

# Watch this space

Munisamy Anandan, president of the Society for Information Display, talks to **Rebecca Pool** about the breath-taking technologies that are now emerging in the displays market.

## ■ Which display technologies are we likely to see more of in the near future?

There has been a lot of recent excitement regarding three-dimensional (3D) video. The 3D television market had sold out completely after launch, despite the current economic downturn. Panasonic expects to sell one million units this year, while Samsung is expecting to sell nearly two million units.

Vigorous research is underway to eliminate the need for 3D glasses, although it may take another three or four years to reach a stage where people can view a 3D television without glasses. There are glasses-free prototypes that exhibit a 3D effect if the user stands directly in front of the screen, but this is lost if the user stands anywhere else. Today's customers also want touch-screens that have the touch-sensitive element inside the display rather than on the top. This is particularly the case for applications such as smart phones; researchers are now working hard on a technology called 'in-cell touch', in which sensors are built into every pixel of a liquid-crystal display, making the final device thinner, brighter and more lightweight.

## ■ Has any particular technology been crucial to the growth of the displays markets over the past decade?

Yes — the LED backlight. We first saw it in mobile phones, and now LCD notebooks are almost completely illuminated by LED backlights. The technology has, at least over the past five years, started to dominate LCD televisions, which demonstrates phenomenal growth. Power consumption has come down, and the longevity of these devices has increased tremendously as a result.

The electronic book (e-book) will be the next big growth market for the LED backlight. A few years ago many people doubted the potential of the e-book market, but only recently Amazon.com saw sales of e-books surpass those of hardback books for the first time. My guess is that this will happen globally over the next three to four years.

## ■ Are there any other technologies to look out for?

One technology waiting to challenge the LCD is the organic LED (OLED). Unlike LCDs, OLED displays do not require a backlight to function, and so are very thin and lightweight.



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However, at present, manufacturers cannot economically manufacture OLED screens larger than 15 inches. The backplanes of these displays contain low-temperature polysilicon thin-film transistors (TFTs), which do not exhibit uniform characteristics over a large display area. Also, the manufacturing cost of these transistors is high, but yields are low.

A new generation of TFT — the oxide TFT — looks promising. Indium gallium zinc oxide TFTs, for example, not only exhibit good performance characteristics over a large display area, but can be manufactured in fewer processing steps than polysilicon TFTs.

Unfortunately, these performance characteristics can deteriorate after exposure to moisture and oxygen during the fabrication process. When researchers solve this problem, manufacturers will be able to scale OLED screen sizes to 32 inches and beyond while implementing economical mass-manufacturing processes. The performance of oxide TFTs has already been demonstrated at the recent Society for Information Display international symposium in Seattle, USA, so we should see them in manufacturing lines over the next two to three years.

Researchers have also explored using OLED displays in e-books. Although this technology has a wider viewing angle and superior colour quality compared with an LCD, its power consumption is higher than that of an LCD and backlight combined. This is a major problem for e-books, as end users do not want to charge their devices frequently.

An alternative would be to use phosphorescent OLEDs, which are three times more efficient than standard OLEDs

and could therefore drastically reduce the power consumption of e-books if they can be economically mass-manufactured.

## ■ Where are the opportunities right now?

Many multinational display companies are looking to invest in China, particularly to establish LCD manufacturing plants. Making the LED backlights for LCDs requires the LED manufacturing infrastructure to be in place, so China is now vigorously trying to establish extensive LED manufacturing operations. The government is subsidising critical manufacturing equipment, including nearly 50% of the cost of an embossing tool. China has been doing the back-end packaging of LEDs for a long time, but now it wants to manufacture the LED chips themselves.

## ■ As president of the Society for Information Display, what are your plans for the future?

We would like to develop our partnerships with various countries. For example, we already have partnerships with France, Korea and Japan, and we wish to strengthen such links. Some companies are unaware of the strengths of certain universities around the world, so we are trying to provide information on the technological strengths of each university, where the breakthroughs are coming from, and how industry could benefit from interacting with these universities. For example, I am trying to establish a database in which we will compile all the universities in the world and categorize them based on which field of technology they are strongest. This type of information will be highly useful for industry and will help display technologies to grow. We are also increasing our activities on the internet. Many of our members operate remotely nowadays, so we want them to be able to watch or listen to seminars online. The migration of display technologies to China and also to Brazil will allow us to increase our membership in these countries, organize more conferences and partner with more local societies. This is in tune with our mission: to promote display technologies around the world.

## INTERVIEW BY REBECCA POOL

*Rebecca Pool is a freelance journalist based in the United Kingdom.*