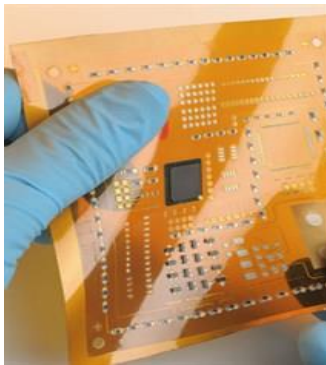


PlastronicsSpec - Development of an automated digital radiography system for the inspection of plastic electronics

Plastic electronics is a relatively young technology to be used in consumer electronics products. Nevertheless, the plastic electronics global market is forecast to grow as much as £143bn by 2027. Plastic electronics are mostly printed or sprayed on, rather than etched using expensive photolithography systems. Therefore this technology offers a number of advantages over existing PCB circuit manufacture techniques, including low cost and physical flexibility. However, numerous types of defects can arise during manufacture which are specific to plastic electronics and are discovered only after production, leading to high product waste and correspondingly high prices, which threatens the market promise.



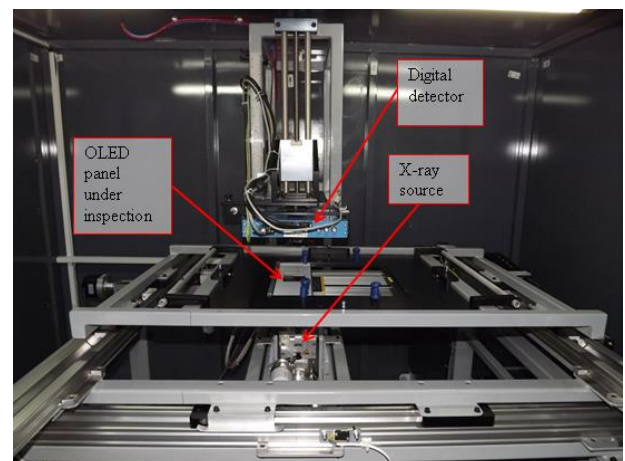
Defects in the display pixels and their inter-connections include cracks, chips and pixel misalignment, all of which reduce image and colour quality. Displacement errors can also occur in the necessary high-resolution printing of the electrical interconnections. Defects in high-end films such as pinholes, cracks and grain boundaries are common in thin oxide barrier films when fabricated onto plastic substrates. These defects cause a 'pore effect', where oxygen and water molecules are able to seep through and penetrate the plastic barrier. It is important that all defects that will reduce the performance or lifetime of a circuit are detected at the production stage so that defective circuits can be discarded before they leave the factory door or become incorporated on site into a larger product.

Project objective

In response to these problems, the goal of the PlastronicsSpec project is to perform rapid, on-line, high resolution and 100% volumetric inspection by digital, real time radiographic imaging leading to

automatic and instant rejection of defective product with minimum wastage. Emphasis will be on the development of an in-line automated digital radiography inspection system with high throughput with advanced image pattern recognition links. This approach eliminates human misinterpretation that causes errors in the production system.

Novel multimode signal processing will be used to maximise the use of X-ray photons from a wide X-ray viewing angle, resulting in the smallest possible minimum detectable defect sizes limited only by quantum fluctuations. The simultaneous operation of several signal-processing options will permit the highest spatial resolutions to be obtained simultaneously with minimum detectable thickness changes (i.e. defect depths).



By assuring defect-free products, the PlastronicsSpec project will provide an enabling technology for the achievement of a mass market in plastic electronics products.

For further information, please visit the project website at www.plastronicspec.eu.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under Grant agreement number 286531.