



## CVTCLIB

The **CVTclib** software library, developed by CUVIS for Opto Engineering, is a powerful tool for building custom software applications in telecentric-based metrology systems.

### KEY FEATURES:

- calibration of telecentric measurement systems
- correction of residual lens distortion
- fast subpixel edge detection and labelling.

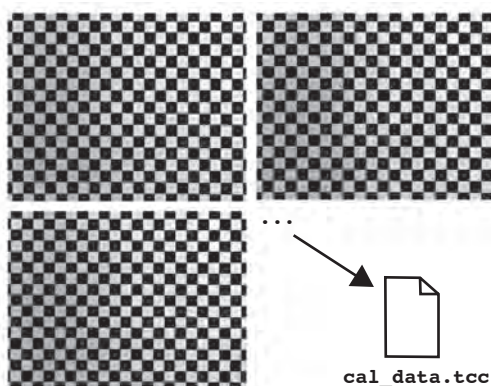
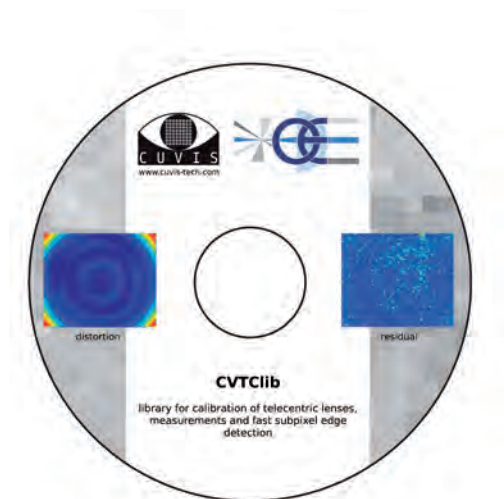
### Calibration and Correction of distortion

Even if the distortion of Telecentric Lenses is usually very low, it can still lead to unwanted measurement errors: CVTclib allows for extremely accurate calibration of the system by minimizing residual distortion, thus making the most demanding applications possible.

Just to give a feeling of the software capabilities, let's consider a telecentric lens featuring a distortion as low as 0.1%; this would normally lead to a 0.1 mm dimensional error at the image borders when imaging a 100 mm wide object, while CVTclib can lower such error to 0.007 mm (0.007%).

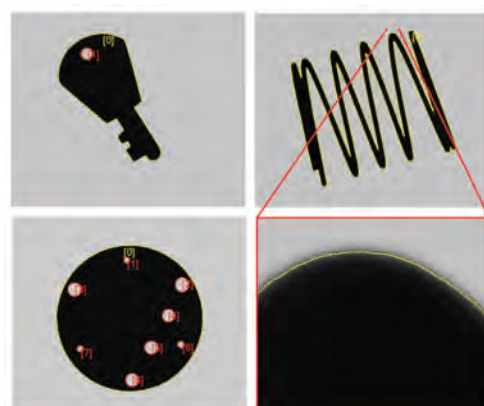
The calibration procedure just requires the acquisition of a few pictures of a checkerboard pattern; CVTclib's calibration functions take into account lens distortion (radial and trapezoidal), optical system misalignment and background illumination inhomogeneity.

System calibration data are stored into a small binary file which can be used during the measurement process.



**CVTclib** provides three ways to correct measures, so as to comply with the different stages of a measurement procedure (image processing, edge detection and edge analysis):

- **Single point coordinates correction**, to be used in combination with existing image processing and edge detection functions; CVTclib can elaborate the edge so as to obtain its undistorted metric coordinates.
- **Subpixel edge detection** together with undistorted metric coordinates computation, by means of CVTclib functions straight on camera frames.
- **Entire image correction**; you can pass a camera frame to CVTclib and get it undistorted, so that you can use your own image processing and edge detection functions.



### Edge Detection

CVTclib implements superior edge detection functions with subpixel accuracy that can:

- extract edges with different precision grades
- return them as ordered chains of pixels for ease of computation
- label edges as "internal" or "external"
- identify them through an ID, also allowing for multiple objects analysis

### Product Package

The software package includes:

- runtime library files: CVTclib.dll, CVTclib.lib, header files
- sample applications for calibration and measurement, to quickly test the library
- reference manual, with full documentation of the library functions and code examples.