

InkJet History and Continuing Role

Chris Menzel

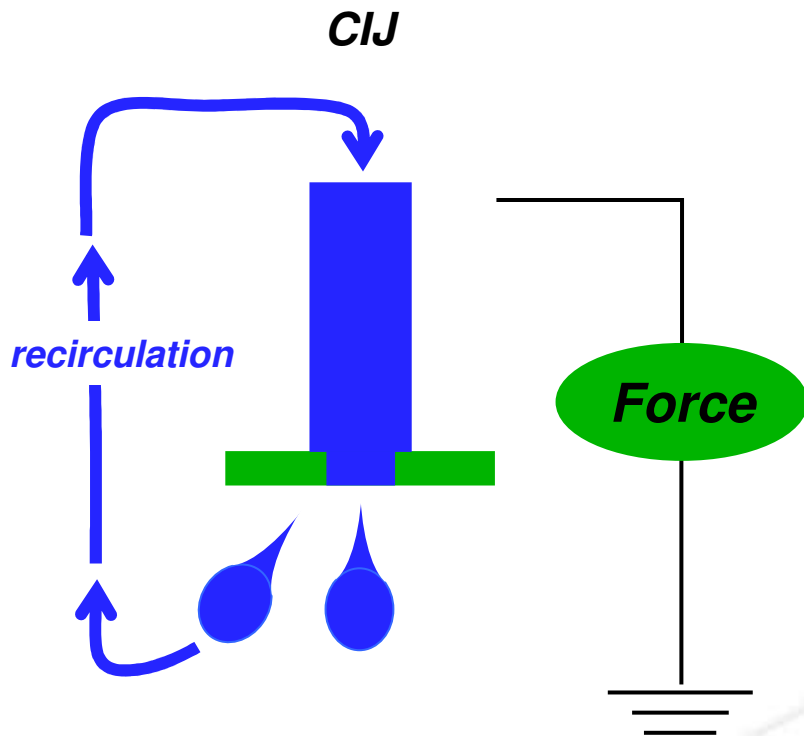
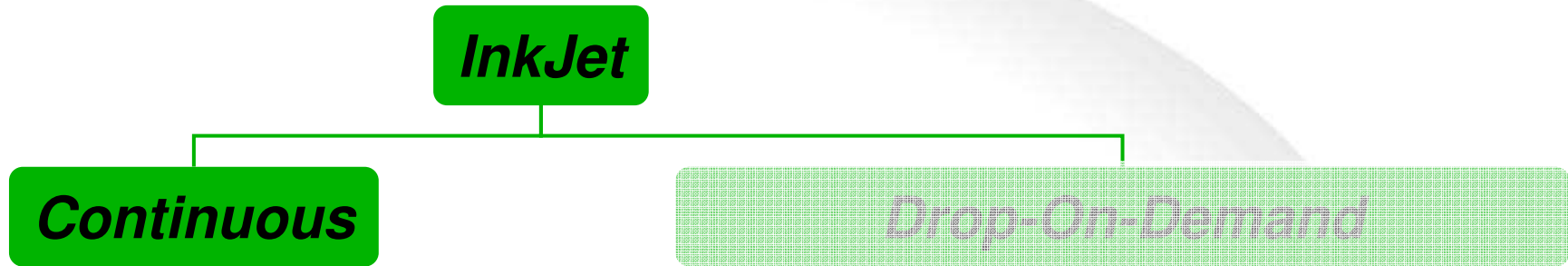
FujiFilm Dimatix, Inc

Nanotech2009
InkJet Symposium
Houston TX
May 4, 2009

Ink Jet Technology Map



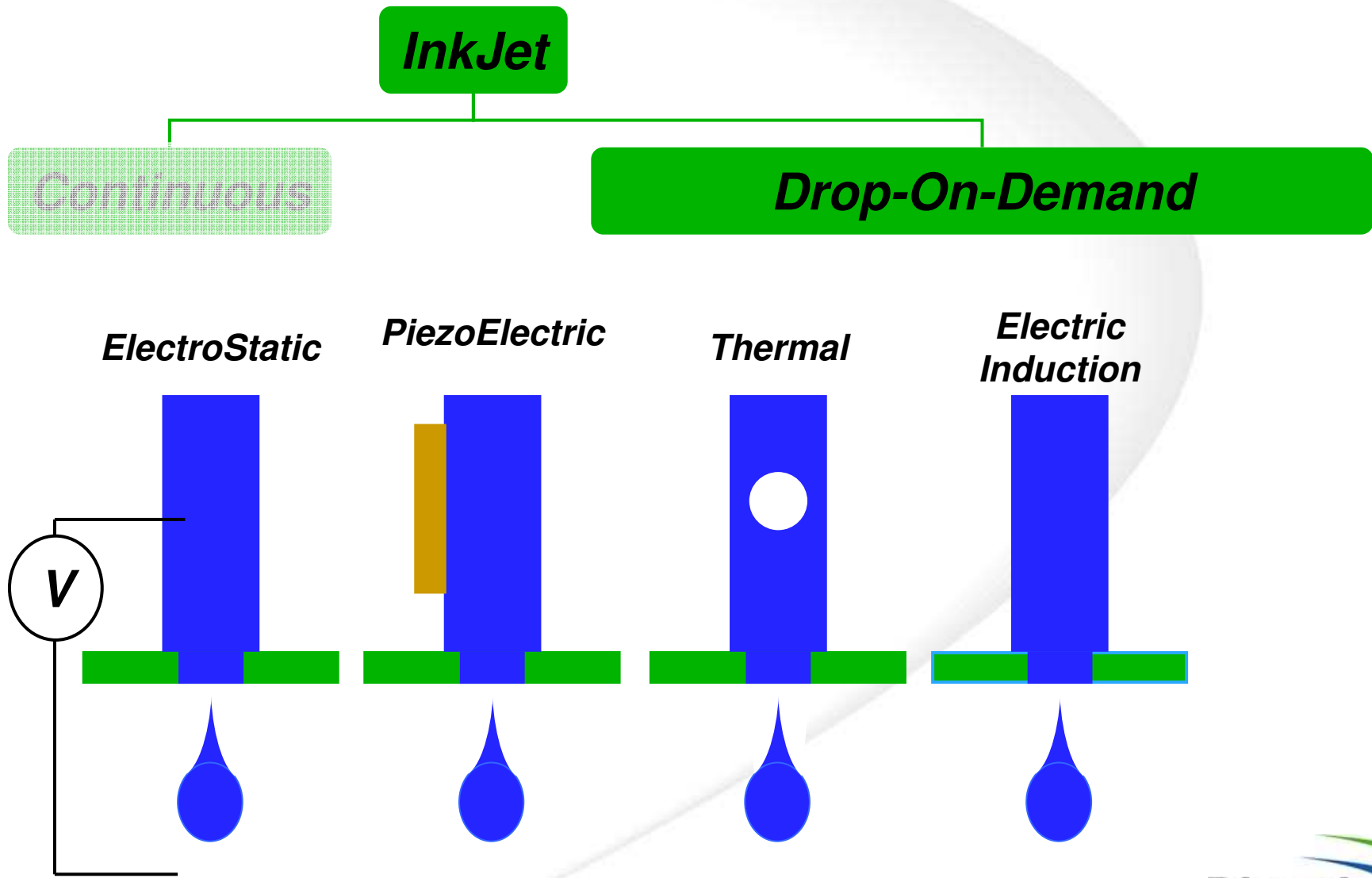
Ink Jet Technology Map



1 Continuous InkJet

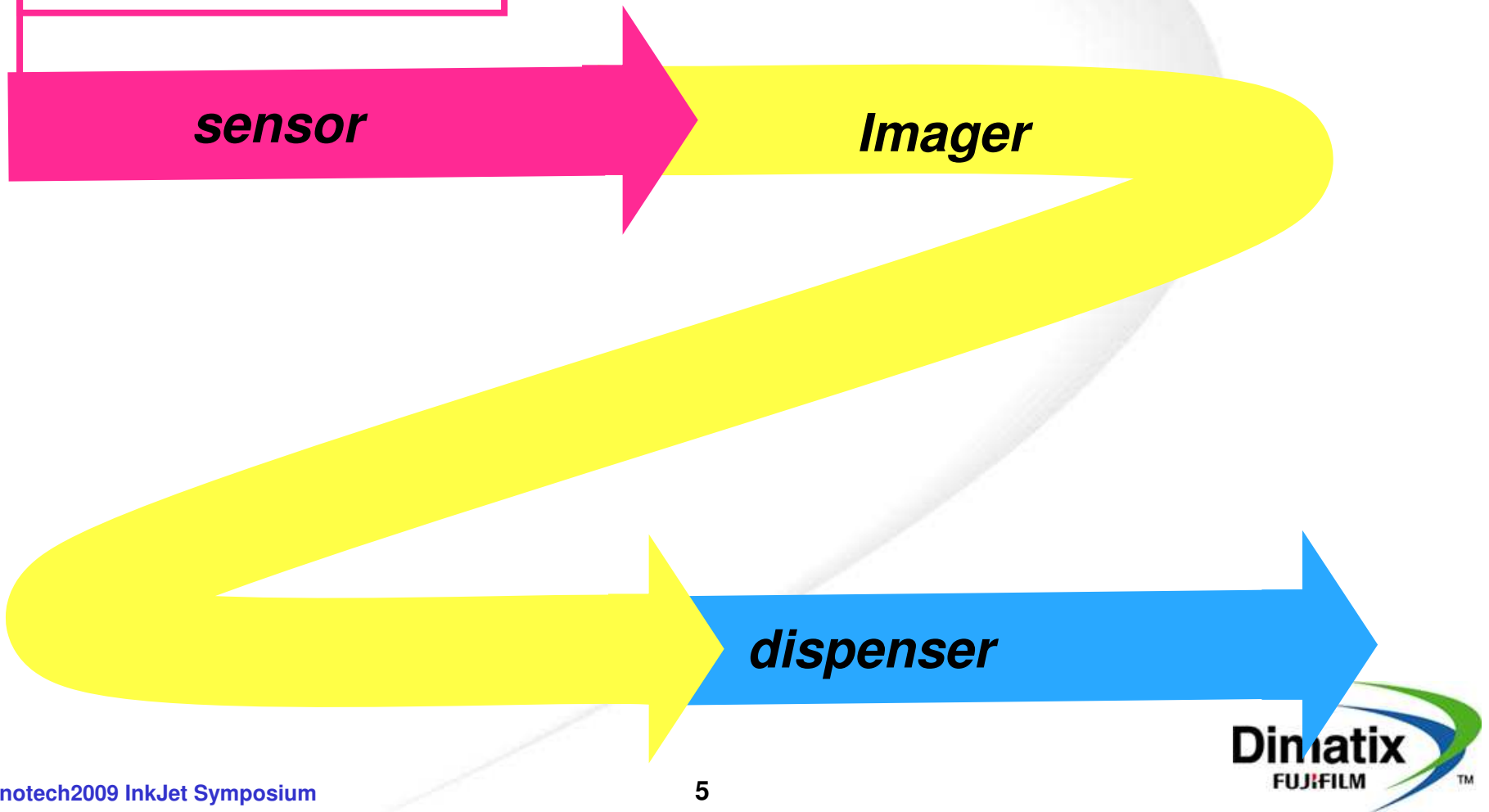
- Continuous Stream of Drops
- Drops selectively directed to re-circulate OR go to paper
- Driving Force: pressure or electric
- On/Off or Directed

Ink Jet Technology Map



InkJet Timeline

1867: Lord Kelvin jets ionized ink as a detector/printer for TransAtlantic Cable



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1950: Hansell Patent for Piezo Based Jet Sprayer (RCA)

sensor

Imager

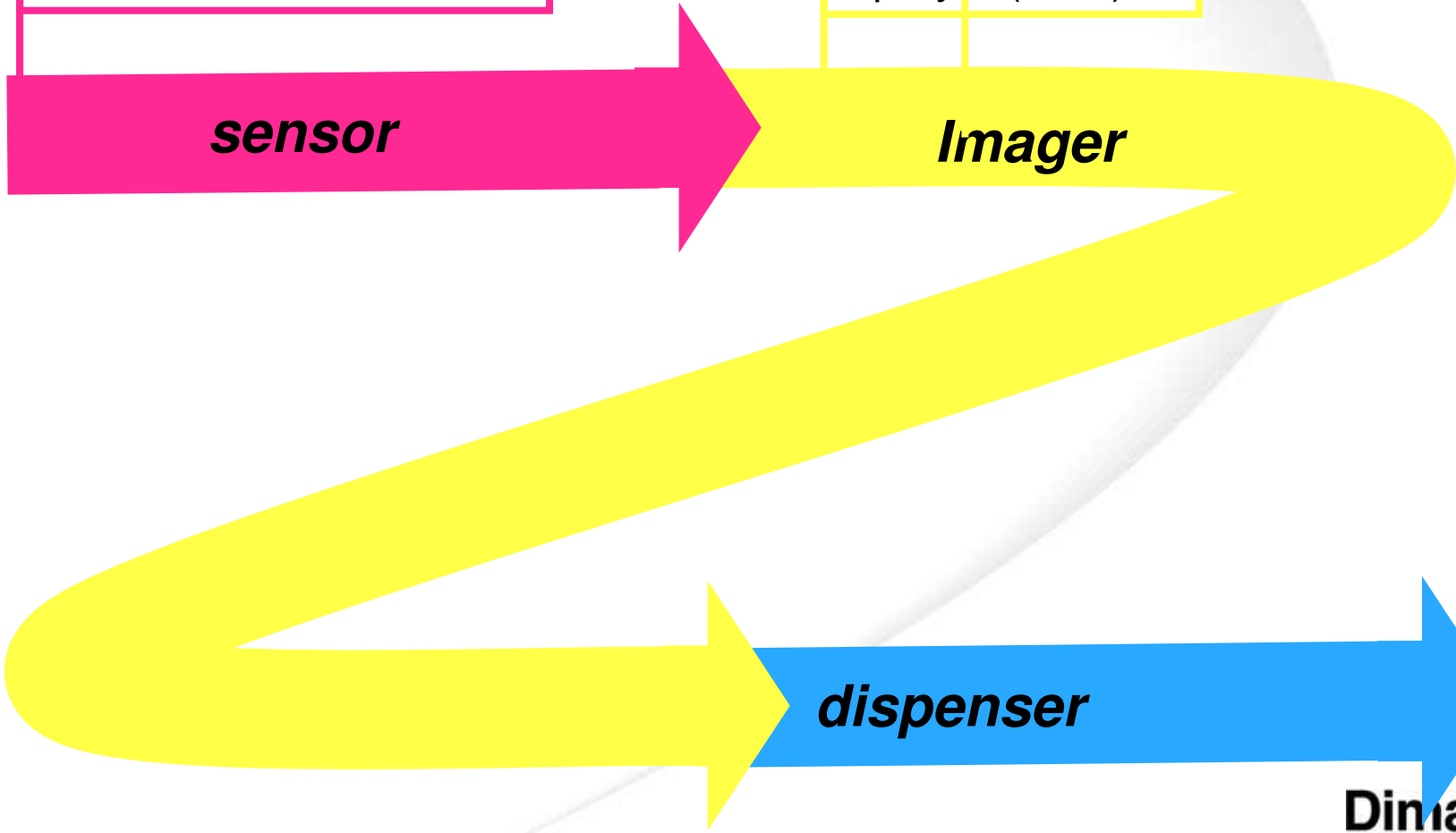
dispenser

InkJet Timeline

1867: Lord Kelvin jets ionized ink as a detector/printer for TransAtlantic Cable

1950: Patent Based Jet Sprayer (RCA)

1951: Seimens Introduces a (CIJ) Device



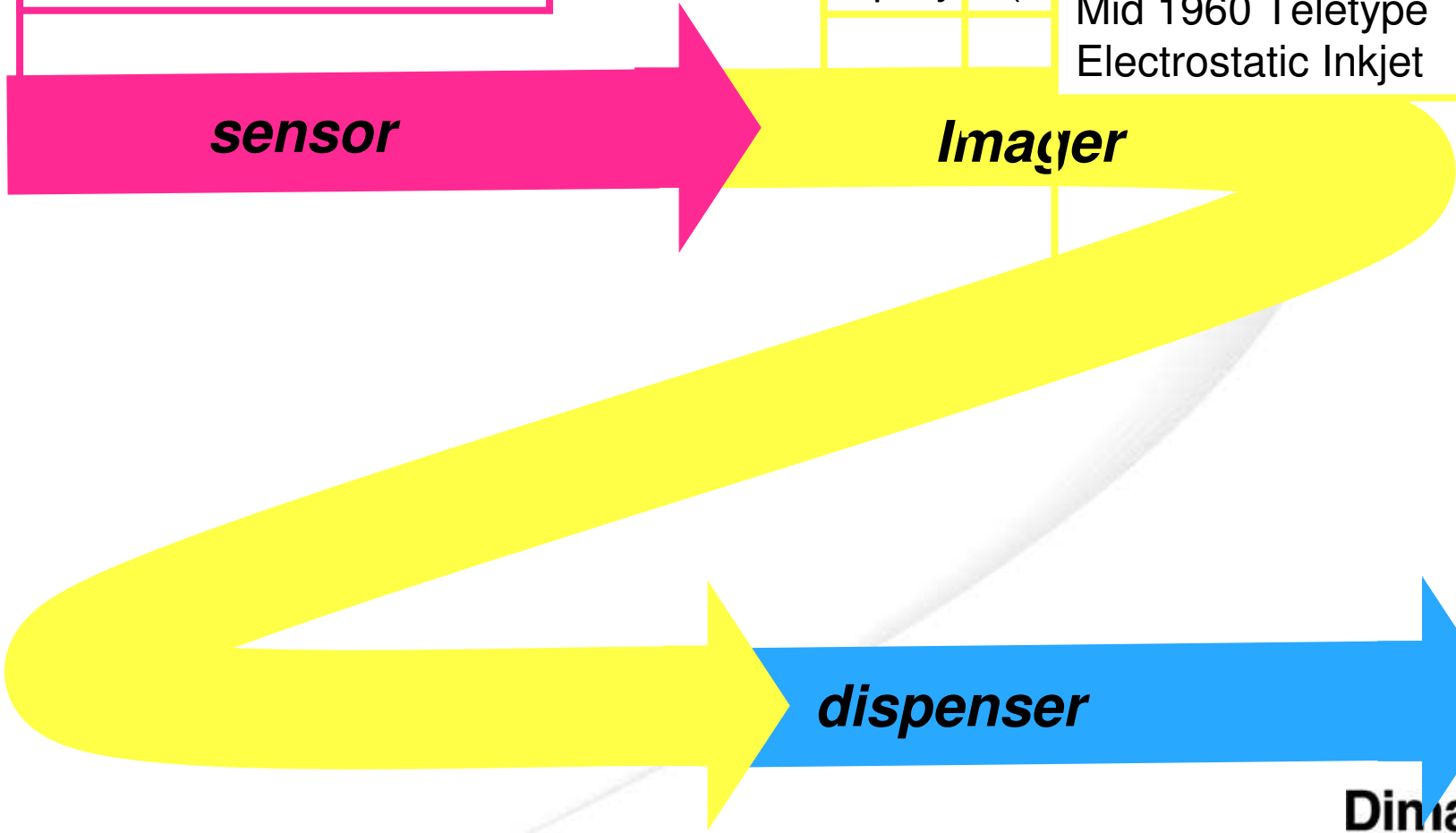
InkJet Timeline

1867: Lord Kelvin jets ionized ink as a detector/printer for TransAtlantic Cable

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Mid 1960 Teletype Electrostatic Inkjet



InkJet Timeline

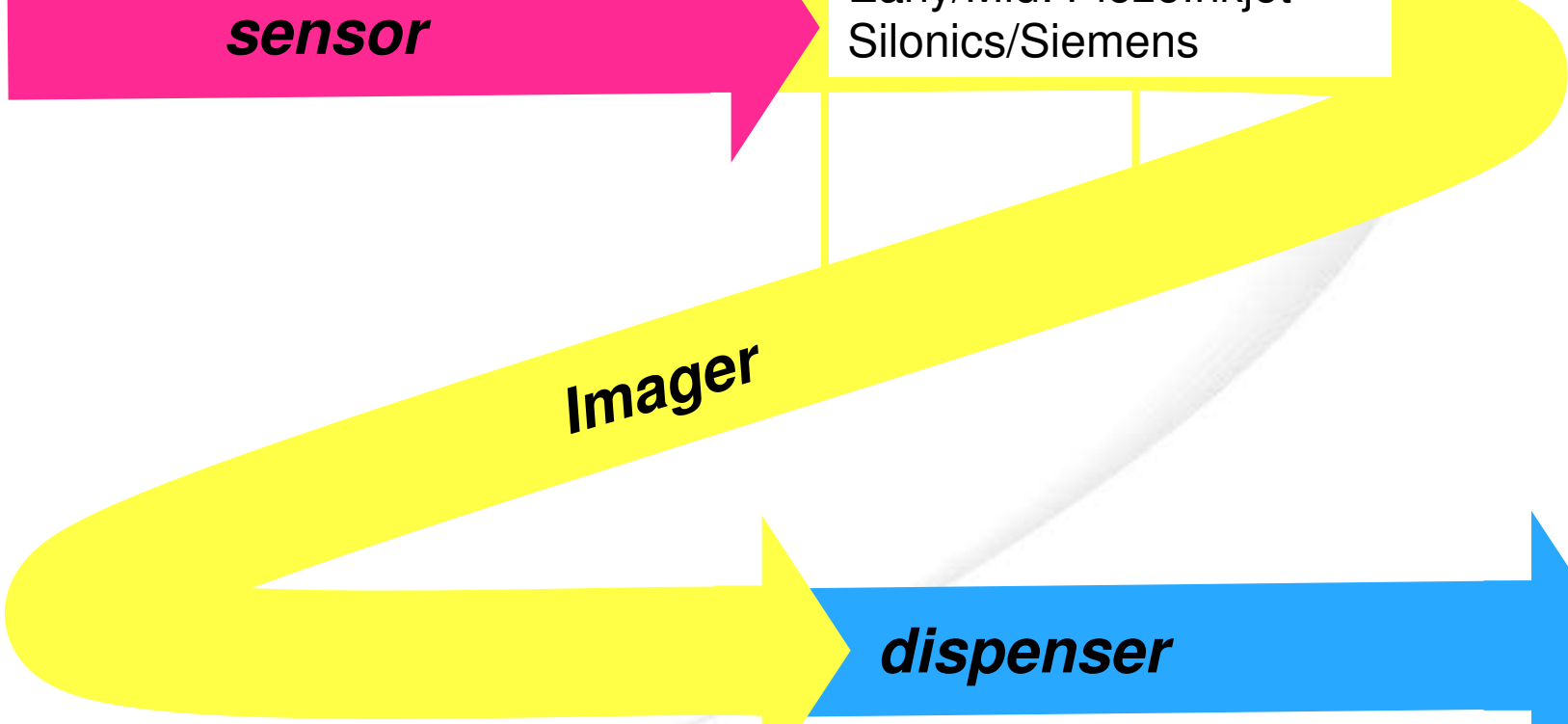
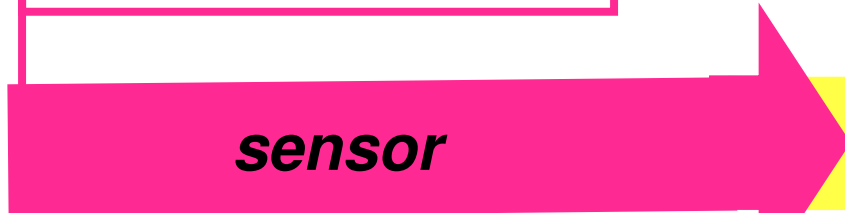
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Mid 1960 Teletype Inkjet

Early/Mid: Piezo Inkjet Silonics/Siemens



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Mid 1960 Teletype Inkjet

1975 Cambridge Consultants, Ltd

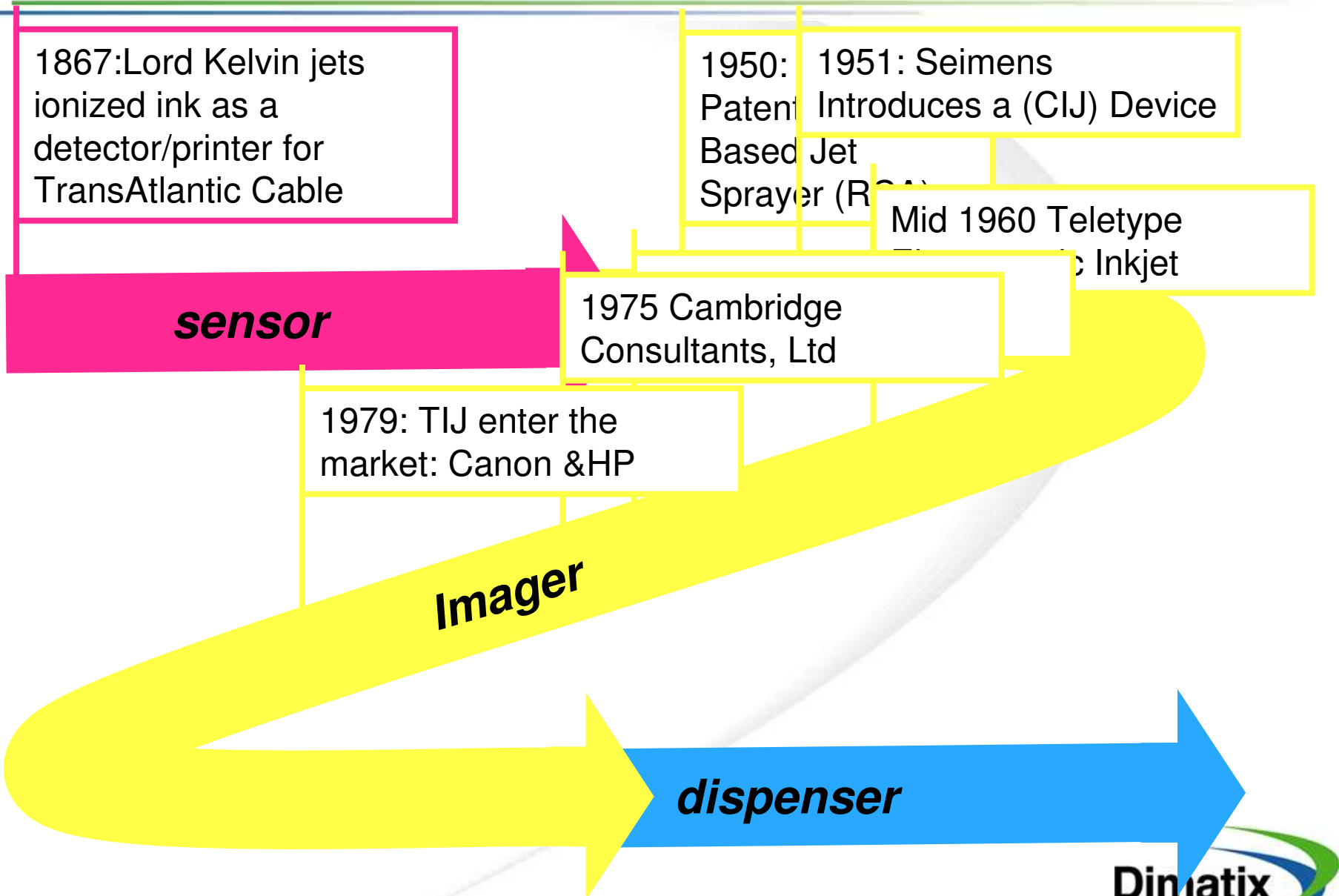
sensor

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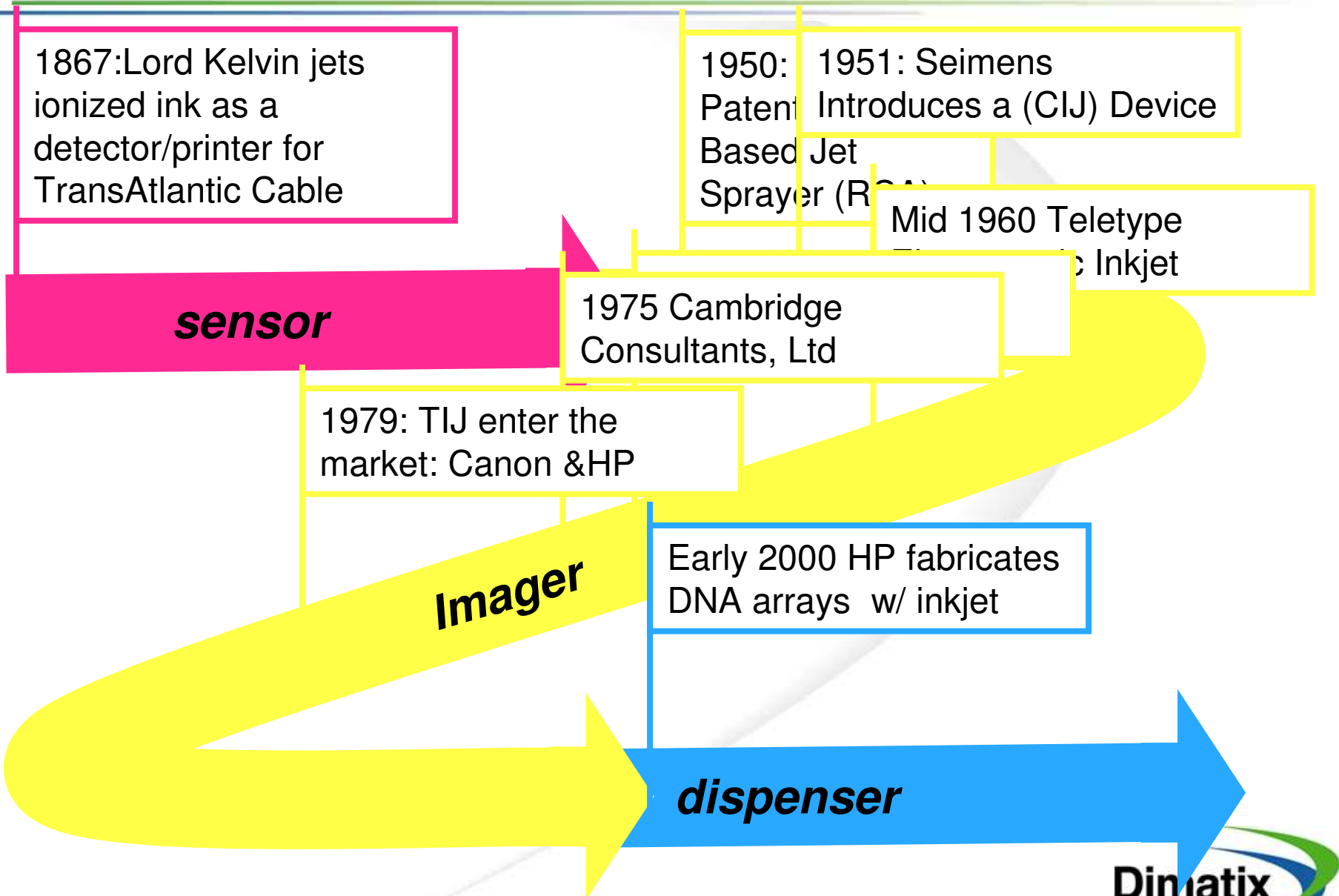
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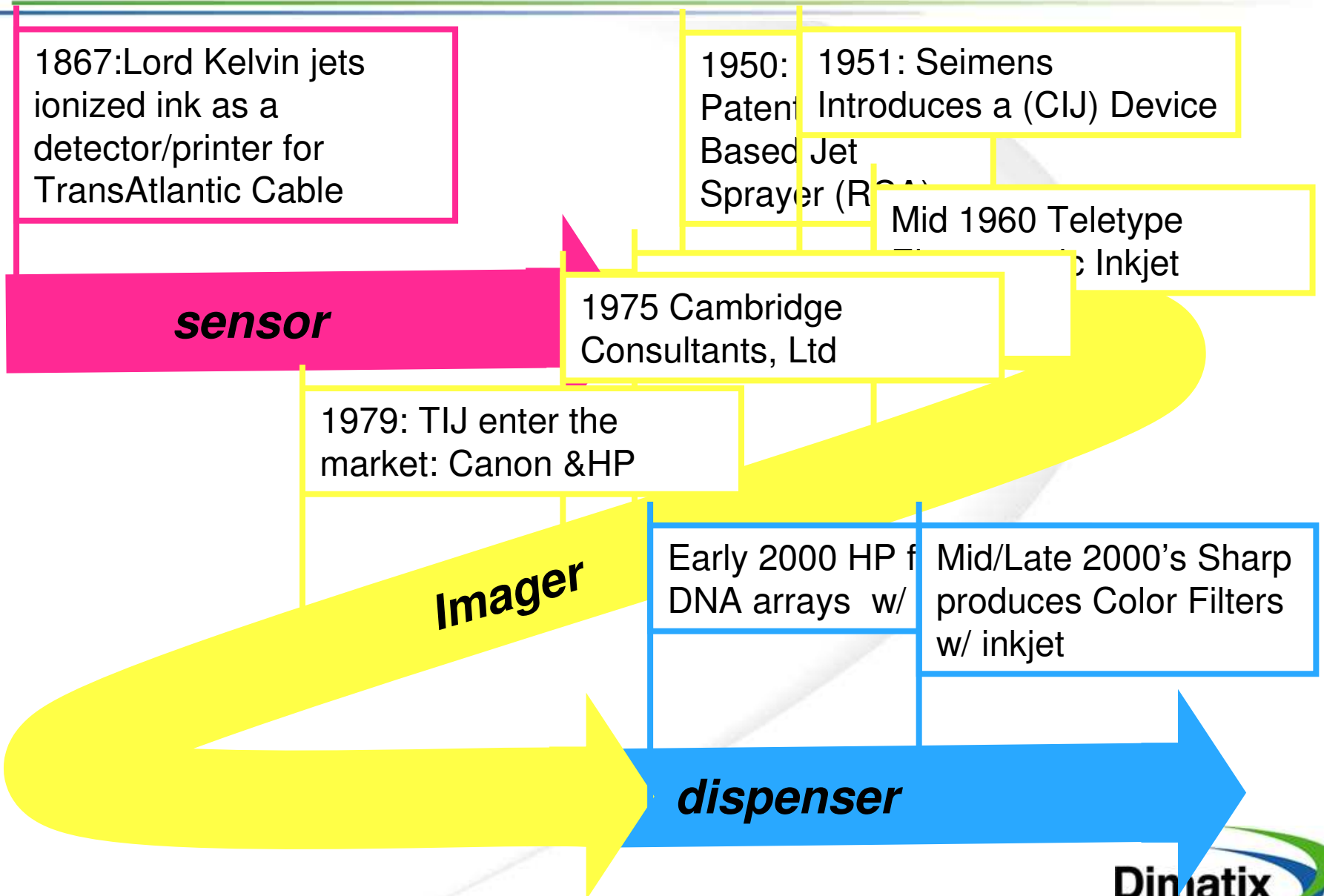
InkJet Timeline



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InkJet Timeline



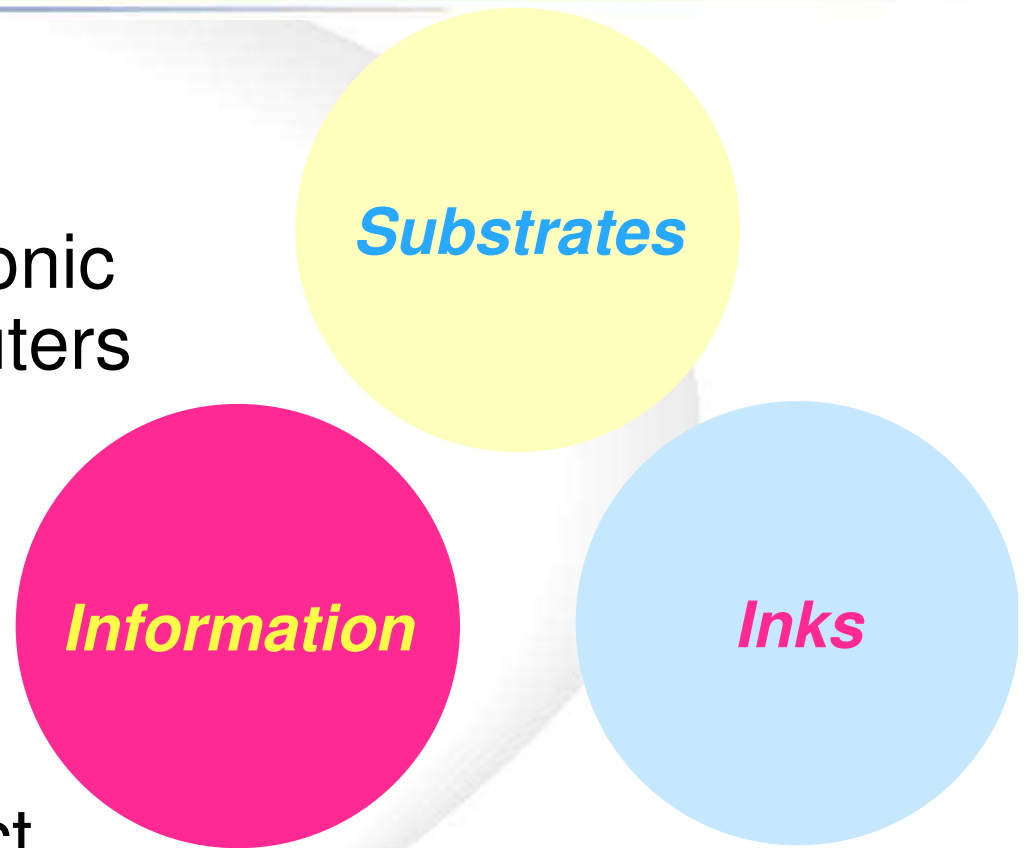
InkJet Role: Deposition

- 1 Versatility
 - Information
 - Substrates
 - “Ink” & Jettable Fluids

- 1 Value based on the extent to which products can deliver the above

InkJet Versatility: Information

- 1 Versatility: Information
 - Digital!
 - A natural with Electronic Systems and Computers
- 1 Information Handling
 - Sophisticated: “defect hiding”
 - High Speed Electronics



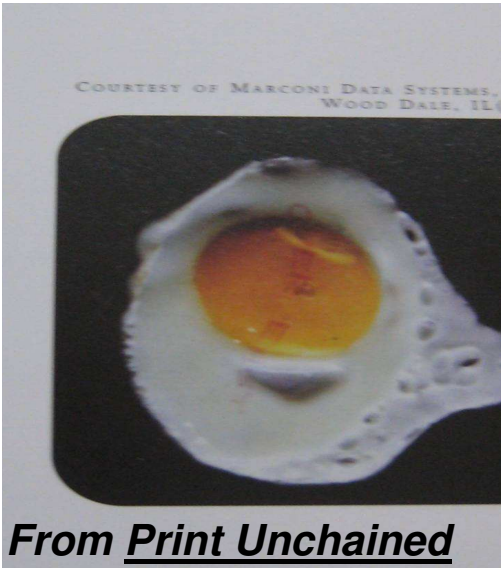
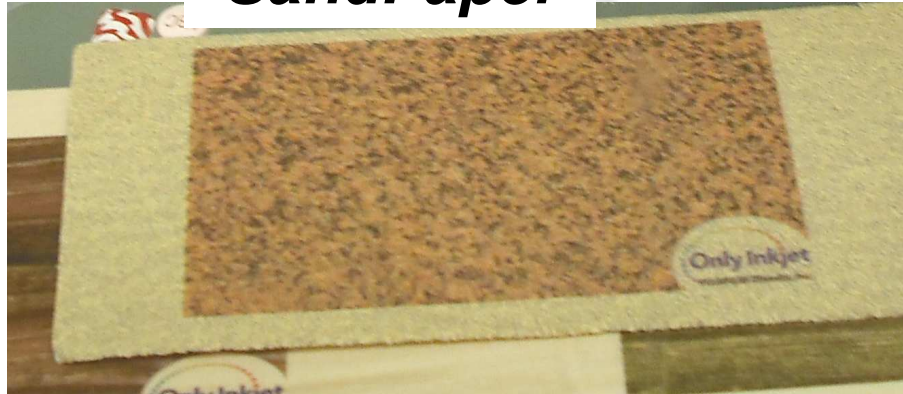
InkJet Versatility: Substrates



Styrofoam



SandPaper



From Print Unchained

“NonContact” has Implications:

Types of Materials

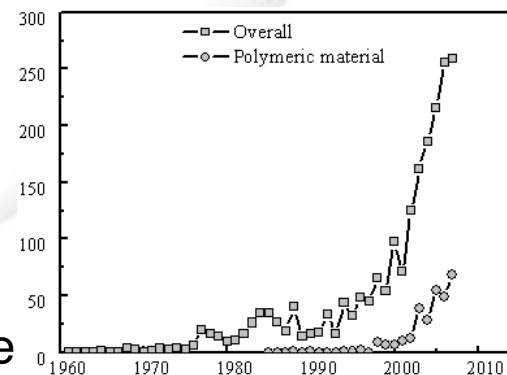
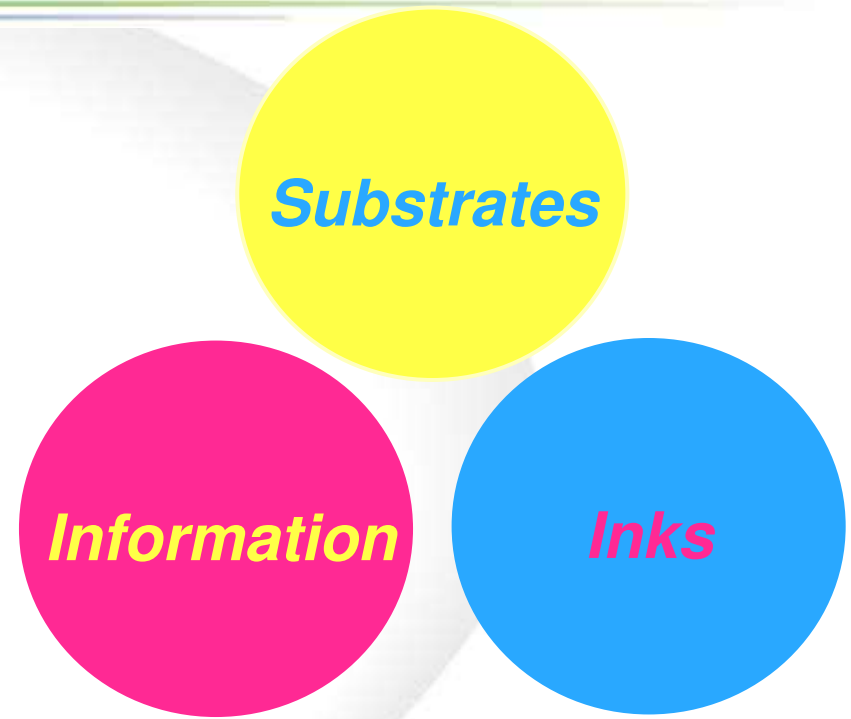
When within Process

Surface State

InkJet Versatility: “Inks”

- 1 Versatility: “Inks”
 - Jettable fluid
 - Limited set of requirements
 - based on Jetting Technology
- 1 While open ended, NOT to be underestimated!
 - Much not know about fluid characteristics and jetting properties

Number of publications with topics related to inkjet printing technology versus time (data were obtained by using ISI Web of KnowledgeSM).



InkJet Role (Value Proposition)

- 1 Versatility
 - Information
 - Short runs
 - JIT
 - Distributed Printing
 - Substrates
 - NonContact application potential!
 - Process options
 - “Ink” & Jettable Fluids
 - Applications!
- 1 Value based on the extent to which products can deliver the above within acceptable
 - Cost/Quality
 - Design: Printing speeds & Drop size(s)
 - Jettable Fluids: Useable formulations

Thanks for your attention

Questions?