# Low Cost Artificial Targets For Terrestrial Laser Scanning

Department of Geomatics
Engineering
University of Calgary
Jacky Chow

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University of Calgary

## Outline

- Introduction & Background
  - Existing terrestrial laser scanning targets
- Alternative Methodologies
  - Mean
  - Median
  - Least-squares geometric form fitting
- Quality Assessment
- Conclusion

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# Introduction & Background

- **Artificial Targets**
  - Planar
  - Spherical
  - Cylindrical
  - Pyramidal

- **Natural Features**
  - Edges
  - Planes

http://www-group.slac.stanford.edu/met/
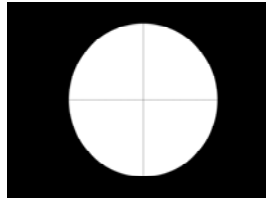Align/Laser_Scanner/laserscanner_accuracy.
pdf (accessed October 7, 2009)

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# Introduction & Background

- **Drawbacks:**
  - Expensive

  - Not reusable

  - Software dependent

  - Fixed dimension

  - Black box

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# Methodologies

- Mean of centroid
- Median of centroid
- Least-squares geometric form fitting
  - ▫ Edge detection via interpolated intensity image
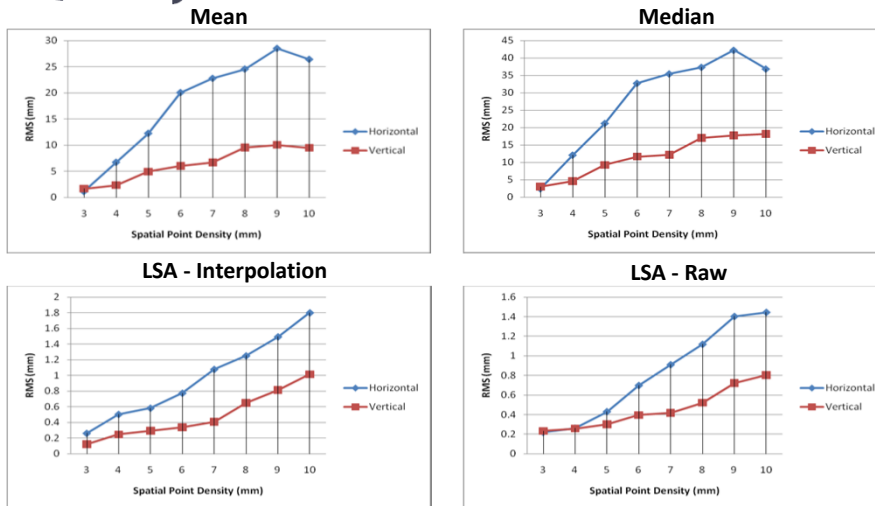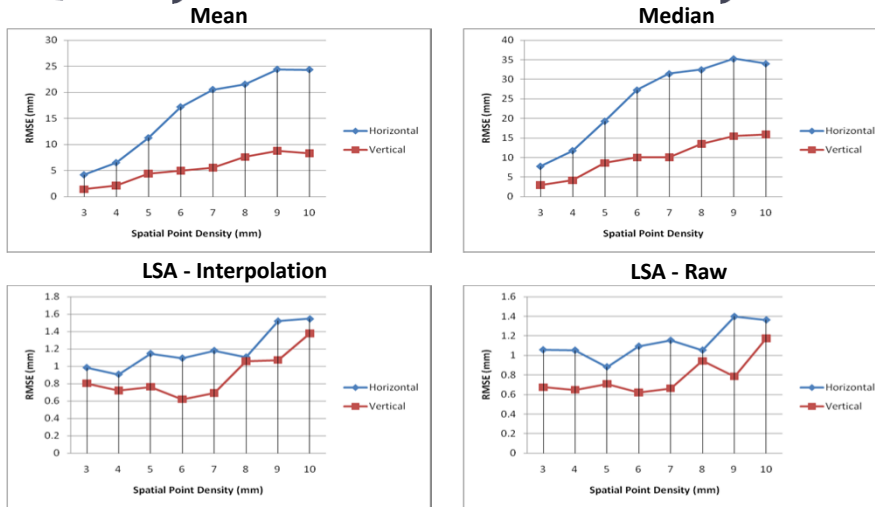  - ▫ Edge detection via raw point cloud

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# Experimentation

- Trimble GX
- 5m by 5m by 3m lab
- Observed 40 targets on 4 walls

# Quality Assessment - Precision

# Quality Assessment - Accuracy



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## Conclusion

- Least square geometric form fitting is superior
  - Instrument/software independent
  - Transparent
  - Inexpensive
- Sub-millimetre precision and accuracy achievable with paper targets
- Edge detection method has negligible effect