

Reinventing RFID: cost, usability, scalability

15th Anniversary HVM Conference
3 November 2017, Cambridge, UK
www.cir-strategy.com/events



Electronics in everyday objects

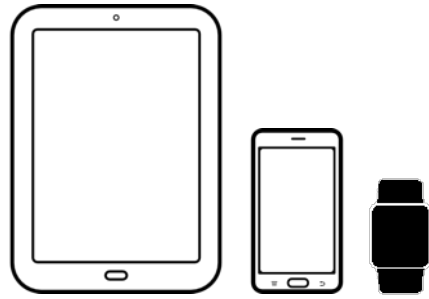
The evolution of electronics



VOLUME ~300 million p.a. → ~50 billion p.a. → >1 trillion p.a.



Computers



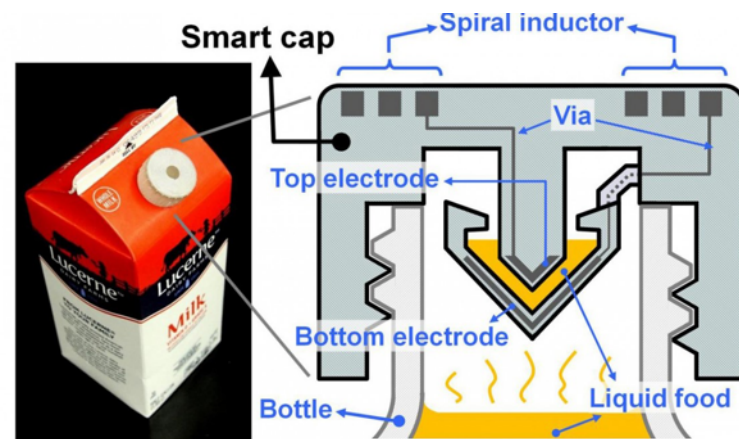
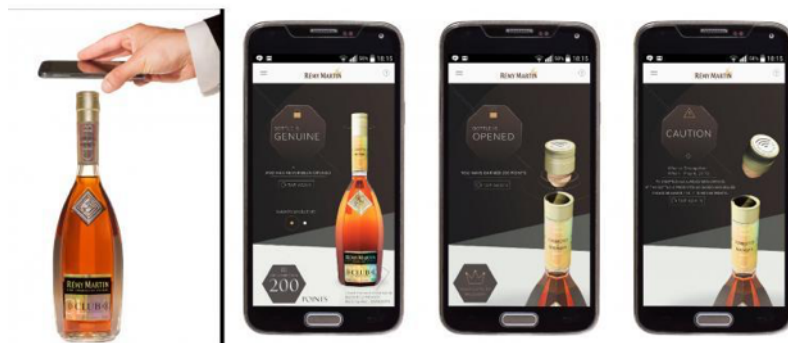
Smart devices



Electronics in everyday objects

Smart / intelligent packaging

PragmatIC™



Source: PragmatIC/Innovia; Packaging Digest; Chief Packaging Officer

RFID (Radio Frequency Identification) & NFC (Near Field Communications)




- ❖ "In 2017 the total RFID market will be worth \$11.2 billion; 18.2 billion tags will be sold"
 - *IDTechEx Research (Aug 2017)*
- ❖ "NFC is projected to be the fastest growing segment within intelligent packaging"
 - *Grand View Research (Oct 2016)*



The challenge...

PragmatIC™

With conventional electronics, at over 10¢ per tag, smart packaging for consumer engagement has focused only on premium products or limited scope campaigns

BRAND	NFC USE CASE	SCOPE
	✦ Product information; contests	✦ St. Patrick's Day promotion in Ireland
	✦ Recipes; product information; contests	✦ 40,000 bottles at Tesco U.K. stores
	✦ Social media; ski location information	✦ USST jackets (\$250 average price)
	✦ Authentication	✦ All bottles (\$3,000 average price)
	✦ Consumer engagement; brand story video	✦ One-time trial on product displays in Whole Foods
	✦ Product information; community engagement	✦ Limited edition shoes

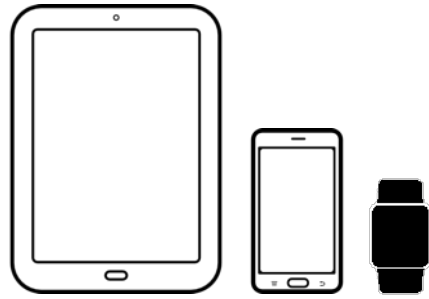
The challenge...



VOLUME ~300 million p.a. → ~50 billion p.a. → >1 trillion p.a.



Computers



Smart devices



COST ~\$100 per IC → ~\$1-10 per IC → <1-10¢ per IC

Electronics in everyday objects

Beyond silicon...

PragmatIC™

Flexible integrated circuits (FlexICs) enable trillions of smart objects

- ❖ Thinner than a human hair
- ❖ Flexible and conformable
- ❖ Sub-cent electronic solutions



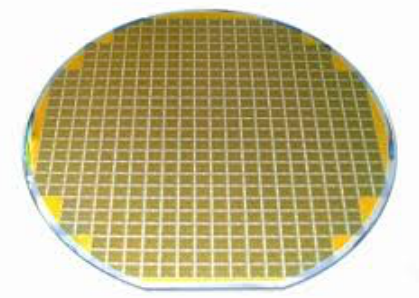
Reinventing RFID and NFC



Over 90% lower IC cost

Up to 80% lower tag cost

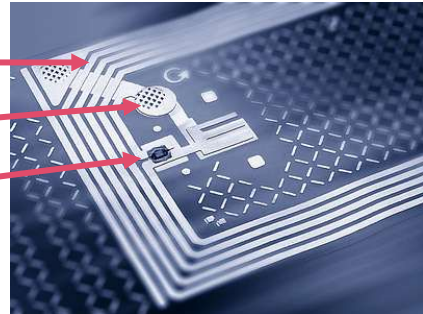
Silicon IC wafer



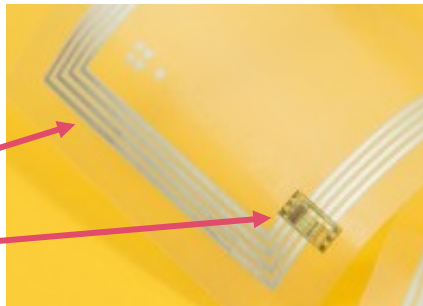
FlexIC sheet



Two layer antenna
Crimped crossover
Silicon IC



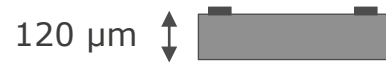
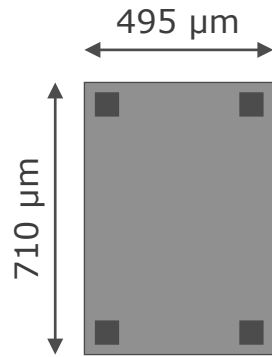
Single layer antenna
FlexIC as crossover



Reinventing usability

PragmatIC™

Imperceptibly thin and simple to integrate



Typical Silicon IC

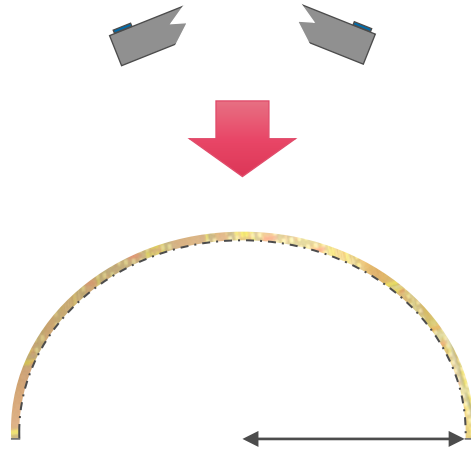
Typical FlexIC

Reinventing usability



Inherently flexible

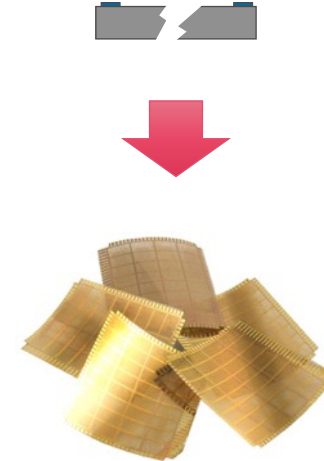
Silicon IC – doesn't bend...



FlexIC – bend radius up to 5mm

Robust & shock resistant

Silicon IC – fragile...



FlexIC – plastic construction

Reinventing scalability



Fully integrated FlexIC production line

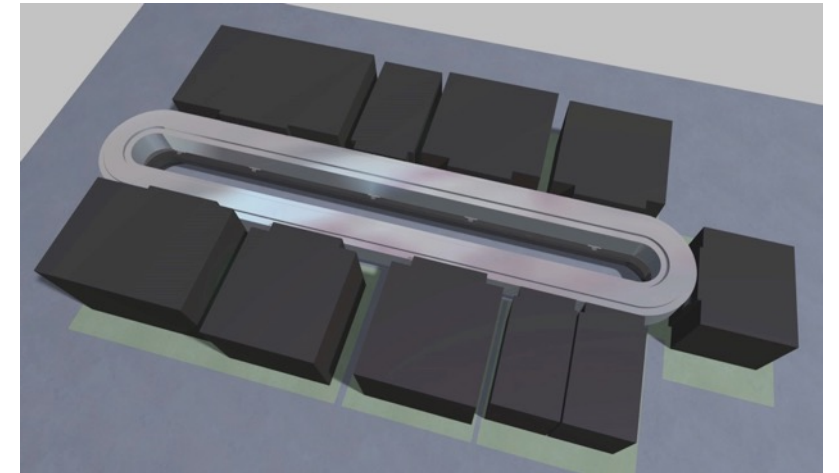
- ❖ Automated materials handling and process control
- ❖ Self-contained clean environment

Enables rapid expansion of FlexIC manufacturing

- ❖ Capacity for billions of FlexICs per annum
- ❖ Modular scalability

Compelling financials

- ❖ Capex 100–1000x less than Silicon IC fab
- ❖ Pricing <1¢ per FlexIC in volume



FlexLogIC™ fab-in-a-box

Validation by leading global RFID tag manufacturers

PragmatIC™



- ✦ “With PragmatIC's technology, there is the potential to extend the use of unique item-level digital identities to improve consumer experiences in a number of new segments, such as fast-moving consumer goods.”
– *Francisco Melo, VP and GM, Global RFID, Avery Dennison*

And stay tuned for upcoming announcements ...

The PragmaticC logo consists of a yellow, curved banner shape pointing to the right, containing the text "PragmaticC" in a bold, black, sans-serif font. A small "TM" trademark symbol is located to the right of the banner.

PragmaticC

The background of the slide is an aerial photograph of a city grid, showing a dense pattern of streets and buildings. The image is slightly blurred and has a warm, golden-yellow color cast, suggesting a sunset or sunrise. The grid lines are clearly visible, and the buildings are arranged in a regular pattern.

Thank you

www.pragmatic.tech