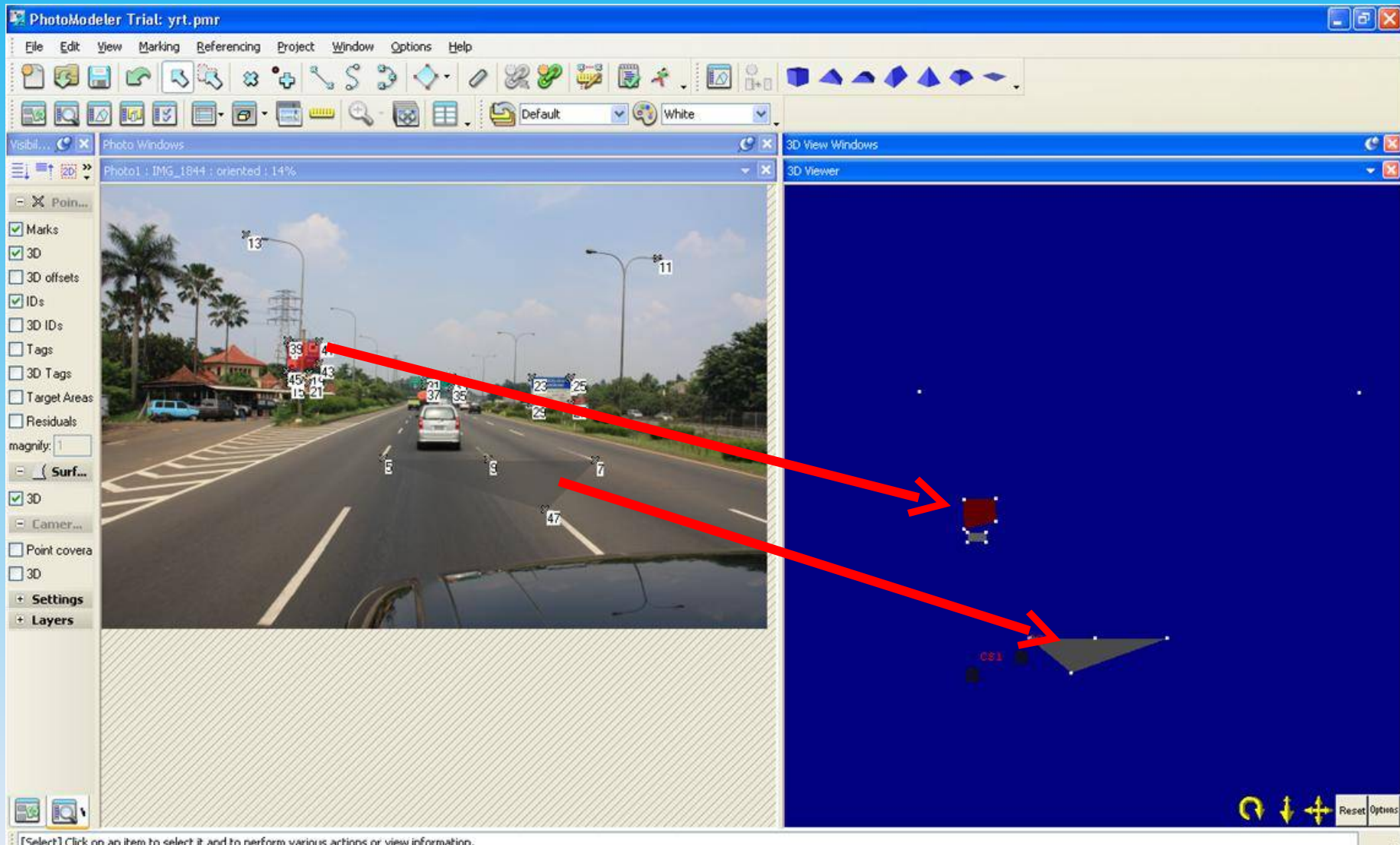
THE BASIC CAPABILITIES

Measuring object: shape-dimension, position, and physical condition calculated in every point position

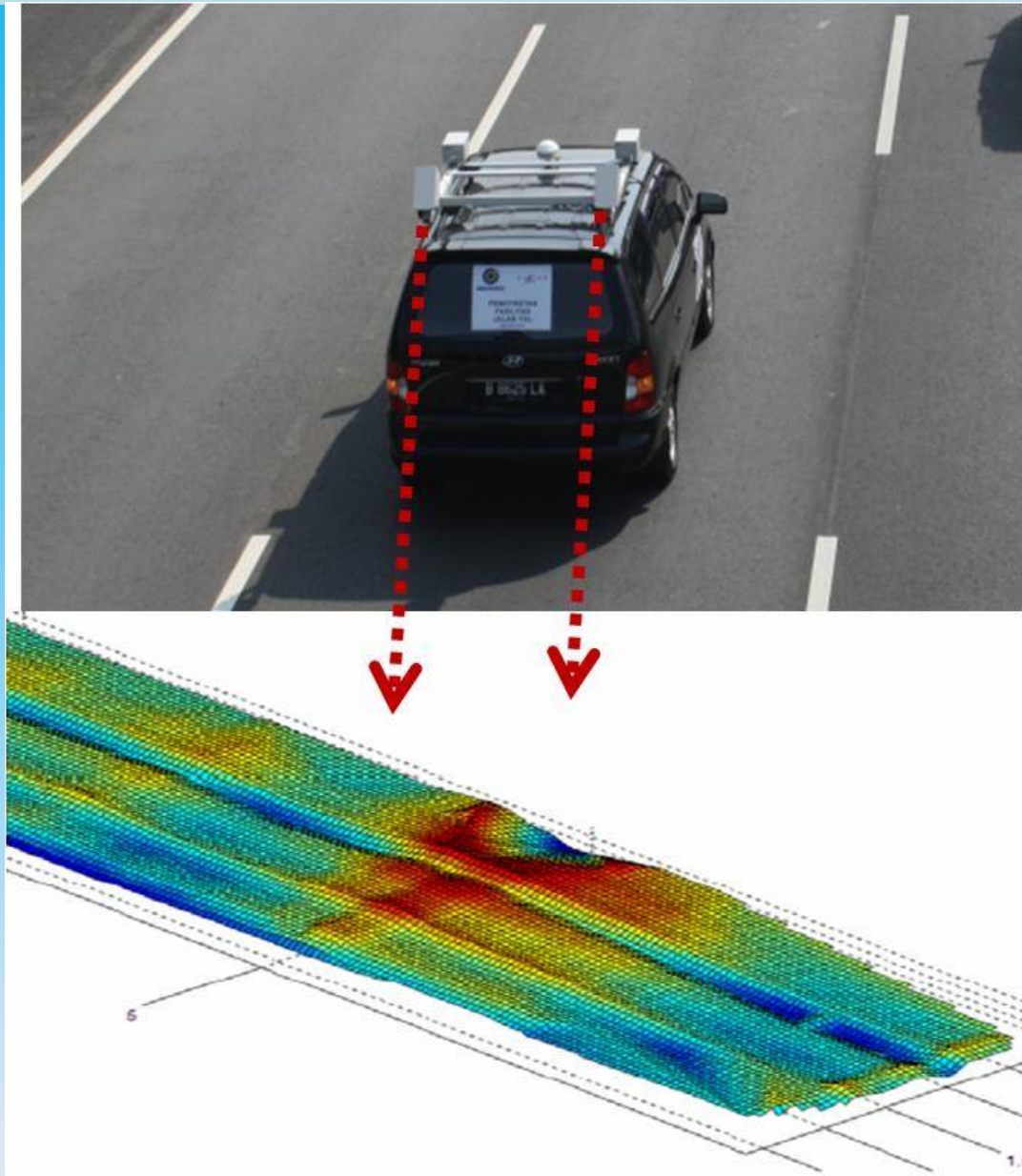
The screenshot displays the PhotoModeler software interface with the following components:

- Photo Windows:** Two windows are open: "Photo2: IMG_1832 : oriented : 10%" and "Photo1: IMG_2610 : oriented : 28%".
- Measurements Panel:** Lists various points and camera stations with their coordinates and distances. For example:
 - point(s)[Op Ids: 36] <X,Y,Z>: 454.298, 240.021, -1195.76; Precision: 5.750, 3.254, 15.462
 - camera station(s)[cs: 1] <X,Y,Z>: 24.030, -24.589, 45.329
 - point(s)[Op Ids: 40] <X,Y,Z>: -359.853, 46.064, -738.620; Precision: 2.324, 2.063, 2.748
- Inset Image:** A detailed view of a road sign with a red arrow pointing to a specific point on the sign. A vertical scale bar is visible on the left of the inset. A yellow arrow points to the bottom of the sign. Text "419cm" is displayed on the left. Below the inset, the text "Capture the condition" is present.
- Coordinate Data:** A small window shows coordinates for a point: <X,Y,Z>: 419.995, 122.647, -401.159.
- Status Bar:** Shows "Max residual: 1.88, pt28/photo2" and "Last Alert".

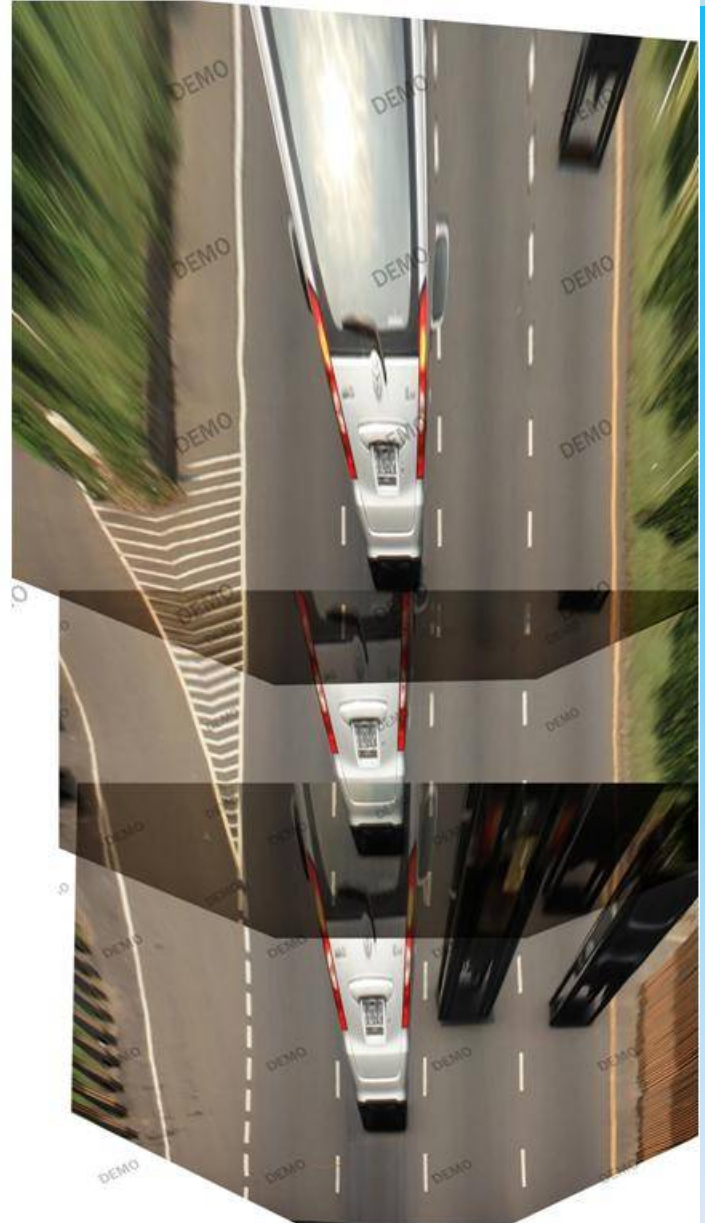
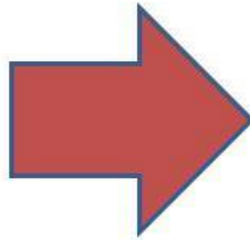
Measuring object: shape-dimension, position, and physical condition calculated in every point position



Road Pavement (1 cm accuracy) in local coordinates systems



Road Pavement (1 cm accuracy) Ortho Road Image



Object Valuation along the road



Object Valuation along the road (supporting building taxation)



Some Problems

Generally, the survey activities should be done in time where the traffic is high density. So, it is better to **rise up the camera up to 3m above the ground.**



- Some objects such as toll-gate can not be captured by using two camera with forward looking only. This should use a wide field of view up to 270 deg. So, it is need to combine more than four camera.
- One of the biggest geometry error is because the camera use non-metric lens. It is need to utilize in-situ calibration objects to resolve the lens distortion parameter and the relative orientation between the multi camera also.
- It is need to develop the automatic tie-point matching feature to produce the point cloud data just like the laser scanning do. This is possible because the image correlation between the two adjacent cameras are good.

CONCLUSION

1. There are some basic product that can be utilize for the corridor based mapping.
2. The measurement capabilities yield a good results, and it is potential for many remote measurement applications.
3. The high resolution image can capture the existing conditions.
4. Some future development still needed related to the some field disturbances and automation in data processing.