

# REVOLUTIONISING ELECTRONICS IN EVERYDAY OBJECTS

WITH A TRILLION UNIT VISION IN PLACE, PRAGMATIC ARE AT THE FOREFRONT OF INNOVATION.

▶ **Standing as a world leader in low cost flexible electronics, PragmatIC enable the potential for trillions of smart objects to engage with consumers and their environment.**

FlexLogIC is the brainchild of PragmatIC. Showcasing a unique technology platform it is able to successfully deliver complex, flexible and integrated circuits within a variety of everyday objects - while being no thicker than a strand of human hair.

By reinventing IC manufacturing for the mass market, PragmatIC create solutions that provide opportunities to clients in terms of adding new functionality and extending proven applications such as RFID and NFC, previously prohibited by the cost of traditional IC's produced from silicon. Since 2010, a deep technology based platform has enabled PragmatIC to come to the forefront of

the sector and retain its outstanding reputation as an absolute innovator.

CEO of PragmatIC, Scott White, expressed: "While a few other companies (and several academic groups) have demonstrated flexible integrated circuits, only PragmatIC has proven a scalable production model (to billions and eventually trillions of units) with a cost structure that is over 10x better than silicon ICs. Hence our solution is the only one that makes electronics viable in mass market everyday items."

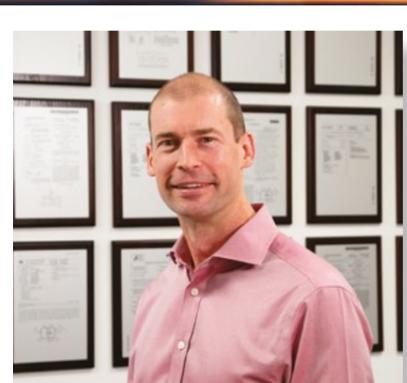
With such remarkable ambition and enviable knowledge across the industry, PragmatIC edges ever nearer its latest, and arguably greatest goal, the trillion unit vision.

"Our target applications are typically characterised by billions of units per product per customer, so aggregated across many products and customers this quickly ap-

proaches requirements for trillions of units. Our scale-up plans are therefore focused on delivering capability for a trillion units by 2025."

FlexLogIC is a bespoke fab-in-a-box model for low capital, high capacity manufacturing of FlexICs (Flexible Integrated Circuits). Providing an exceptional, radically different approach in relation to mass market volumes, and low cost requirements, of embedded flexible electronics into the everyday item - revolutionising electronics in everyday objects.

Differentiated products come from PragmatIC which are then adopted within an ever expanding base of companies and clients across the globe. This is inclusive of niche and novel markets as well as the broader spectrum. In which consumer goods, gaming, retail, security and pharmaceutical sectors all benefit from the invention and deployment of FlexLogIC.



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"For our target applications (e.g. FMCG smart packaging) there is a strong drive to shorten the supply chain as much as possible, moving towards just-in-time on-site production. This maximises responsiveness in launching and scaling new products, while minimising unnecessary costs such as inventory and shipping.

"This approach has never been feasible with silicon (where "mega-fabs" are required to achieve economies of scale, and production cycle times are measured in months) but our process is suitable for automated high-throughput production. The FlexLogIC fab-in-a-box makes this a reality, with production cycle times under 1 day, and a capital cost and physical footprint over 100x smaller than silicon fabs. While individual process steps within the FlexLogIC system use mature off-the-shelf tools, the way these are combined with full automation and software control has been developed in-house by PragmatIC."

FlexLogIC brings forth humongous potential. Reflective of PragmatIC's innovative approach and clever usage of unique technology, teamed with the company's commitment to production for the larger spectrum. Suitable for

both installation and operation in a diverse and distributed range of supply chain environments.

Production time cycles remain under 24 hours, compared with that of several months for the more traditional silicon fab. Upfront design costs are considerably lower than previous methods, meaning new flexible electronics can be developed, tested and delivered, in dramatically shortened time frames with efficaciously reduced risk rates.

## WE HAVE A RANGE OF LONGER TERM R&D PROJECTS EXPLORING FLEXIBLE INTEGRATED CIRCUITS WITH MORE ADVANCED FUNCTIONALITY

Once teamed with on-site integration into the manufacturing supply chain, a revolutionary new model for rapid introduction of electronics into smart objects comes forth.

"In addition to simply scaling production of our initial products, the rapid cycle time of FlexLogIC also allow very rapid new product introduction. We expect that this will allow us to expand the range of products we can offer far more quickly than would be possible in the

conventional silicon chip industry."

Extreme and enviable knowledge cross all borders of the sector, inclusive of, but by no means limited to: skill sets in advanced robotics, precise material deposition, precise laser cutting, computer controlled etching process and in-line quality monitoring.

Through such a unique, diverse wealth of understanding, PragmatIC are able to efficiently aim to the future with achievable

ambitions. Many of which are already revolutionising the way in which electronics are created and implemented.

Headquartered in Cambridge, UK, PragmatIC has seen a recent investment for a new billion-unit facility in NETPark, Sedgefield. Shareholders for the company include Cambridge Innovation Capital, Arm Holdings and Avery Dennison, while a large portfolio of trusted relationships-inclu-

sive of University partnerships, enable PragmatIC to keep its well-grounded reputation across the field.

Future projects are eminent for the establishment, through an innovation culture that is as demanding as it is continuous. With new electronic designs and ideas coming forth as a constant, there are a variety of other projects alongside the FlexLogIC creation that emit success from PragmatIC's dedicated approach.

"We have a range of longer term R&D projects exploring flexible integrated circuits with more advanced functionality. These include the "PlasticARM" (a 32-bit microprocessor system based on the industry-standard ARM Cortex series) and "PlasticArmpit" (an electronic-nose sensor system being developed in collaboration with ARM, the University of Manchester, and Unilever as a customer)."

With plans for the Trillion Unit Vision well underway to be successfully integrated in the next 7 years, it will be interesting to see the bright future further unravel for this unique, experienced company, as it further becomes - one of the best in the business.