

Articulograph AG500 Quality Measurement

Three sensors were calibrated with the Circal calibration unit and fixed on a plastic board. The sensor axis were aligned parallel to the AutoKal Y-axis as well as parallel to the X-axis.

All data are presented in a form as they came out of the machine. There was no smoothing or other processing done.

Each measurement is performed as one sweep. The data recording was continuously while the AutoKal was moving.

The first measurement "py-cube80.txt" was done with the sensors parallel to the Y-axis as shown in Figure 1.

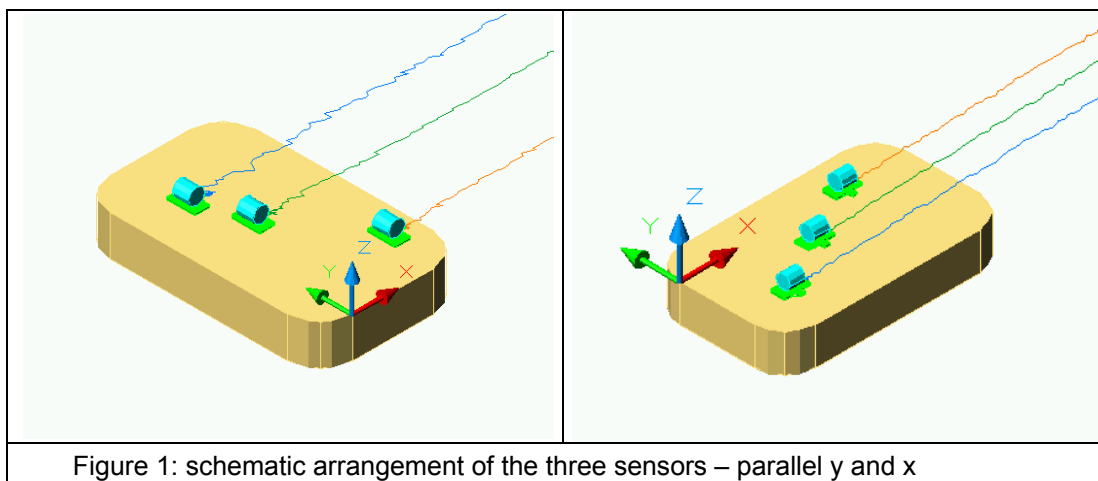


Figure 1: schematic arrangement of the three sensors – parallel y and x

The board was fixed on the AutoKal and the following movements were performed (Figure 2):

- 80mm in positive x-direction
- 80mm in negative y-direction
- 80mm in negative x-direction
- 80mm in positive z-direction
- 80mm in positive y-direction
- 80mm in positive x-direction
- 80mm in negative z-direction

The board with the sensors was rotated by 90° around the AutoKal Z-axis and the same measurement was done again (Figure 3).

The following figures show on the left side the measurement with sensors parallel y-axis and on the right side the corresponding result with sensors parallel to the x-axis.

The co-ordinate system for the plots was defined by the first two sections (+x and -y) from the center sensor.

Just the first two moves were selected, without checking if other orientations would fit better. Perhaps another orientation would show less deviations from an ideal system.

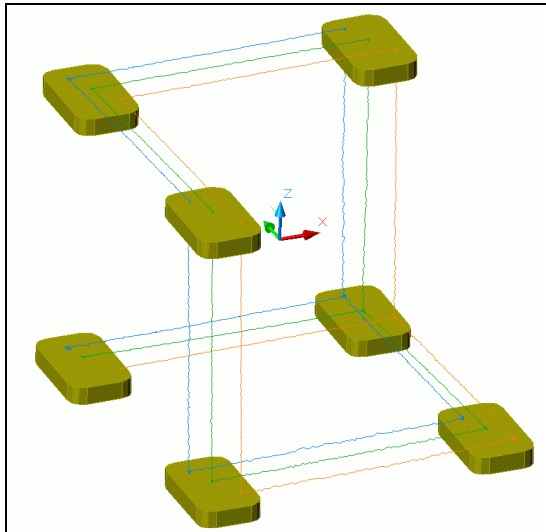


Figure 2: sensors parallel Y

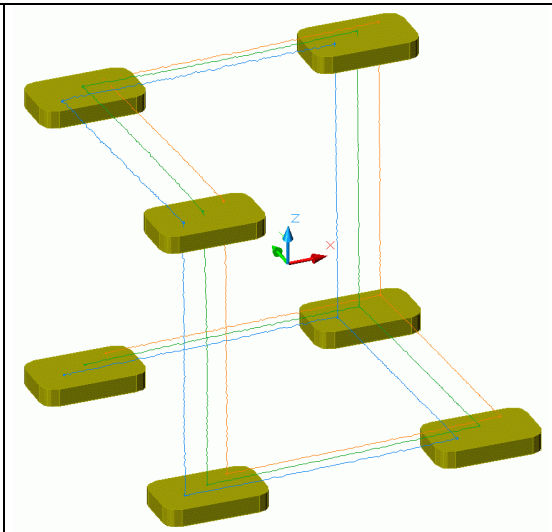


Figure 3: sensors parallel X

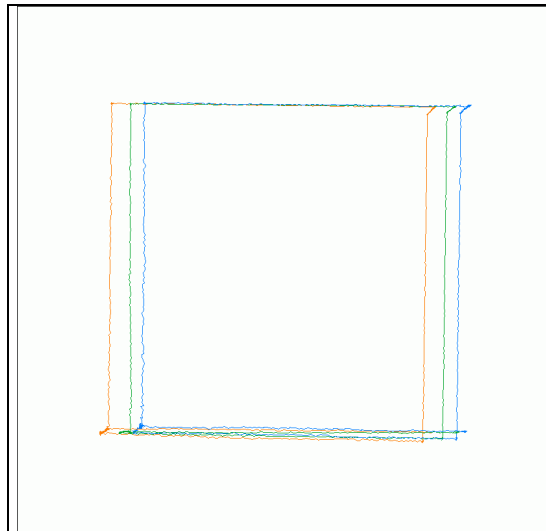


Figure 4: py-cube80_y – view from +y

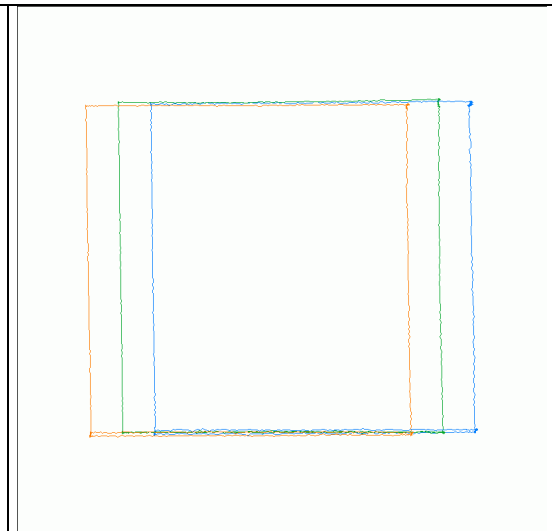


Figure 5: px-cube80_y – view from +y

Figure 4 and Figure 5 show a perpendicular view on the x-z plane and the Figure 6 and Figure 7 show the corresponding perspective view.

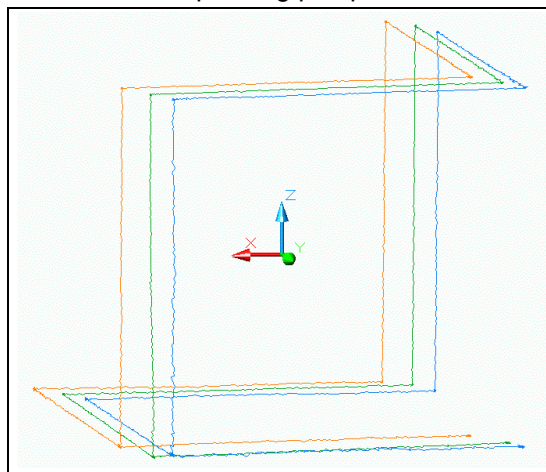


Figure 6: py-cupe80_y2

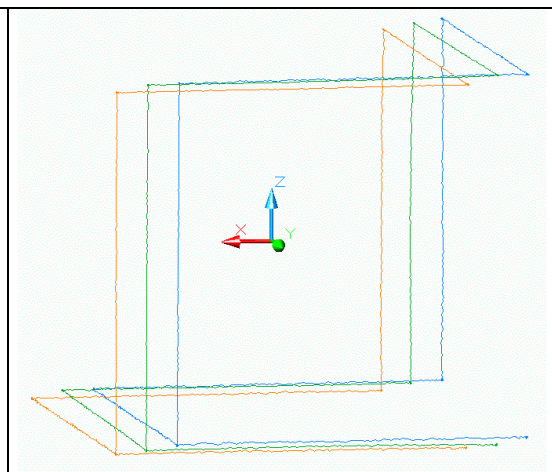
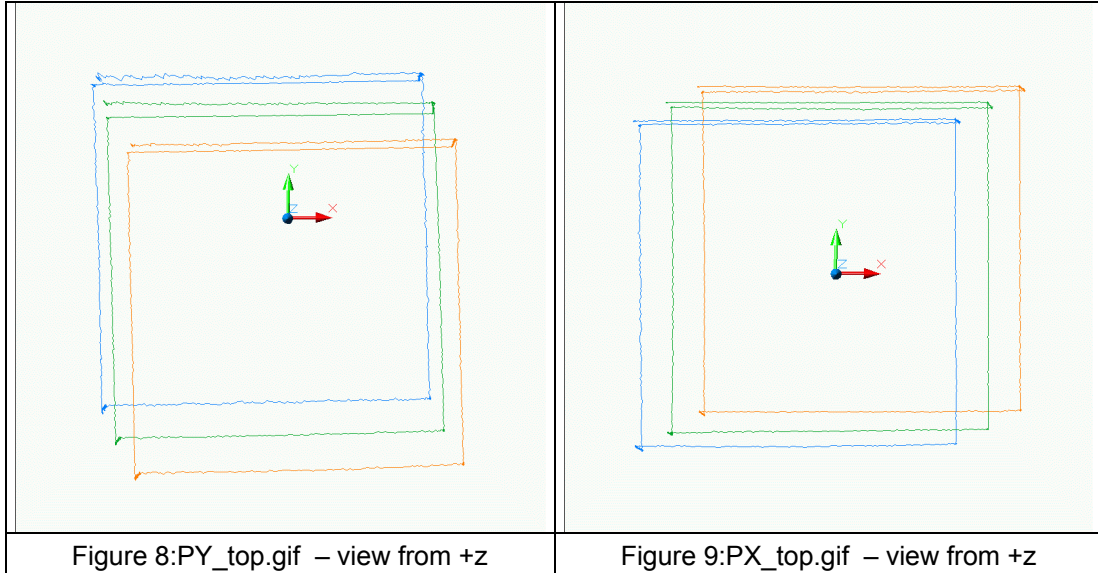


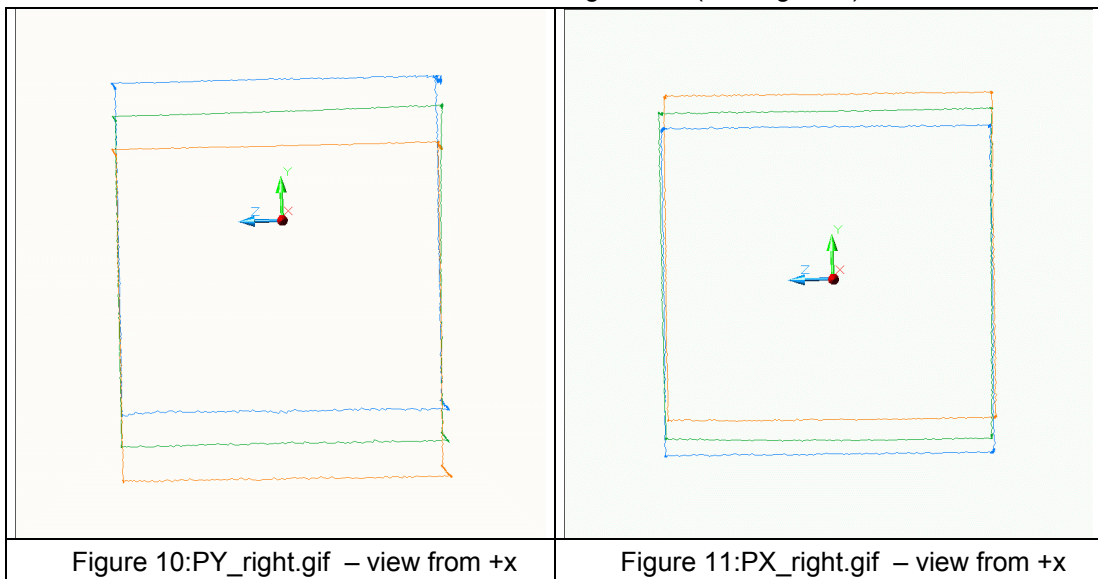
Figure 7: px-cupe80_y2

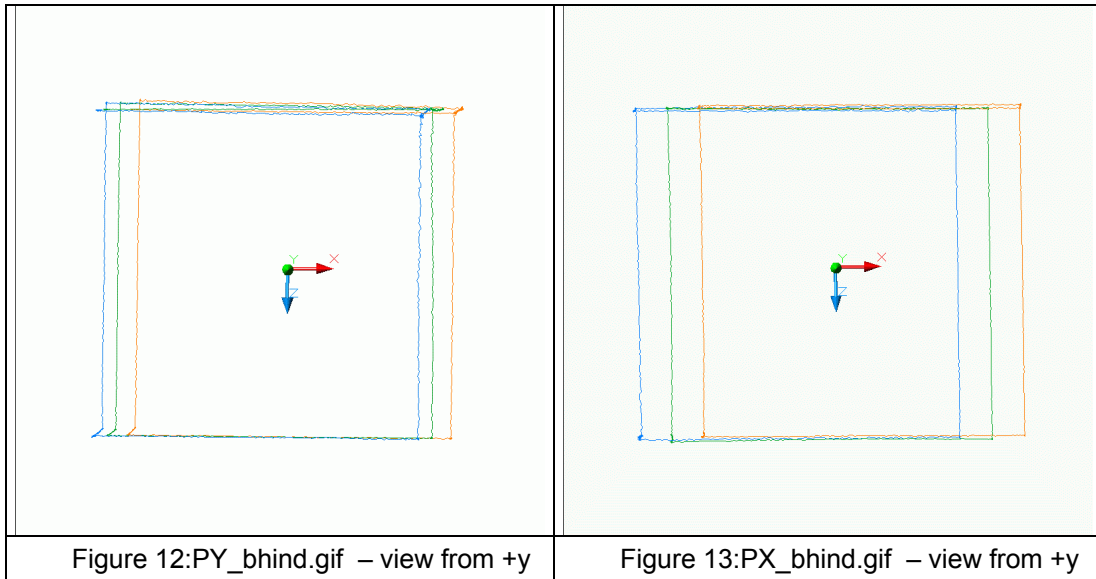
In Figure 8 and Figure 9, the lower left and upper right corner the movements in z-direction are seen. In an ideal systems this movements should appear as single points. Also in an ideal system the upper parallel lines would be projected at the same place.

In a correct aligned co-ordinate system, this deviations would show the measurement errors.

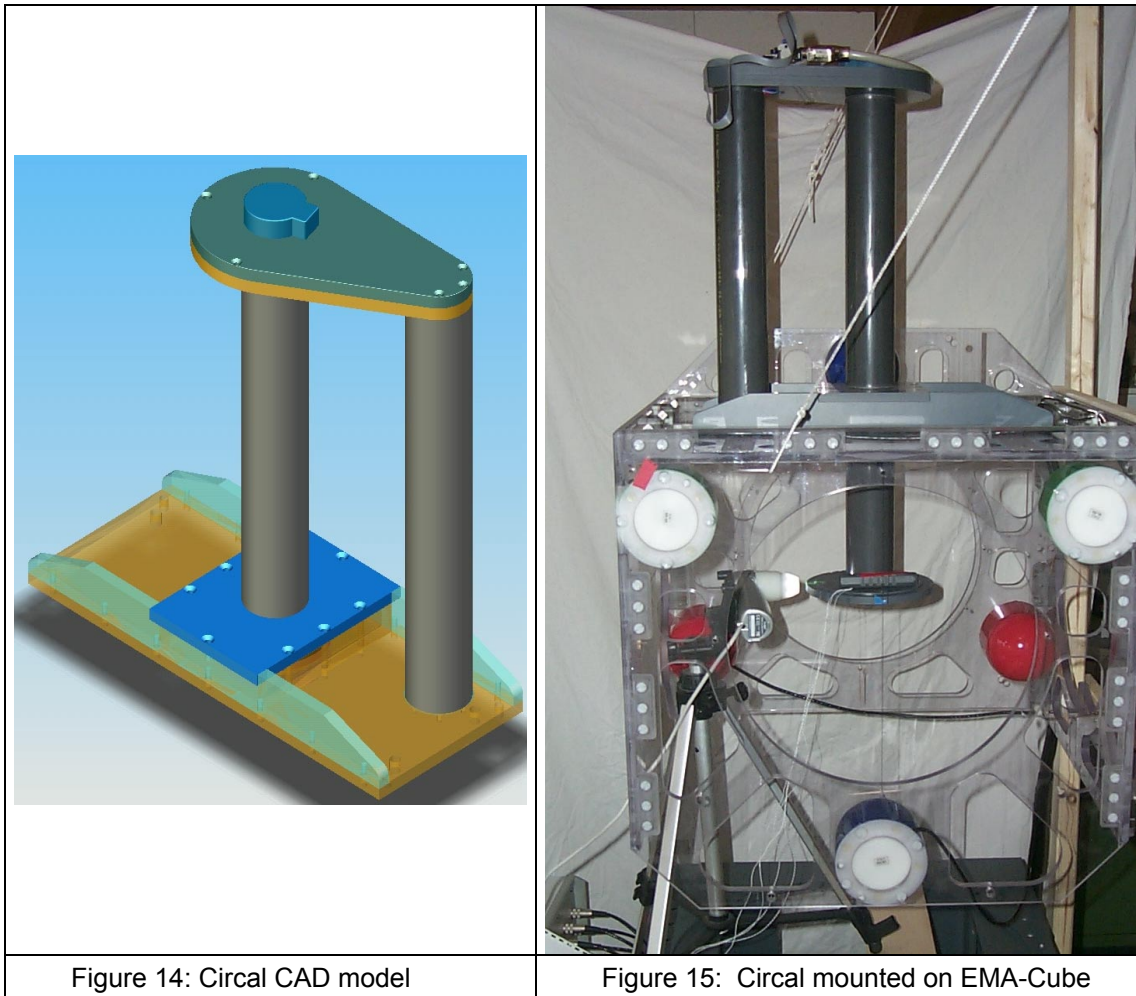


The upper and lower parallel lines in Figure 10 and Figure 11 are different distances because the sensors have different distances in both board alignments (see Figure 1).





New calibration unit "Circal"



The lower part from the Circal is removable. So the main part of the Circal can stay mounted during an investigation.