

The Angular Calibration Tool

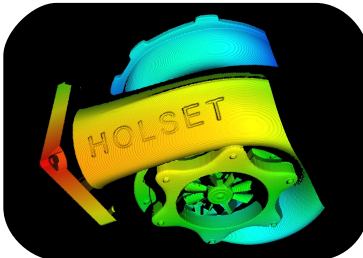
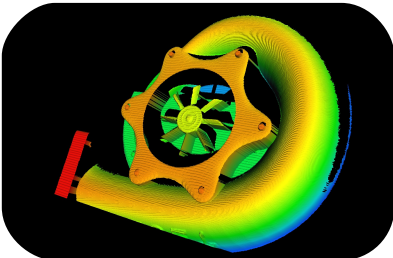
The Angular Metric Calibration Tool of the AQSENSE SAL3D library extracts automatically and easily calibration parameters for reconstruction of Point Clouds without distortion, from scanned objects using a camera-laser configuration rotating about an axis.

Features

- Easy to use: Only a simple single step calibration operation required
- Very accurate conversion 2.5D -> 3D
- Totally removes perspective distortion effects (1)
- Average real 3D error: 50 µm (2)

Benefits

- More compact and cost saving, compared to linear scanner
- Perfect for integration on a robot arm
- Allows 3D scanning of wide static areas



Turbine scanned using the Angular Metric Calibration Tool

Match3D Sample Code

```
const PatternSPPoints points = { {-30, 30}, {-10, 60},
    {10, 60}, {30, 30}}, 60 };
const float initialAngle = -5.0f
const float angleStep = 0.01f

sal3d::AngularMetric::Config config =
sal3d::AngularMetric::calibrate(patternRangeMap, points,
initialAngle, ang)

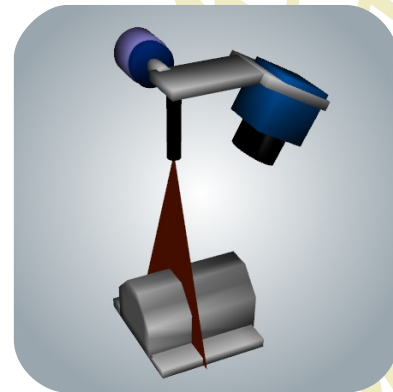
// Now we use the config obtained to create a COP.
sal3d::COP cop(patternRangeMap, config, initialAngle,
angleStep);
```

1. Perspective distortion occurs, due to distance difference from scanned object to the camera.

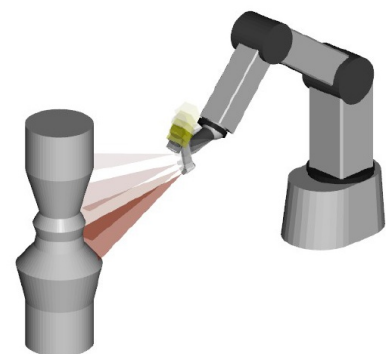
Lens distortion can as well be corrected by using the Lens Distortion Tool.

2. Real condition, using AQSENSE Peak Detector Tool.

Camera-laser angle: 30°, F.O.V. = 130mm. Sensor noise, laser speckle, depth of focus, etc... may influence the result.



Angular Calibration using AQSENSE's calibration pattern



Angular scanner integrated on a robot arm