

# Probing at 67 micron Pitch

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# Probing at 67 micron Pitch

- Pad Ring - 800 Pad Single Row Periphery
- Probe Equipment Setup
- Vision Coordinate Measurement System
- Probe Mark Data Analysis: Card/Single Die
- Probe-to-Pad Positioning Process Capability

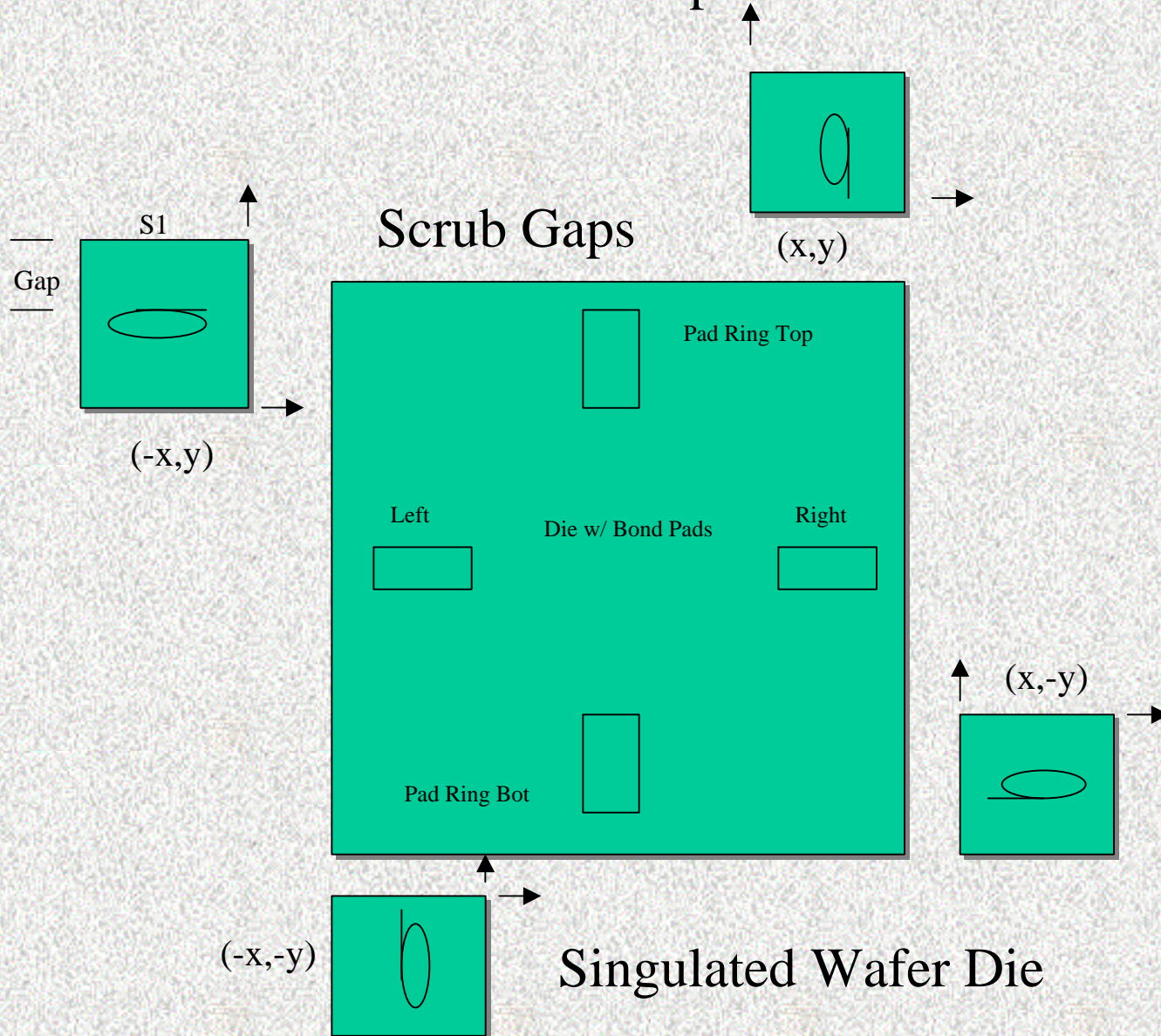


# Pad Ring Layout

- Pad Ring Size - 13,500 micron square
- 800 Pad
- Single Row Periphery
- 67 micron pitch
- Pad Opening - 55 X 120 micron

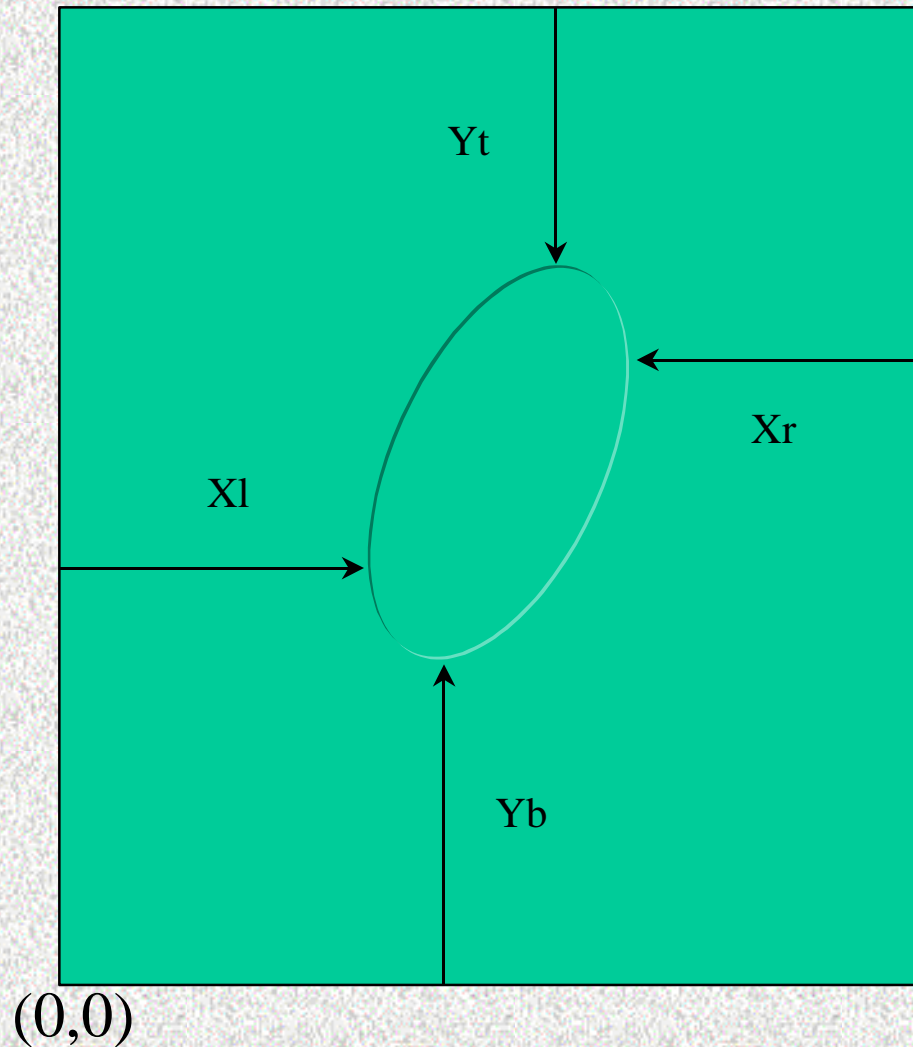


# Die Scrub Profile Representation





# Scrub Mark Geometric Representation



$$\text{Scrub\_Mark\_Box\_Composite} = \text{Pad Opening} - \text{Gaps\_Distribution}$$



# Probe Equipment Setup

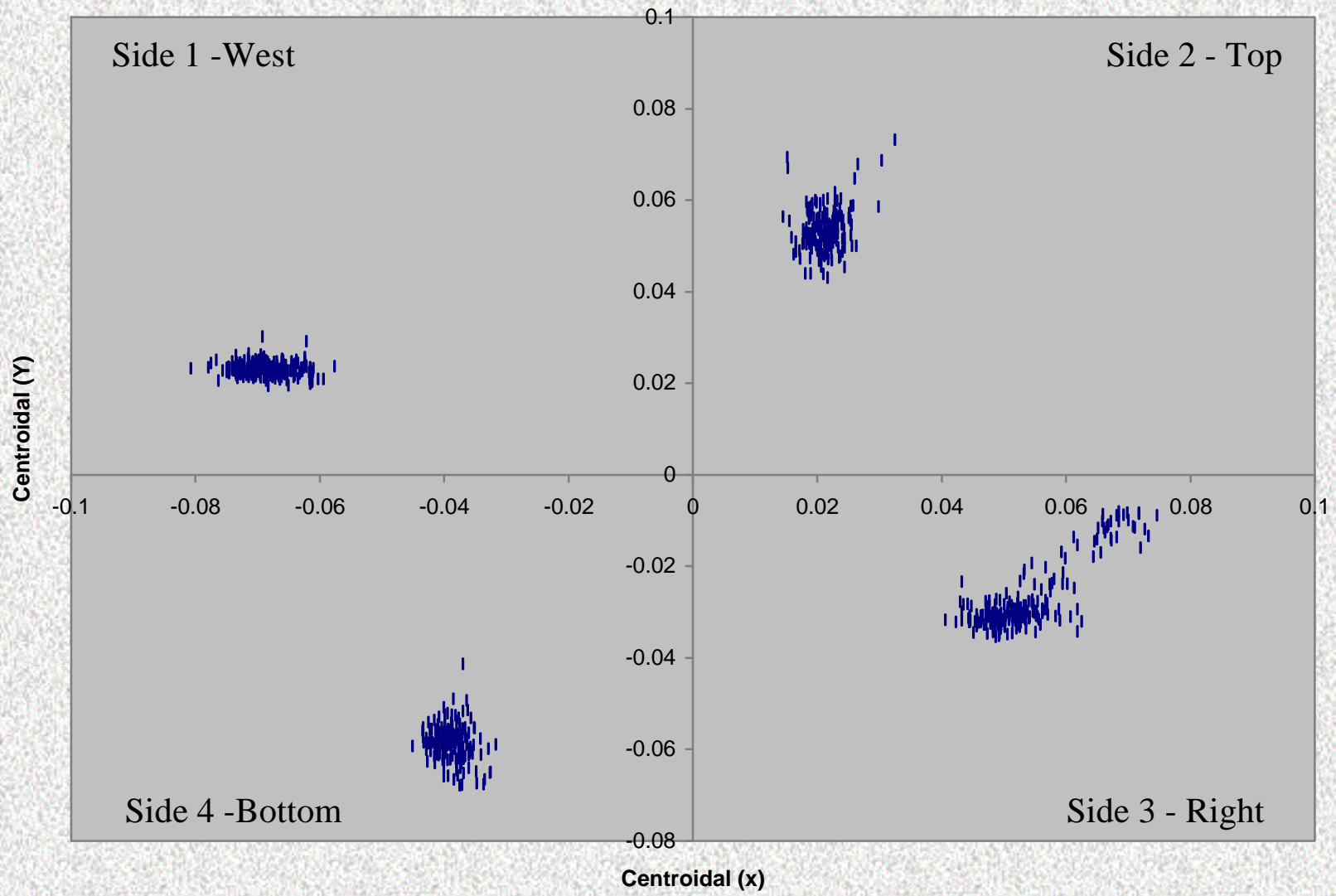
- Probe Card - 3 tier, 800 Pin, Epoxy Needle
- Probe System - EG4090
- Test Head Interface - ITS9000GX floating
- Overtravel Setting - 3.0 mil



# Vision Coordinate Measurement

- General Scanning/View Engineering V1212
- Coaxial Illumination, 20x objective
- Align to Wafer, Die, Pad
- Corner/Edge Finder Tool - scrub mark box
- Average Area Centroid Tool
- System Accuracy  $\pm 7\mu\text{m}$  (12 inch span)

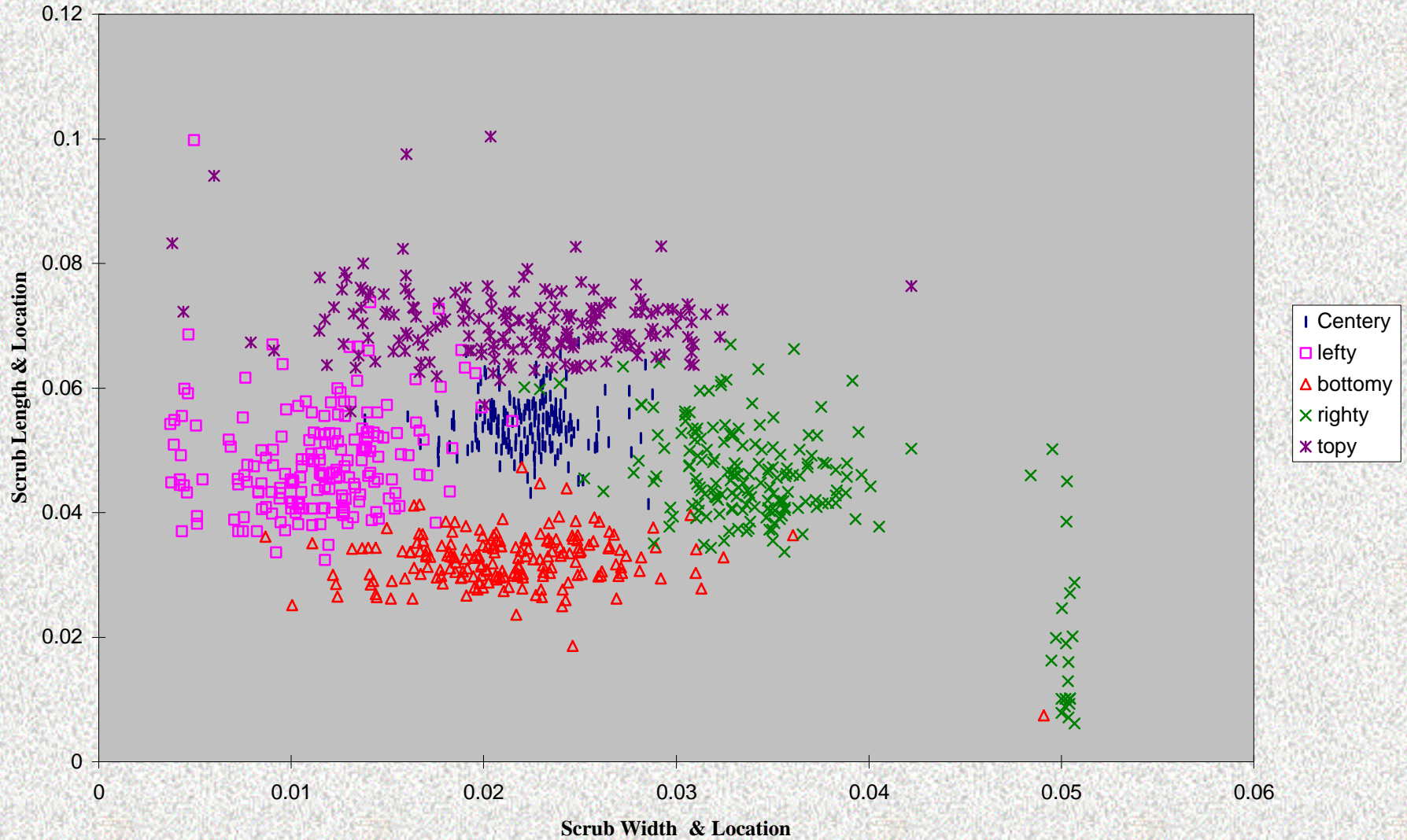
# Centroid Scrub Mark Distribution Per Wafer Die Side





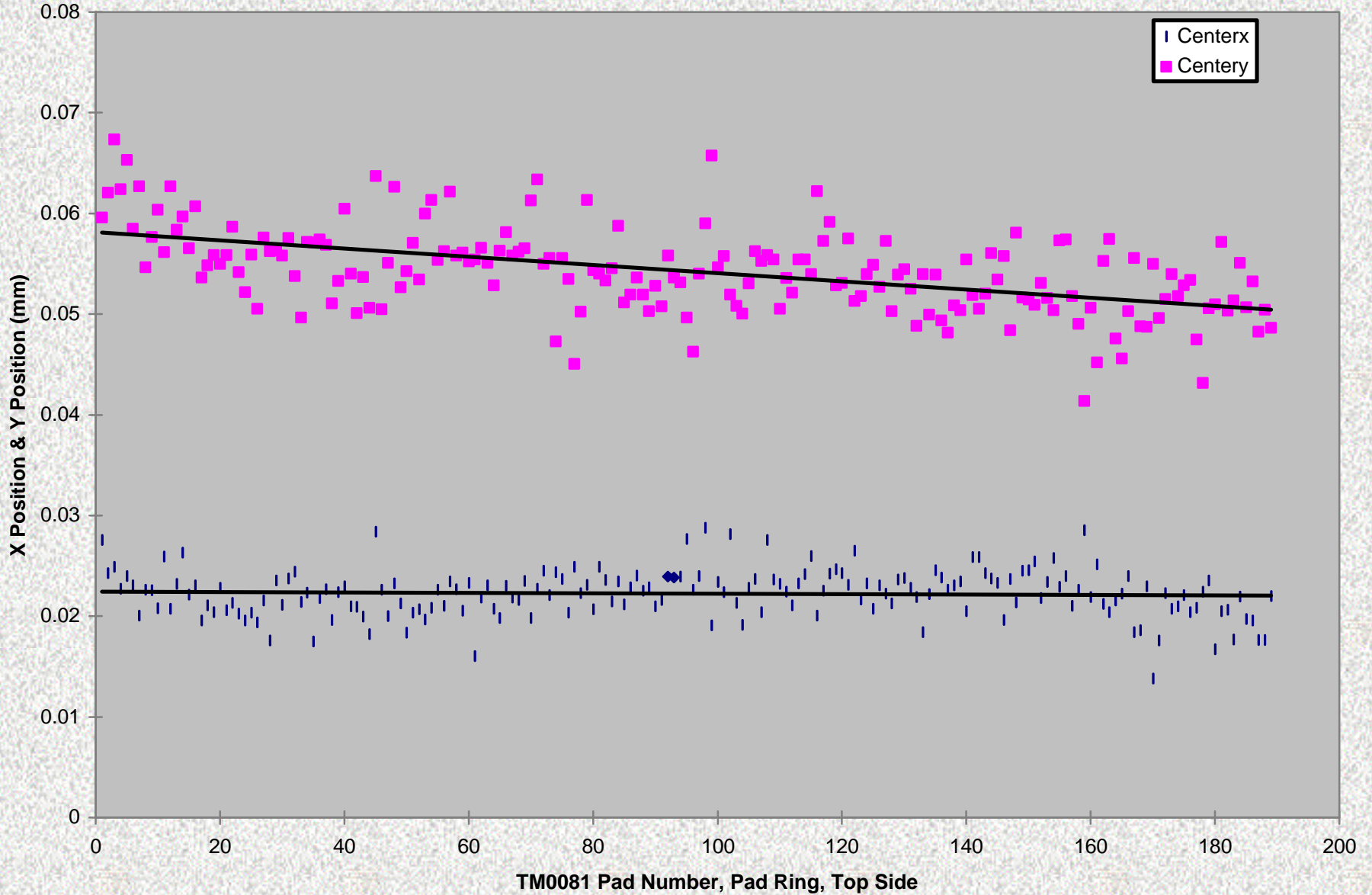
# Scrub Mark Box Edges Composite

Scrub Positions, Top Side Pad Ring, Automated Measurement (mm)





# Probe-to-Pad Theta Rotation





# Scrub Mark Data Analysis

- Measured Scrub Mark Box/Window edges
- Orient data for consistent side-to-side view
- Compute Scrub Mark Box Centroids
- Best Fit vs Pad Centers -----  
to remove setup/probe system  
theta/ $XY$  error
- Compute Scrub Mark Box Edges/Gaps



# Probe-to-Pad Mark Capability

- Compute Probe Card/Scrub Mark Box Size
- For Pad Width “X” Direction
- $C = \text{Pad Width} / \text{Composite Mark Box Width}$
- $C = 55\mu\text{m} / (\text{Box Mean} + 6 \times \text{Edge Sigma})$
- $C = 55\mu\text{m} / (25\mu\text{m} + 6 \times 2.9\mu\text{m}) = 1.3$
- Est. Box Edge, Special Cause Outlier Rate