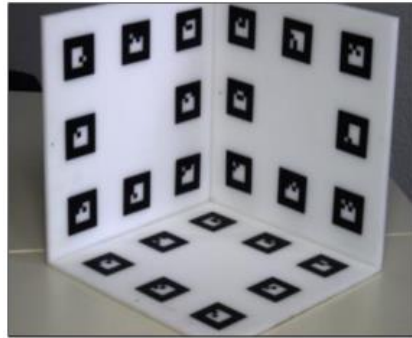


Camera Calibration using Direct Linear Transformation (DLT)

The three-dimensional reconstruction of objects from images requires, that the *interior* and *exterior orientation* of the cameras are known. Acquire one image from an object of your choice and determine the projection matrix using a direct linear transformation (DLT) to reconstruct the geometry of image formation.



Task 1 – Image acquisition

Take one picture of an appropriate calibration object and transfer this image into the computer.

- Describe the acquired calibration object in brief.
- Specify important technical information of the used camera (i.e. type, resolution, etc.).

Task 2 – Control Point Measurements

Determine the three-dimensional object coordinates of at least 6 known control points (e.g. by using a folding rule) and their two-dimensional image coordinates. a) How did you define the axes of the object coordinate system? b) How precisely are the object coordinates measured?

Task 3 – Estimation of Projection Matrix

Implement a function on your own for spatial resection using the direct linear estimation method of the projection matrix. Singular value decomposition (SVD) can help solving the equation system.