



UCSB Gantry Qualification Results

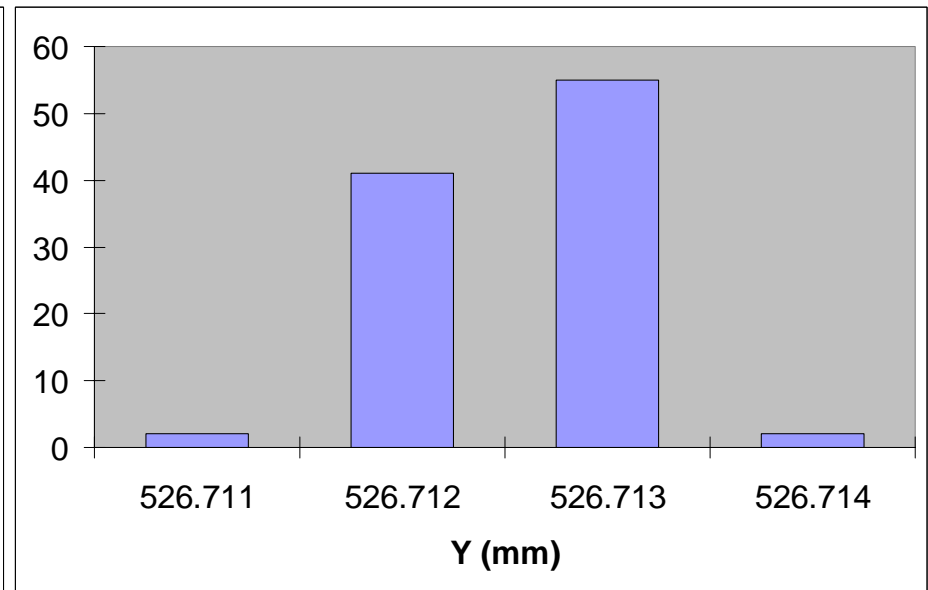
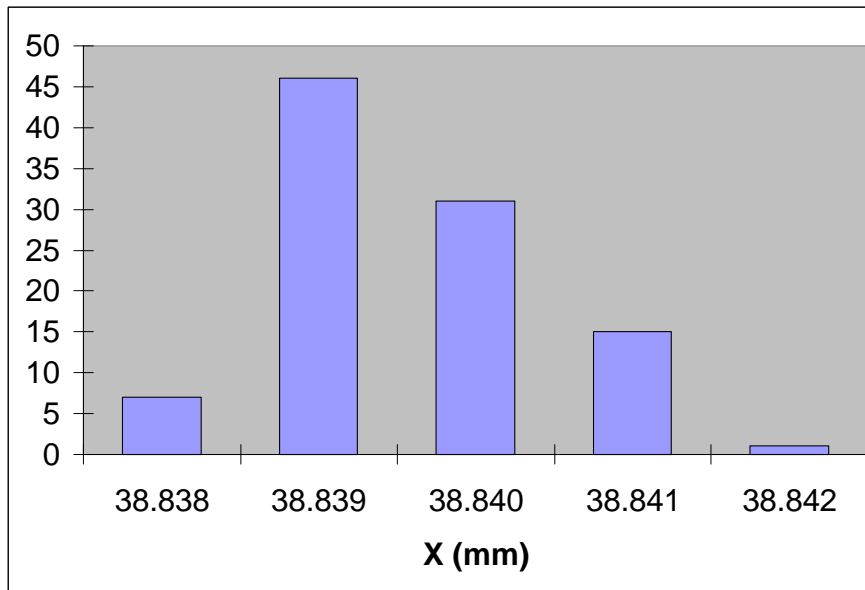
*following November 2001 document:
“Gantry Centre Qualification Procedures”
(CMS Gantry Working Group)*



Exercise 2.1: Manual positioning repeatability



- Hold down sensor with vacuum
- Measure position of fiducial with joystick and crosshair
- Move randomly away, then back and re-measure fiducial
- Repeat 100 times (v. tedious!)



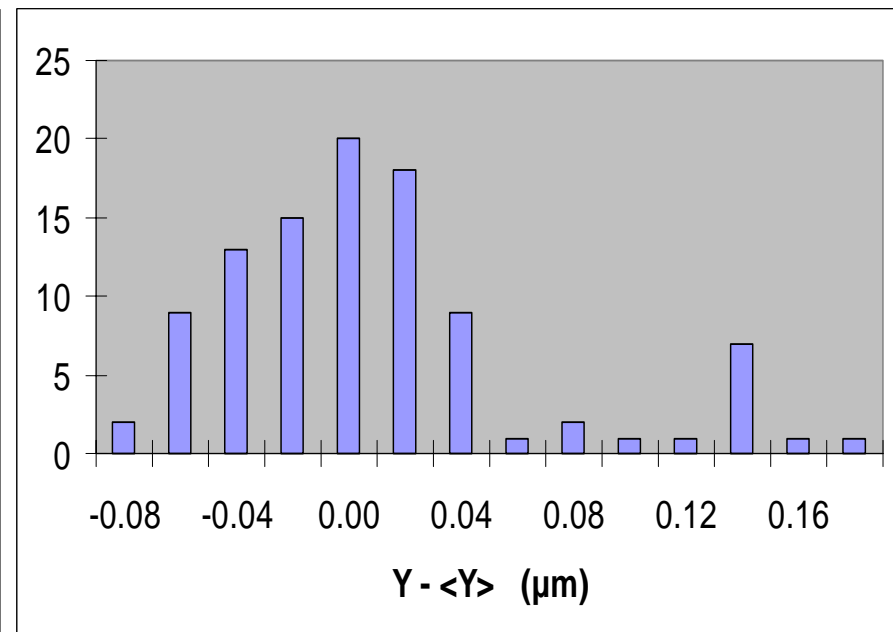
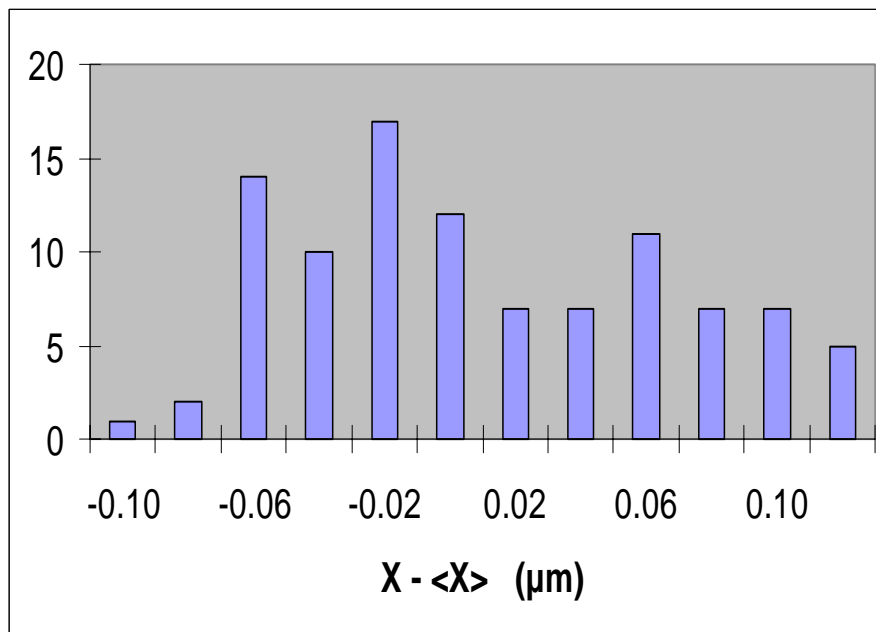
- Standard deviations: X 0.9, Y 0.6 μm



Exercise 3.1: Pattern recognition intrinsic repeatability



- **Hold down sensor with vacuum**
- **Position camera over silicon fiducial**
- **Run pattern recognition (PR) 100 times**
 - **No gantry movement**



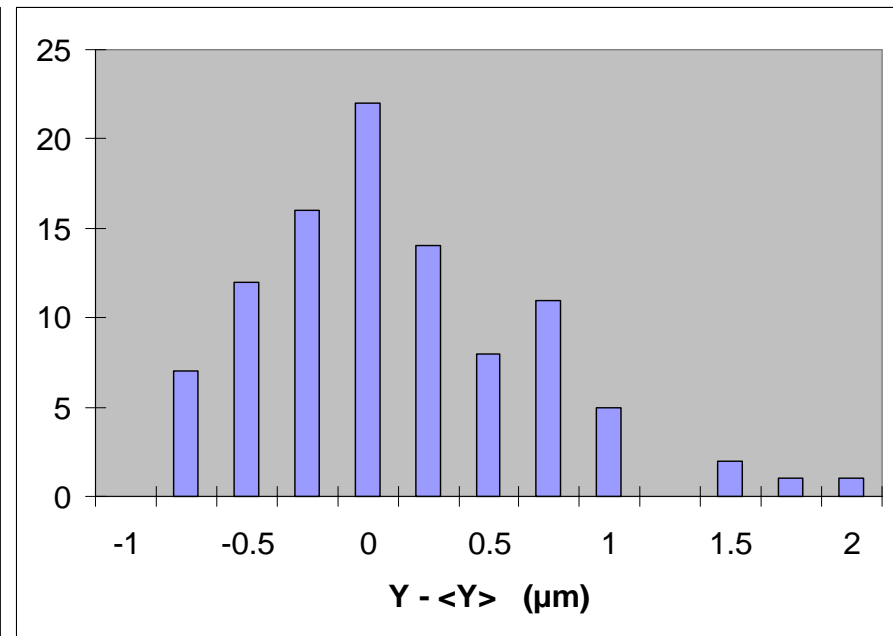
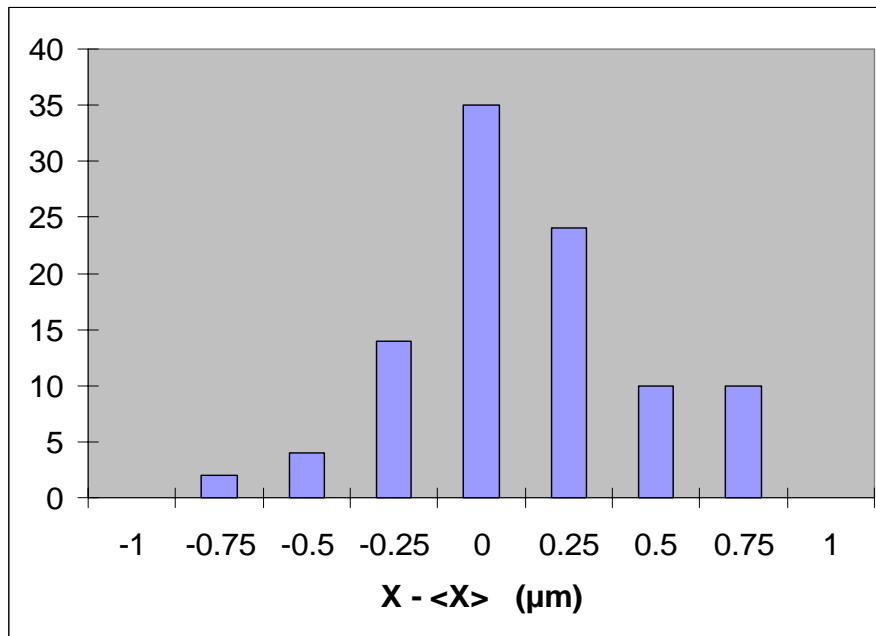
- **Standard deviations: X 0.06, Y 0.06 μm**



Exercise 3.2: PR global repeatability



- Hold down sensor with vacuum
- Move camera over a 100x100 μm grid, centred on silicon fiducial, in steps of 10 μm
- Run PR at each step



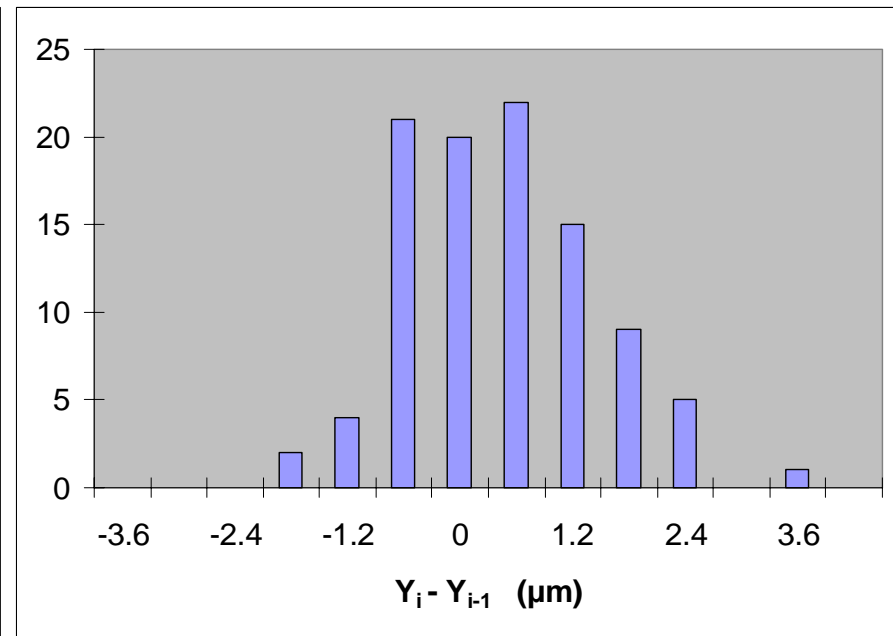
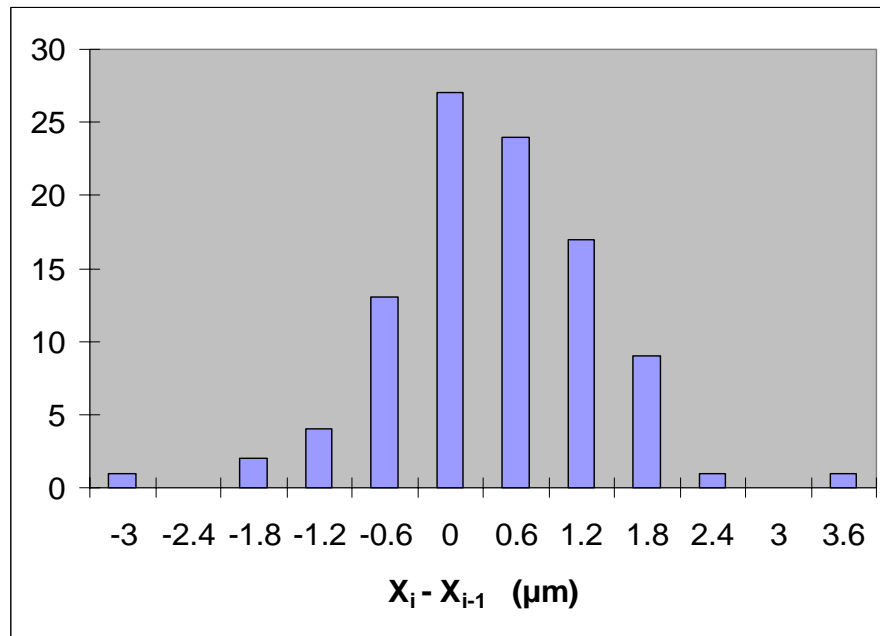
- Standard deviations: X 0.3, Y 0.6 μm



Exercise 4.1: Pick and Place



- Repeatedly (100 times) pick up, put down and vacuum hold sensor with no gantry X-Y movement
- At each step measure marker and calculate position difference with respect to previous iteration



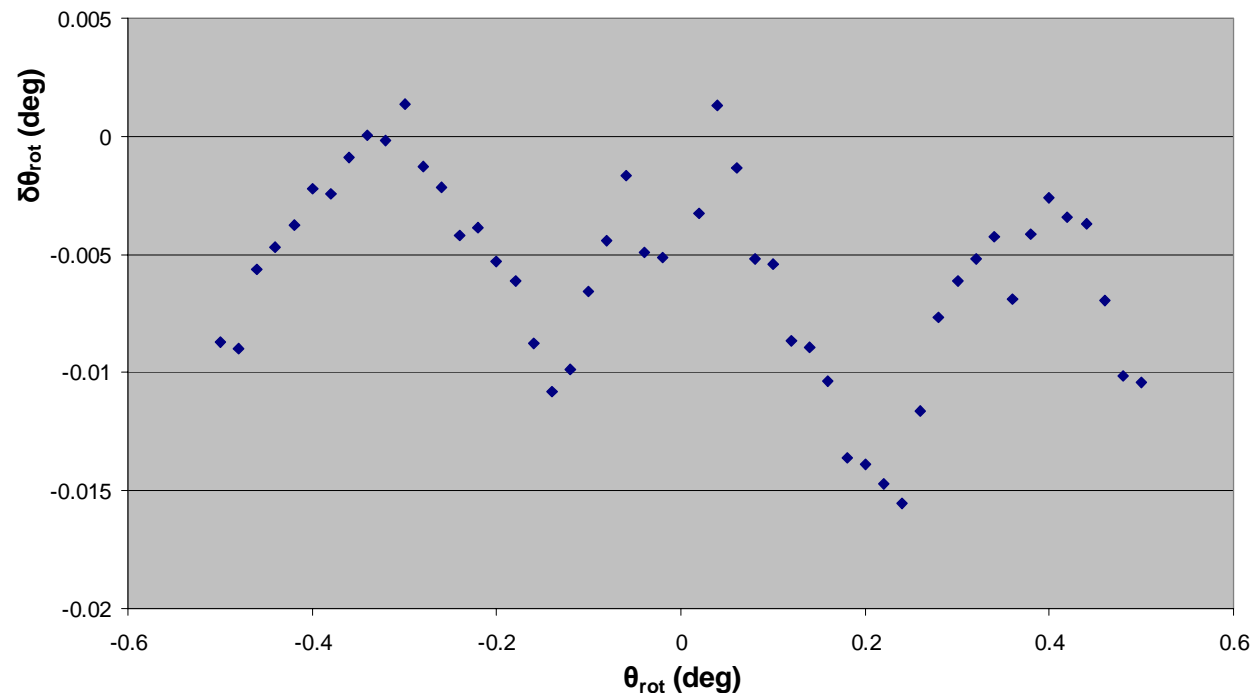
- Standard deviations: X 1.0, Y 1.0 μm



Exercise 4.2: Rotational Correction



- ‘Lyon’ test of accuracy of the θ axis
- “Hot off the press” (exercise only done last week)
 - See same general behaviour as other gantries
 - Need to quantify and apply the correction
 - No. 1 on the “to do” list! (i.e. no correction applied in following exercises)

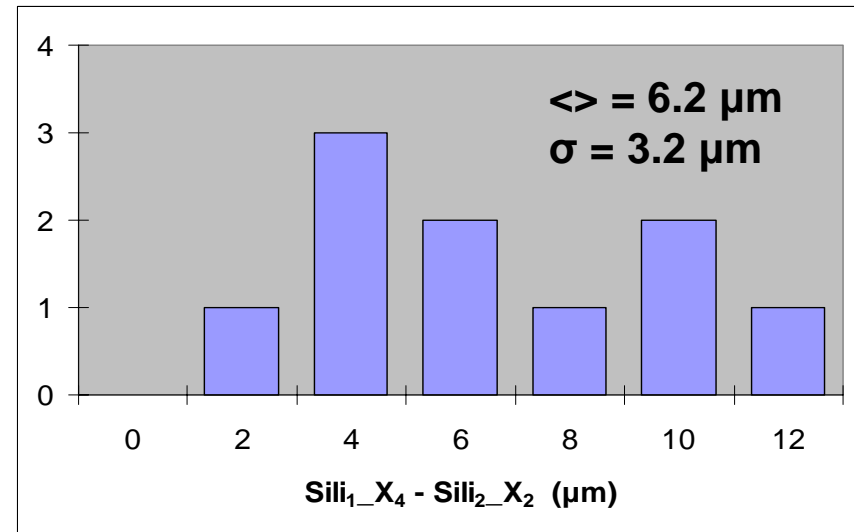
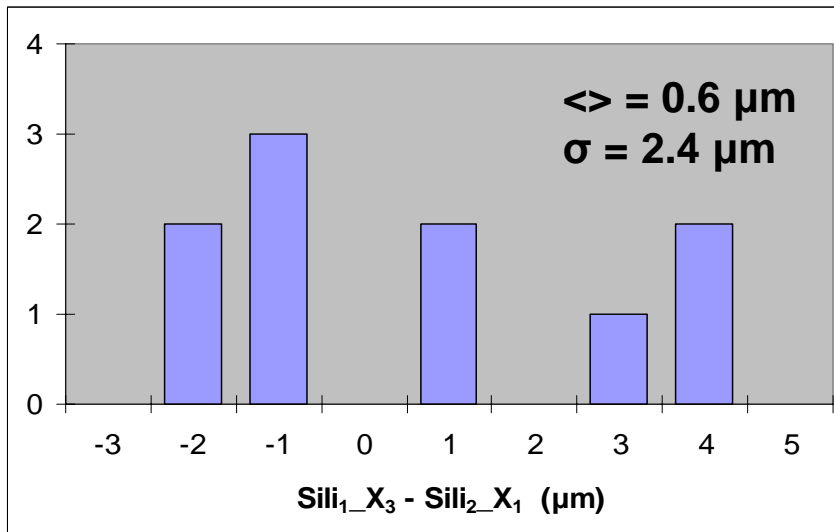
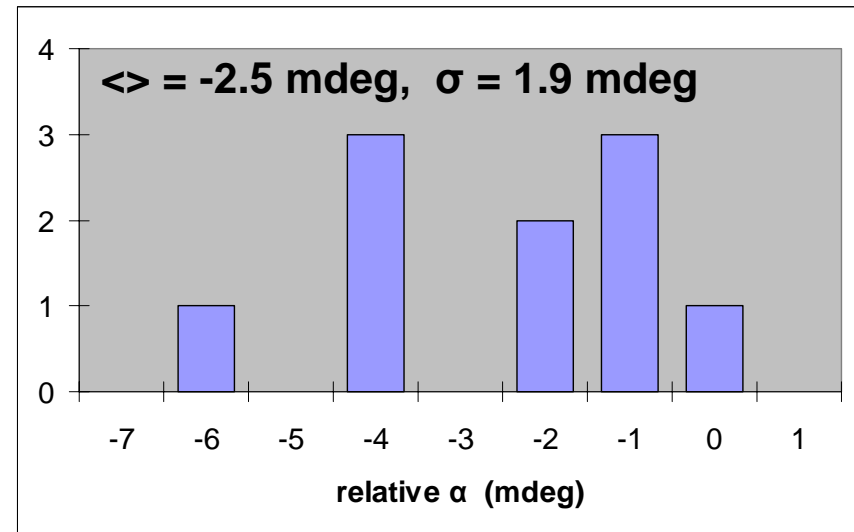




Exercise 5.1: Silicon-Silicon-Frame Assembly (I)



- 10 dry-run silicon on frame assemblies
- Plots show silicon-silicon strip alignment and relative angle
- 2D calibration file ACTIVE
 - Noticeably improves results (x2)
- Rotation correction not in yet



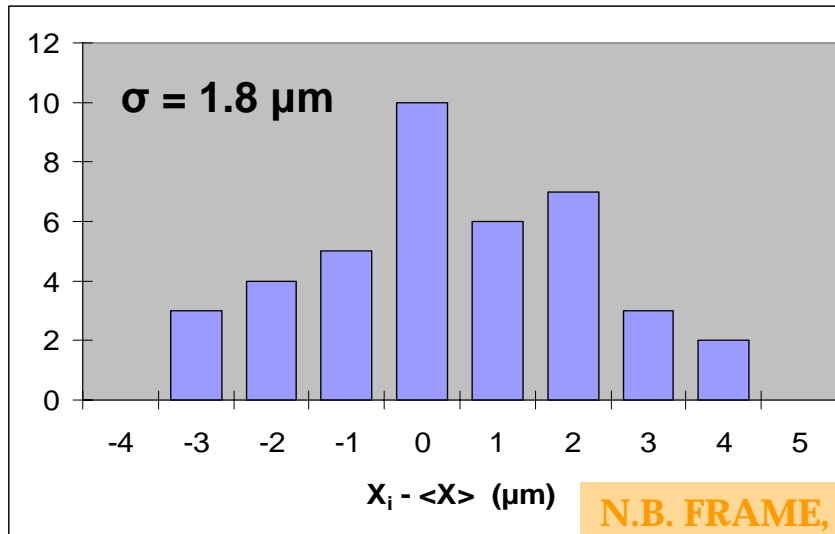
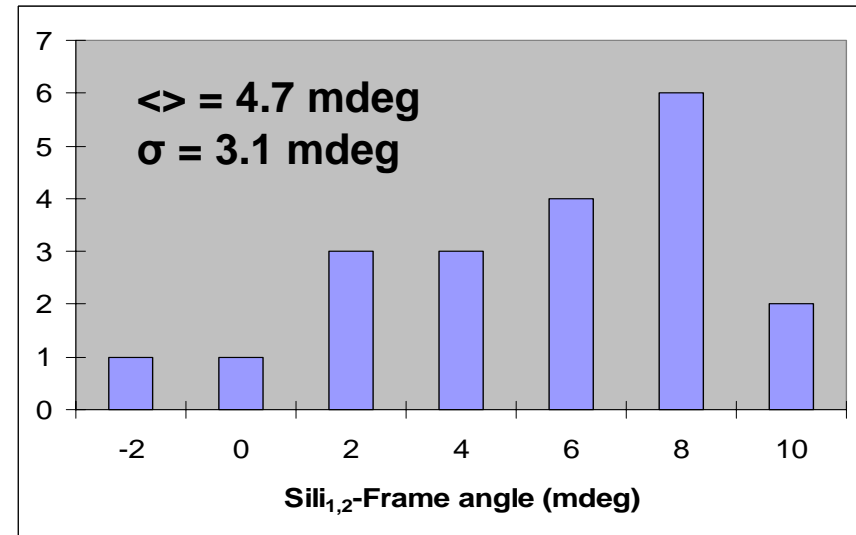


Exercise 5.2: Silicon-Silicon-Frame Assembly (II)



Going clockwise from right...
(for the same 10 dry-runs)

- Silicon-frame angle is OK
- Absolute silicon placement wrt frame looks good (Shown is Y position for 'inner' 4 fiducials)
- And dispersion around mean is not large



N.B. FRAME, NOT GANTRY, X!

