

Tribute to Bryan Preas

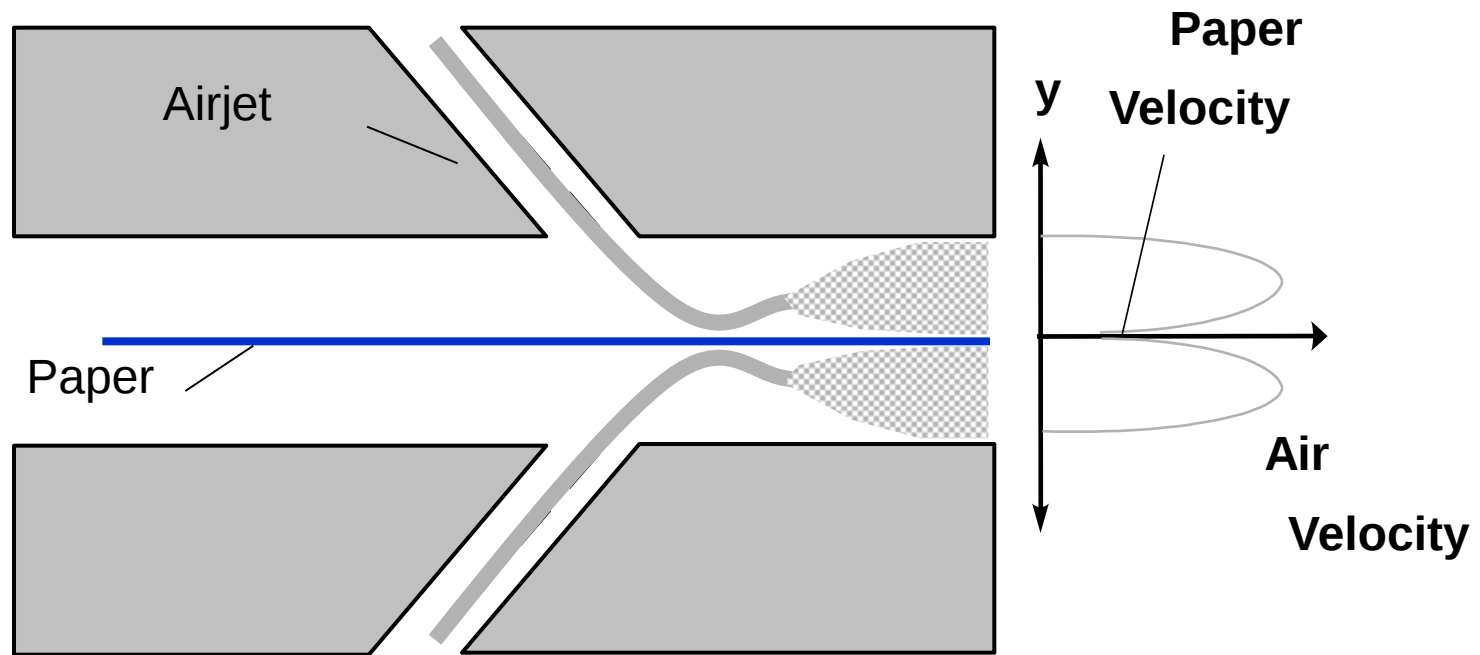
April 1, 2014

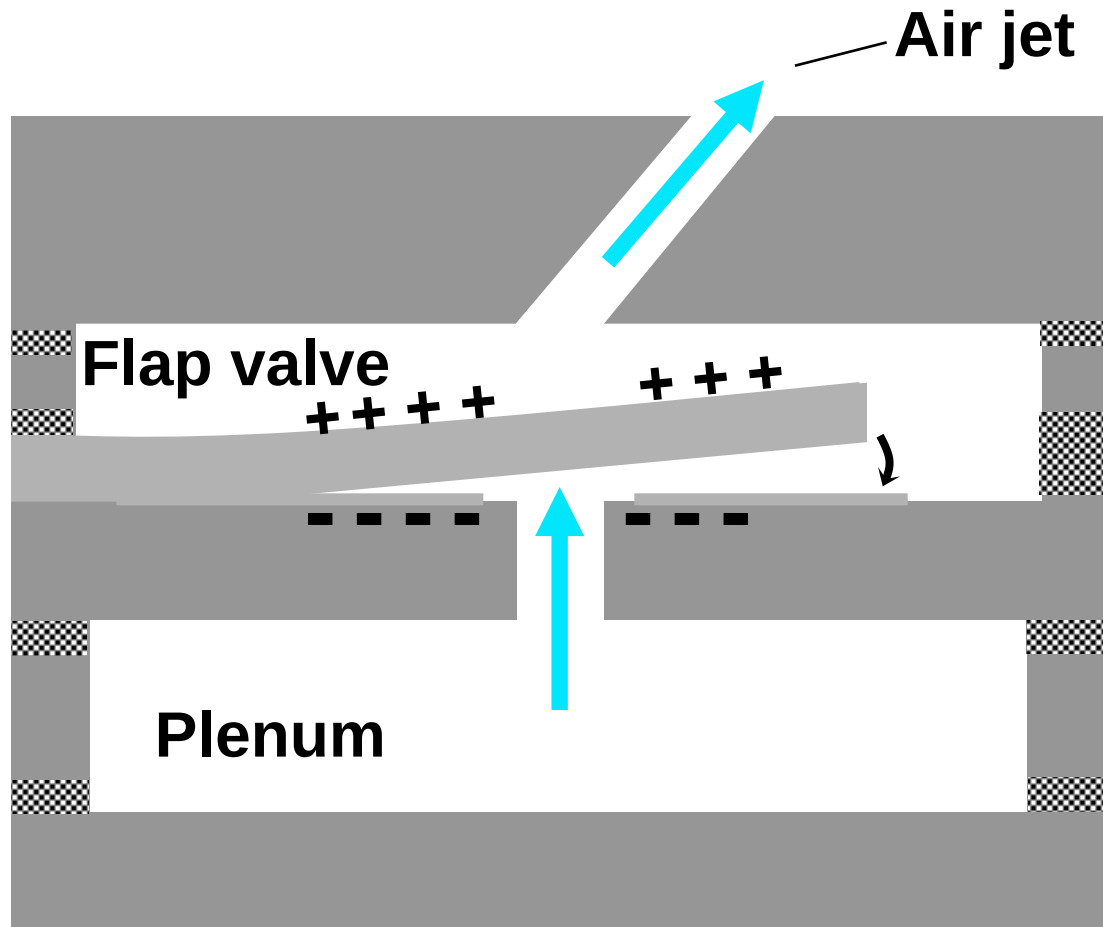
Scott Elrod
Vice President
Hardware Systems Laboratory
PARC, a Xerox Company
elrod@parc.com

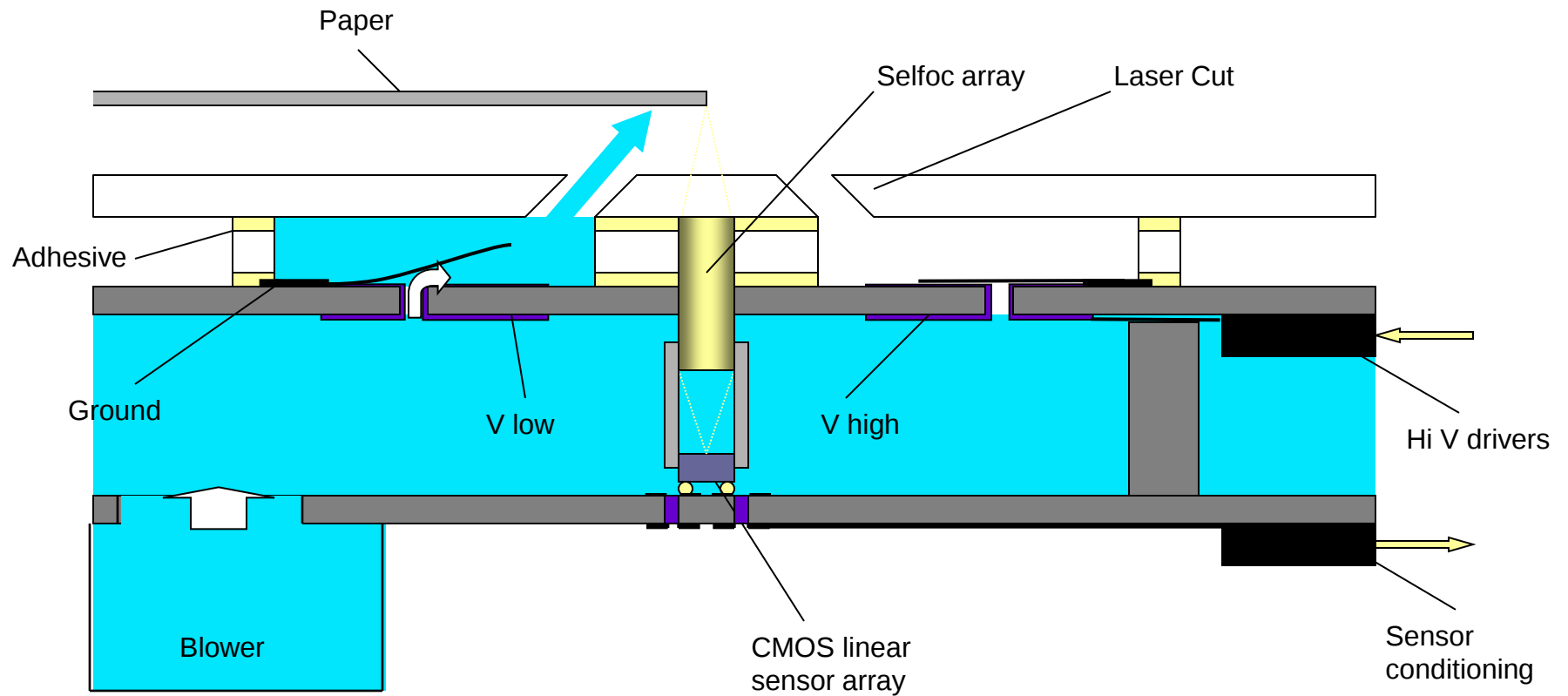
Time Period from 2000 - 2012

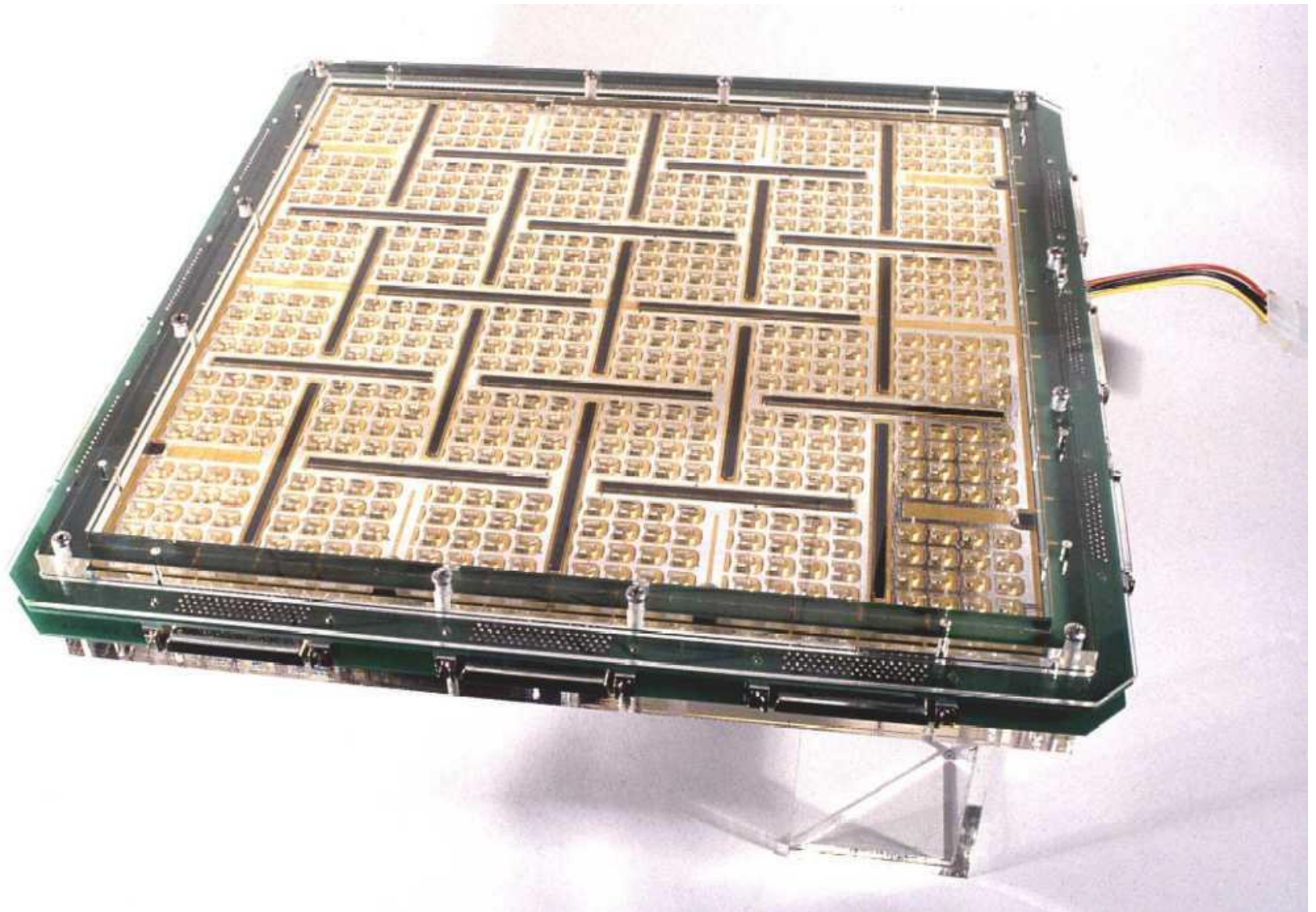
(The Do-Whatever-It-Takes System Engineering Period)

- Airjet Paper Mover (~ 2000)
- Hypermodular TIPP (~ 2004)
- Bioagent Detection (~ 2006)
- Digital X-Ray System (~ 2010)









System Designers

A Berlin

J Reich

B Preas

D Biegelsen

M Fromherz

K van Schuylenbergh

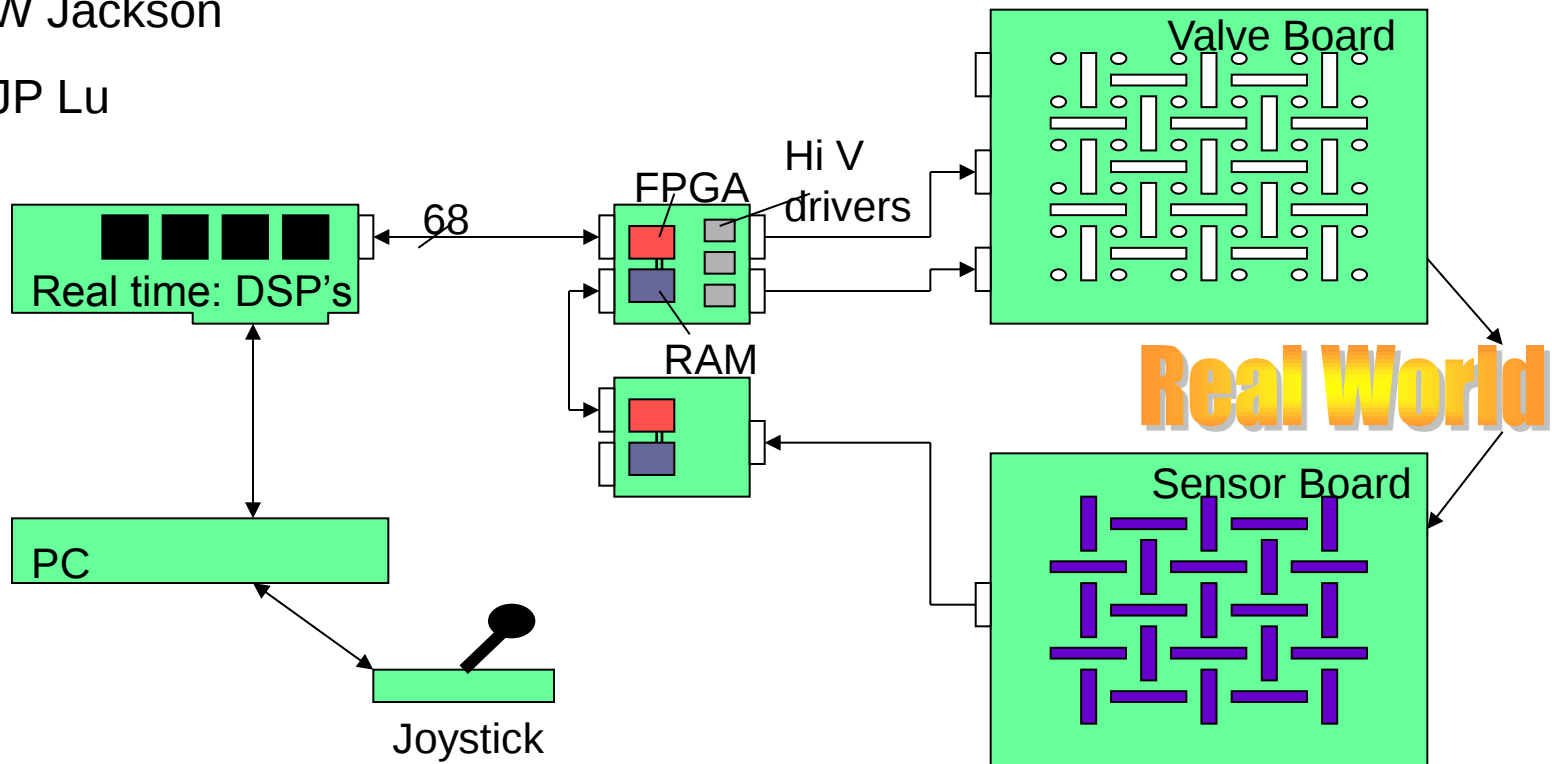
P Cheung

D Goldberg

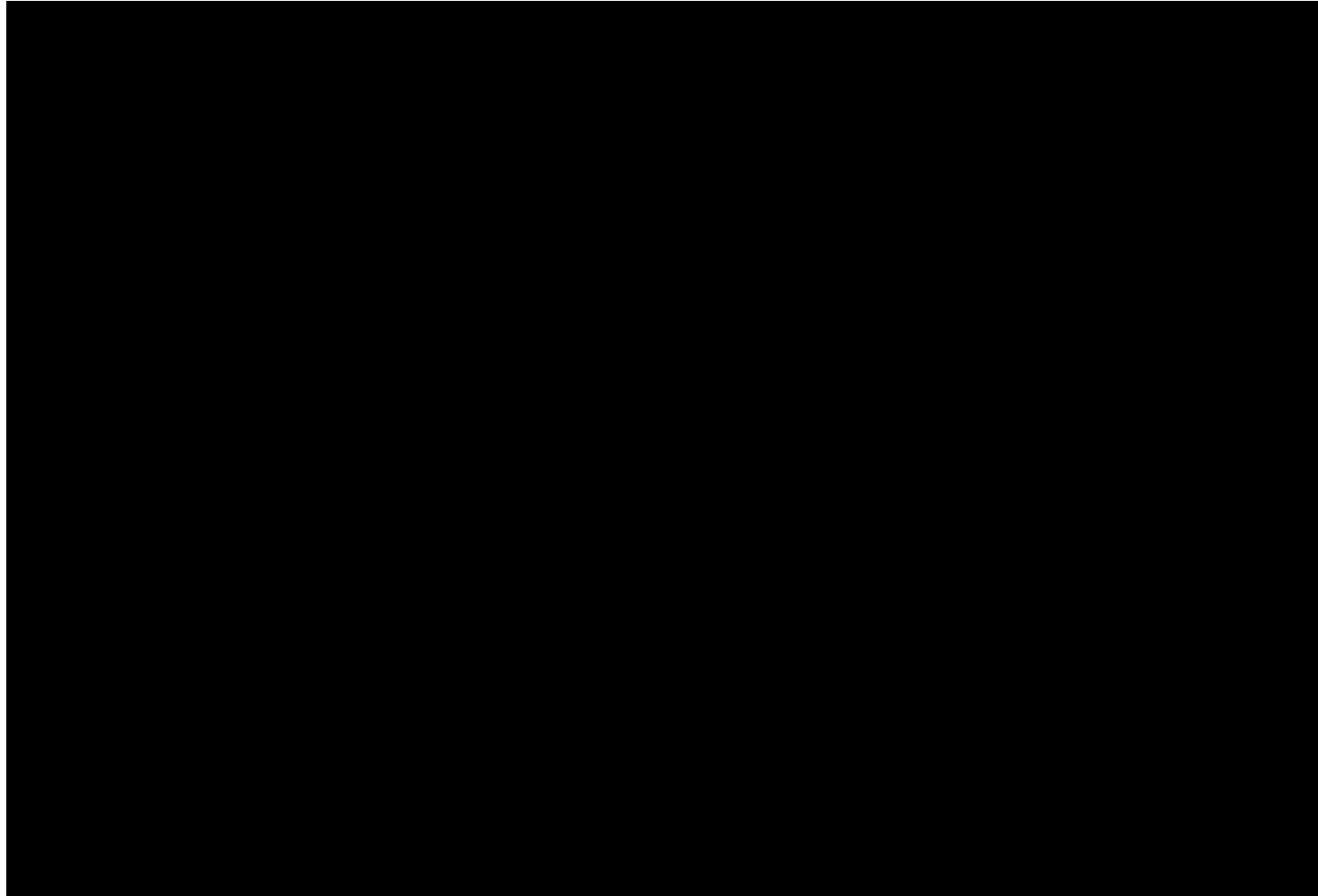
L Swartz

W Jackson

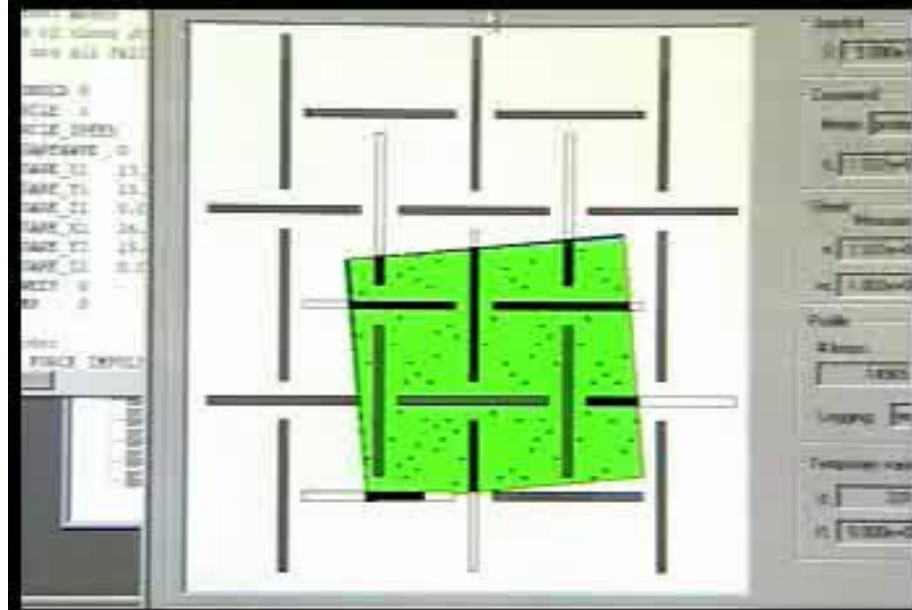
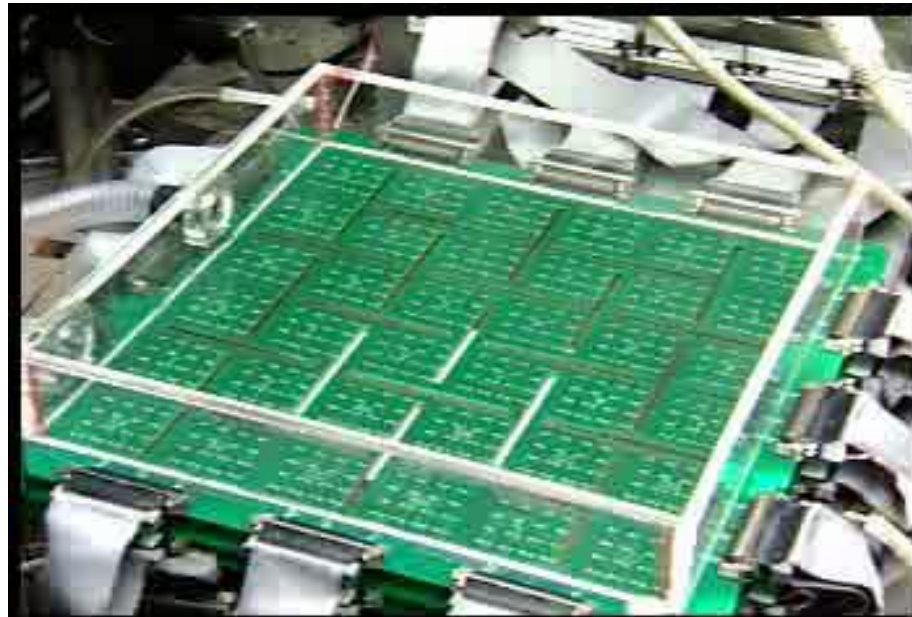
JP Lu



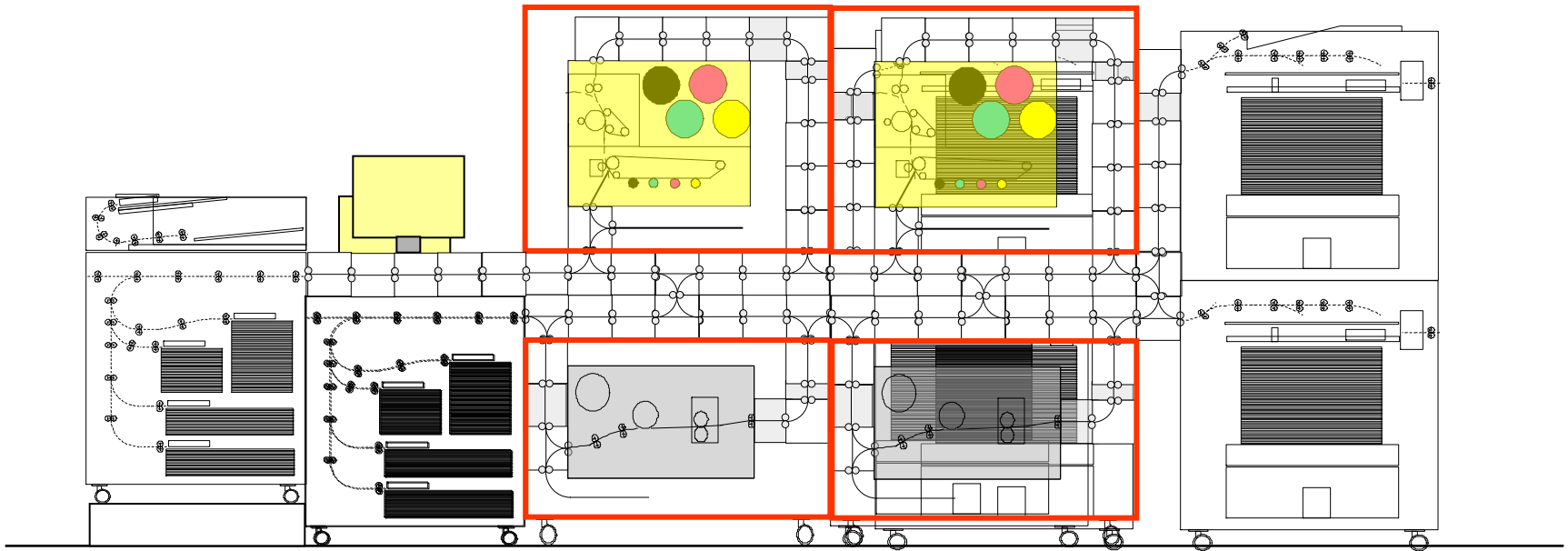
Airjet Video



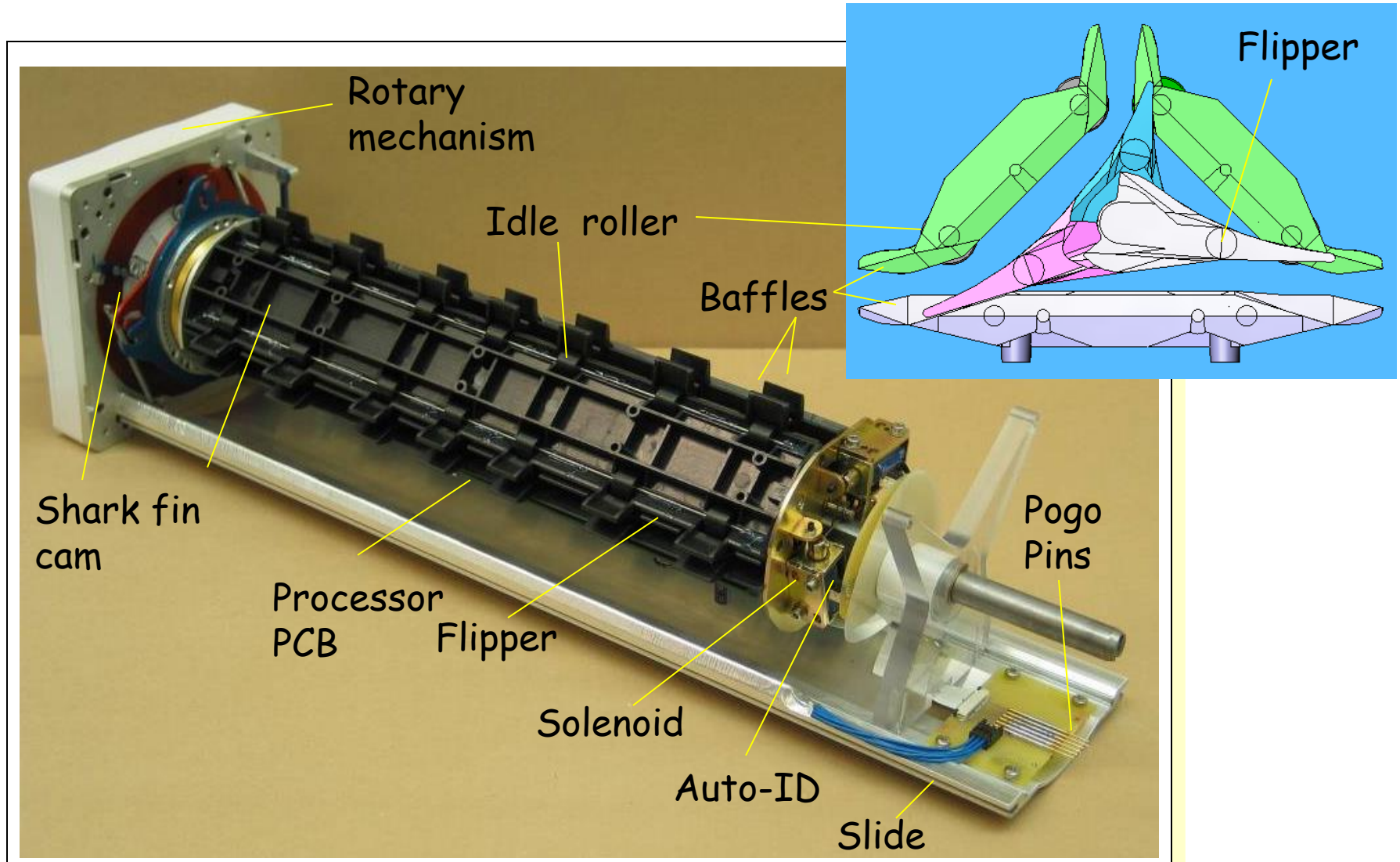
Dual Sided with Planned Path



Hypermodular TIPP (Tightly Integrated Parallel Printing)



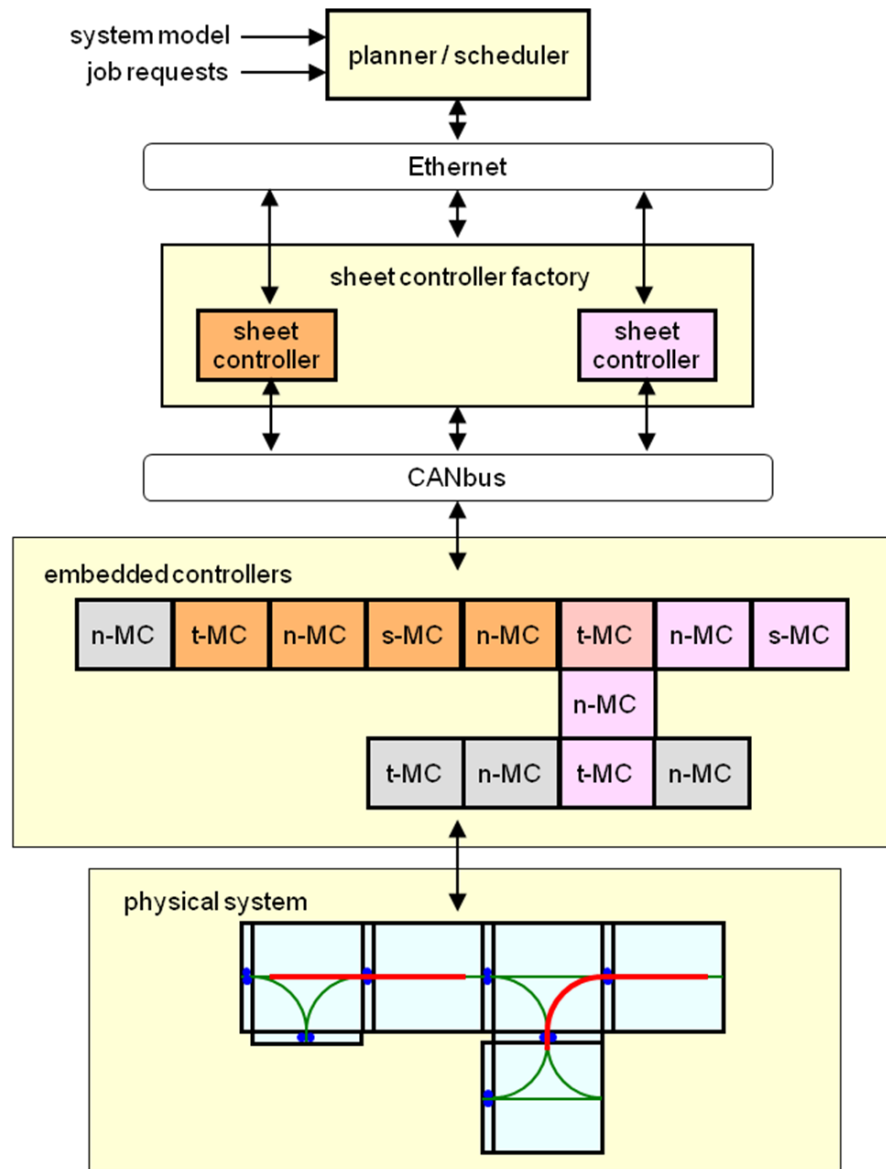
Director assembly (3-way)



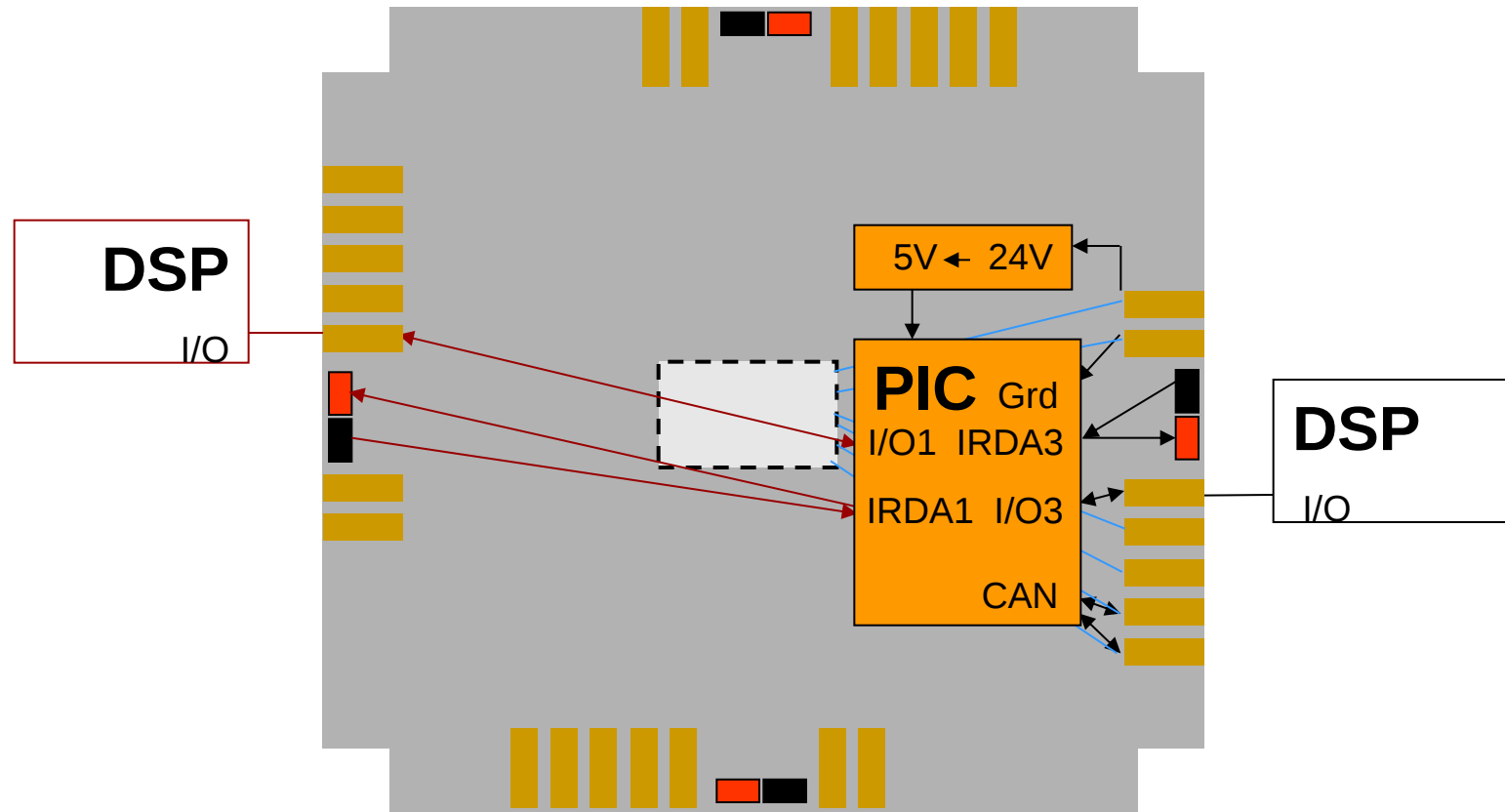
210 ppm with four 55 ppm engines



Planning and control



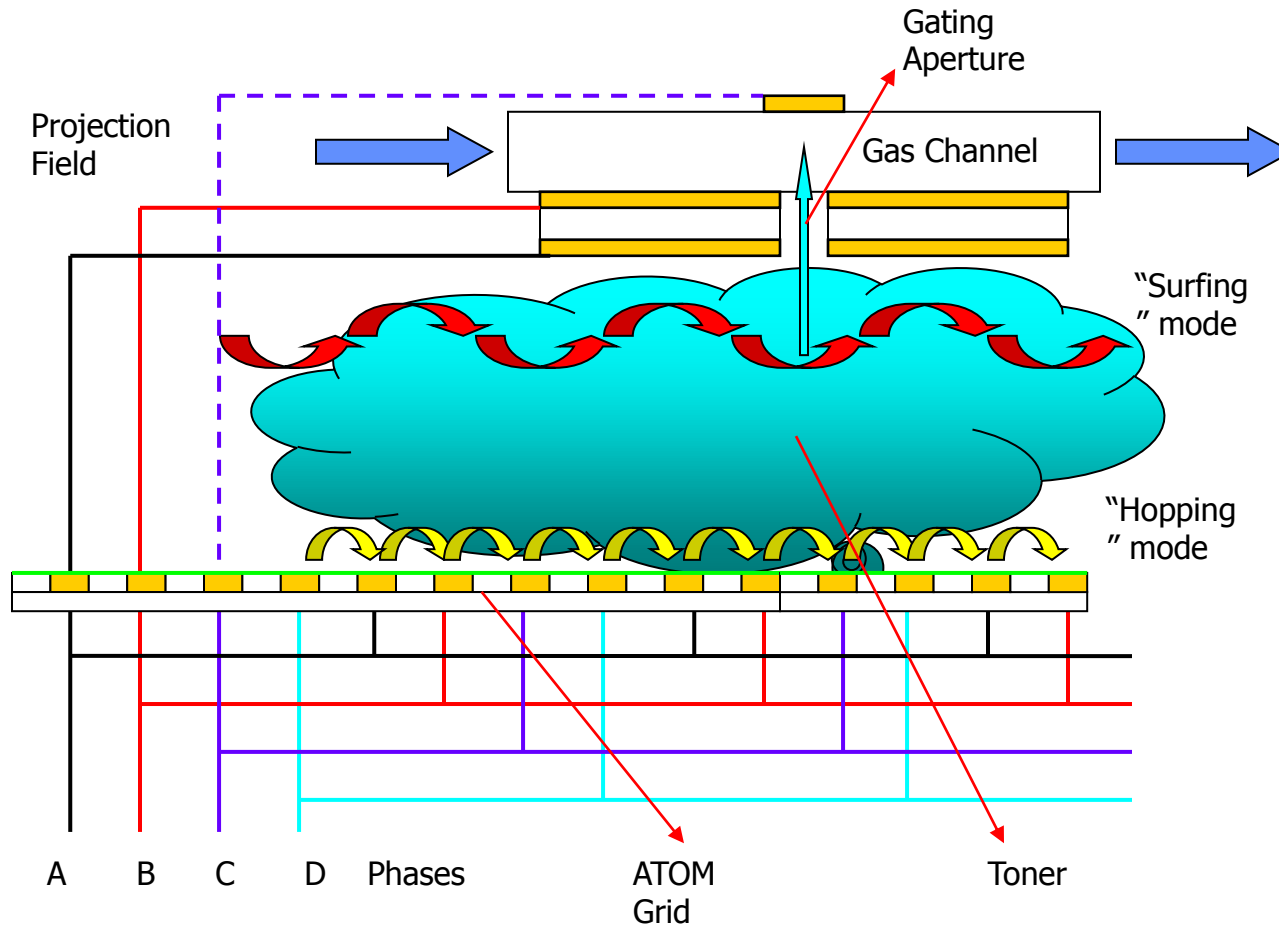
Backplane PWB connector & auto-ID



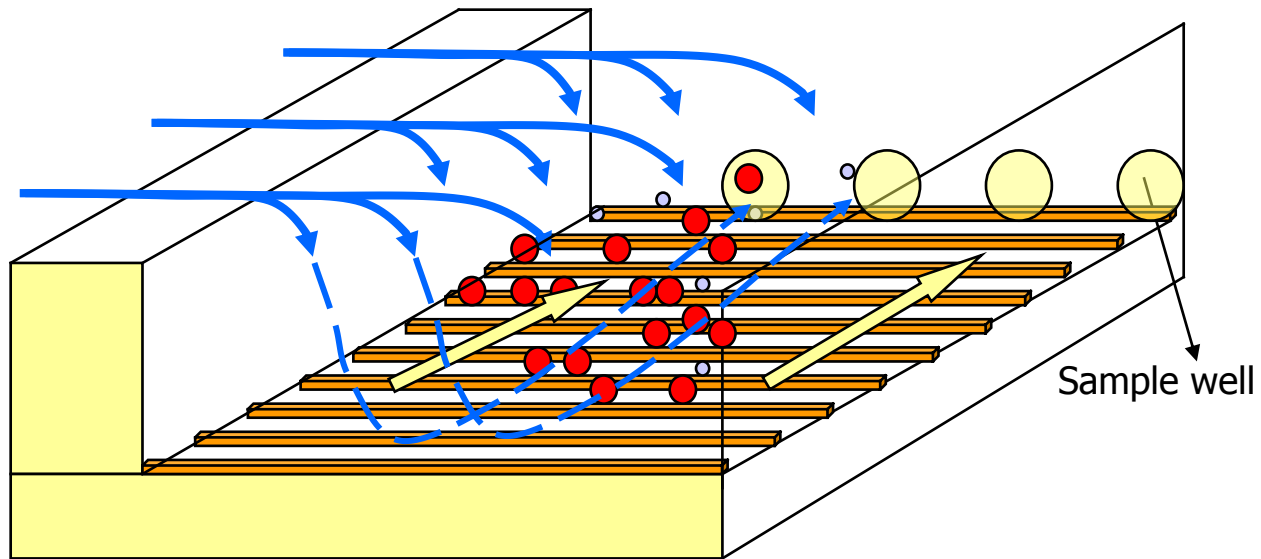
- PIC has flash to store board address, or has its own ID
- PICs communicate with nearest neighbor PICs via IRDA (e.g. P_iWest : P_jEast, etc.) then send to system memory the links (*no physical location binding necessary*)
- On input requests from DSPs on PIC I/O lines, PIC sends out on same line PIC ID plus 2 bits for orientation. Then DSPs communicate their capabilities, location and orientation to system.
- PCB can be oriented in any of the 4 directions

Dry Powder Manipulation Using Traveling Electrostatic Waves (for Printing)

parc
A Xerox Company

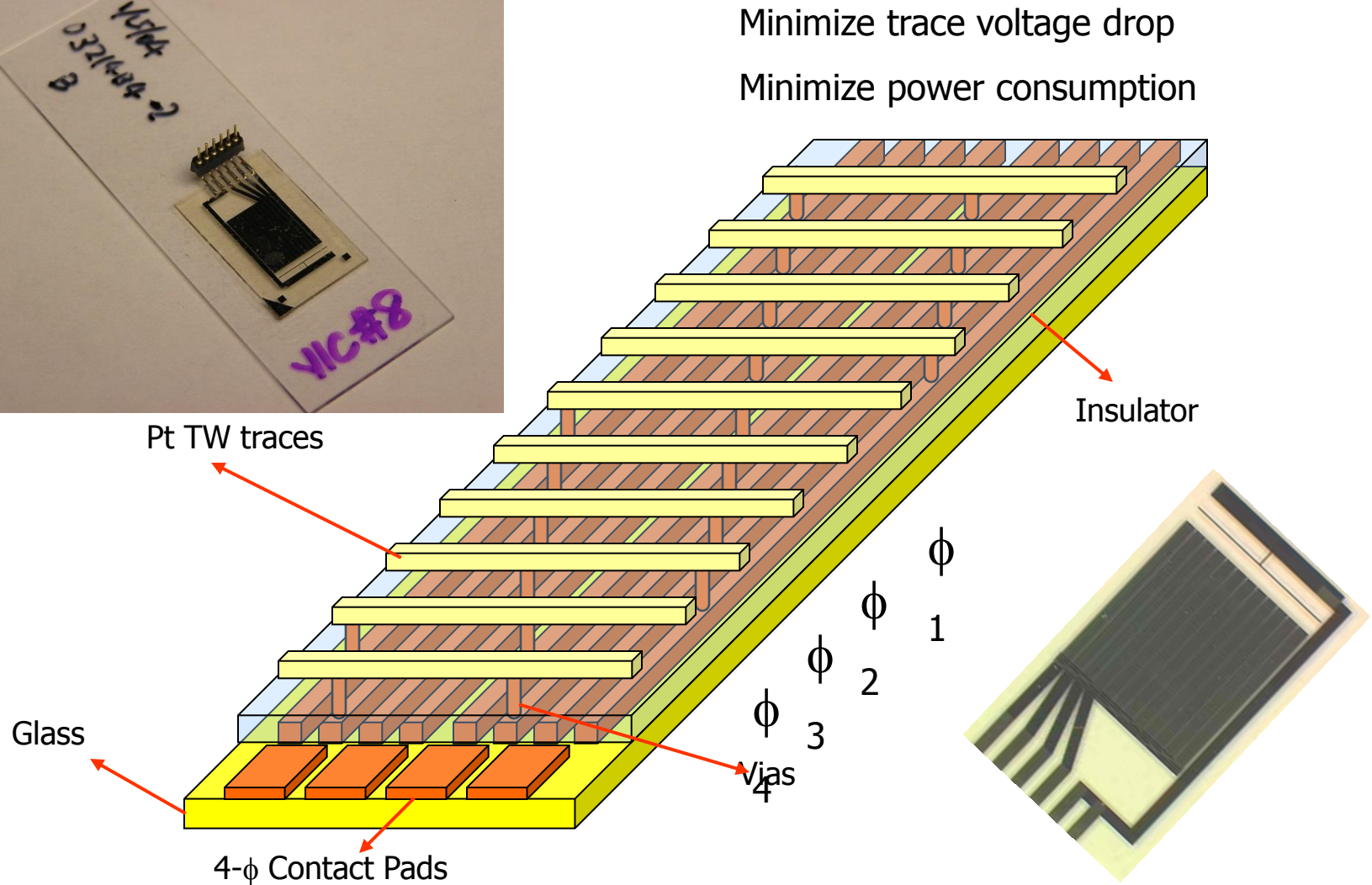
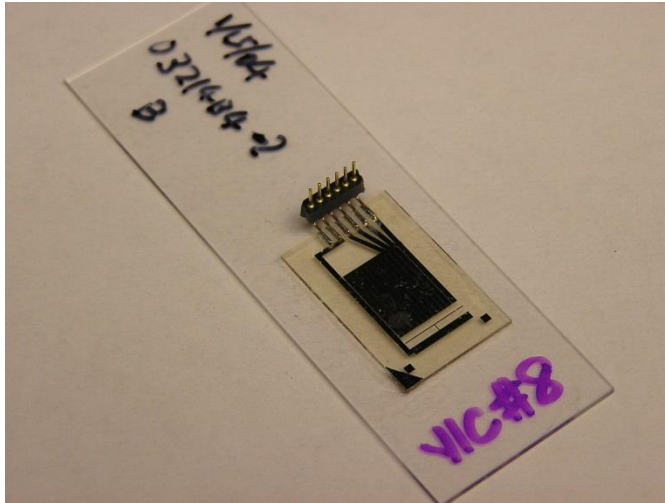


Field Flow Fractionation + TW



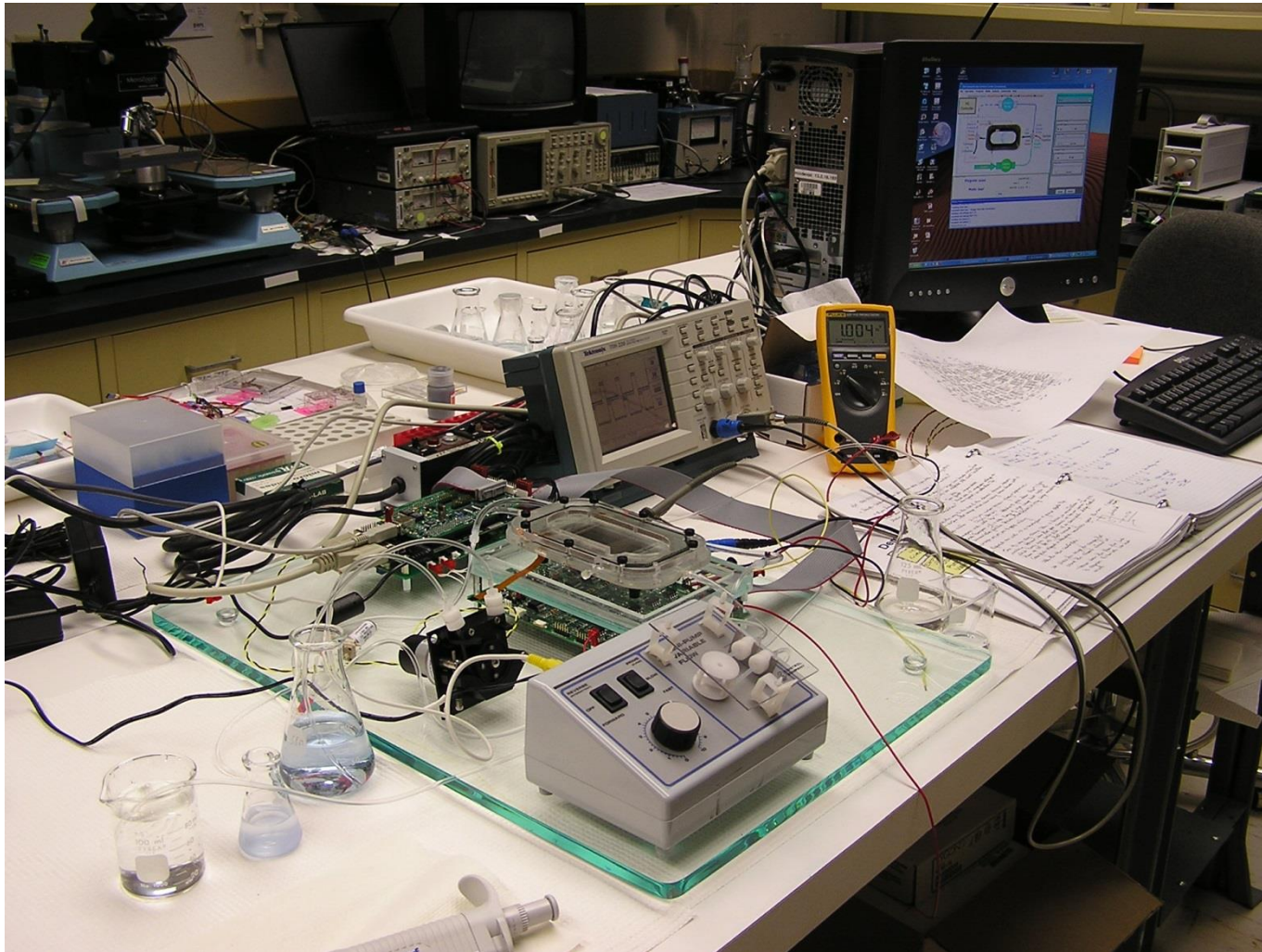
TW moves particles to side edge

3-Layer Scalable Traveling Wave (TW) Module **parc** A Xerox Company

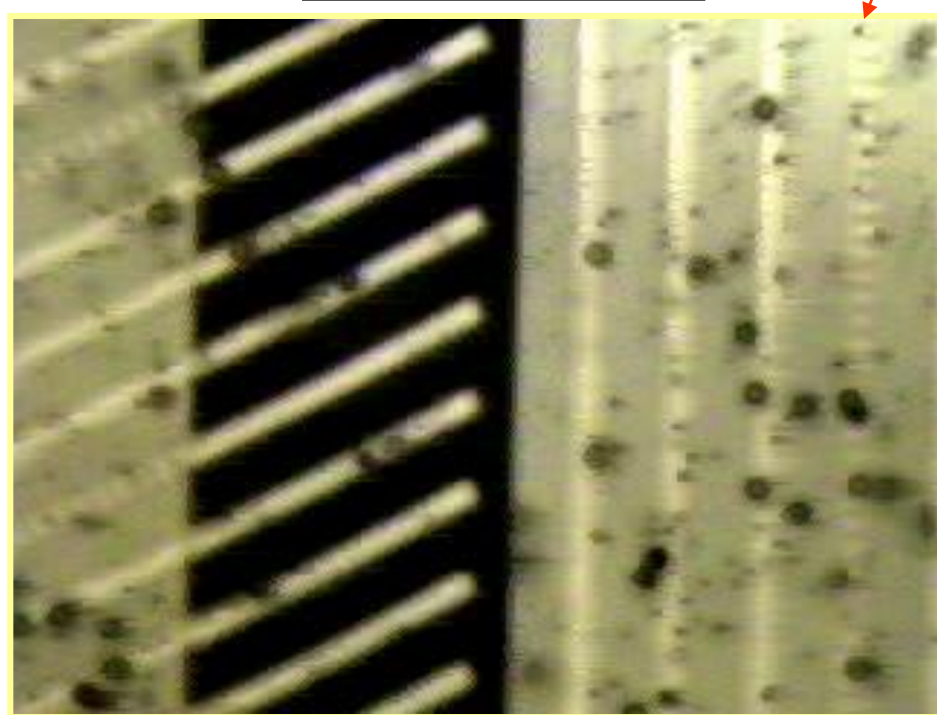
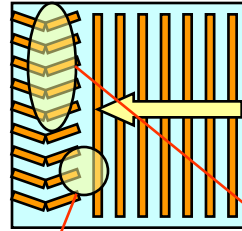
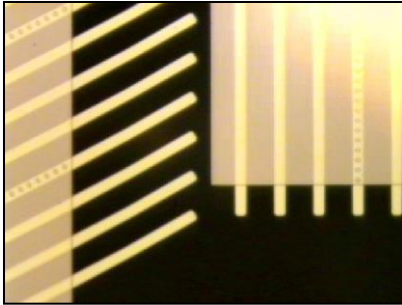


System Breadboard

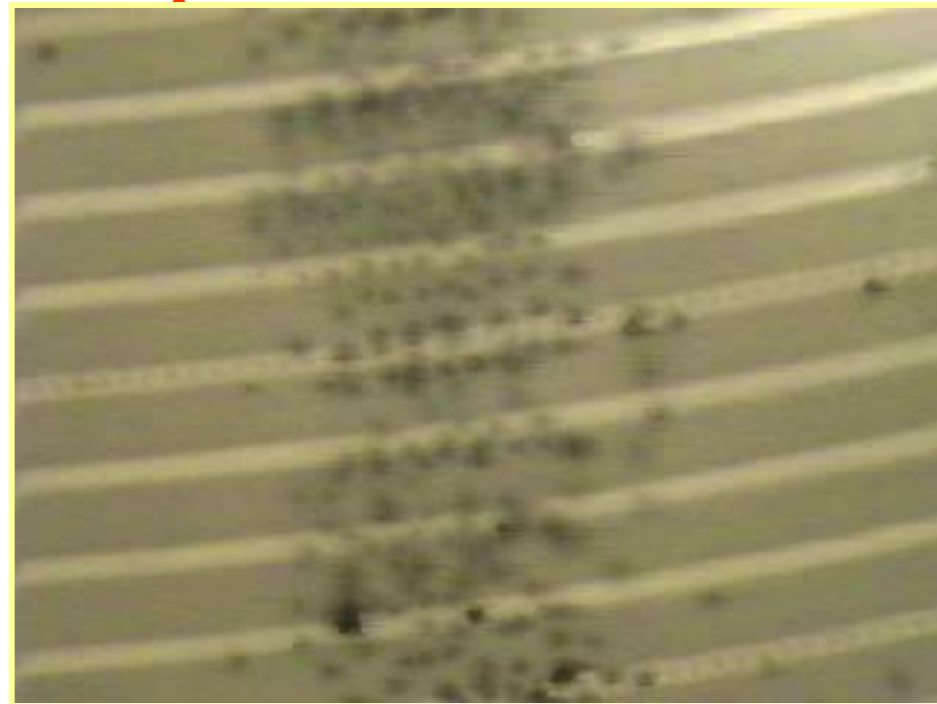
Operation Cycle: *Flush/Clean* → *Prime* → *Load* → *Concentrate* → *Extract*



TW Concentration: 3um & 10um beads



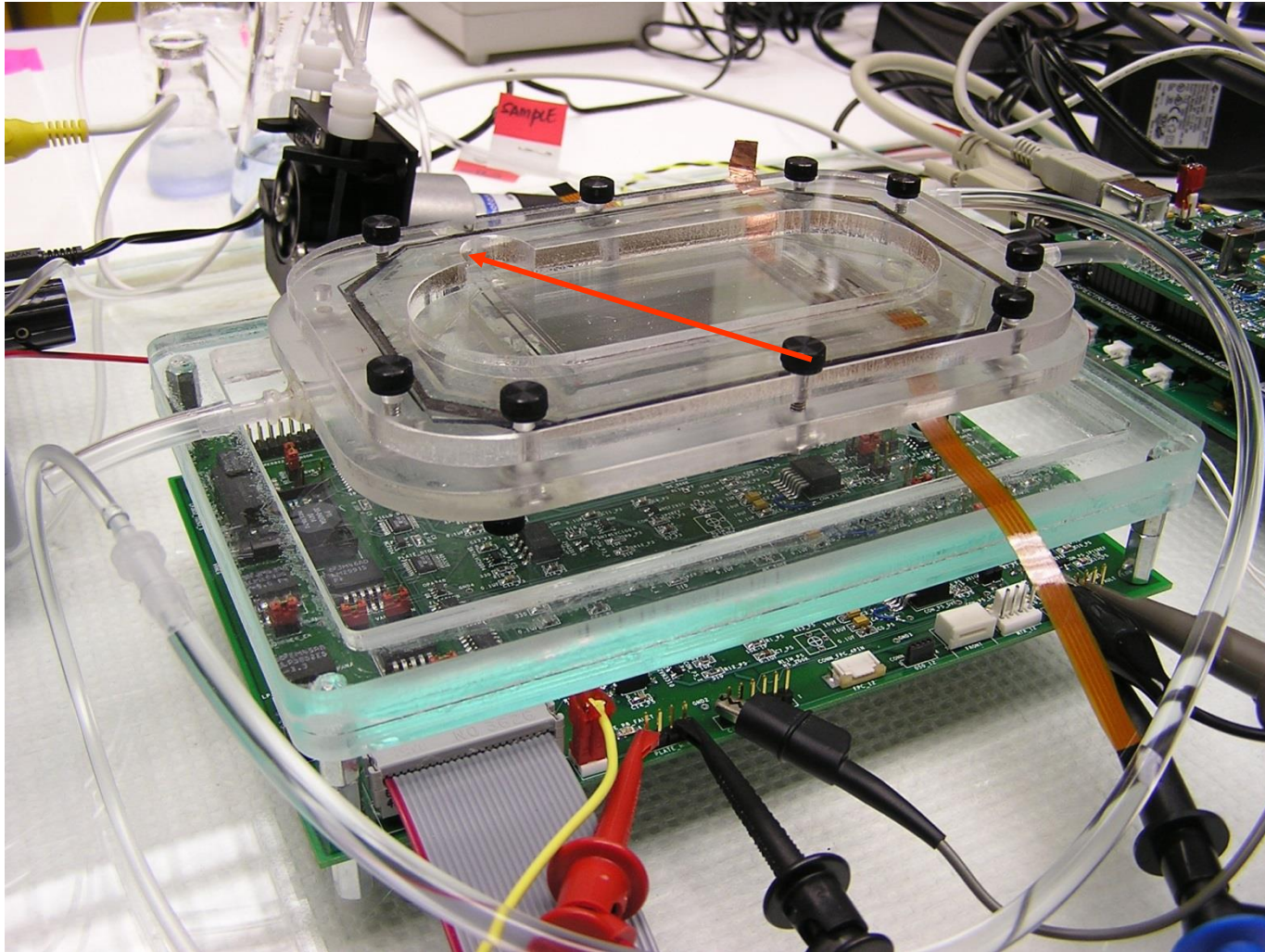
"Turning the
corner"



"Into the concentrate"

[Click on images to play movie](#)

Close-up of Concentration Cell

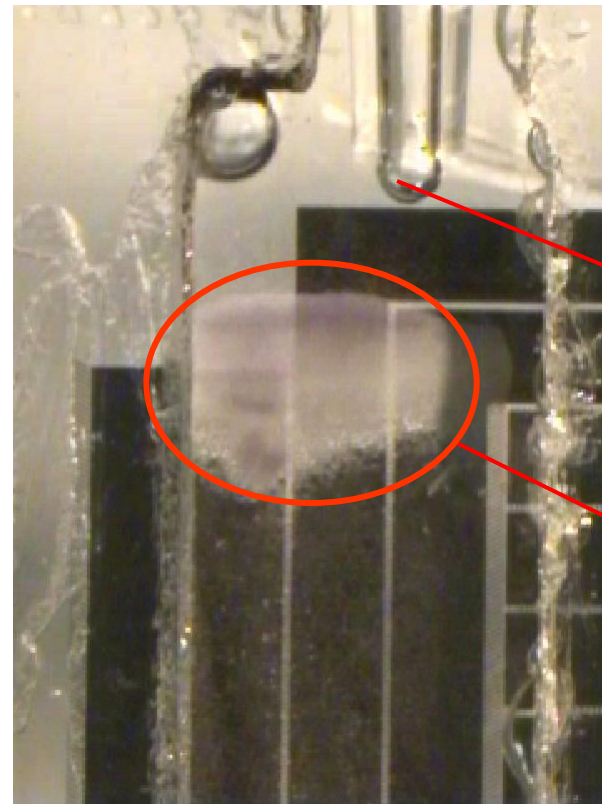


Concentration Factor

Before Concentration



After Concentration



Pipette tip w/
air bubble

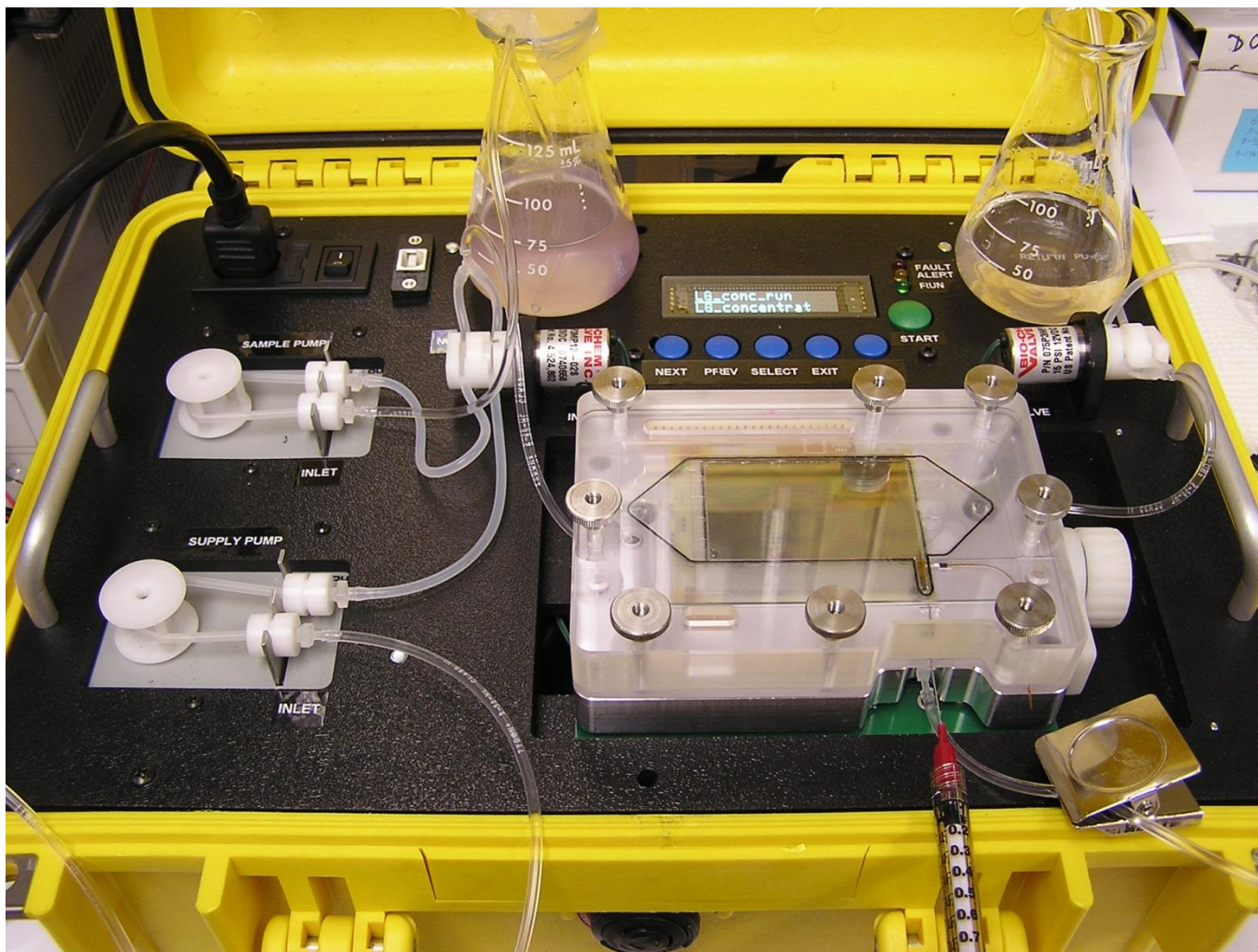
Conc. of 3 μ m
& 6 μ m
polystyrene
beads

←→ 3 mm

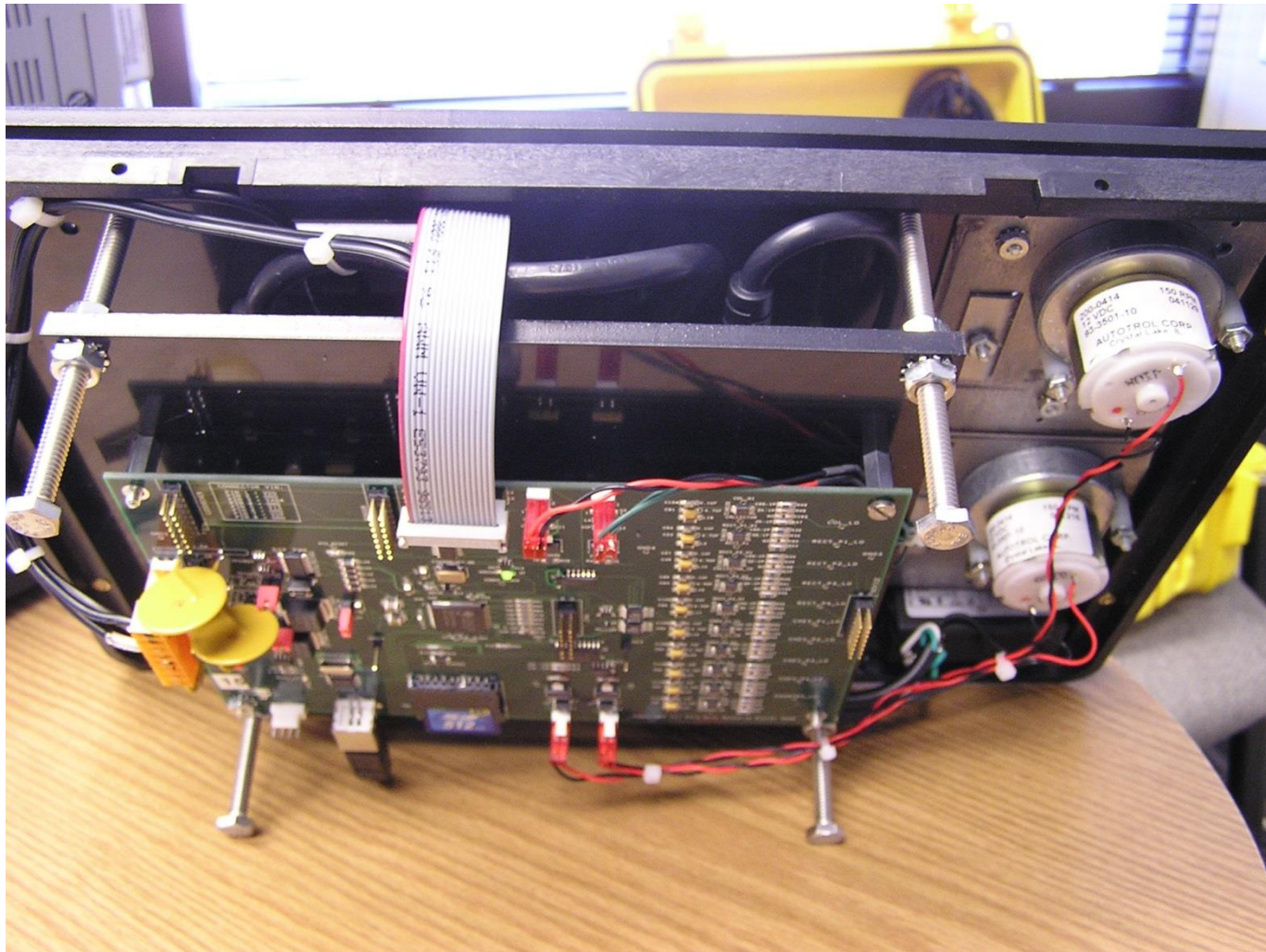
Cavity Volume = 2.3 mL; Conc Volume $\sim 2 \times 1.5 \times 1 = 3 \mu\text{L}$

Concentration Factor = Cavity Vol/Conc Vol $\times$ (1-fraction loss) $\sim 700 \times 0.25 = \mathbf{175X}$

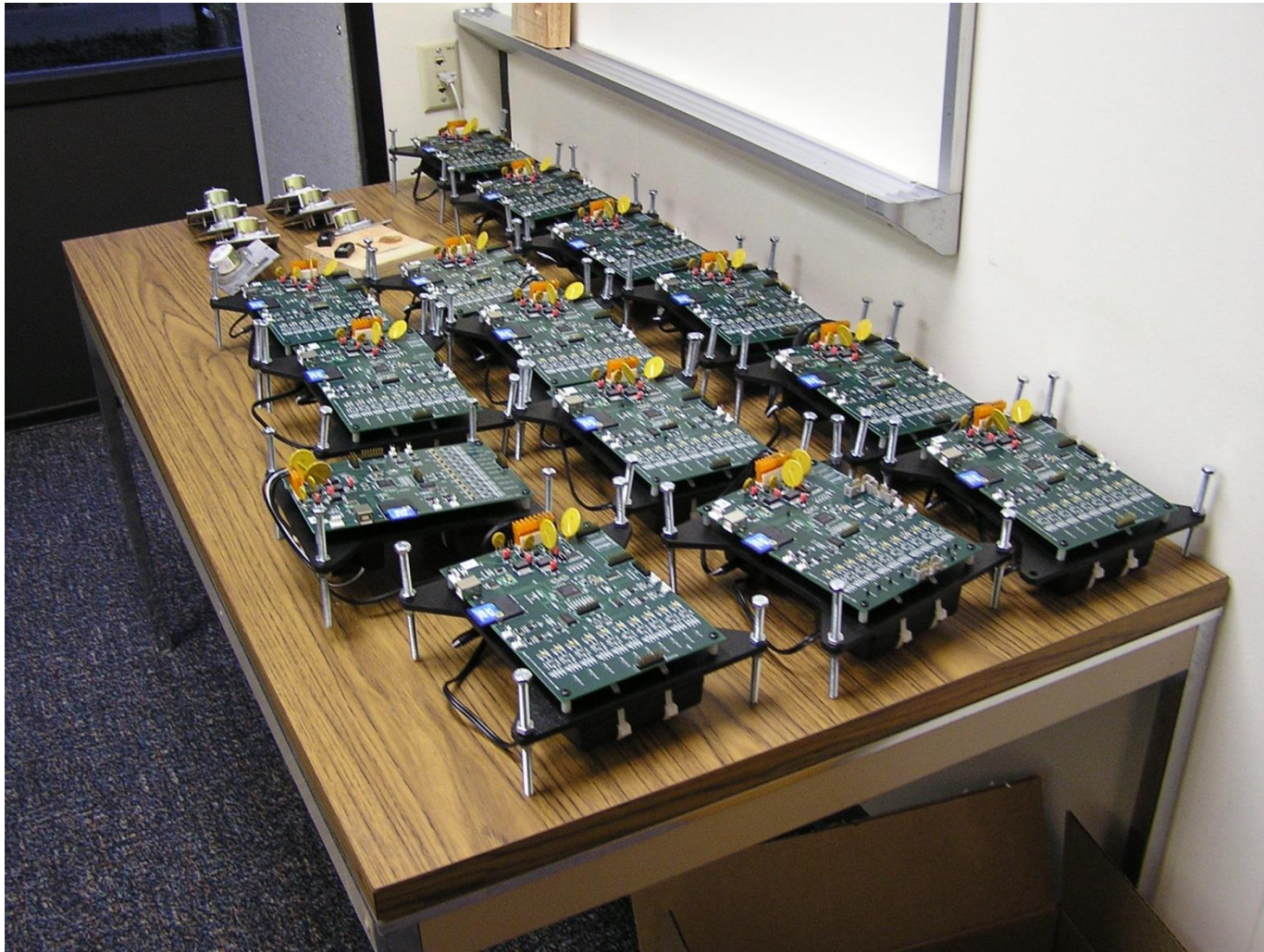
Portable Prototype BAC Device



Bulkhead Mounted Electronics



Electronics Production Line



BAC Device Production Line



PARC Direct View Digital X-Ray Camera



Bryan Preas

- The one person at PARC with complete mastery of end-to-end system architecture, design, fabrication and test (FPGA, Embedded Software, GUI, PCB design/layout, PC interface)
- Incredibly versatile
- Does whatever it takes
- Selfless contributor
- A pleasure to work with
- **Sought after by EVERYONE**