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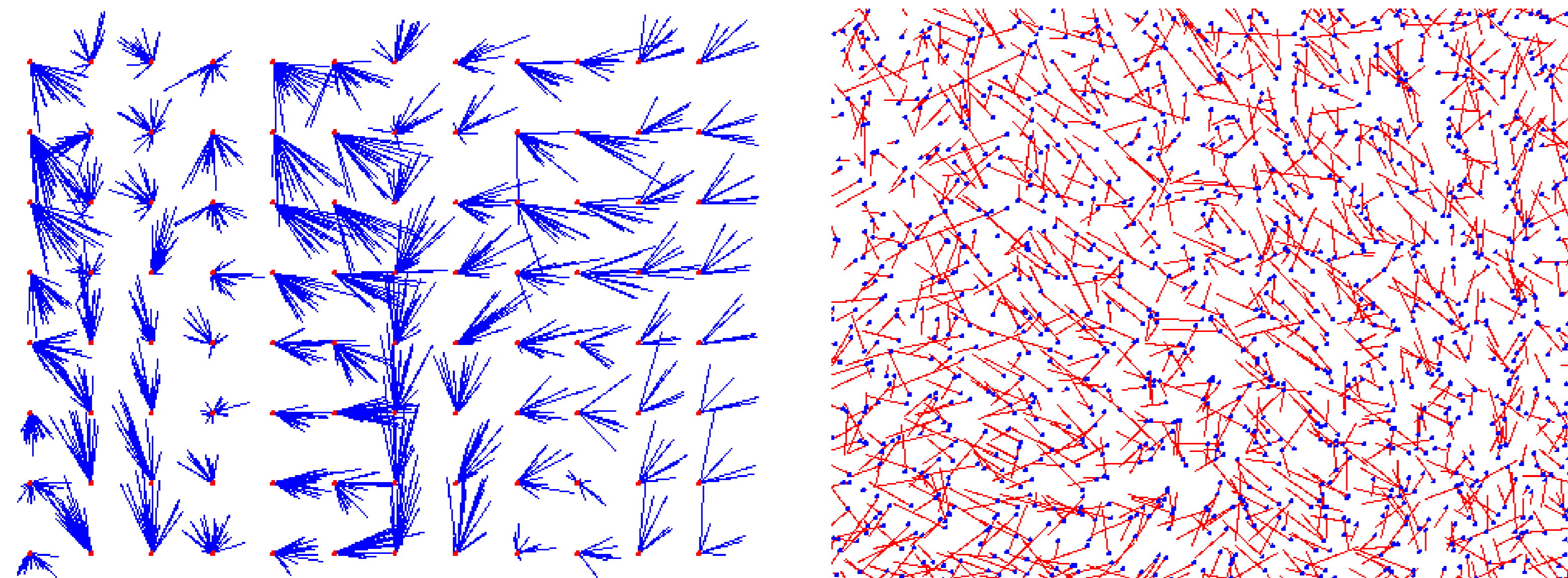
# Robust Camera Calibration using Inaccurate Targets

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## Research Goal

The strongly polarized distribution of the reprojection error with respect to target points obtained in our calibration experiments suggests that the measurements on images were not subject to zero-mean error. On the other hand, the distribution of the error on the image plane is isotropic, assessing the good compensation of radial and tangential distortions and the reliability of the corner detector. This supports our hypothesis that the discrepancies are due to systematic printing errors



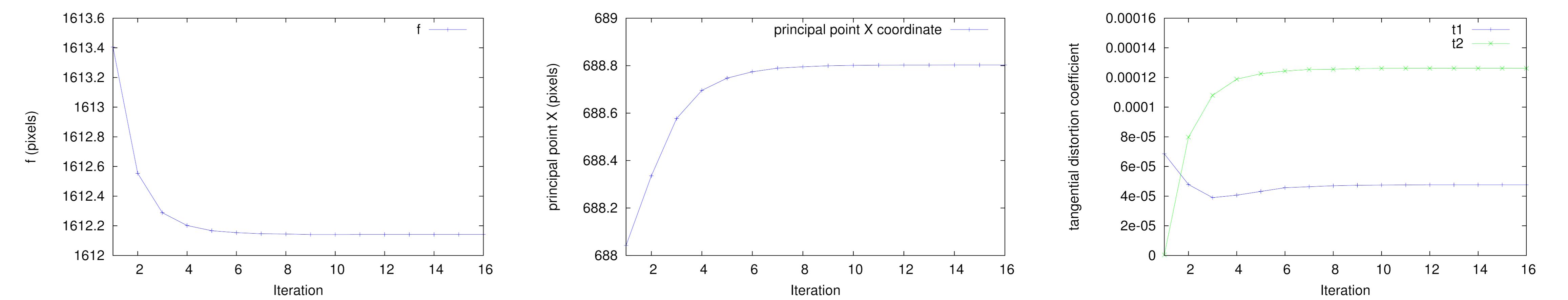
## Calibration Algorithm

```

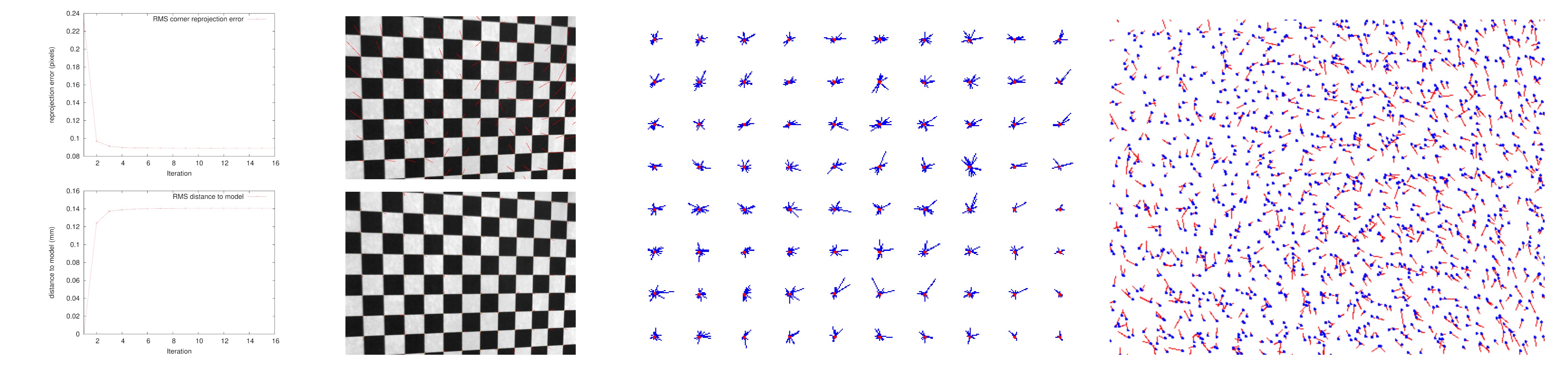
originalTarget ← target
reprojectionError ← +∞
currentIteration ← 0
while reprojectionError > minError and currentIteration < maxIter
    CameraParameters ← calibrateCamera(target, images)
    reprojectionError ← bundleAdjust(target, cameraParameters, images)
    Target ← hornAdjust(target, originalTarget)
    currentIteration++
return cameraParameters
  
```

## Experimental Validation

### Convergence of internal and distortion camera parameters



### Reprojection error reduction and distance to theoretical model



### Stereo validation

To better understand the relationship between the reprojection error and the calibration accuracy we performed an independent check based on stereo reconstruction with a pair of calibrated cameras.

	Reproj. error	Distance to model	Measure error
Model full set	0.08907	0.14062	0.00145
Model small set	0.05814	0.11645	0.00317
No model full set	0.23191	0	0.00362

