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## **Key industry drivers in the display and embedded technology industry – with their insider knowledge, Anders looks ahead to 2020 and beyond**

In the second part of our journey with Anders, General Manager [Paul Mullen](#) discusses what he believes will be the display and embedded technology industry drivers over the next five years and beyond. It's about style *and* substance, with new shapes, sizes, and contours to design with, and advanced energy-efficient, and flexible technologies coming onto the market.

UK-based Anders (<https://www.andersdx.com/>) specialise in the design, development, and supply of world-class display and embedded technologies. They are the industry leaders in what they do, so when Paul Mullen offers his view on the direction he believes the industry and the technology itself is heading, we should stop, grab a cup of coffee and read on.

Today there are numerous markets and opportunities for high-tech products, and their increasing intelligence can support sophisticated user interactions. A display is often the mainstay of the user interface, combined imaginatively with any combination of audio, touch, gesture control, or haptics. The display also has a significant effect on the overall appearance and sales appeal, so it's fortunate that designers now have plenty of options to get the effects they want. New sizes and shapes are emerging, there are crisp and cool new monochrome options, curved full-colour displays, and flexible displays are now commercially viable, too. Let's take a closer look.

### **Monochrome:**

In the industrial world, [monochrome technology](#) is still highly desired for many reasons, not least of which because of its **low power consumption, small footprint and low cost**. An artfully designed user interface hosted on a monochrome display can be **clear, simple, easy to understand**, and respond quickly to the user's demands.

Technical advancement of traditional technologies such as **STN** and its derivatives has improved aspects such as viewing angle, image quality, and high-temperature performance, making these an excellent choice, particularly in the industrial and medical sectors.

On the other hand, newer **Vertical Alignment (VA) displays, with their** high contrast and deep black background, can offer added crispness. They can be used with a backlight of almost any colour to achieve a variety of effects, from sharp or clinical to warm and comforting.

Monochrome technology still has plenty of scope for development and will remain a powerful option for designers, particularly for engagement with small and low-cost Internet of Things (IoT) devices. Monochrome is a cheap solution for this need, and it is simple to drive. We will see people redesigning their monochrome display to fit with the market demands for TFTs in smaller form factors as unit costs continue to reduce. You can now introduce a 2.4" or a 2.8" by

3.5” display for around \$7 to \$10 with or without integrated touch. By allowing rich interactive experiences at such low cost, this type of technology will move into a much wider arena than ever before.

#### **AMOLED & PMOLED:**

Active Matrix Organic Light Emitting Diodes (AMOLED) and Passive-Matrix OLED (PMOLED) have been around for some time and we are now seeing significant growth in demand. We believe this growth will continue as designers engage more and more with this type of technology, particularly PMOLEDs.

Their major strengths are that they are backlight-free and extremely thin as well as flexible. They enable a neat and compact solution ideal for applications like control panels for small home appliances.

One market that looks particularly strong right now is for consumer home medical technology, where there is no rugged requirement and users simply need a small and clear display that they can interact with easily in their domestic environment.

#### **Circular Display:**

The primary requirement is of course for the display to communicate information clearly, but designers now have a wealth of choices available to create products that simply look different and eye-catching and thereby gaining them competitive advantage, particularly in the consumer space. One of the trends we see really taking off is the use of circular displays, and it’s happening in a variety of markets including industrial and automotive.

Applications ranging from simple boiler controls to large clusters of dials are adopting circular electronic displays to replace traditional mechanical dials for a more modern appearance and greater flexibility to display extra information.

We are seeing a lot of interest for ‘cluster panels’ in automotive applications, particularly motorbikes, and also certain marine environments. An electronic display can replace a complete dashboard of mechanical dials, improving reliability and simplifying vehicle assembly, as well as achieving a modern appearance and stylishly presenting large quantities of information. I think this trend has a real long-term future. We’ve already seen circular displays come into consumable watches and other similar-sized devices, and I expect many other markets to make the same move.

I think there are important opportunities for new and stylish displays to take a prominent role in improving home-based care and security for the elderly – many products in the market are still based on the traditional alarm-type systems, which are clunky and old fashioned. The equipment requirements in the medical-at-home are unlike those of really high-end medical, where a raft of medical-specific certifications are required, so there is more freedom to experiment with display technologies and styles, as well as features such as real-time health and safety monitoring to help people live comfortably and securely in their own homes later into life.

#### **Letterbox and Cut-Down Displays:**

We are seeing greater demand for letterbox shaped displays, particularly within the automotive cluster environment.

I think we will see this type of display permeate other applications such as signage. It’s ideal for train information

overhead boards in individual railcars, for example, and could give passengers much richer information than old-fashioned scrolling alphanumeric displays.

As well as standard size letterbox displays, we've been supplying cutdown TFTs for six or seven years and were one of the first companies to promote taking a standard TFT 4.3" and cutting it down to 3.8". We can now cut down various standard sizes, ranging from as small as 2.8" to 10.1", to a customer-specified height and add touch control, FPCs and a backlight to their specification. All this at much lower NRE than a full custom display of a bespoke size.

### **Flexible Displays**

I think flexible displays are among the most exciting and practical developments in the industry right now, and have a very strong future. Feedback from events such as this year's Mobile World Congress suggests that while some companies are talking about it they are reluctant to let people get up close or sample it. You can look, but you can't touch – that's rather ironic. There were approximately five companies promoting flexible displays at MWC, including Samsung, Lenovo and Huawei, but the samples were kept tantalisingly locked away in glass display cabinets. However, their adoption into mainstream consumer products could be 12 – 18 months away.

Anders is engaged with a company called '*Flex Enable*' and are witnessing some very exciting technology. If you can imagine the old Polaroid film that goes into the back of the camera, Flex Enable are now deploying displays with that kind of film-based property. Very thin, very flexible, but offering comparable visual performance to a TFT. From a deployment perspective, this is technology that I can see being mainstream for 2025 and beyond.

In automotive, the flexible display will be the big movement from 2022 onwards, although it won't reach our road cars until around 2027. These will be displays that will be able to replace the whole console. The user will be able to optimise areas for touch like heating, audio, sat nav controls, but the console is all one film. If you think of the whole walnut or plastic dash becoming a film-based display, this is where automotive will go, specifically as there is going to be more and more cameras in cars as we move towards driverless cars or electric vehicles. Cameras will be deployed instead of wing mirrors because the mirrors increase drag resistance and therefore increase fuel consumption. If you want to optimise an electric car you want to make it aerodynamic to use less fuel, so the design needs to be as slick as possible.

### **3D Touch**

The industry is buzzing about 3D Touch, but the technology isn't filtering through to deployment within display yet. I think it's likely to evolve more towards enhancing the overall product feature set rather than being linked closely with the display.

The biggest challenge is integrating the touch technology on-cell or in-cell - into the display stack itself – thereby removing the need for a separate touch sensor. It could be on top or embedded into the pixel. I think this is inevitably where touch is going although, despite its many merits it may not become mainstream. Interestingly, one of the key applications that I've seen for 3D Touch is a non-display based application for controlling power tools such as an electric drill. It replaces the mechanical power-on and power-off button with a sensor that the user can squeeze to adjust the speed. This is such an elegant application that I think 3D Touch is less display oriented and extremely well suited to replacing mechanical switches.

And so, there you have it – tomorrow, today, from the people behind the screen. Perhaps in a year or two you'll be reading about more visions from Paul Mullen, only next time, you'll be reading his words on a flexible display screen within your car. How cool would that be?!

In our third and final article, Paul will share his his views on the outlook for the UK, emerging design and manufacturing destinations, and the view from Anders on future opportunities for growth.

#### **About Anders**

Anders Electronics plc. is a display and embedded display design specialist, dedicated to making electronic touchscreen technology safer, simpler and more enjoyable to use.

Over 30 years ago, Anders started designing, developing, and delivering customised display solutions, for the non-consumer industry, and haven't stopped innovating since! Anders features a history of reliability and innovation and lives to solve display engineering challenges.

Anders harnesses their expertise in display, embedded computing and touch control technology to help differentiate their customer's products through exceptional design and engineering.

Anders, the people behind the screen.

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