

Detection of Second Layer Cracks in Riveted Aluminum Structure

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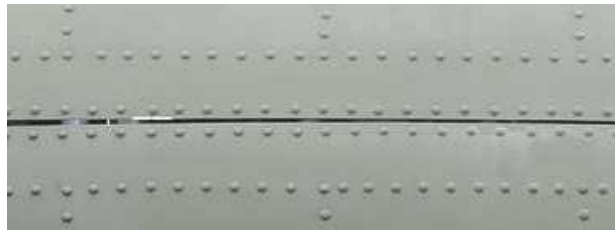




Outline

- ▶ Motivation
- ▶ Approach
- ▶ Results
- ▶ Summary
- ▶ Way FOrward
- ▶ Acknowledgements

Motivation



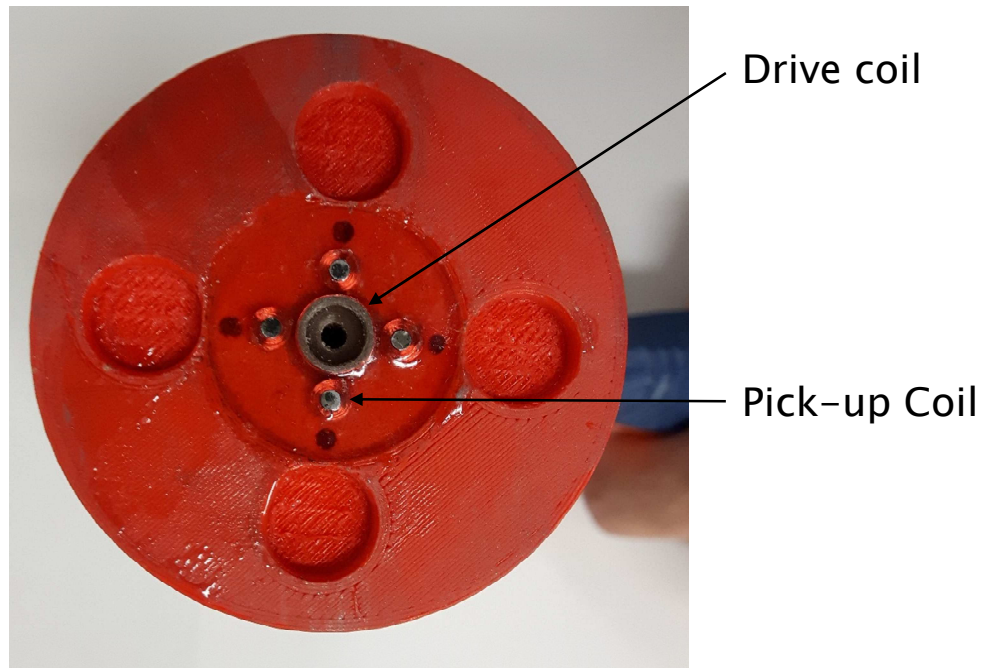
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Approach – Probes I

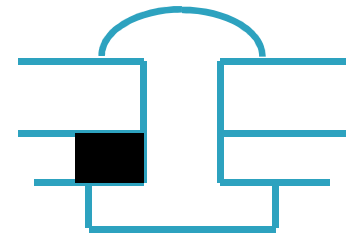
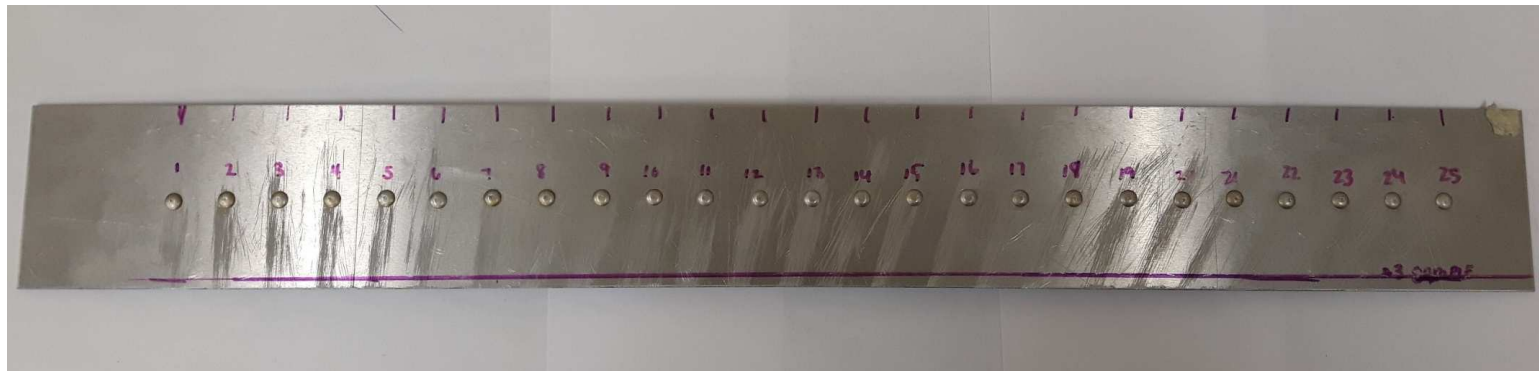


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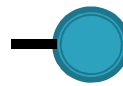
Approach – Probes II



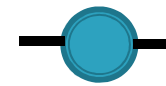
Sample



7



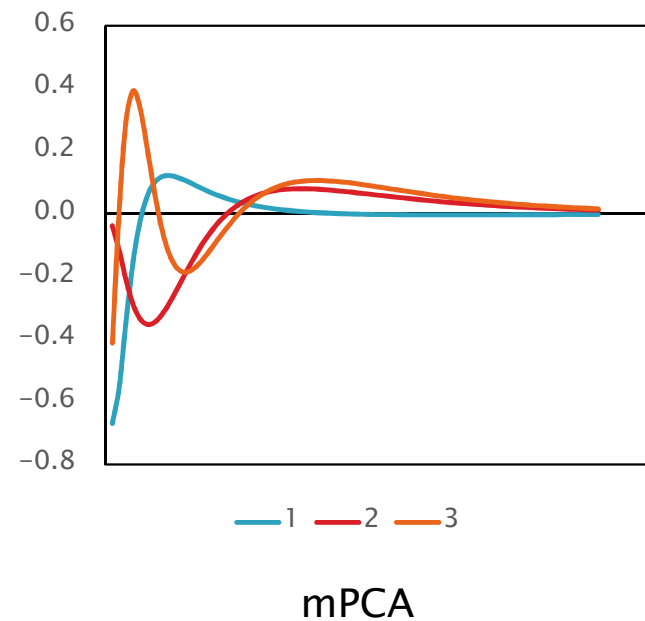
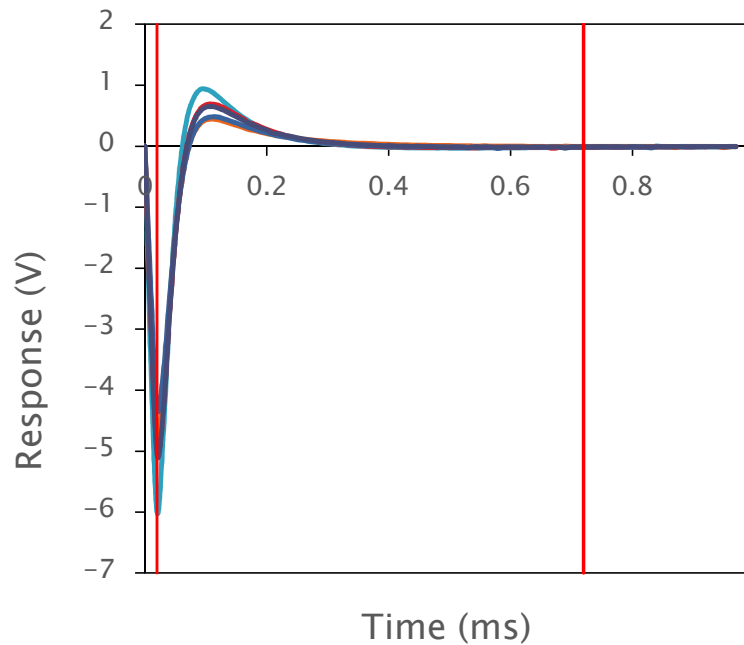
3 - 3



12

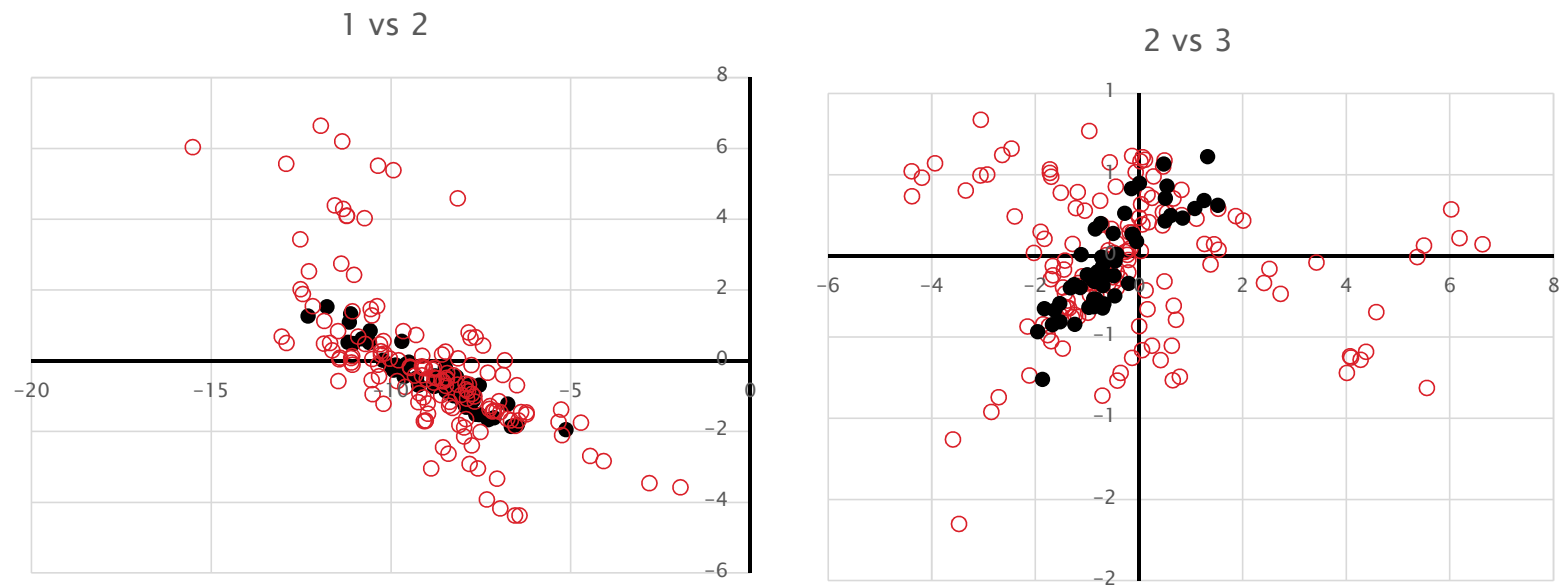
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Approach – Analysis I



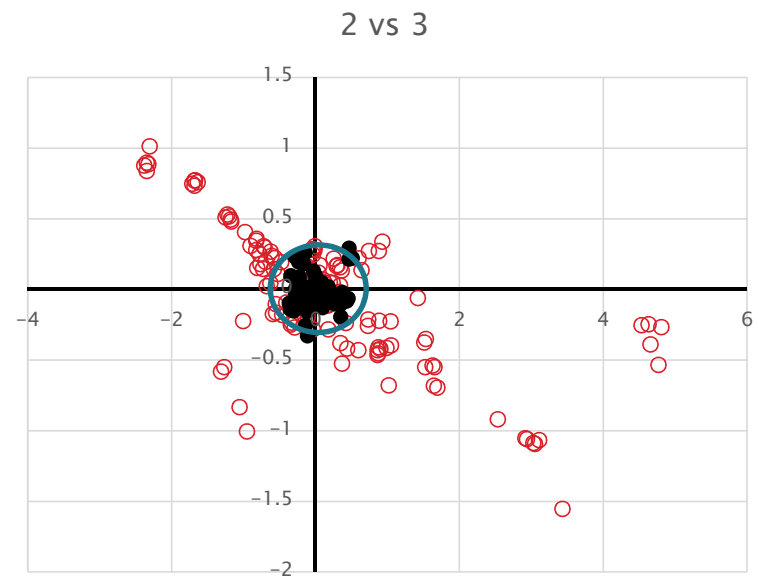
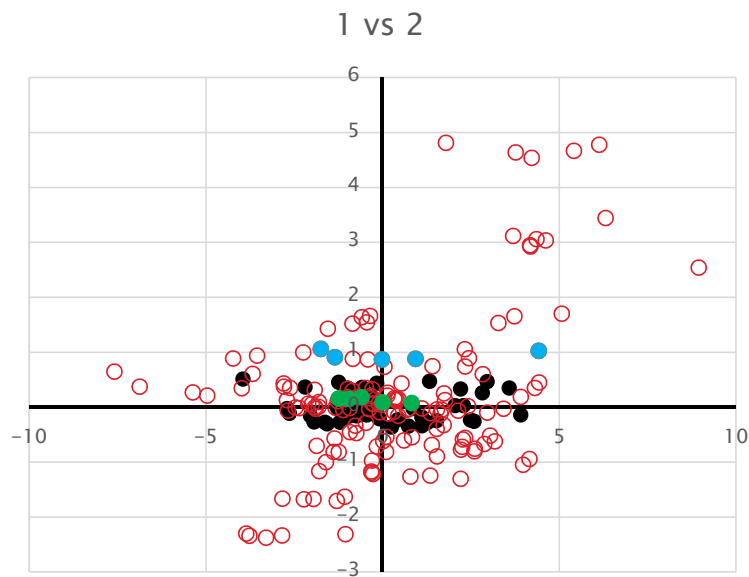
-8.59	0.28	0.39
-7.55	-0.55	-0.20
-6.95	-1.02	0.06
-6.52	-0.86	-0.19
-7.64	-0.66	-0.08
-7.78	-0.49	-0.04
-6.34	-0.92	-0.13
-7.66	-0.69	-0.04

Approach – Analysis II

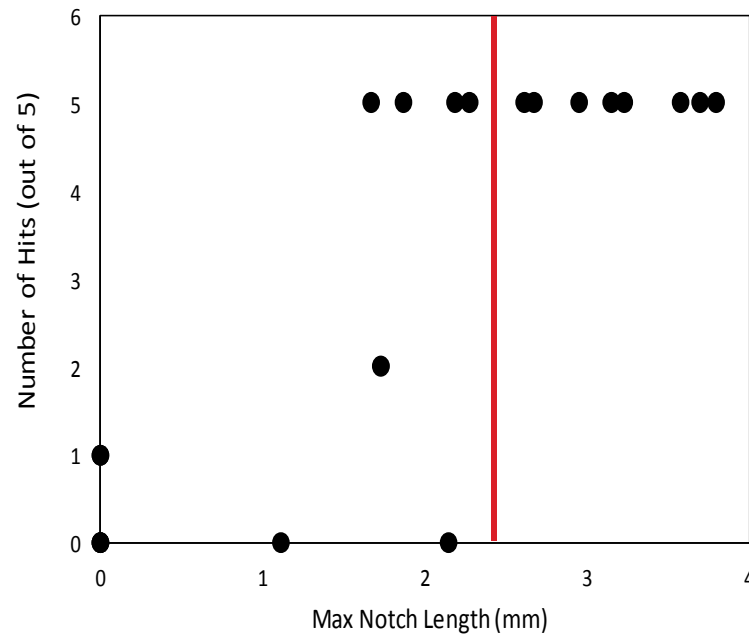


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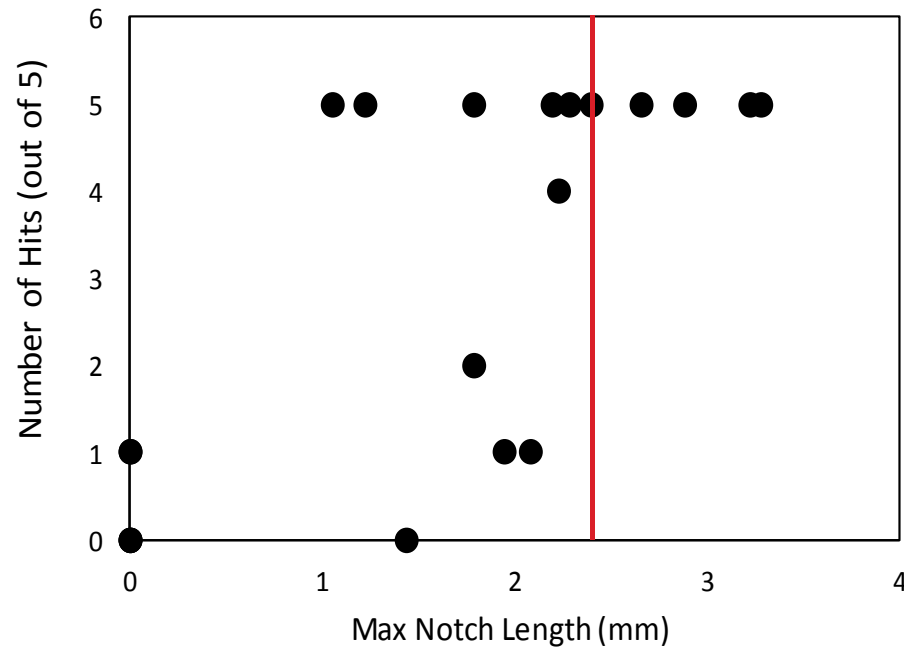
Approach – Analysis III



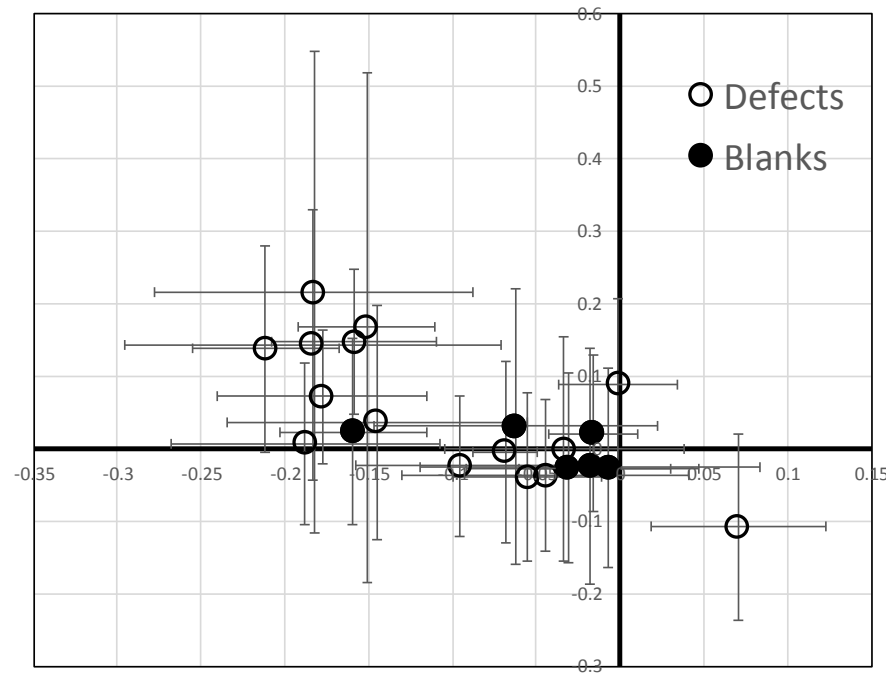
Results– 3 / 16 Rivet Longitudinal



Results – 3 / 16 Rivet Transverse



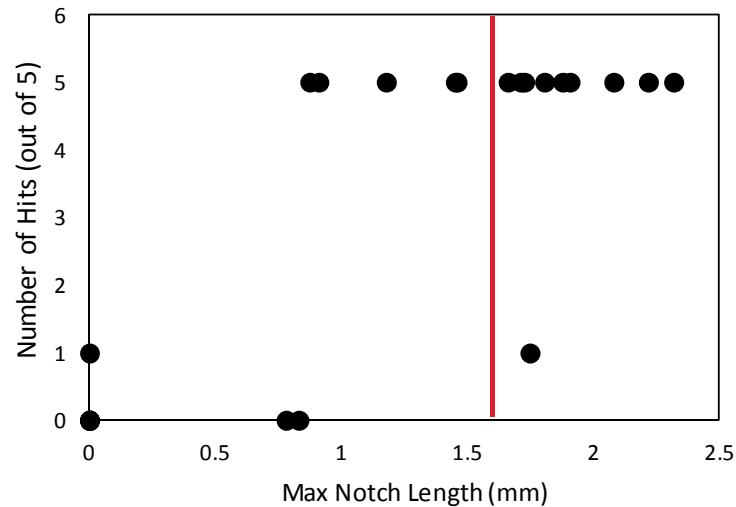
Results – Conventional EC



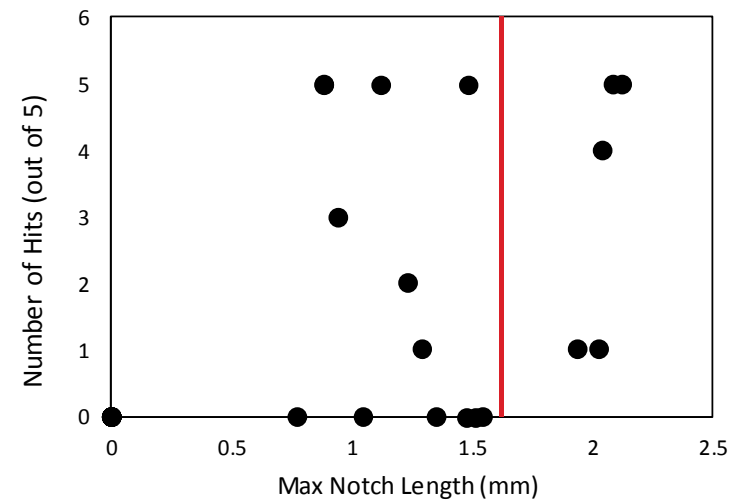
Average of 5
measurements

Results – 1 / 8" Rivet

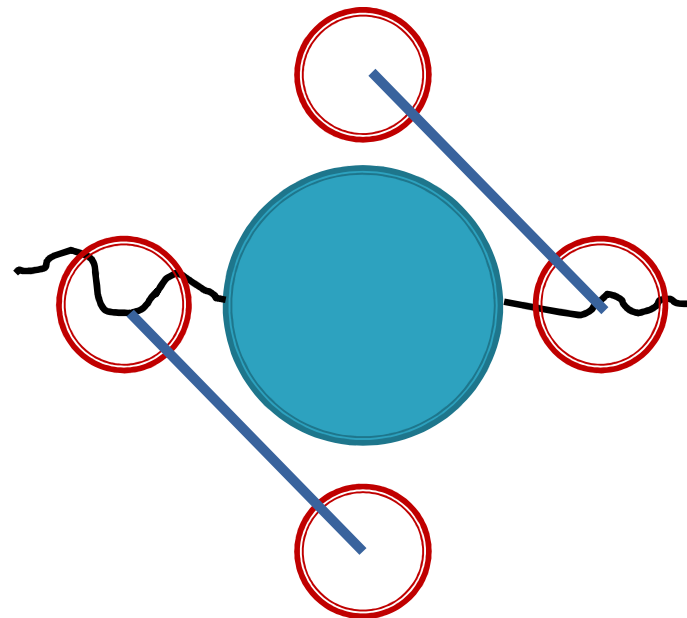
Longitudinal



Transverse



Side by Side Configuration



Side by Side Configuration

- ▶ Longitudinal
 - 100% detection
 - 0 out of 30 false calls
- ▶ Transverse
 - 100% detection
 - 2 out of 35 false calls



Summary

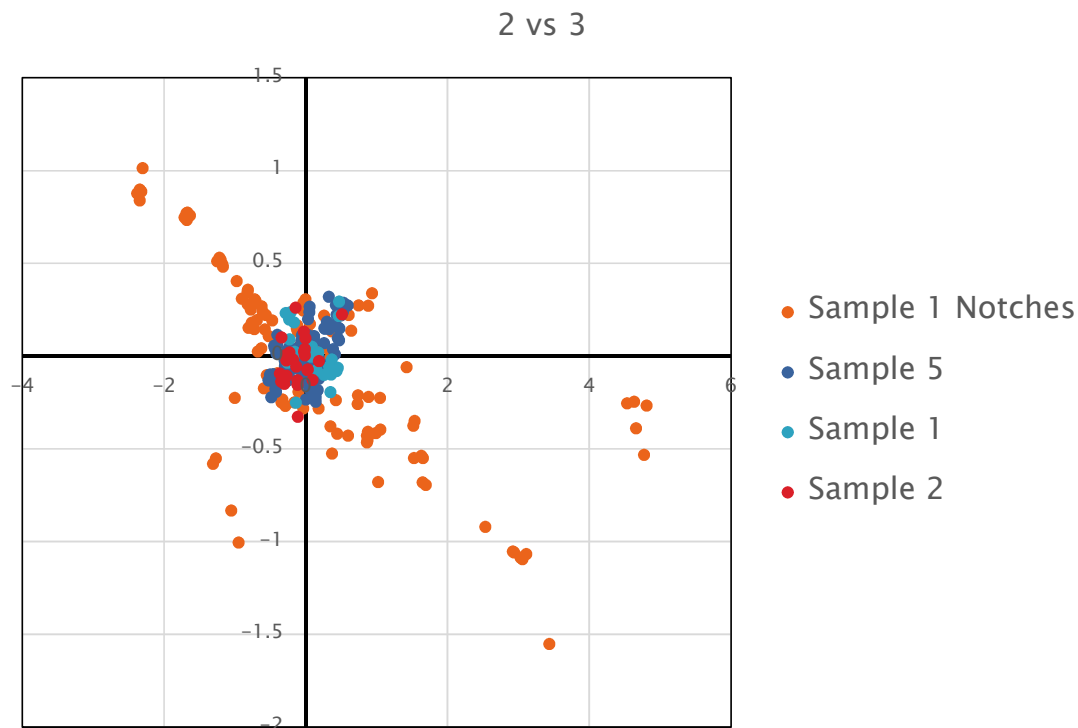
- ▶ Excellent detection rate with small number of false calls
- ▶ Side by side configuration appears to be superior

The way from here

- ▶ Confirm superior performance of side by side configuration with new probes
- ▶ Increase number of samples
 - Shape and position of 2nd layer
 - Hole position variability, especially with respect to edge

The way from here

► Simplify cluster detection



Acknowledgments

- ▶ AERAC committee of DTAES (DND)

Questions



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