



AGM

May 26th 2020

09:30

Safe Harbor

Forward-Looking Statements

This presentation may contain forward-looking statements (including market opportunities and TAM; our growth; future financial results, estimates and forecasts; the performance and benefits of our products and technologies potential market and revenue opportunities, expected company product introductions and future trends in macroeconomic and industry conditions) that are based on company's estimates, theories, assumptions, expectations of current and future events that are subject to any number of risks and uncertainties. Actual results may differ materially from those projected in the presentation. Recipients of the document should make their own independent investigations, consideration and evaluations prior to making any decisions in respect to the Company.

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Certain images in this presentation have
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AUDIO PIXELS HOLDINGS LIMITED

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2020 Annual General Meeting (26/05/2020)
Vote Totals - Based on the first resolution

Securities On Issue	28,301,720
Valid Securities Voted - (For, Against, Open Usable, Open Conditional)	10,553,687
Valid Securities Voted (%)	37.29
Total Securityholders Cast	134

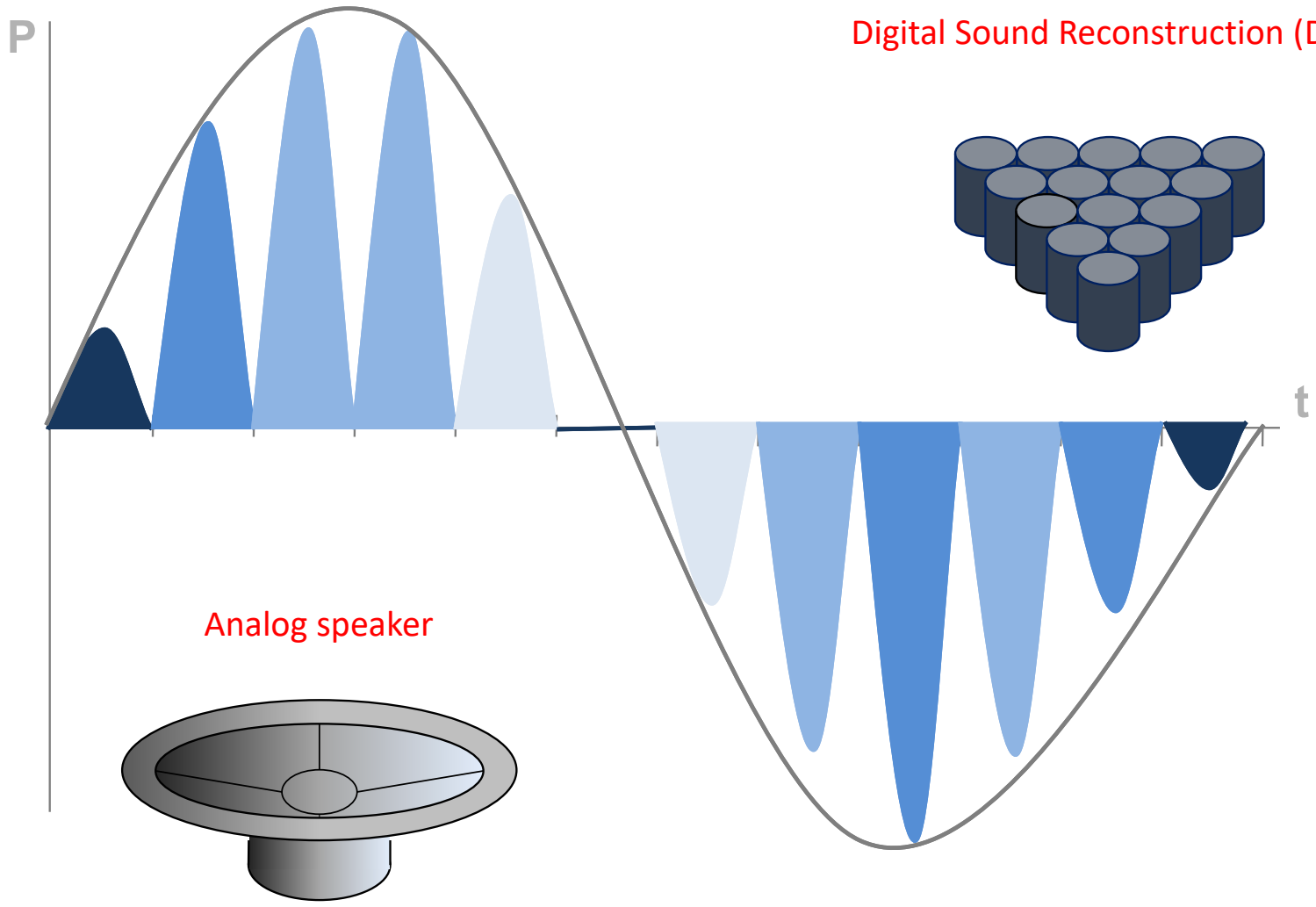
Vote Details

Resolution	Vote type	Voted	%	% of all securities
2, RE-ELECT MR FRED BART	For	10,542,425	99.90	37.25
	Against	2,632	0.02	0.01
	Open-Usable	8,630	0.08	0.03
	<i>Board</i>	8,630	0.08	0.03
	<i>Non-Board</i>	0	0.00	0.00
	Open-Cond	0	0.00	0.00
	Open Unusable	0	N/A	0.00
	Abstain	300	N/A	0.00
	Excluded	0	N/A	0.00
	3, REMUNERATION REPORT	For	4,664,612	99.71
Against		5,067	0.11	0.02
Open-Usable		8,630	0.18	0.03
<i>Board</i>		8,630	0.18	0.03
<i>Non-Board</i>		0	0.00	0.00
Open-Cond		0	0.00	0.00
Open Unusable		0	N/A	0.00
Abstain		232,351	N/A	0.82
Excluded		5,643,327	N/A	19.94

Source of Vote

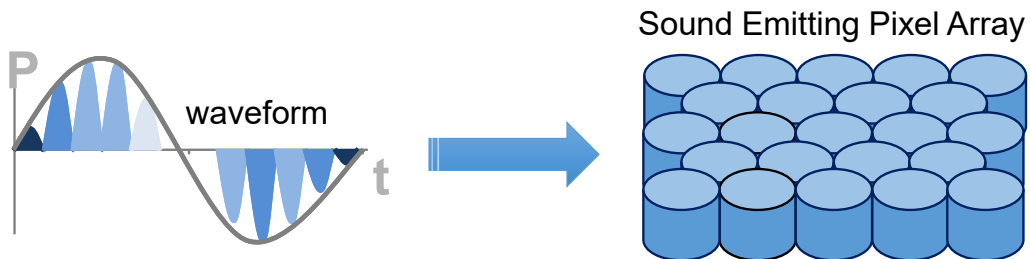
	Keyed	Scanned	Intermediary Online	Proximity	InvestorVote Desktop	InvestorVote Mobile	Other
Votes	6,908,184	112,615	163,635	155,825	3,149,918	63,810	0
Securityholders	20	27	1	1	76	9	0

What is DSR

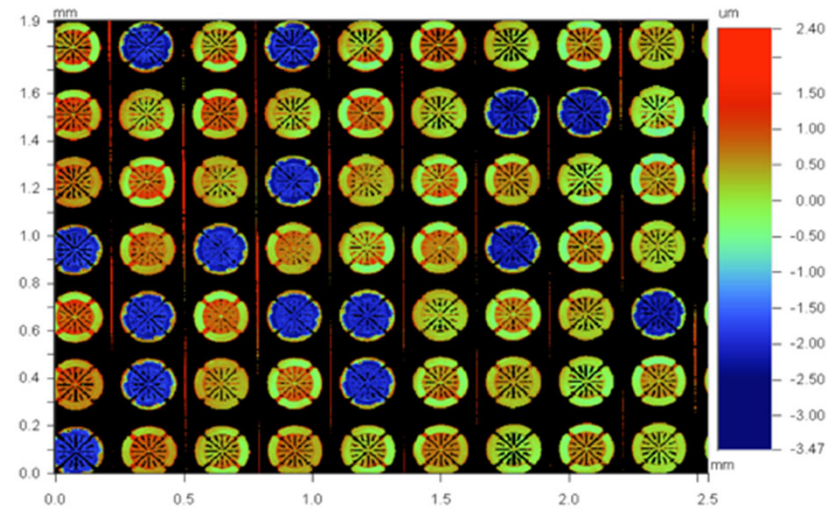
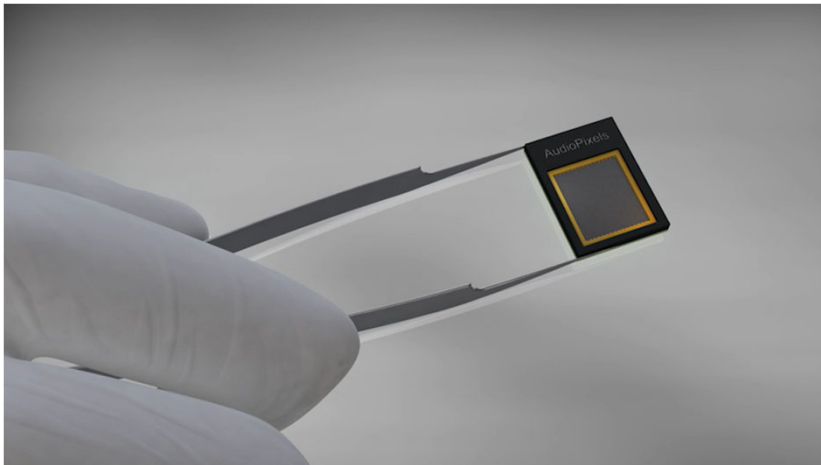


How does it work?

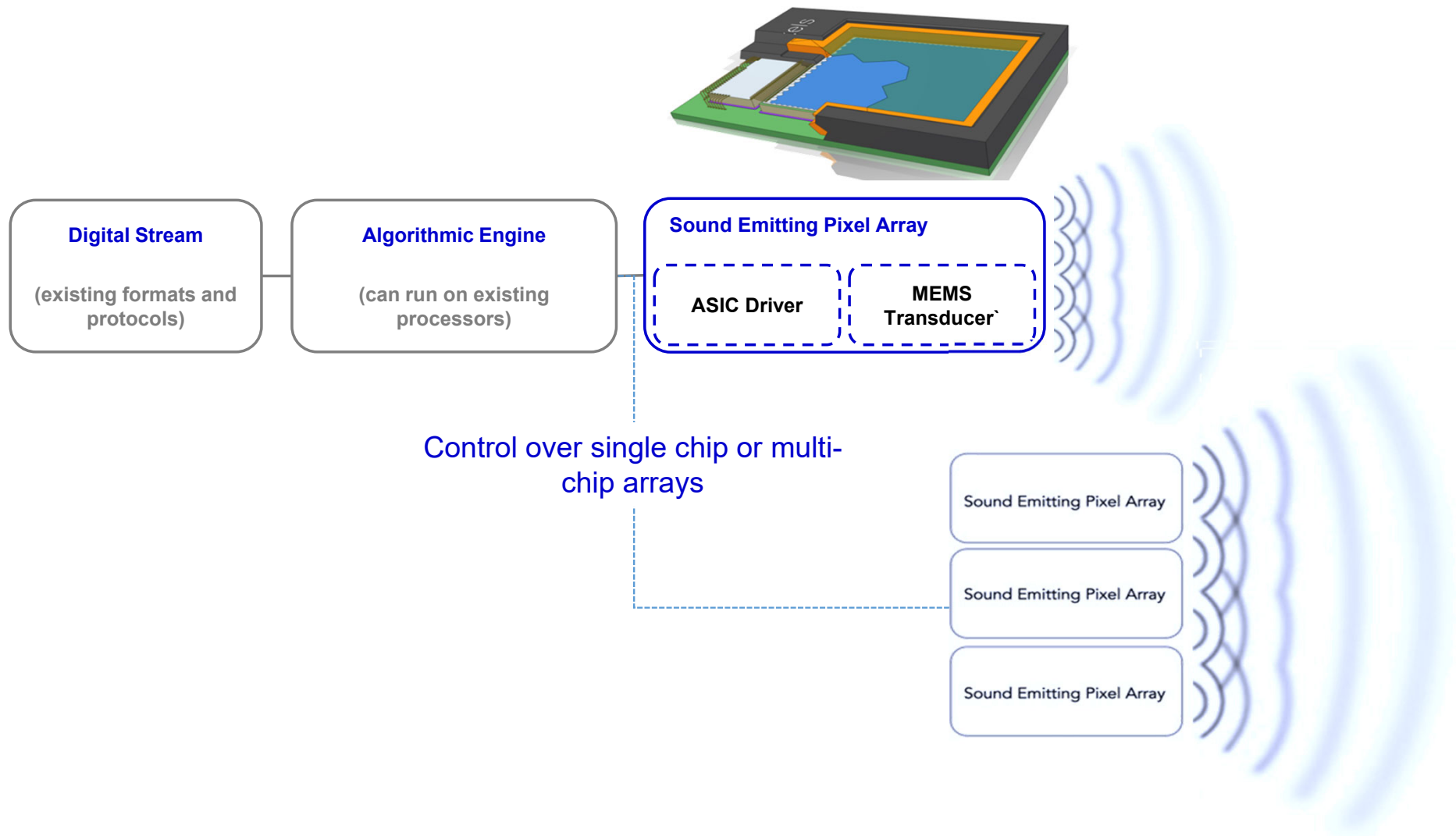
Precision reconstruction of any frequency or waveform made possible by digitally controlling which Pixels actuate (or don't actuate) at any given moment



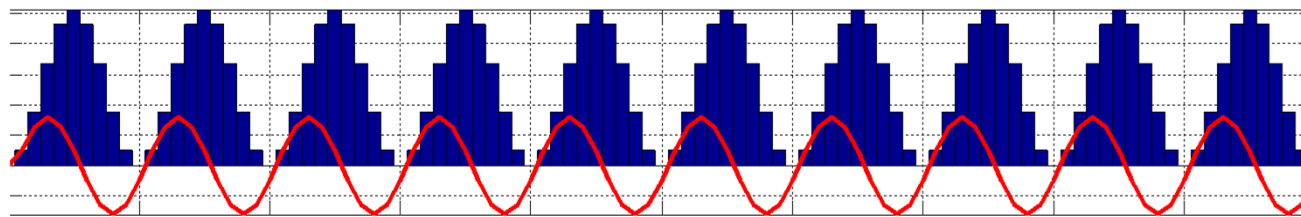
- Uniform Pixel Array
- Identical Amplitude, Velocity, & Actuation Voltages



How does it work?



Importance of MEMS transducer repeatability



A core principle of Digital Sound Reconstruction is the accurate “assembly” of discrete pulses of acoustic energy

The drive algorithms determine, how many, which and when pixels move

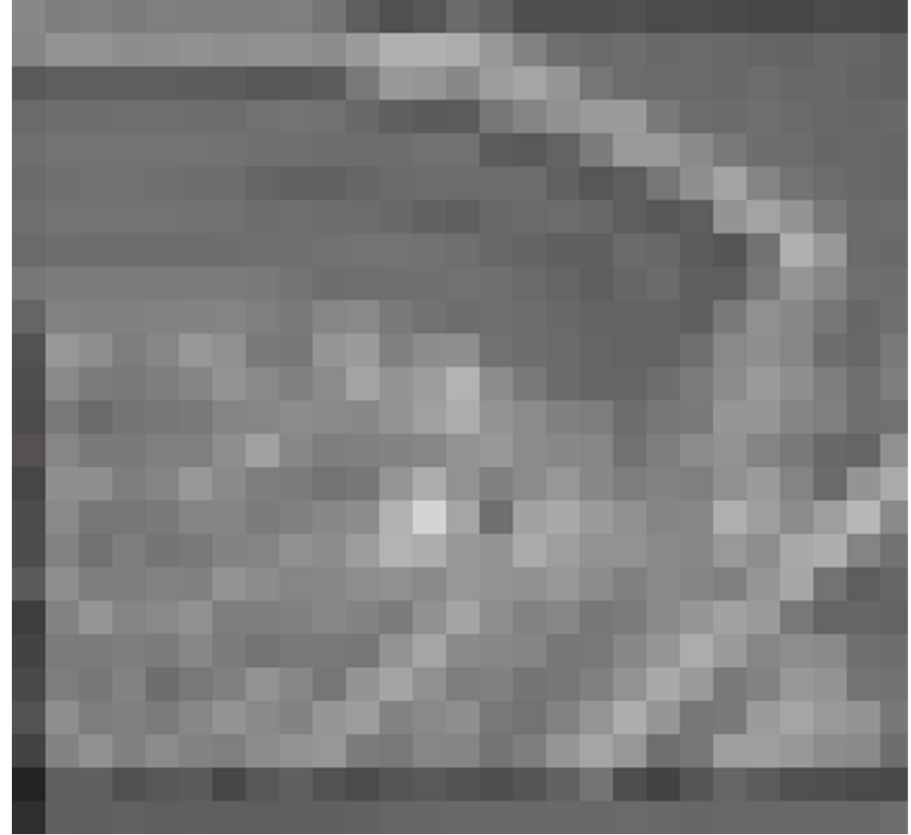
Therefore the drive algorithms assume a precise and repeatable value for each acoustic pulse

Achieving consistent and precise acoustic pulse magnitudes (and timing) are critical to accurate sound reconstruction

Highlight of this periods activities involved in improving transducer repeatability

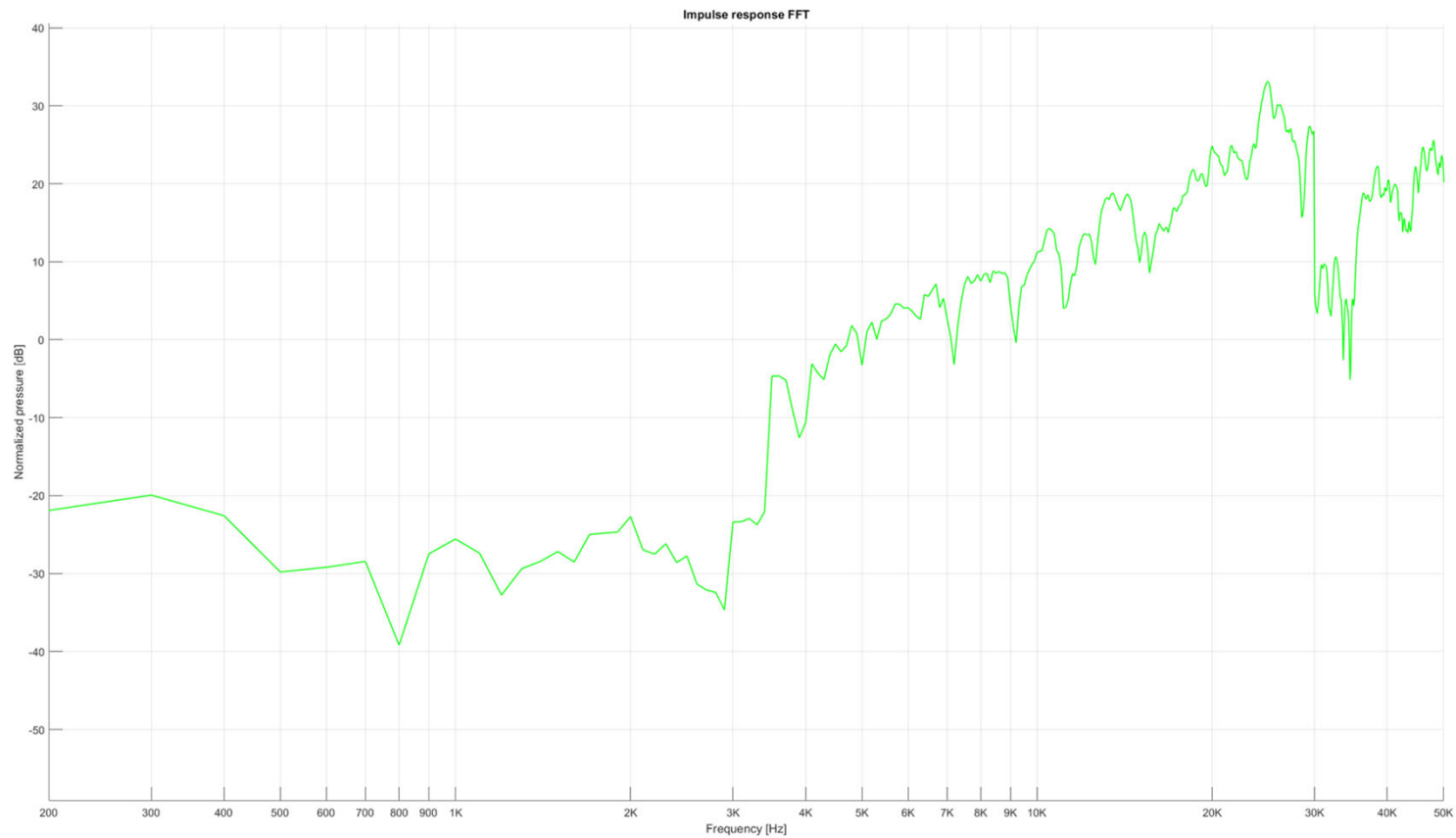
Date	Issue	
May 2019	Electrode Breakage during backside processing	Multiple approaches tested ultimately resolved in August 2019.
Aug 2019	Unsatisfactory acoustic performance	Developed new tools to allow investigation of acoustic performance and underlying dynamics.
Sep 2019	Root cause traced to a deviation from spec tolerances	Modified design to be less sensitive to manufacturing tolerances.
Oct 2019	Fabricated and built wafers with design variants	100's of pixels tested - Nov 2019 ideal variant selected.
Nov 2019	Metal module + release	Identified two compatible tools. Ultimately resolved in Feb 2020.
Dec 2019	Commence Fabrication of wafers with new design	Fabrication.
April 2020	Wafers delivered – residue detected	Ongoing investigation and rework
May 2020	Impulse Response measured and verified	May 2020

Damage related to back side processing



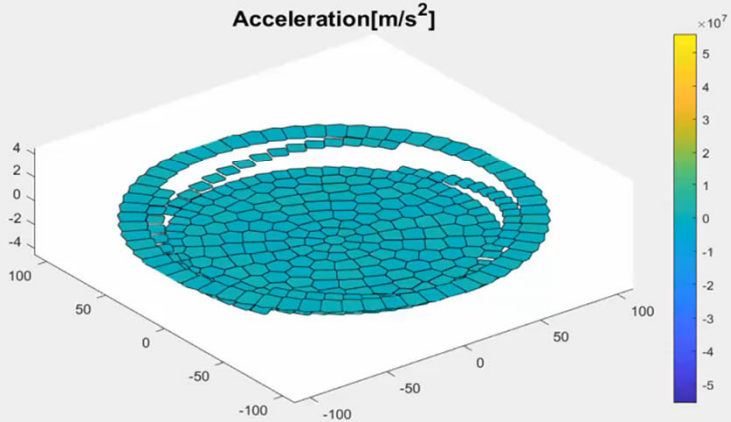
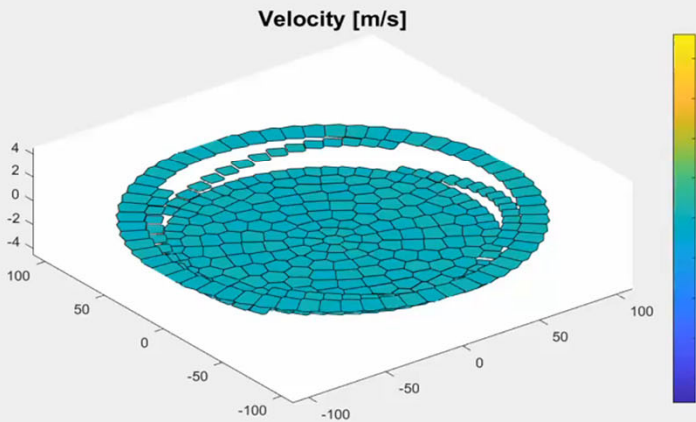
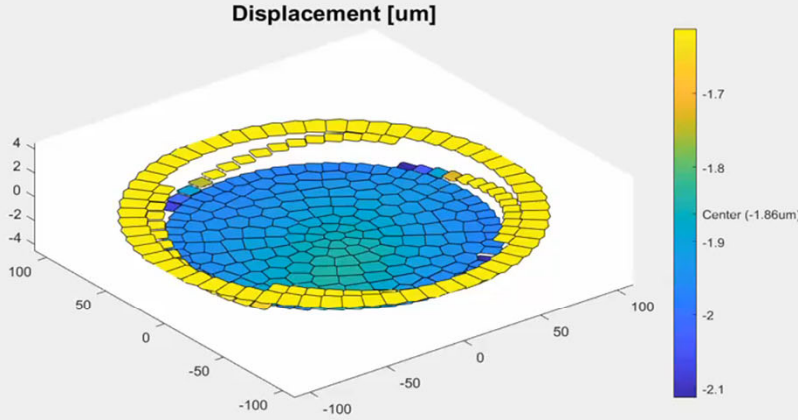
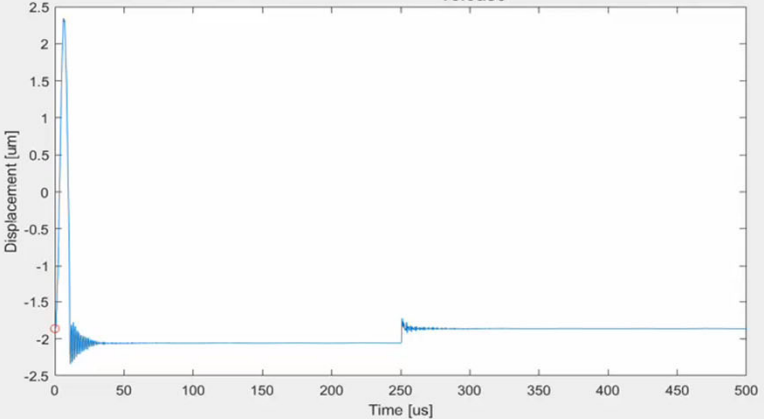
Impulse response – older wafers

- Sound level drops below 3.5KHz.
- Unstable performance at target clock.



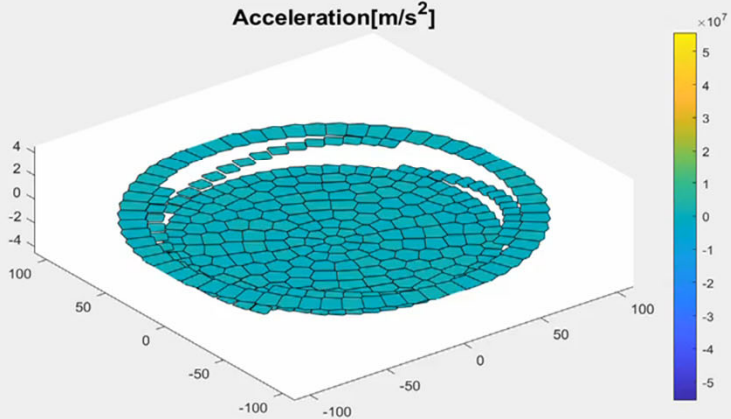
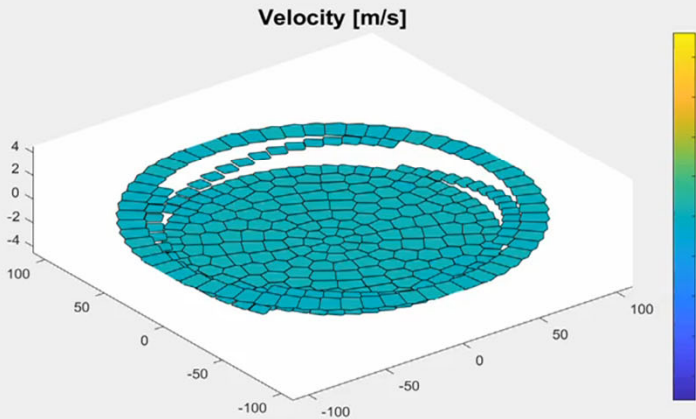
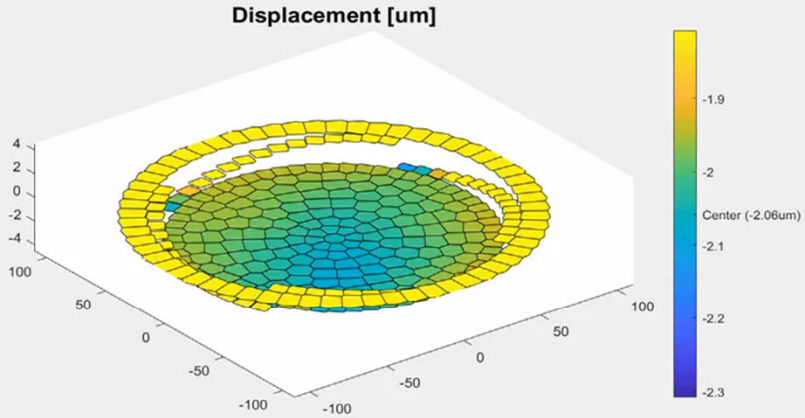
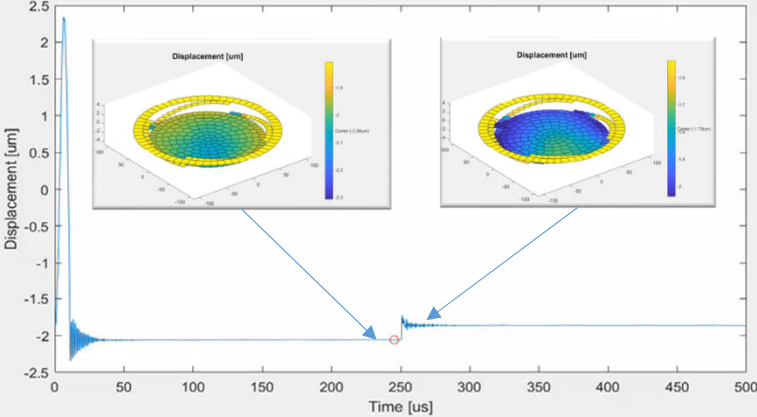
Membrane latch

Scheme = bottom-release-latch-hold; F = 2000Hz; T_{release} = 5us; VL = 80V; VH = 40V; t = 0.00us

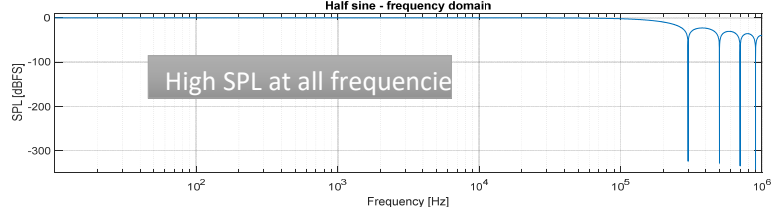
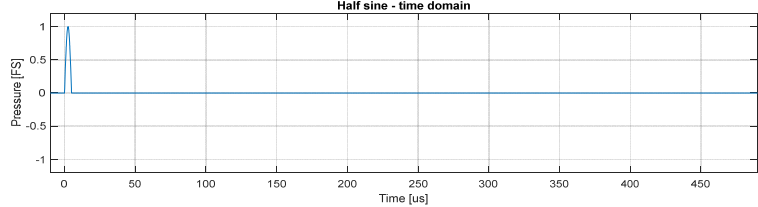
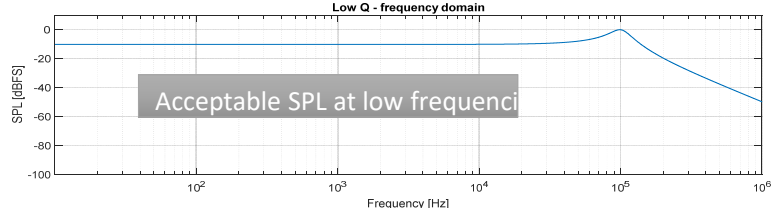
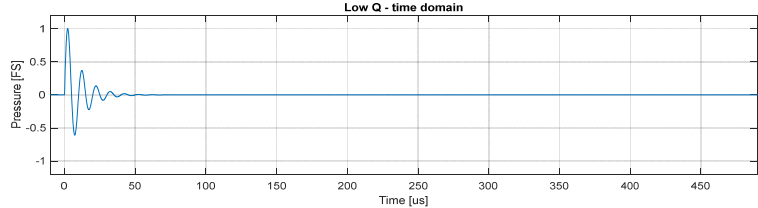
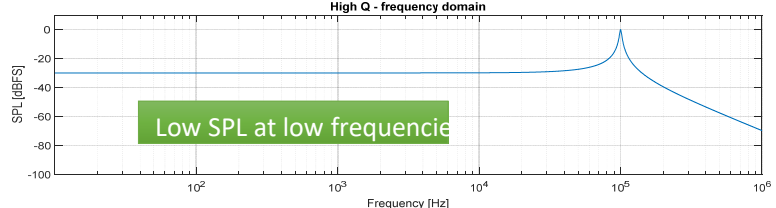
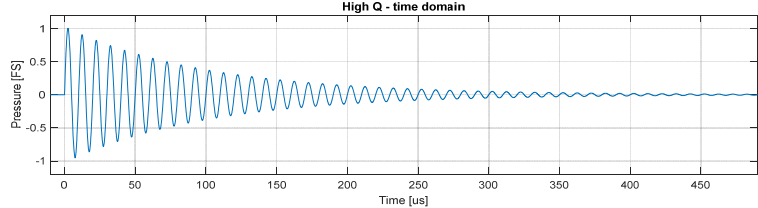
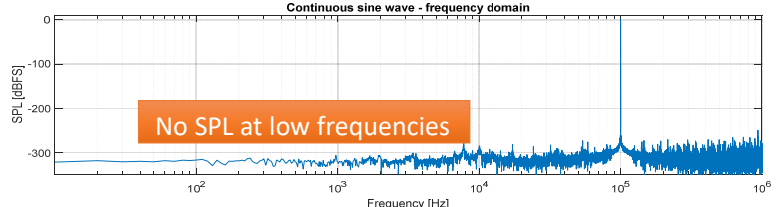
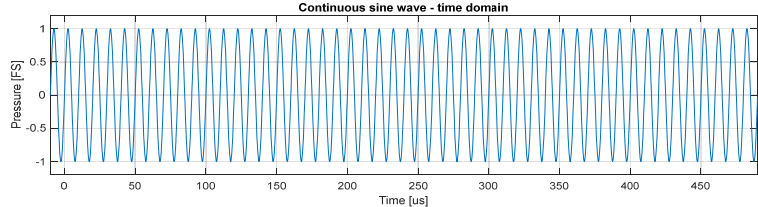


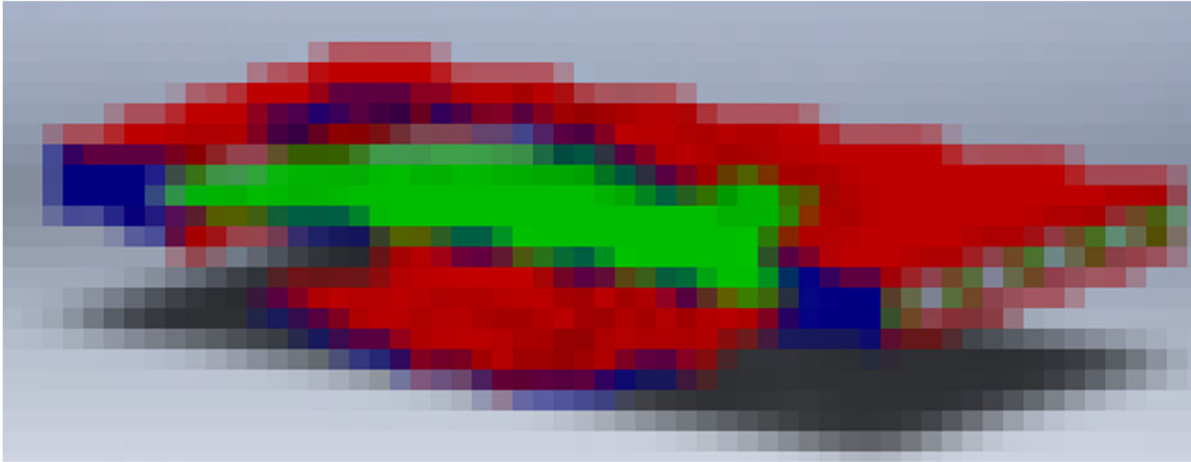
Spring back

Scheme = bottom-release-latch-hold; F = 2000Hz; T_{release} = 5us; VL = 80V; VH = 40V; t = 245.33us



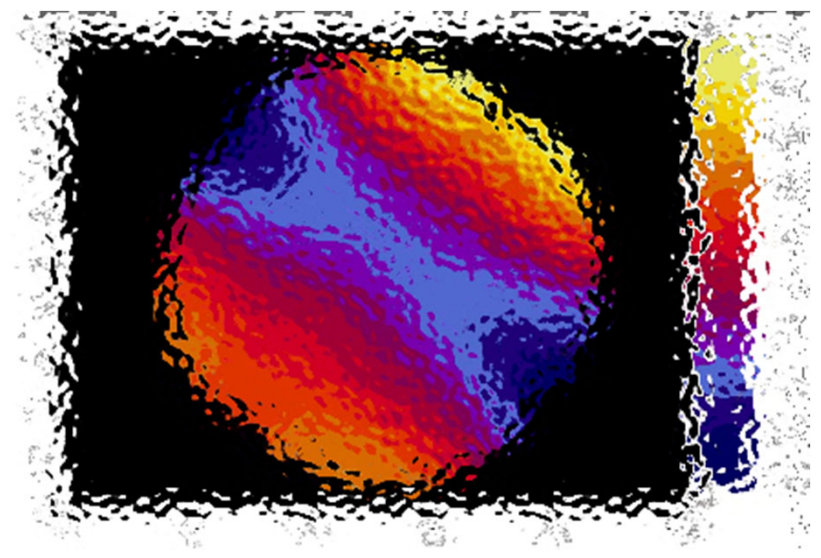
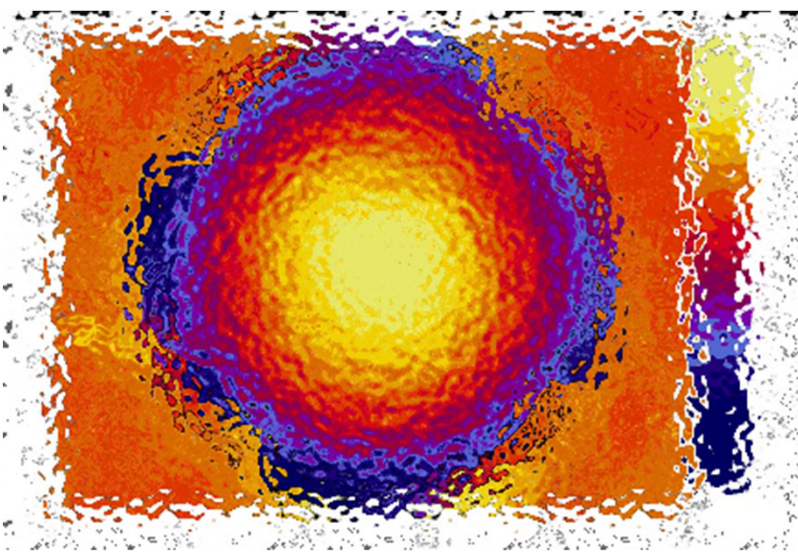
Influence of ringing on frequency response (and low frequency deficiency)





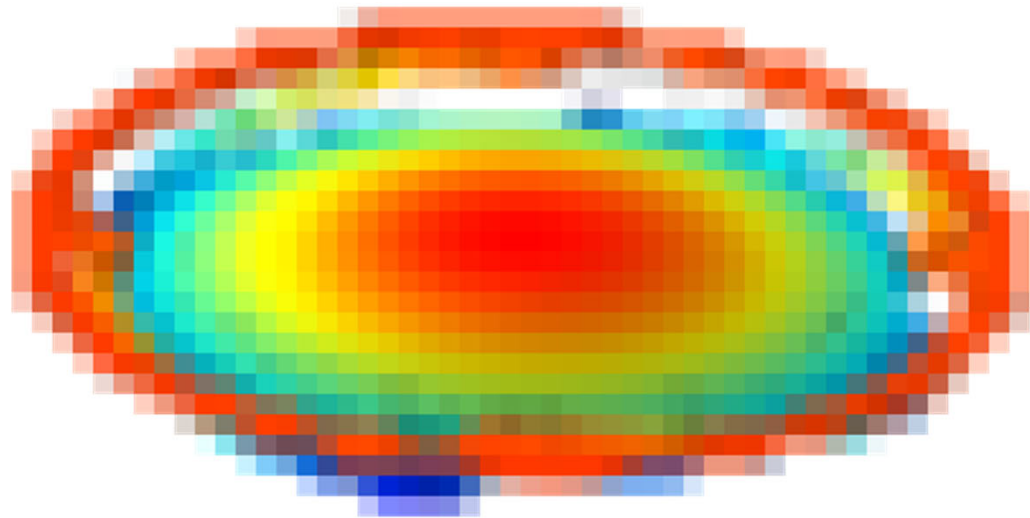
Membrane shape - idle

Membrane shape - latched

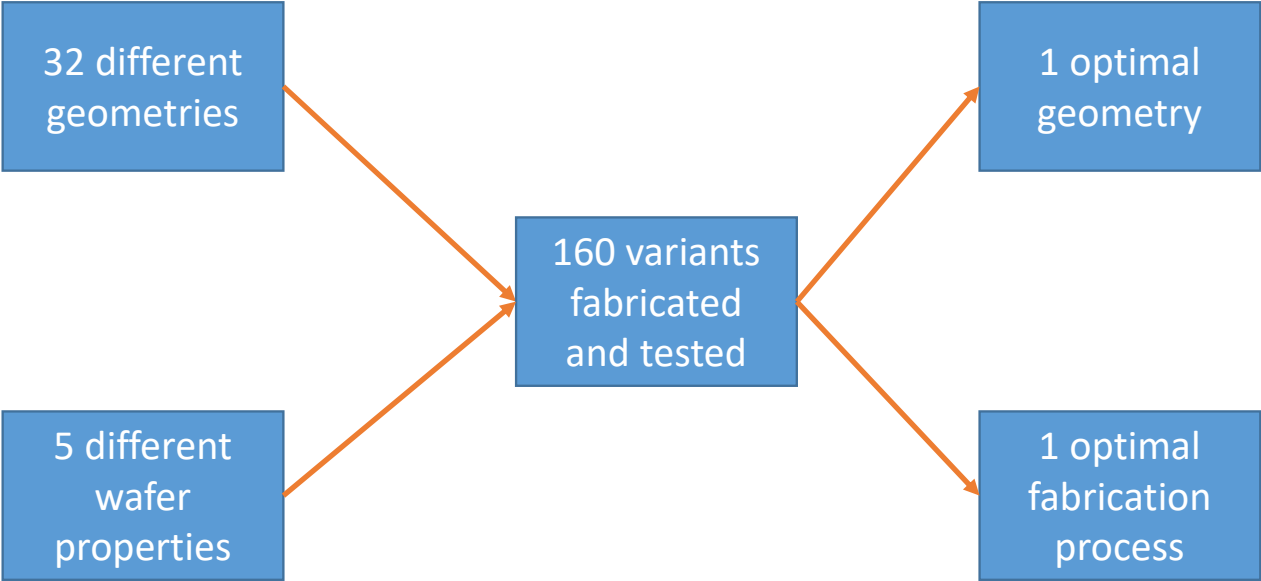


Simulation results

- Root cause identified to be stress in Si layers.
- Actual stress - 400% of spec maximal permitted stress.
- Process improvements are required but would take 6-18 months.
- Membrane redesign would be faster and reduce sensitivity to stress.

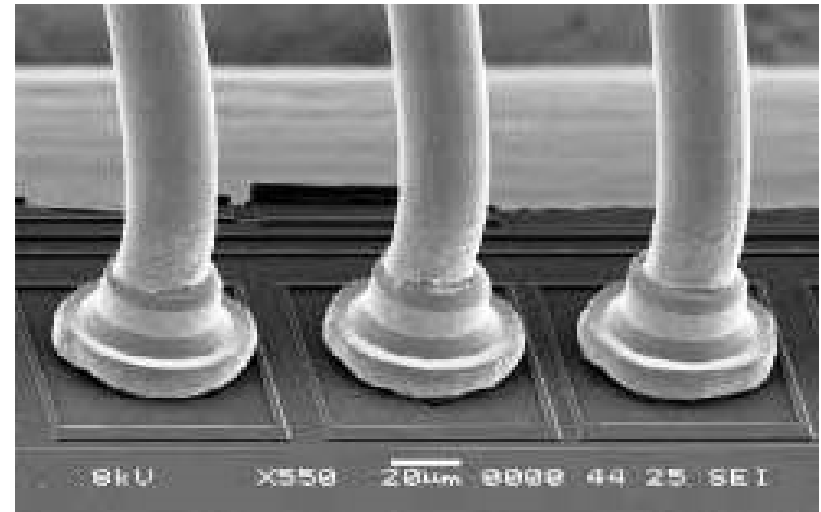
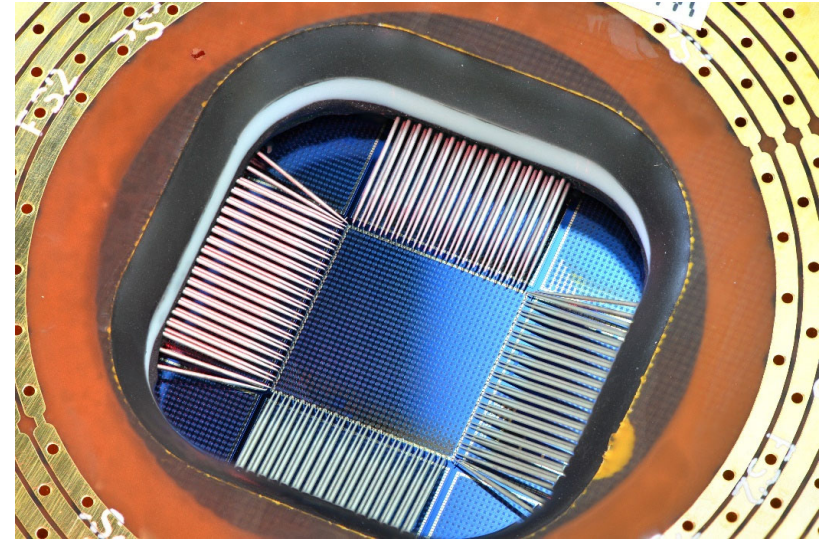


Variants



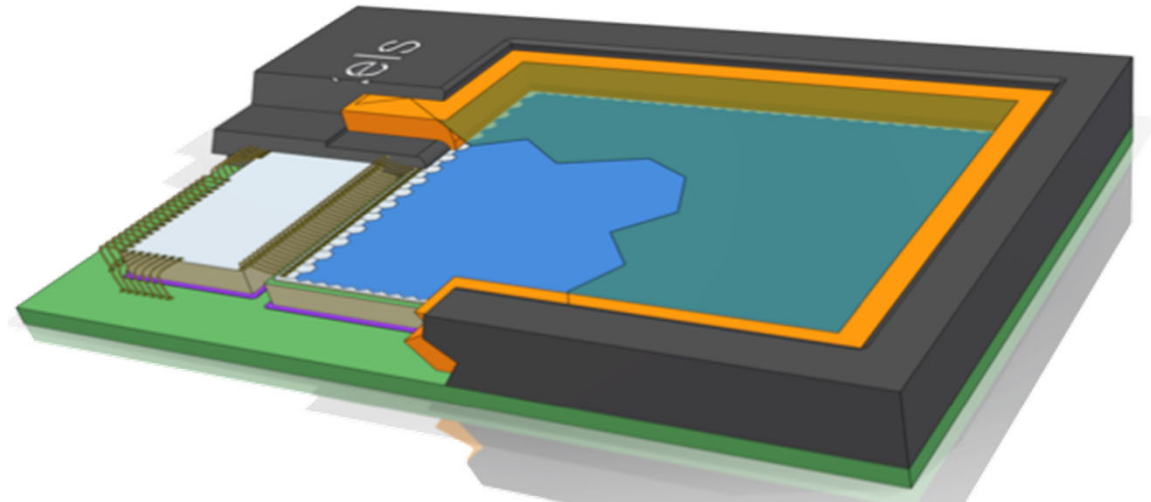
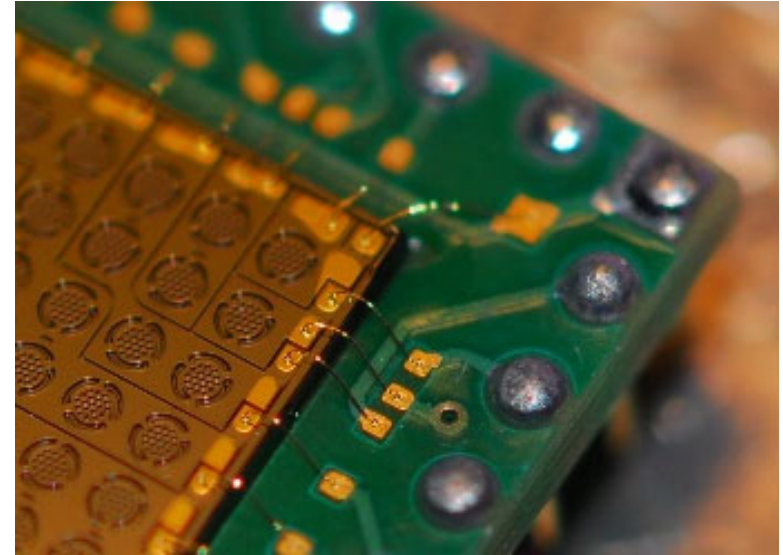
Metallization

- During development, no metallization is required.
- Testing wafers using "probe card".
- In final product, connections to the die are done using "wire bonding"

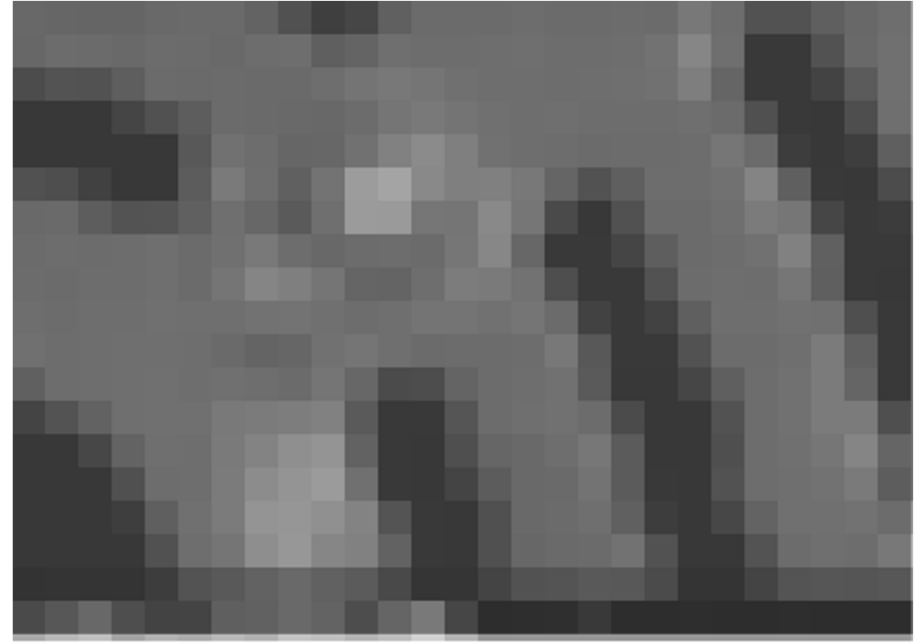
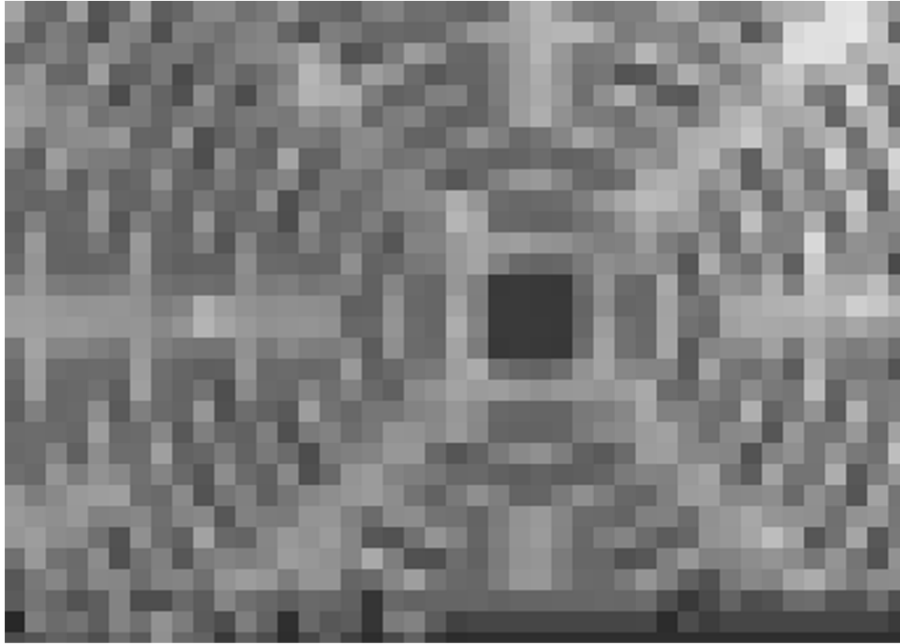


Metallization

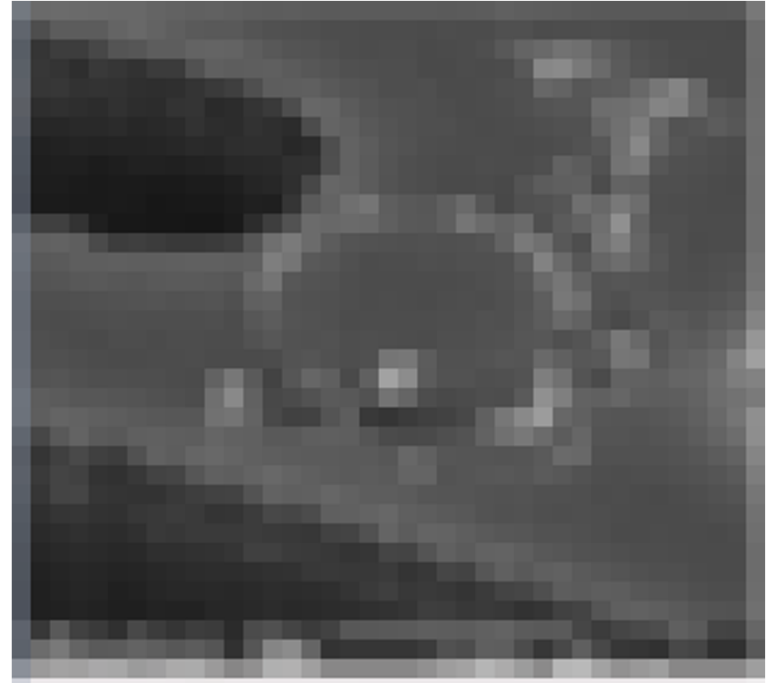
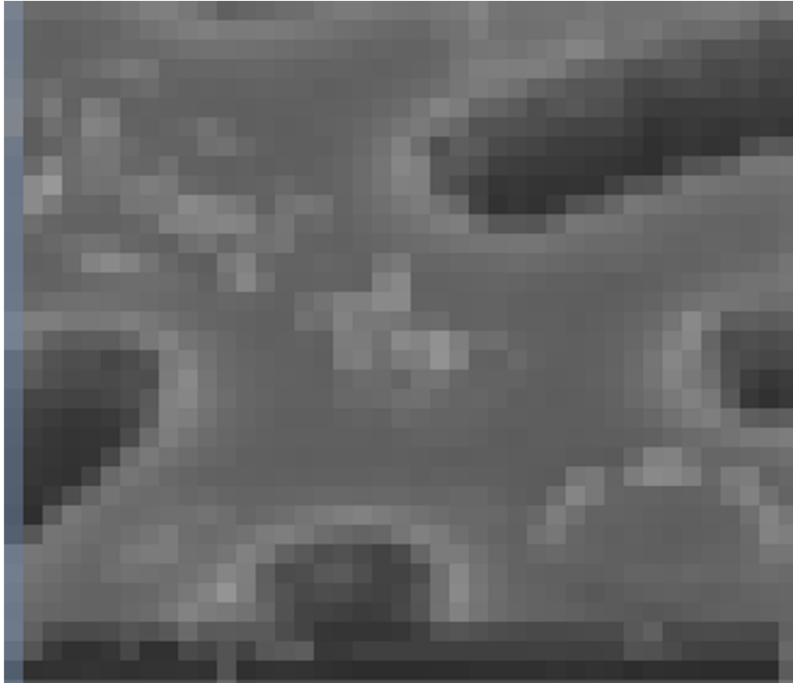
- Metal pads are required for wire bonding.
- Initial release process was incompatible with metal.
- New release tools were required.
- 3rd party vendors and tools identified.
- Two new tools tested and vetted.
- Currently release done by tool vendor.



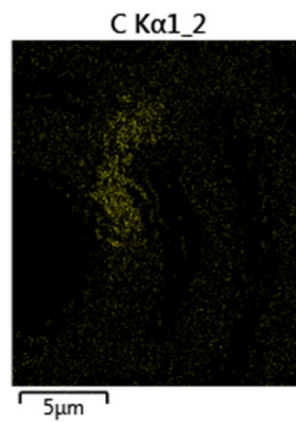
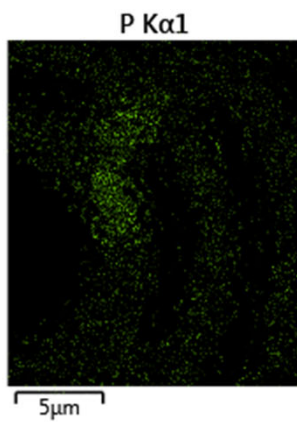
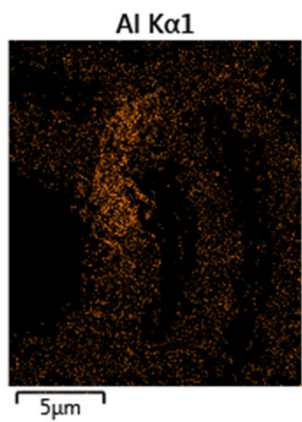
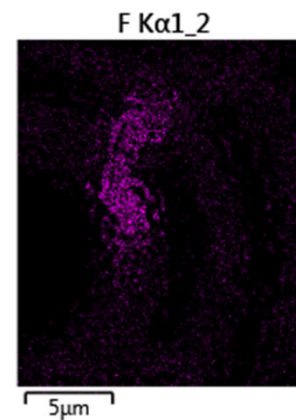
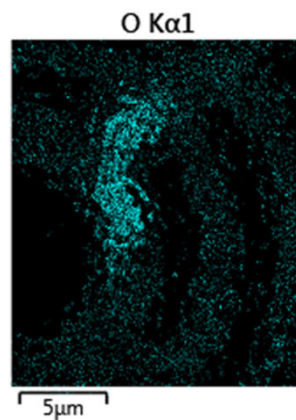
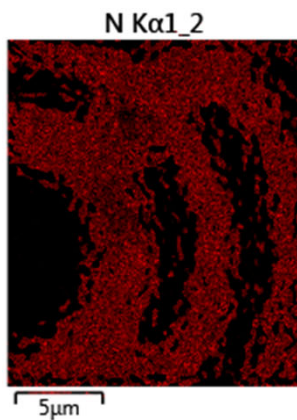
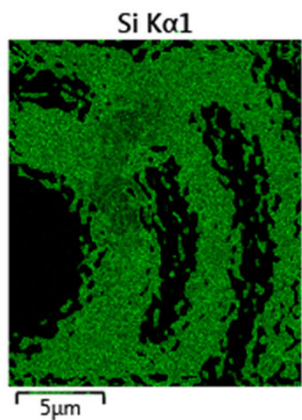
Residue images



Residue images

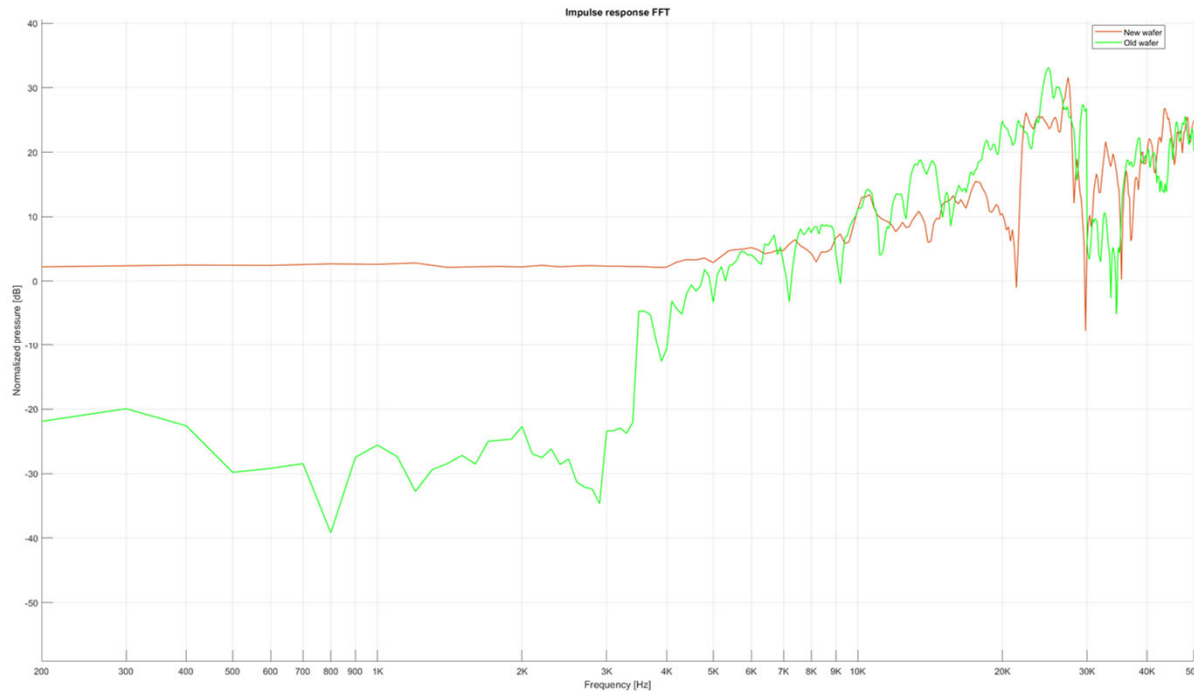


Residues – EDS/EDX (MAP)



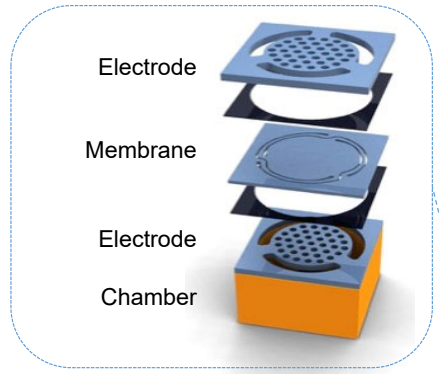
Impulse response after modifications

- Ringing time reduced by 80%
- Settling time reduced by 90%
- Voltage window extended
- Frequency response extended down to 100Hz (single chip).
- The following music rendering was based on new IR measurements (for best experience, please use headphones).

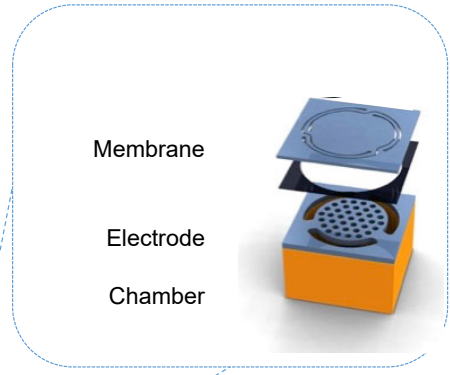


Clip you just heard was played by our Simplified Structure

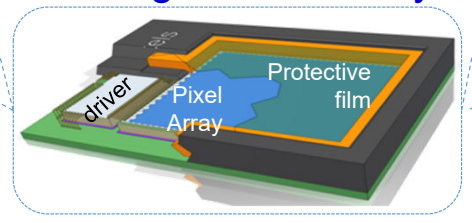
Full Structure



Simplified Structure

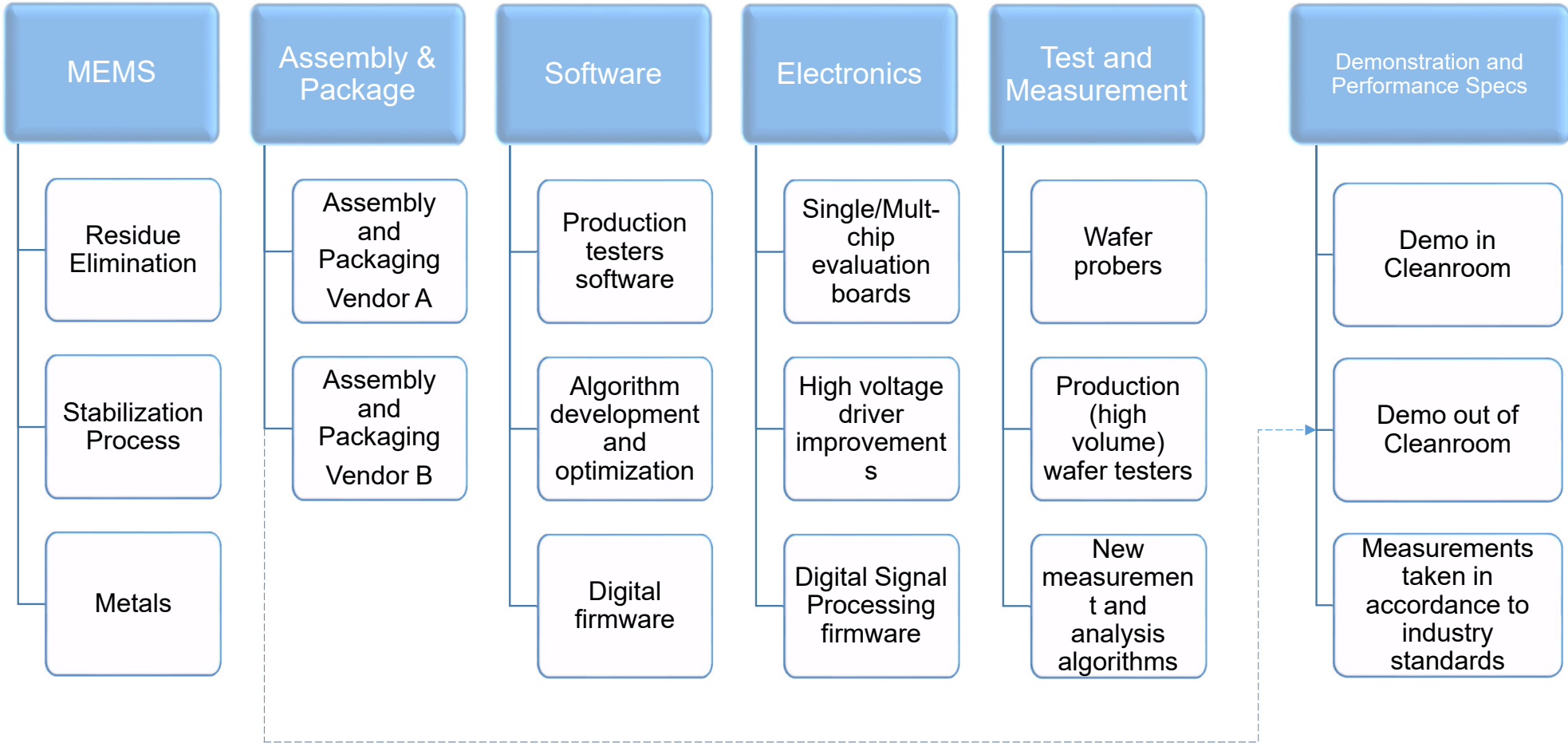


Packaged Pixel Array



What's Next – upcoming Quarter

Concurrent Activities





Questions?

