



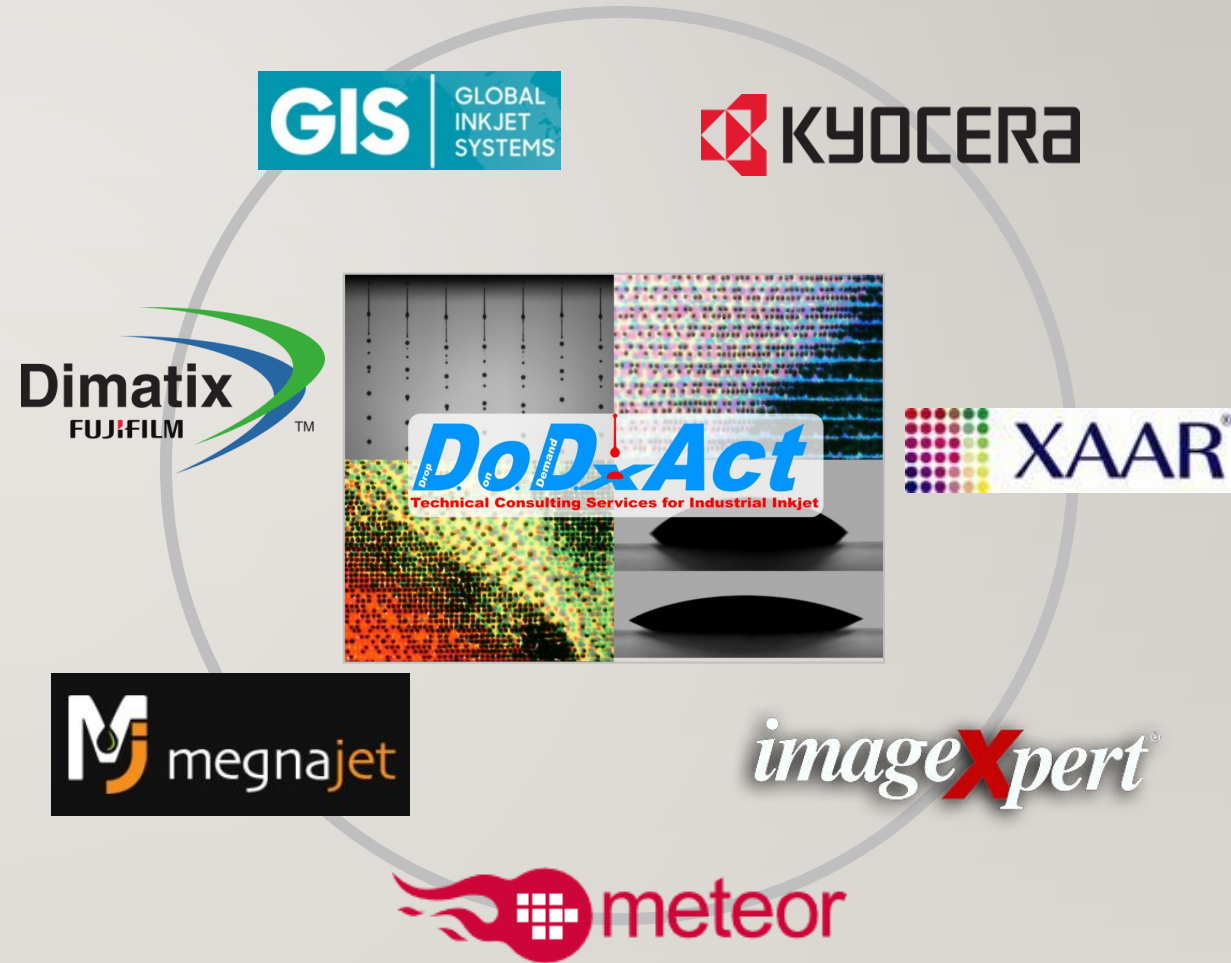
# DODXACT EXPERTISE AND SERVICES *AN INTRODUCTION*

---





- Independent inkjet services company
- We help companies of all sizes by offering:
  - Customised inkjet head & ink training
  - Print head testing & waveform optimisation
  - Print prototyping services
  - System design and process integration consultancy
- Building on:
  - Relationships with key suppliers
  - Hands-on knowledge of most ink types
  - 2, 2.5D, 3D applications expertise
  - 17 years' experience making inkjet work

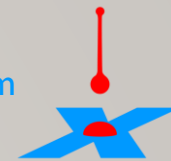


# IN THE NEXT FEW MINUTES..

---

Our expertise and how we use it to help.

- Expertise & Capability
  - Practical ink understanding
  - Print head knowledge
  - Jetting & Waveform
  - Printing & Process Proving
- Services
  - Training & Advice
  - Waveform Creation
  - Print Prototyping
  - System Implementation



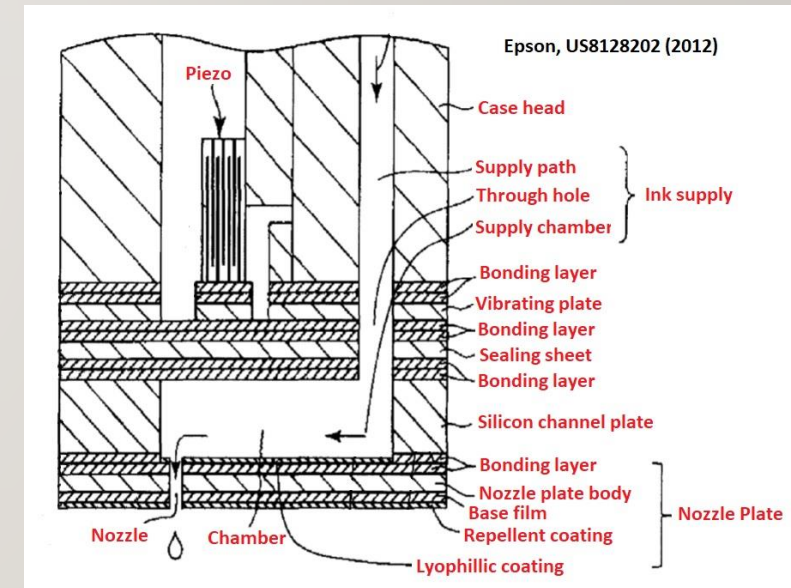
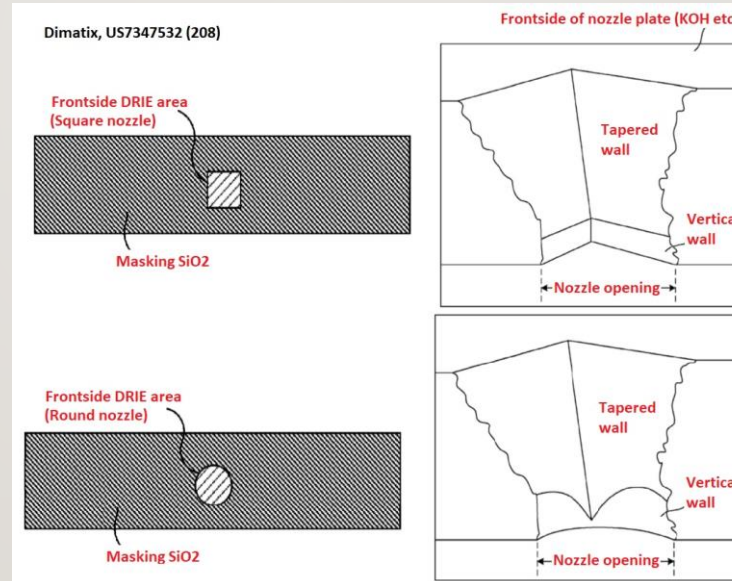
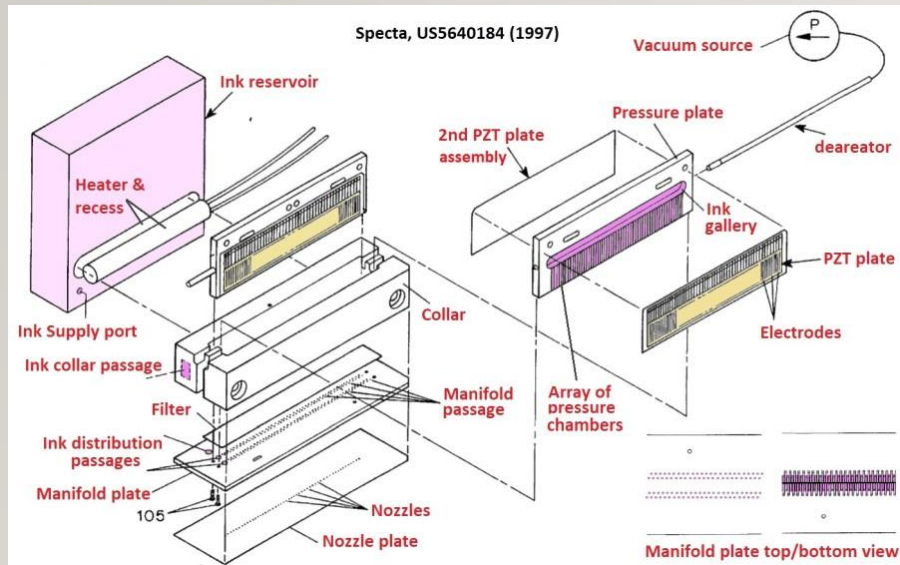
- IMI Training - Ink Types Components and Uses

	<i>Ink Type</i>					
	<b>Aqueous</b>	<b>Solvent</b>	<b>Oil</b>	<b>Hot Melt</b>	<b>Energy-cured</b>	<b>Hybrid</b>
Base material	Water Co-solvents Humectants	Organic solvents (ketones, alcohols, esters, glycols)	Petroleum distillates, plant extracts	Waxes	Acrylate & vinyl monomers Reactive diluents	Water Solvent Monomer <i>Waxes</i>
Applications	Paper Textiles Wide-format Graphics Décor Edible inks Electronics Coding & marking Ceramics	Wide-Format Graphics Coding & Marking	Paper Ceramics/Glass Coding Electronics	WF-Graphics Coding & Marking Electronics Manufacturing Edible inks	WF-Graphics Labels Glass Bottles / Shapes Packaging (LM) Manufacturing Ceramics Décor 3D printing	Graphics (Solvent-UV/Aq-UV) Packaging (S-UV/Aq-UV) Glass Edible inks (oil/hotmelt) Electronics manufacturing (hot-melt-UV)



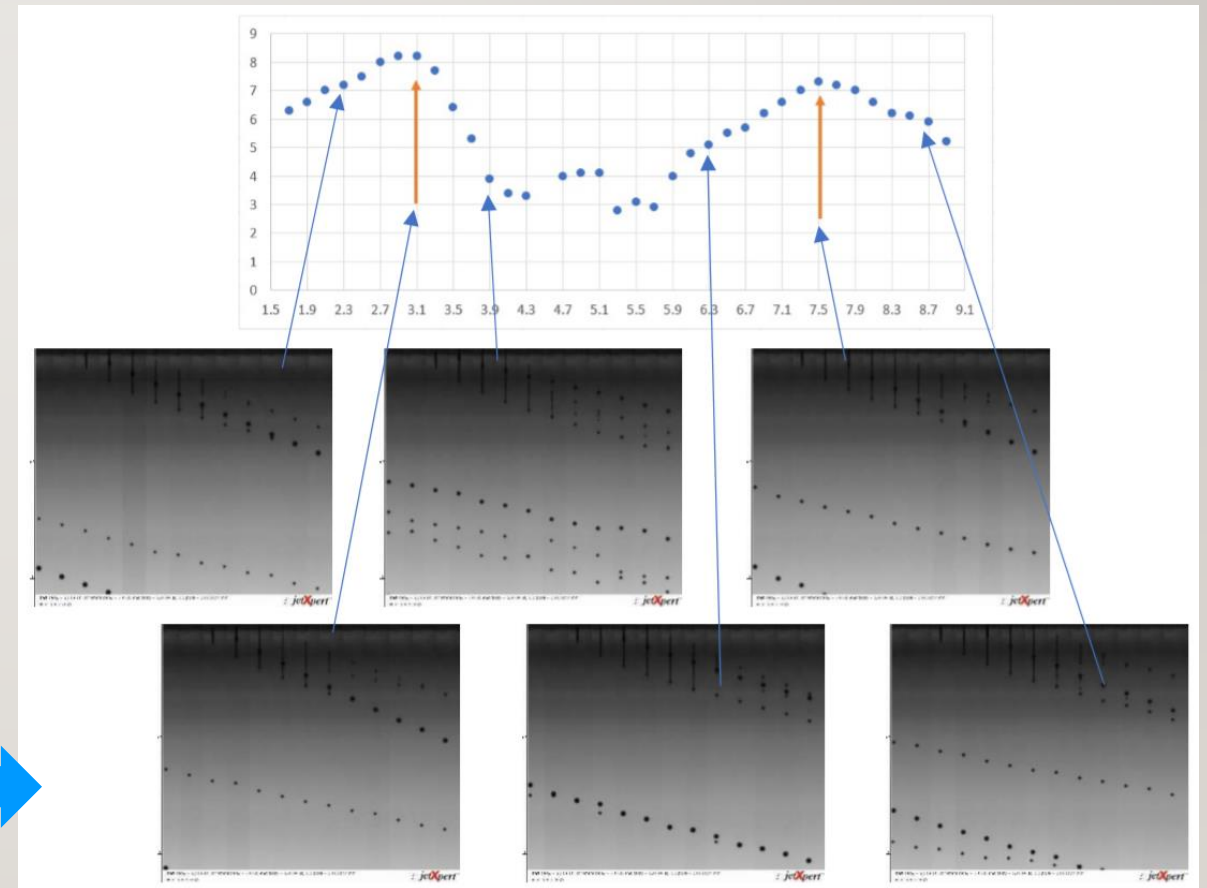
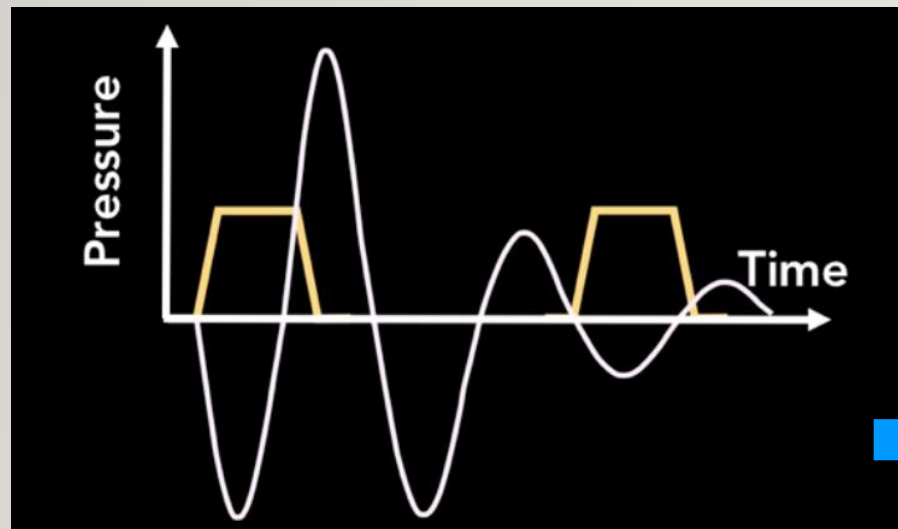
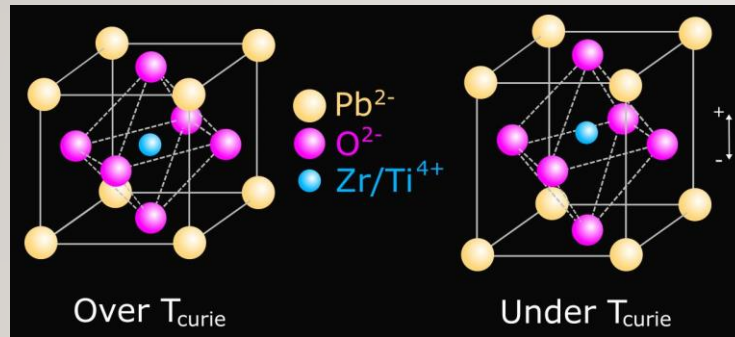
# EXPERTISE – PRINT HEAD DESIGN

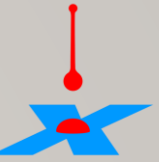
- Academic background in micromachining provides intimate understanding of head manufacturing
- From bulk piezo to thin film and electroforming to si-MEMS





- How each type works and what to do to optimise them (where allowed)

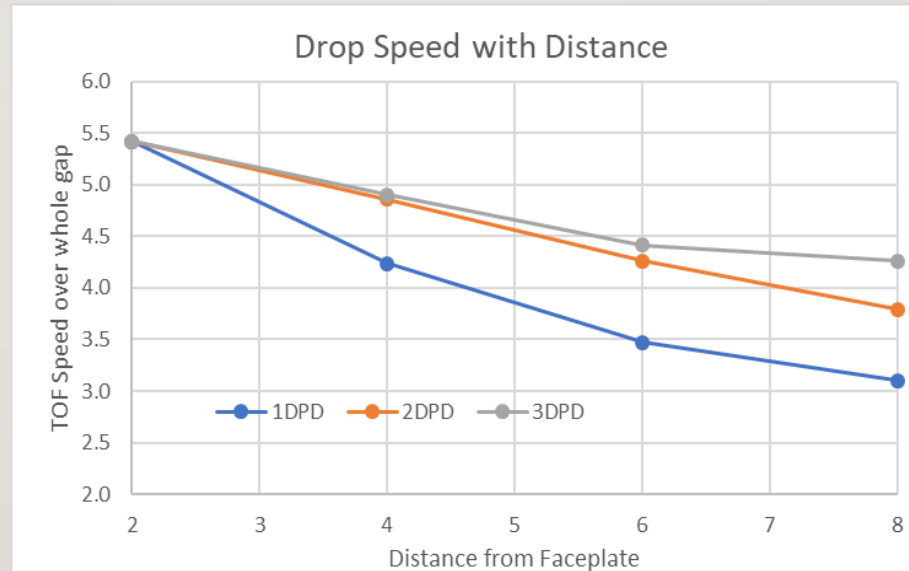




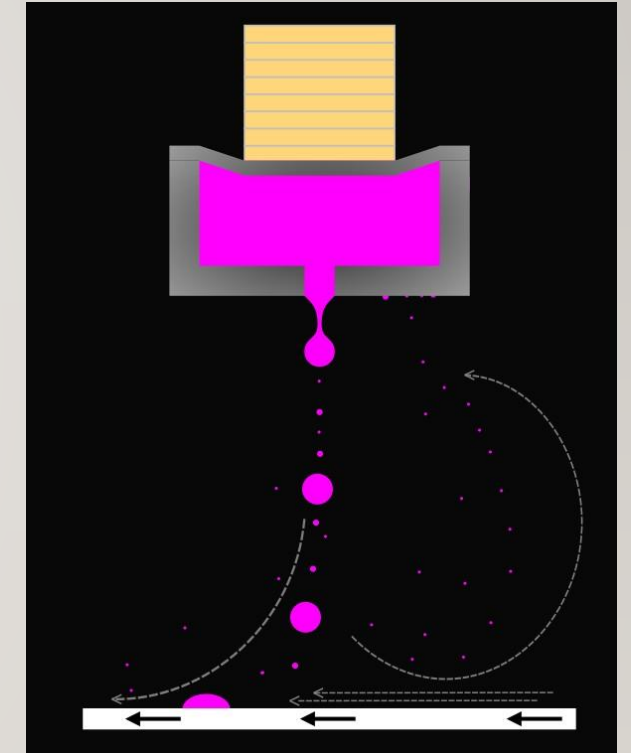
- Practicalities of getting inkjet processes to work
- Scientific and practical approaches to finding a solution



At 20kHz entrained air maintains jet direction for continuous print without cross-flow



At 2kHz drag effect is noticeable



Issues with substrate speed



- In two years of business we have been involved with projects on:
  - Ricoh Gen4, **Gen5F**, **Gen5s**, **Gen5F**, **Gen6**
  - Dimatix S-class, **Samba**, **Starfire**
  - Xaar **1201**, **XJ1003**, XJ5601
  - Kyocera KJ44B
  - **KMI024i**
  - Epson DX series
- Using **Megnajet** and **GIS** ink systems

CAPABILITY KEY:

Underline = jetting in lab

**Bold** = DoDxAct driving capability in place







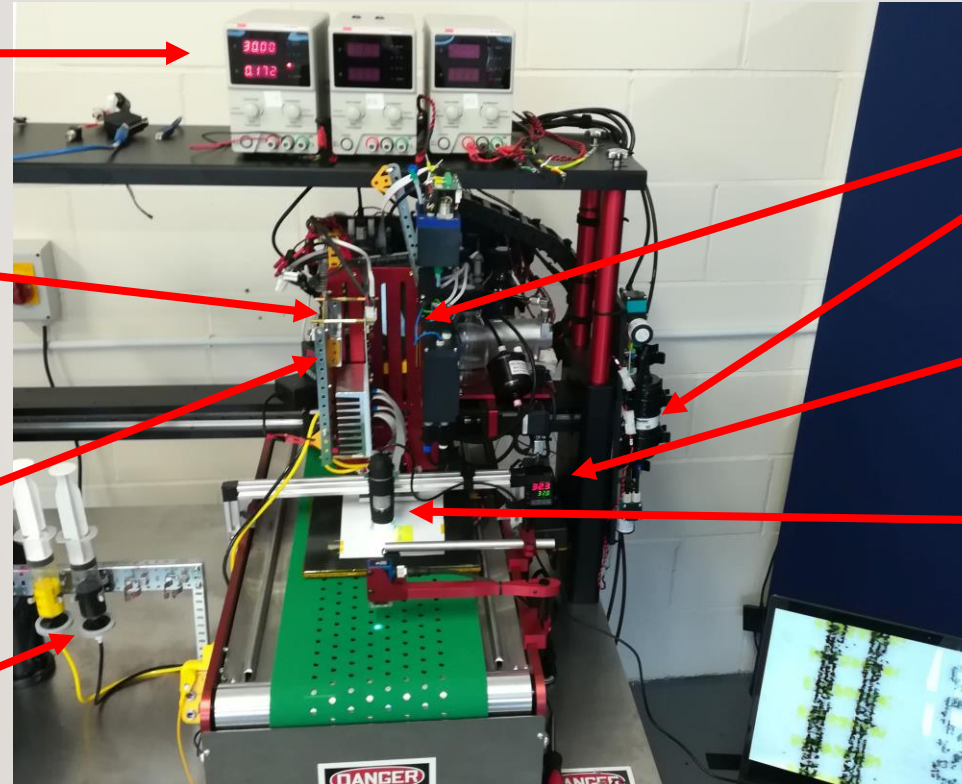
# CAPBILITY - JETXPRT PRINT STATION SET-UP

Power supplies  
for head  
electronics

Head  
electronics  
(GIS/Meteor)

Temperature  
controller for  
head mount  
(UV / Aq)

Ink from syringe  
for prototyping



GIS Ink System for  
high duty cycle  
printing

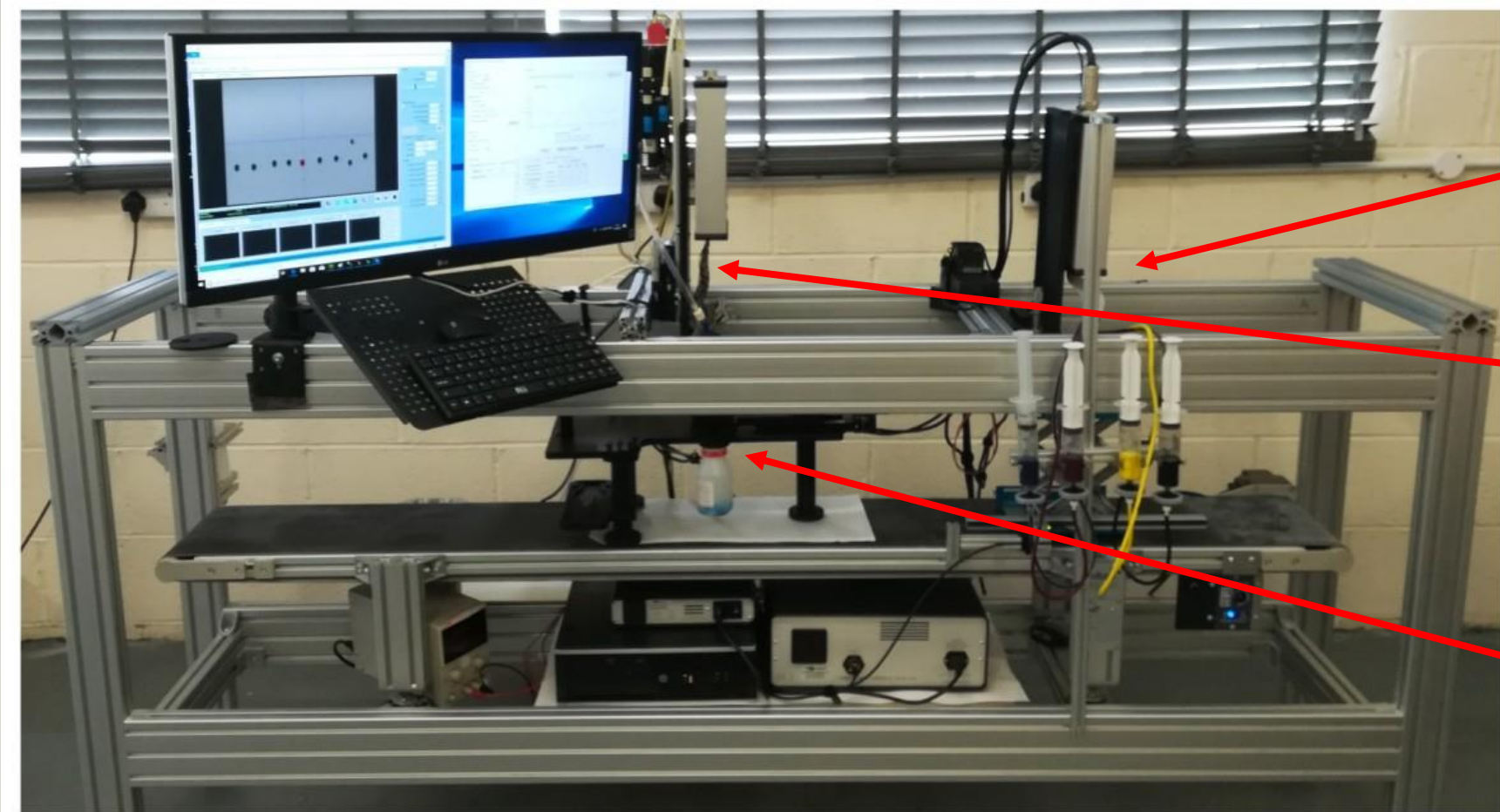
Temperature  
controller for  
heated stage

USB Camera for  
real-time print  
analysis



In there somewhere are some GH2220 heads:

# CAPABILITY - METEOR-BASED SYSTEM

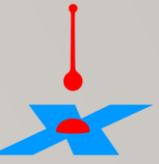


XJ1201 for  
prototyping

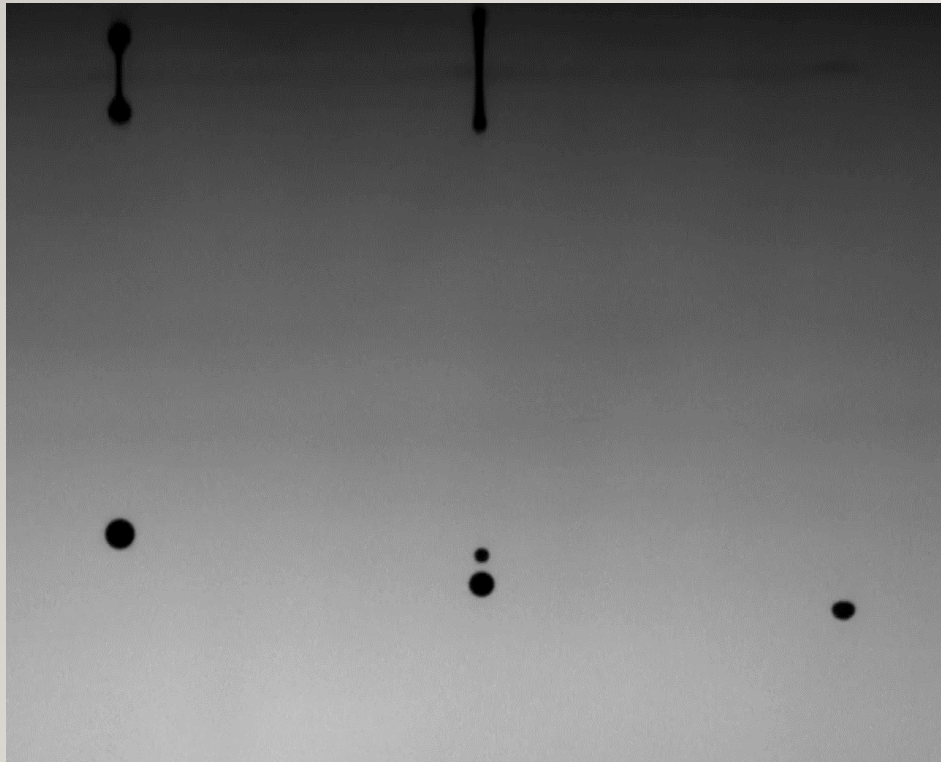
SGI024 for  
confirmation  
testing with  
Megrajt ink  
supply

Meteor  
dropwatcher can  
be used with  
either print head

# CAPABILITY EXAMPLE - DROPWATCHER



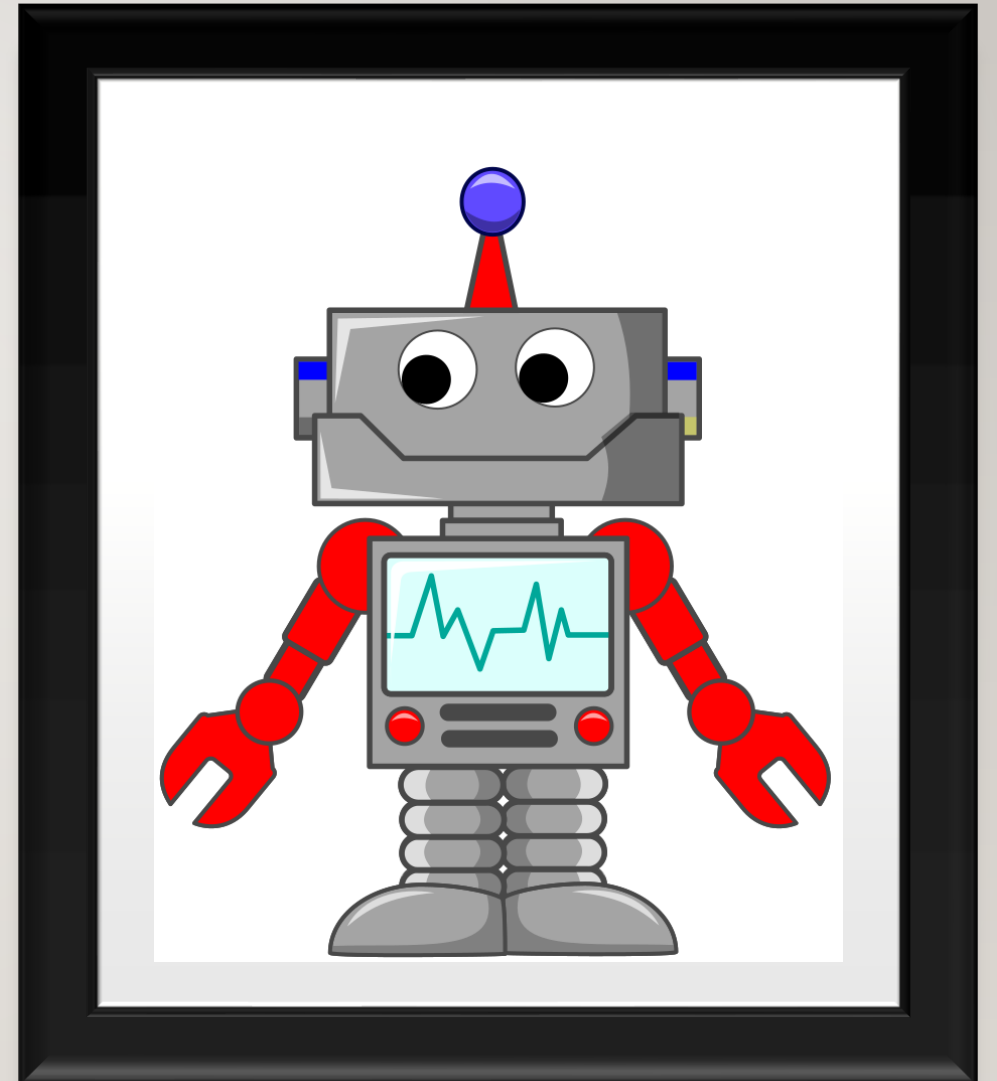
- Different frame rate capture offer different perspectives of droplet stability

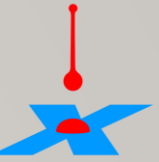


# SERVICES

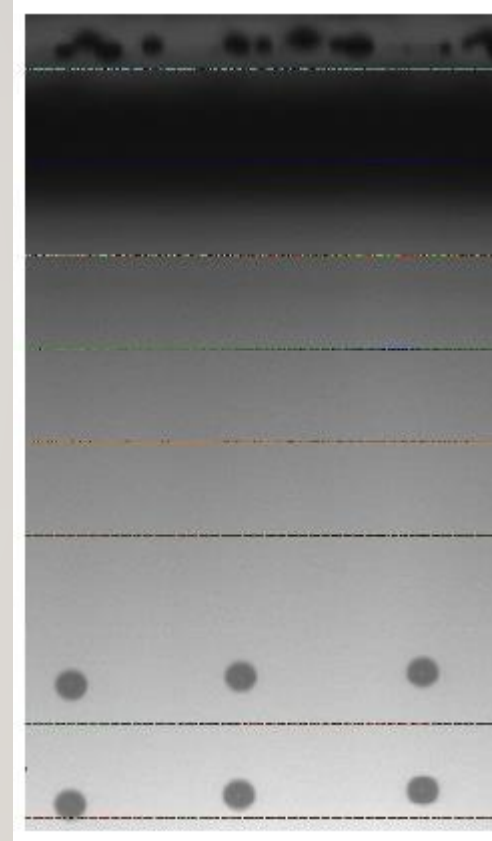
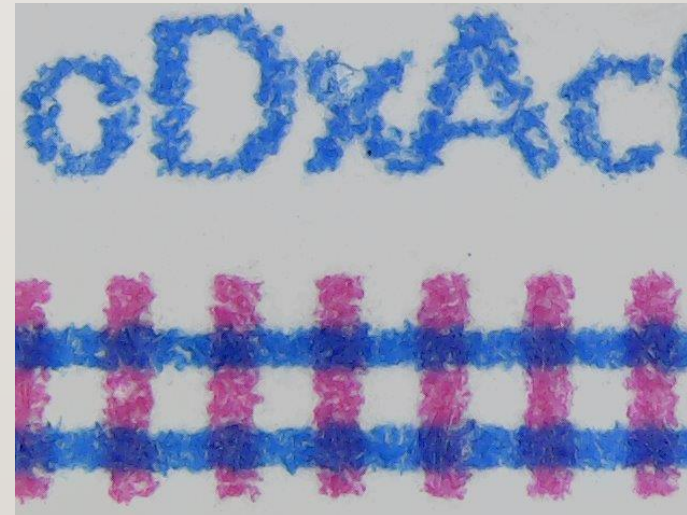
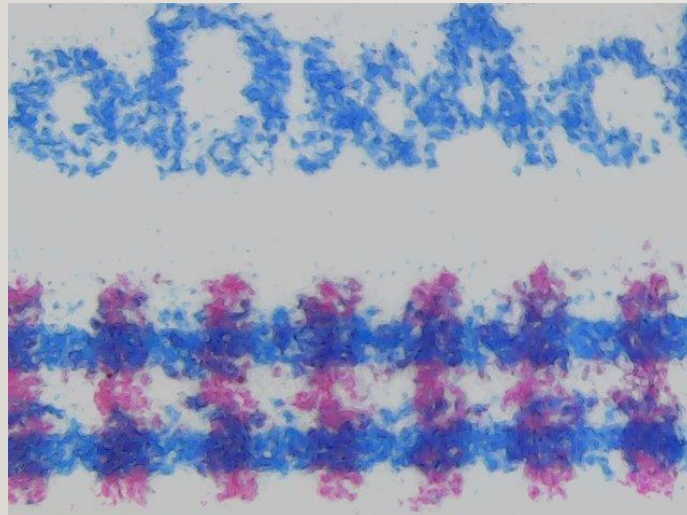
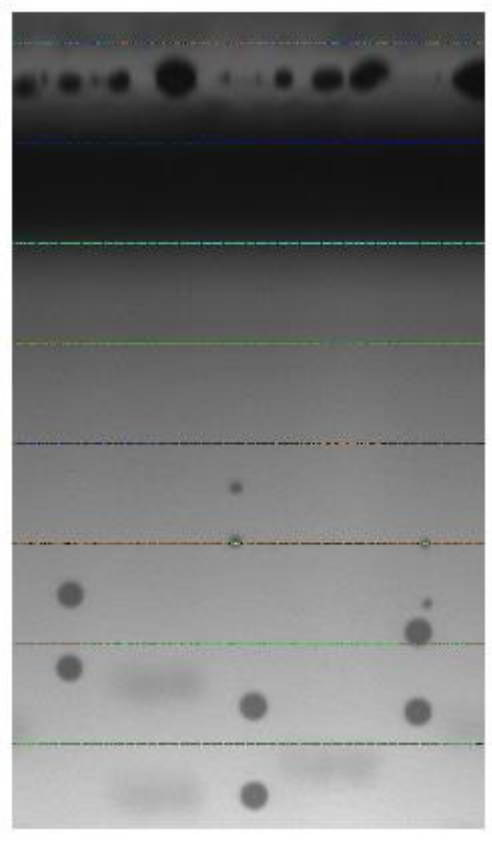
---

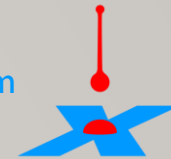
How we can help





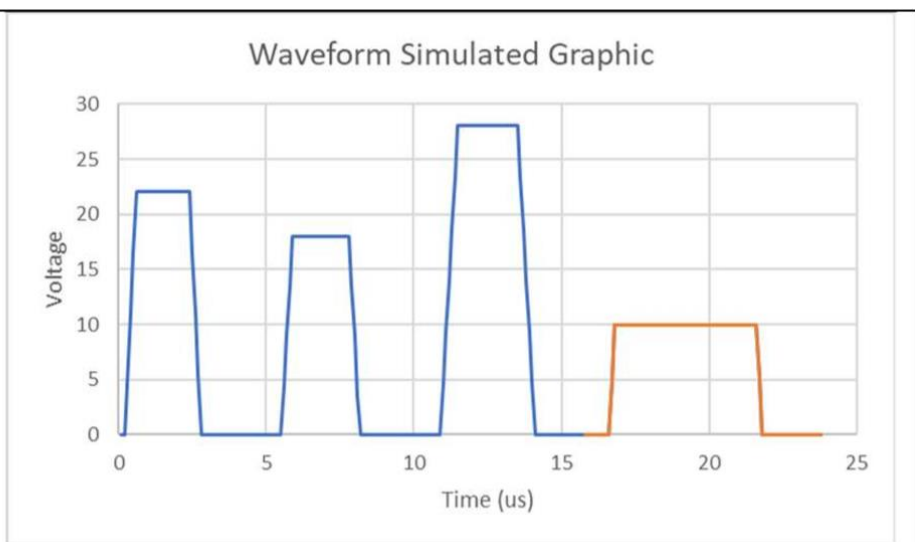
- Optimising pulse timing and amplitudes for a given fluid / temperature
- Relies on methodical first-principle testing of pulse timing
  - Jetxpert and GIS have collaborated to demonstrate this done quickly by degree of automation



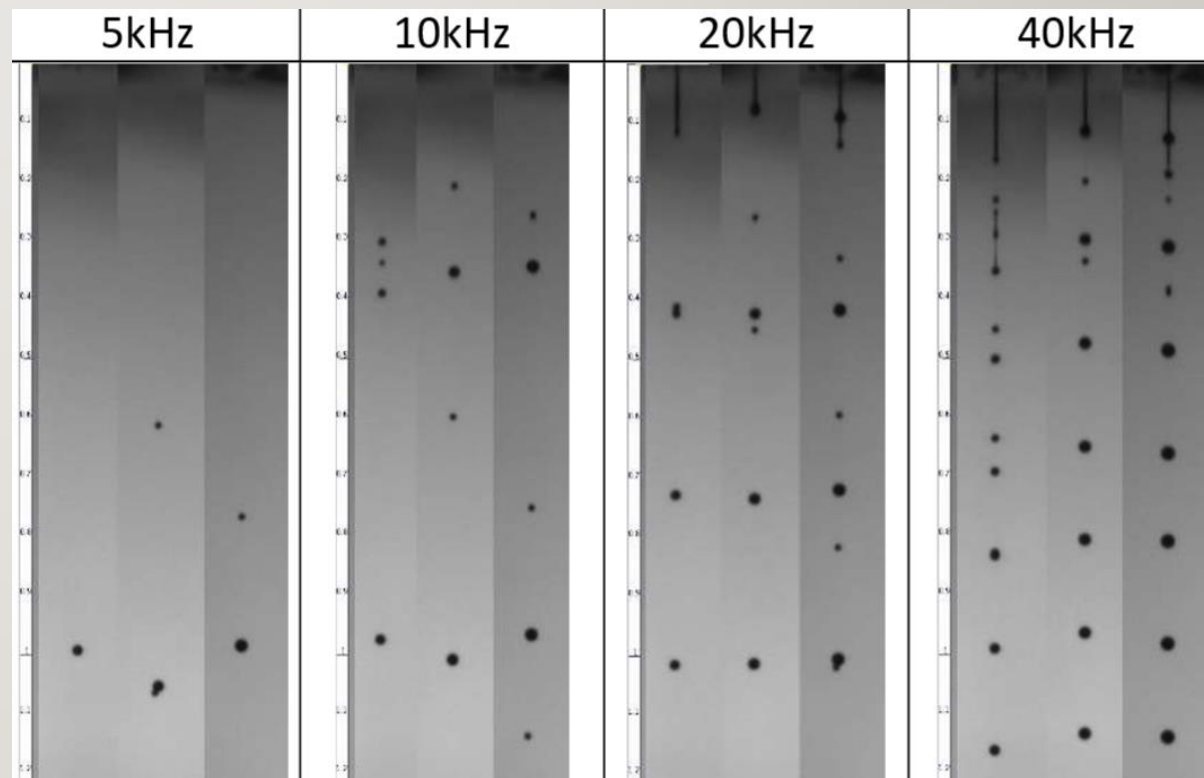


# WAVEFORM - GRAPHICS GREYSCALE

- Want good timing between grey levels at key frequencies as in this Samba test
  - High frequency target leaves fewer options for tuning out satellite drop formation



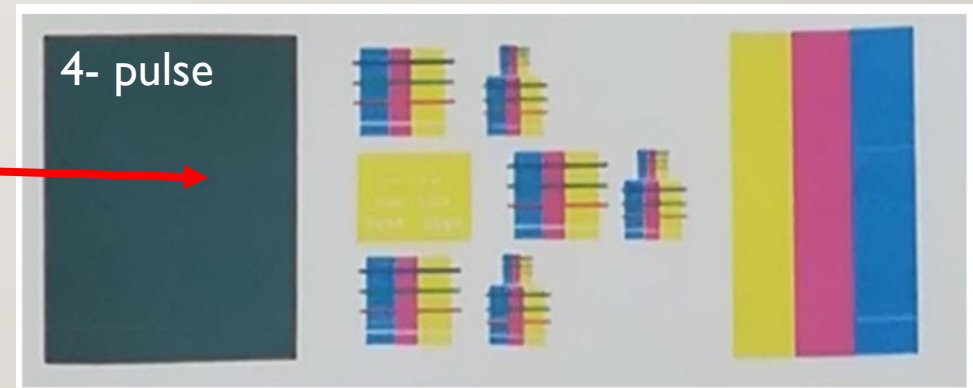
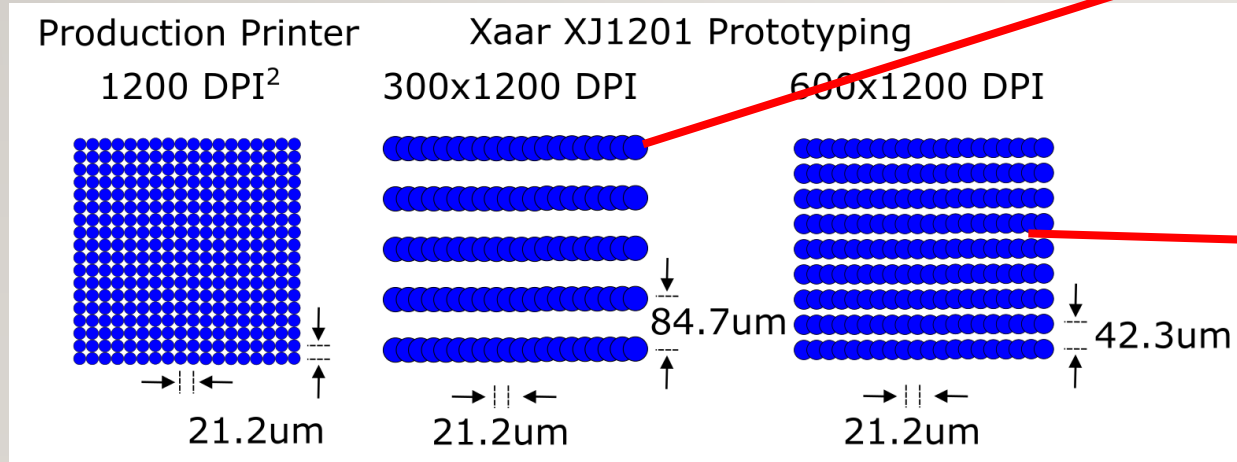
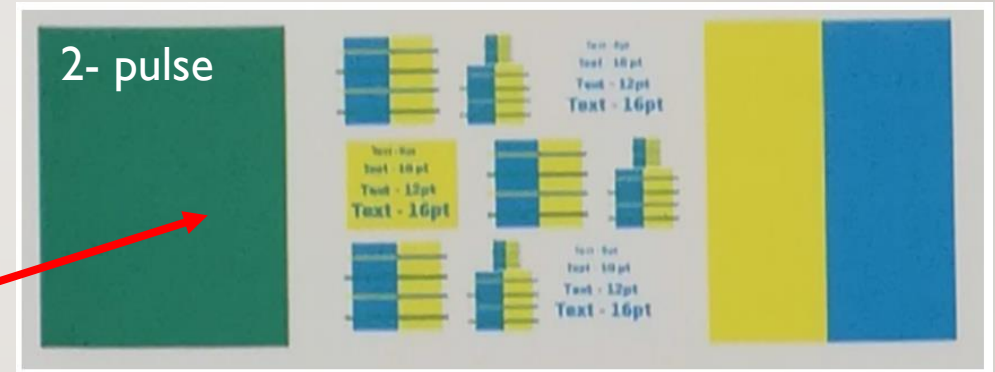
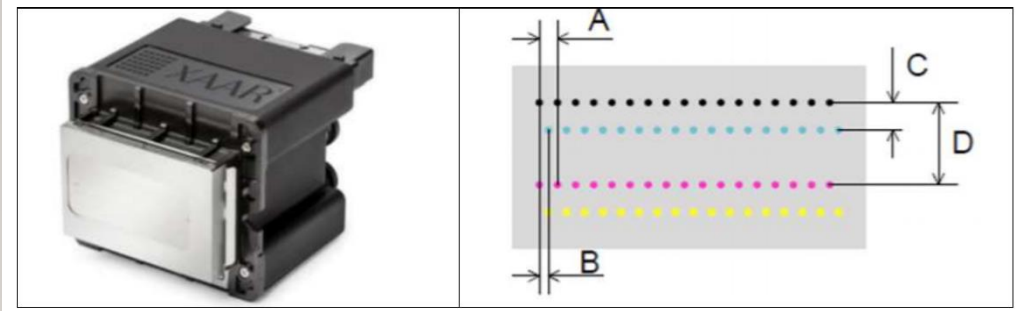
1DPD	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	optional
2DPD	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3DPD	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	



# PROTOTYPING - DPI COMPARISONS



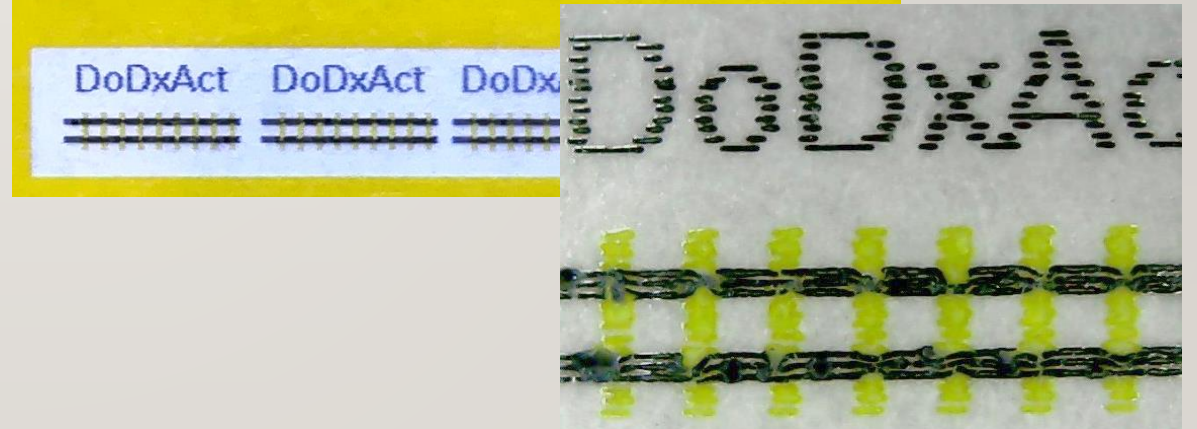
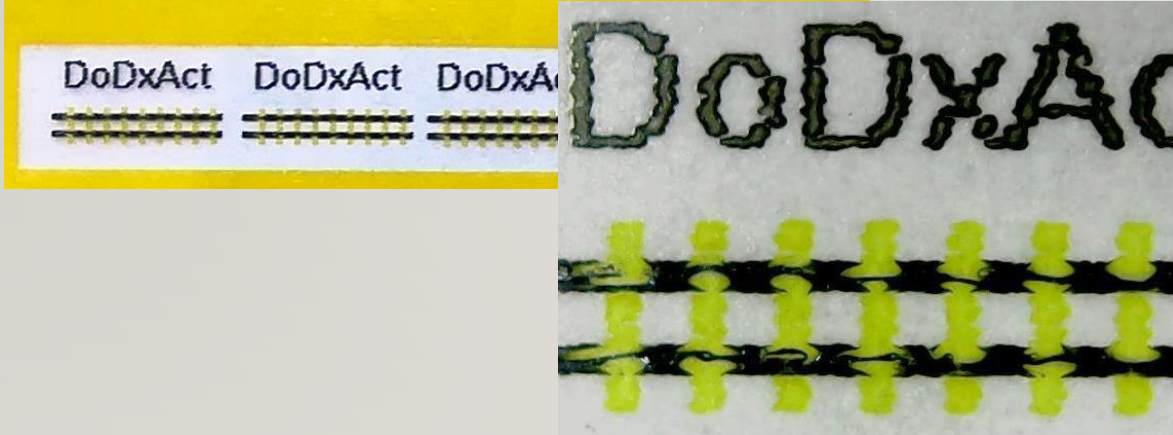
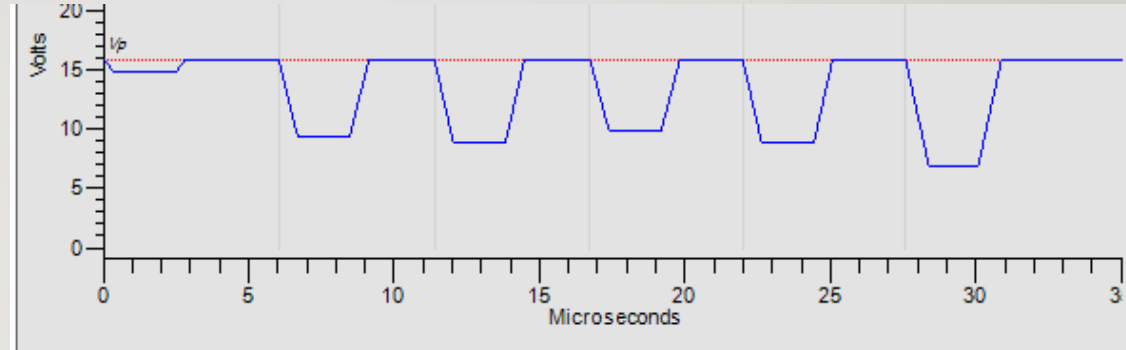
- 300DPI 4-colour versus 600DPI 2-colour on a single easy-to-integrate head



# PROTOTYPING - AQ INK BLEED ON FILMS



- 5-pulse on GH2220
- Same print, different primers





# PROTOTYPING - SPEED & THROW DISTANCE

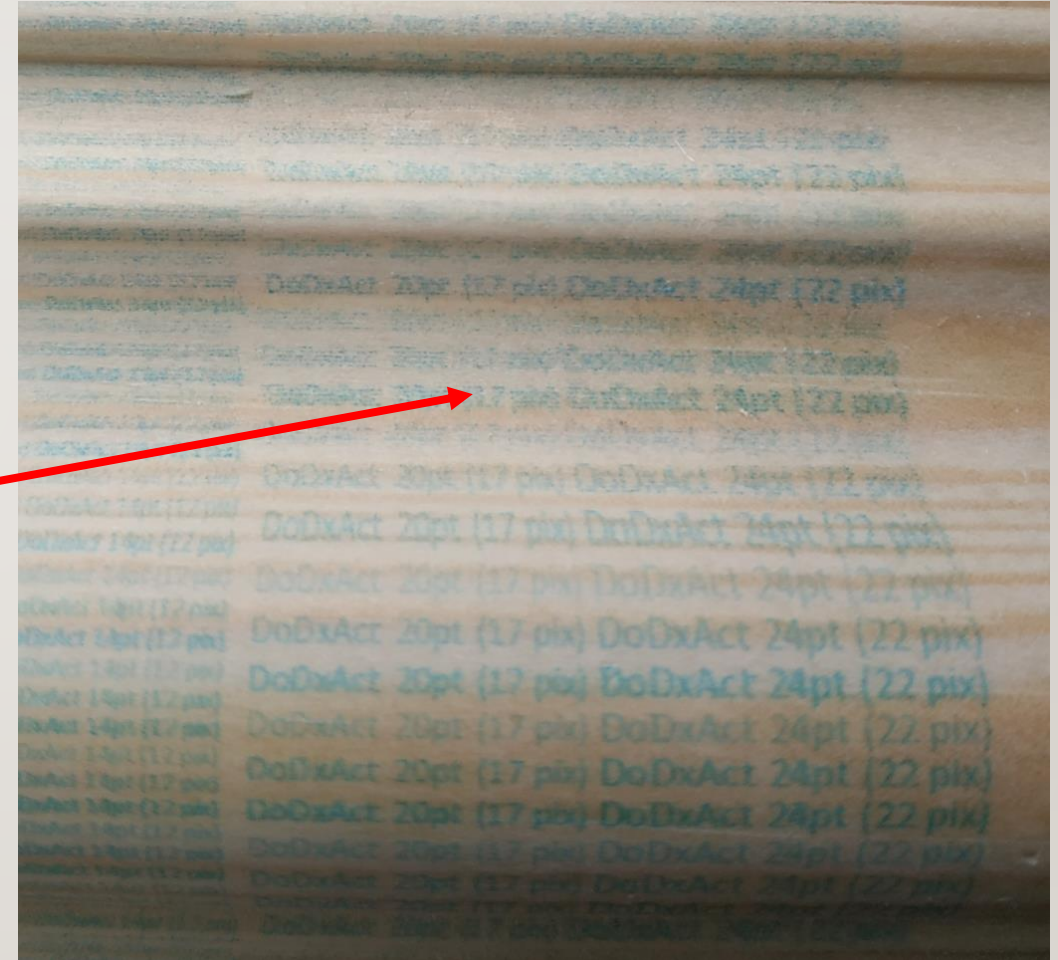
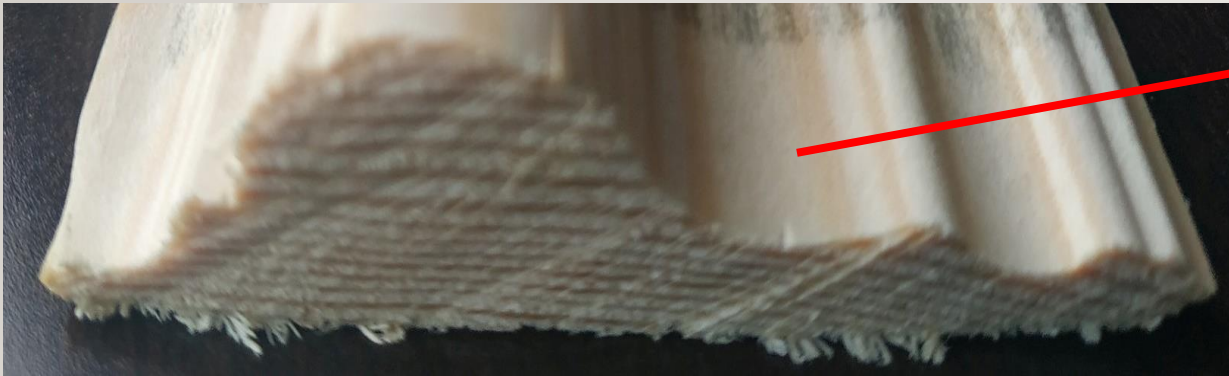


	15	30	45	60
2mm				
4mm				
6mm				
8mm				

# PROCESS - PRINTING TO A SHAPE



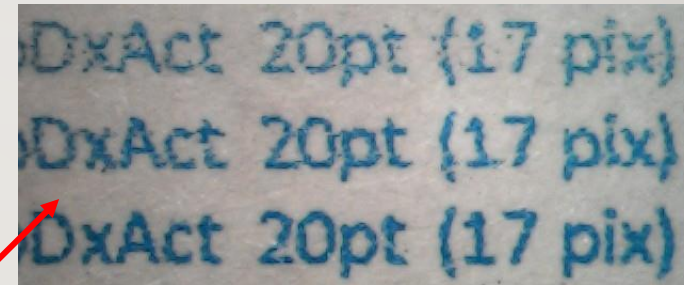
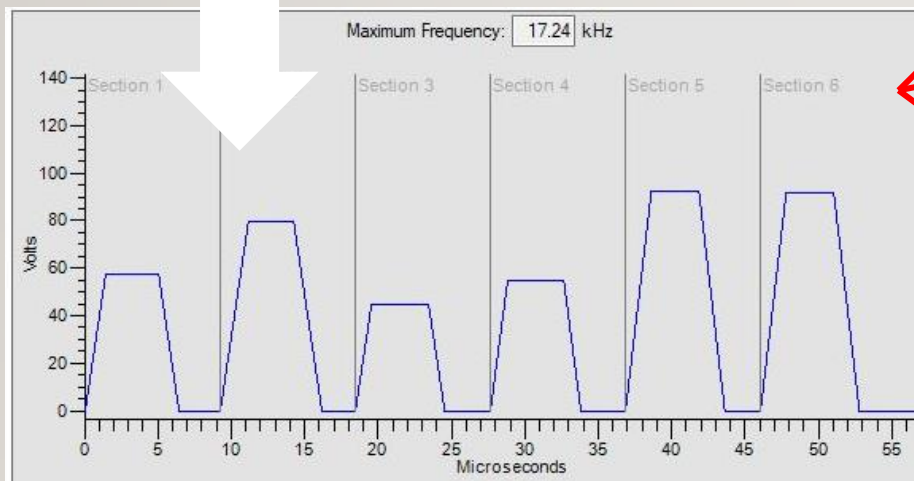
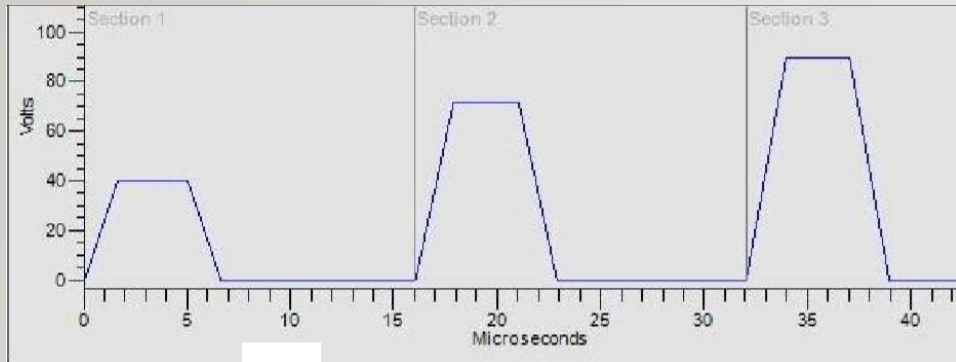
- At lowest speed of 15m/min the “20pt” text remains just readable
  - At 17 pixels, the letter are is approx. 1mm tall
  - Jet distance is 15mm at highlighted position



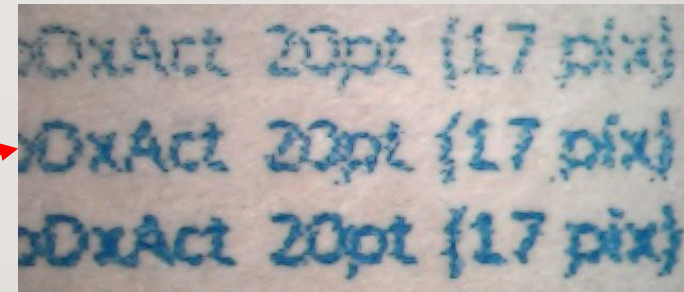


# PROCESS – HIGH THROW DISTANCE

- Can improve performance at 8mm, although limited to 45m/min
  - 1<sup>st</sup> grey (17pl) still challenging > 15m/min



15m/min



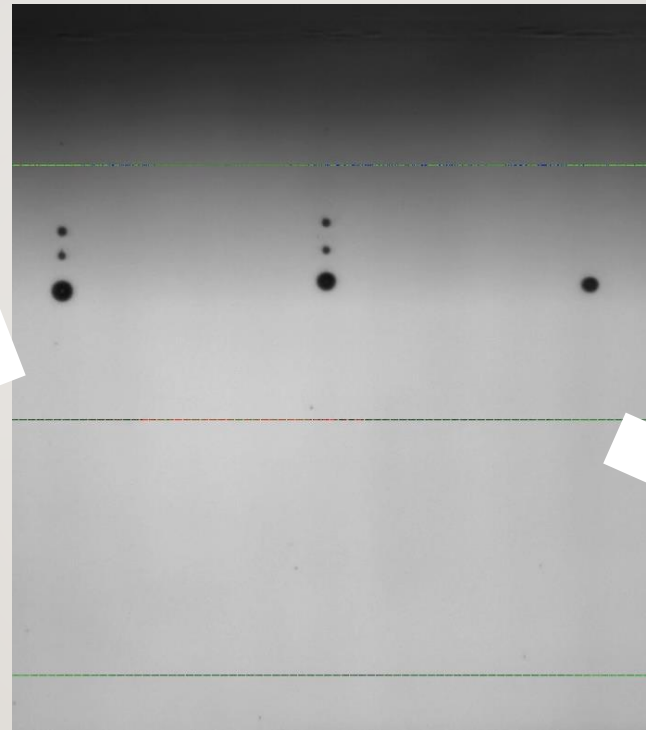
30m/min



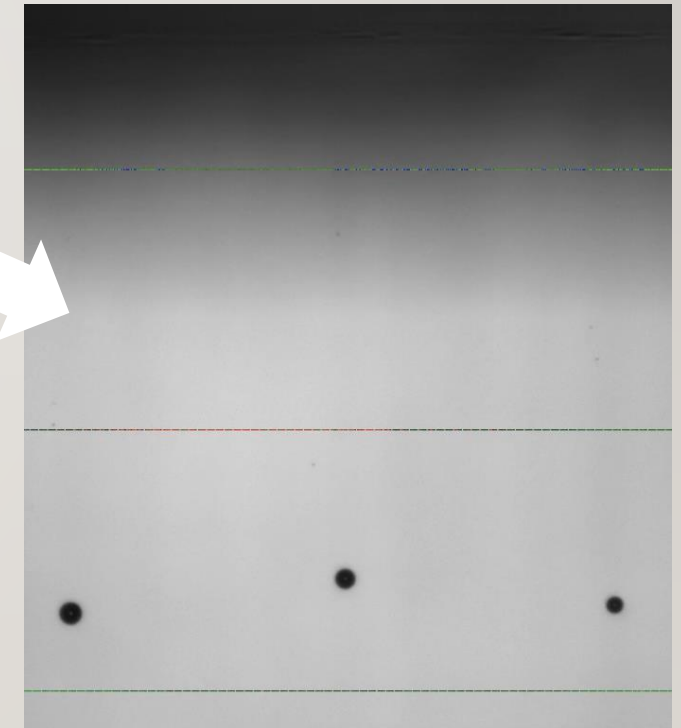
45m/min



# AS SEEN ON DROP WATCHER



*(Still frames of video for print version)*

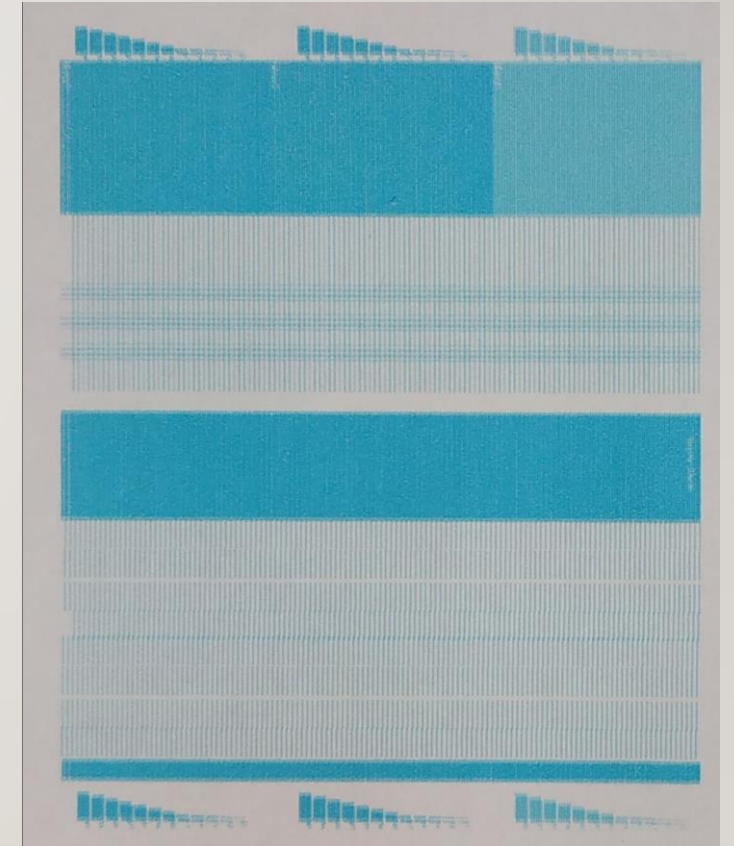
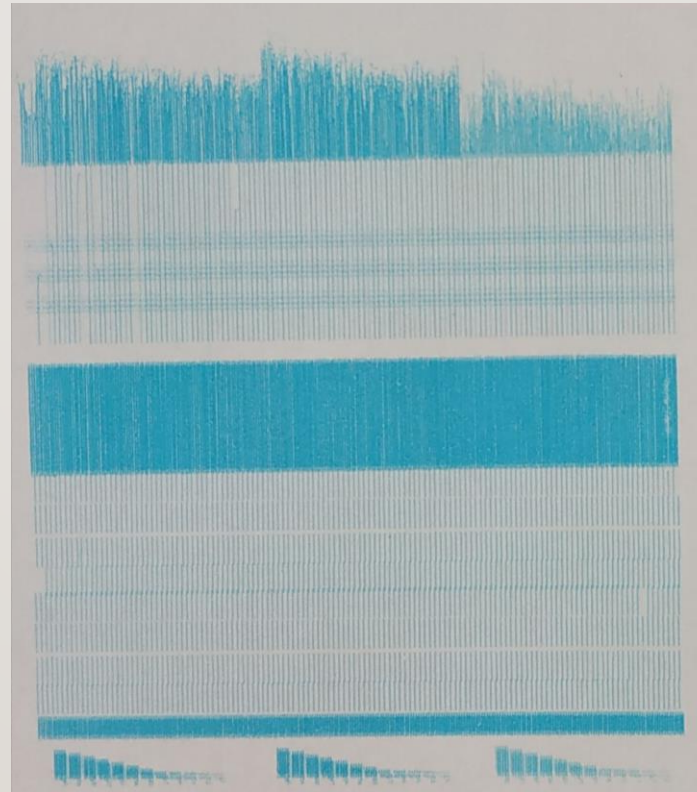
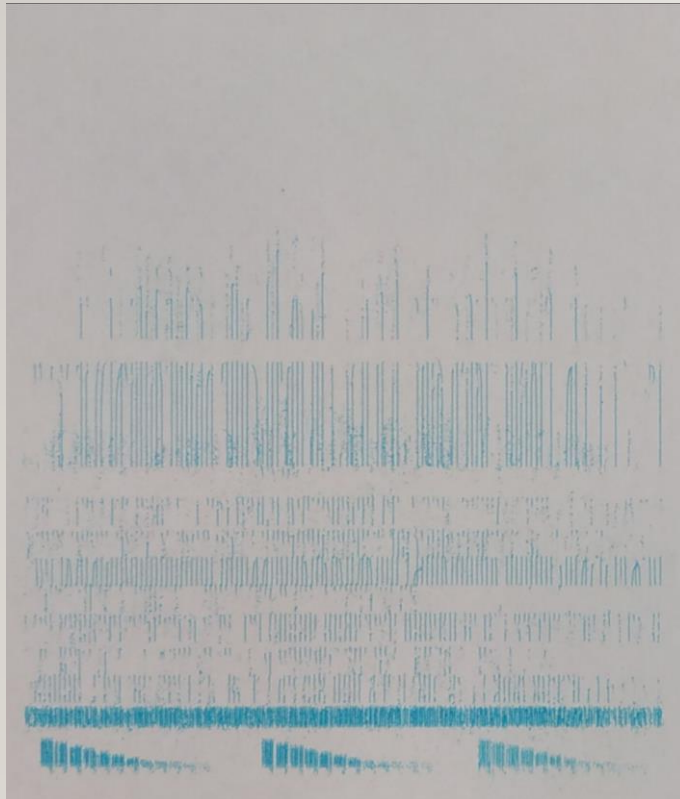


- 3 drop sizes
  - 17pL, 26pL, 37pL
- Droplet speed  $\leq 5.5\text{m/s}$  to avoid satellites
- Deceleration of smallest drop starts at 1.5mm

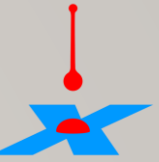
# IMPLEMENTATION – HEAD HEALTH



- For AQ inks recirculation have massive influence, especially over longer times
  - Very localised changes occur in the nozzle very quickly, however



# THANK YOU FOR YOUR ATTENTION



Feel free to Contact us to learn more:

