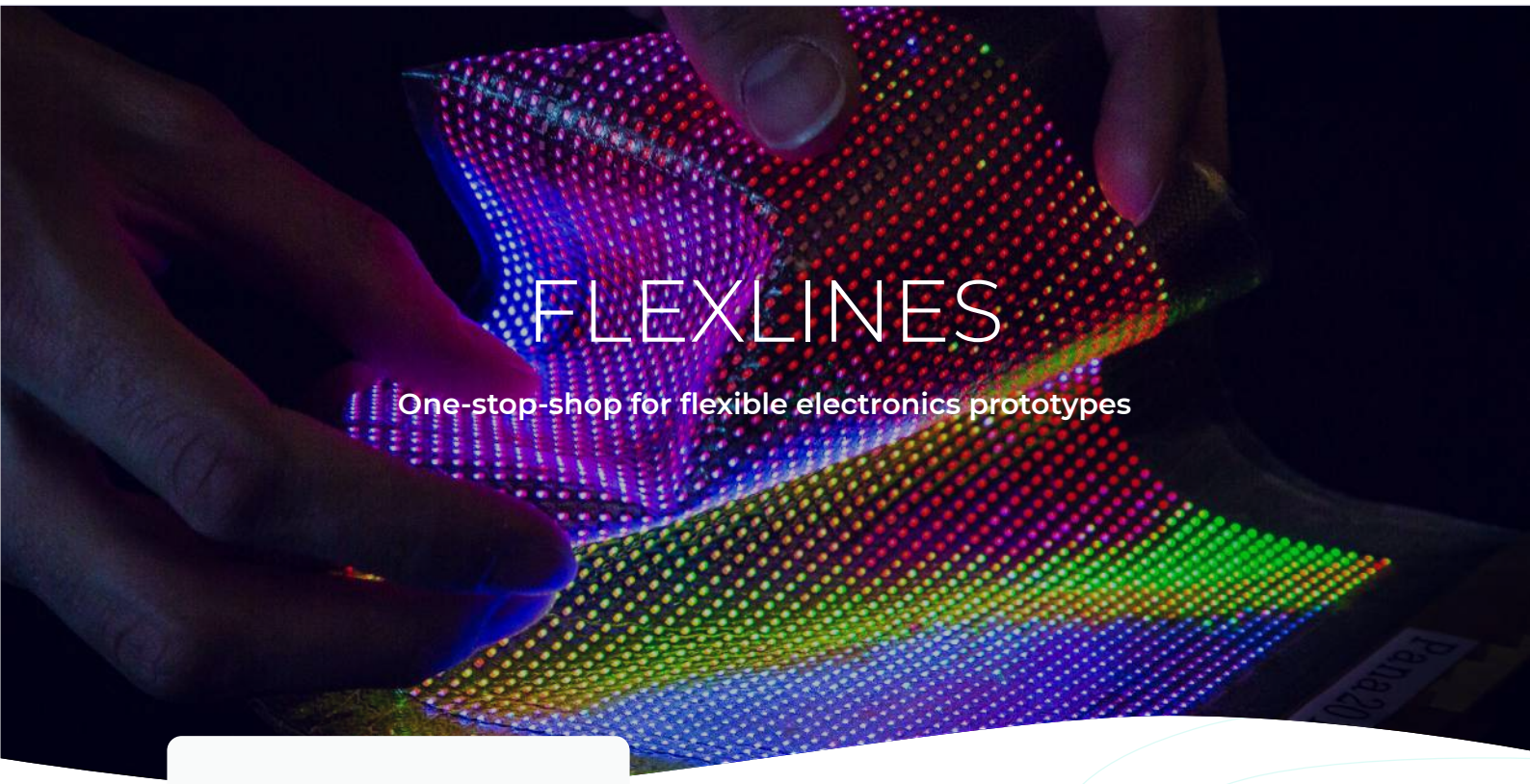
FLEXLINES
FLEXIBLE ELECTRONICS PROTOTYPING

Interreg
Vlaanderen-Nederland
Europees Fonds voor Regionale Ontwikkeling



FLEXLINES

One-stop-shop for flexible electronics prototypes

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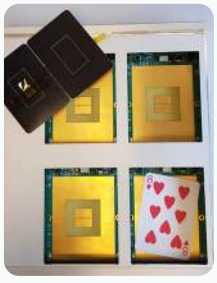
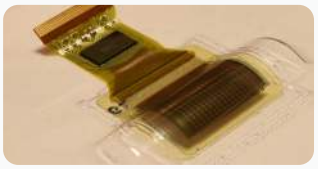
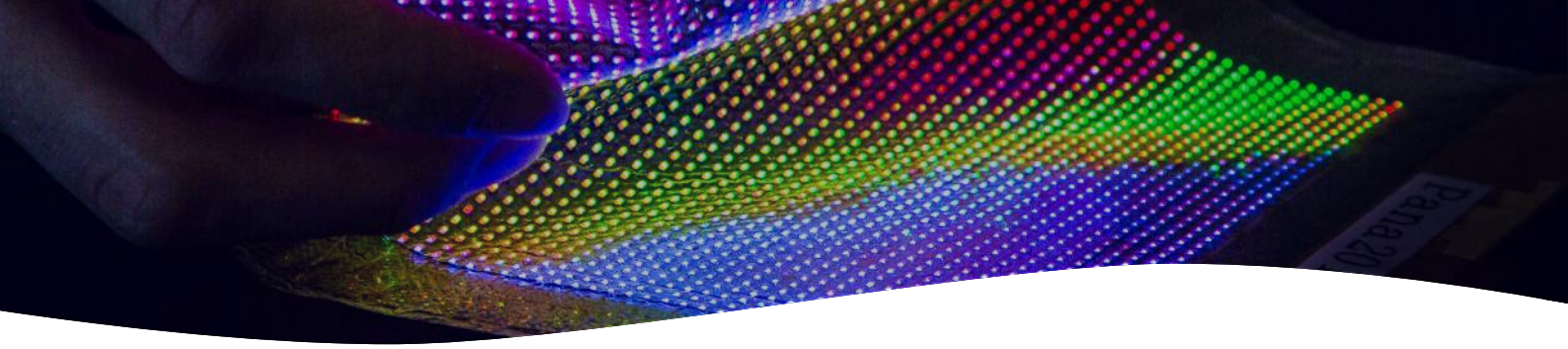
FLEXLINES ENABLING FLEXIBLE ELECTRONICS PROTOTYPES

Flexlines has developed and coordinated the individual links in the Flexible Electronics value chain: processes and infrastructure for design and production. The consortium of partners set up a state-of-the-art and stable pilot line and a 'one-stop-shop' for the realisation of Flexible Electronics prototypes.

Prototypes that meet the needs of the local industry in the border region have been realised for validation of the technology. The main prototypes are showcased in this flyer.



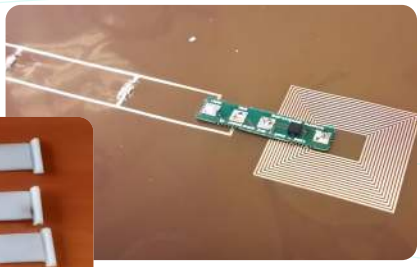


HIGHLY TRANSPARENT FINGERPRINT SCANNER

The world's most transparent large-area optical fingerprint sensor uses a combination of OPD (Organic Photodiodes), TFT (Thin Film Transistor)and TFE (Thin Film Encapsulation) technologies. The new sensor is over 70% transparent, so it can easily be used on top of LCD displays: it can allow a wider range of display applications to incorporate biometric security.

This highly transparent optical fingerprint sensor has won a 'Best Prototype Award' at the 2019 Display Week in San Jose.

OVER-MOULDING OF ELECTRONIC FUNCTIONALITIES ON FLEXIBLE POLYIMIDE-COPPER SUBSTRATES



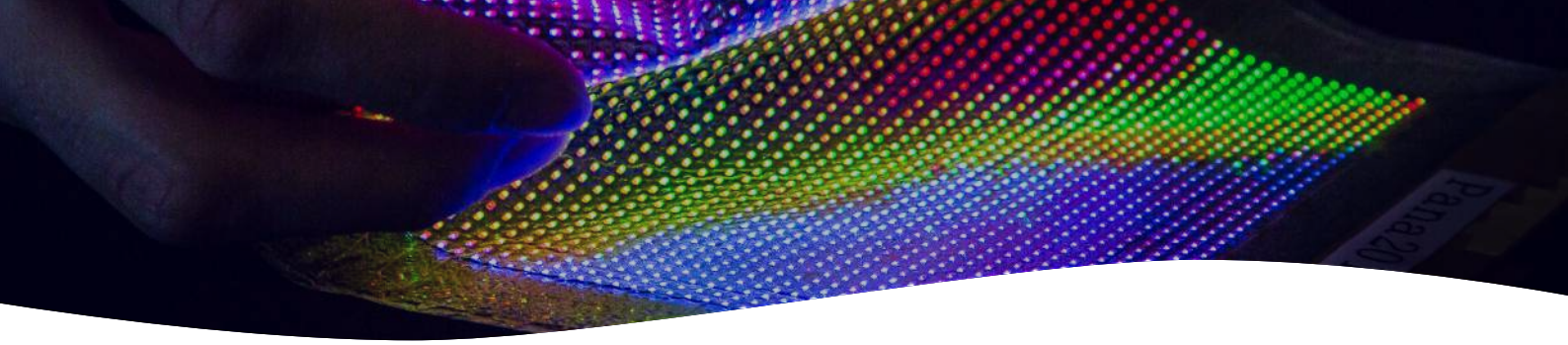
The combination of electronics with polymeric structures is a new technology platform as it integrates multiple functionalities into plastic products. This includes the integration of electronic components, like e.g. resistors, LEDs, etc. Such components were mounted on a flexible printed electronic foil using lead free solder, after which the foil can be adhered with a thermoplastic polymer, using an over-moulding process, which is one of the main technologies developed in the Flexlines project.

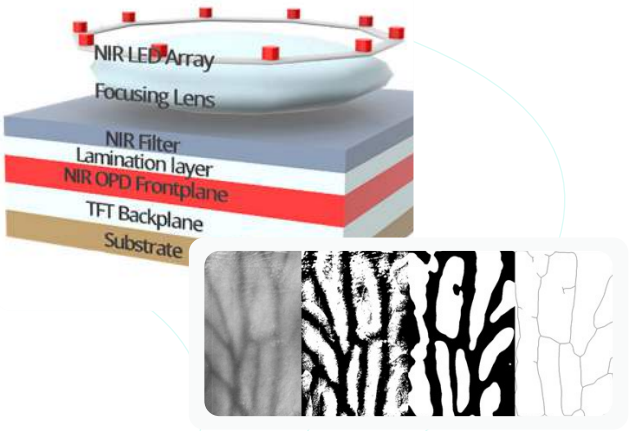
FLEXIBLE TOUCH SCREEN TAGS

A flexible capacitive identification tag that communicates with standard touch screens (C-touch) has been developed. C-touch tags are thin and flexible chips that can be integrated in a wide range of paper and plastic based objects such as tickets, certified documents, payment cards,... realizing smart products. The connection to the internet is established simply by placing the tagged object on the touchscreen or vice-versa. The results have been published in the magazine 'Nature Electronics'.

FLEXIBLE CHIPS IN PAPER

Very thin flexible chips can be integrated into paper gaming cards, tickets and official documents. This way these paper documents are being converted into smart documents, enabling extra features -like gaming, security and logistics- for the users. Each card can have a unique electronic ID without losing any of its touch and feel. Each paper card, ticket or document can interact with electronic devices and provide extra digital information to the users.



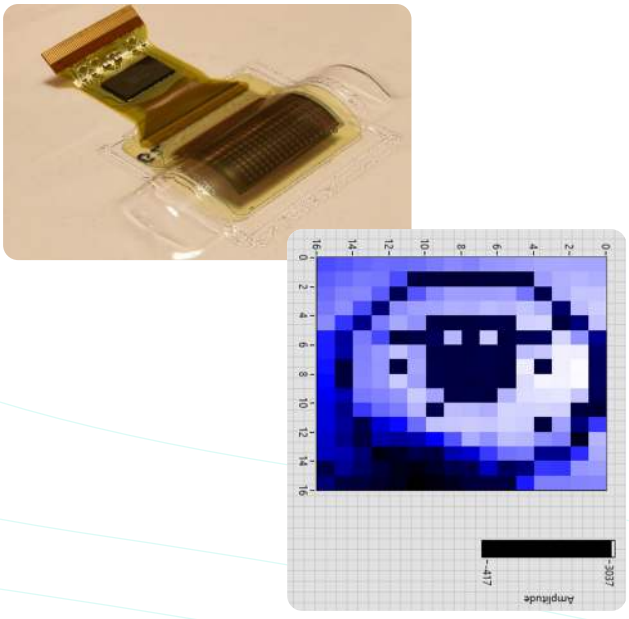


NIR VEIN DETECTOR

A demonstrator for vein detection has been launched. The near-infrared (NIR) vein detector identifies the blood running through the veins, so patterns of people's veins can be measured. This new state-of-the-art NIR vein detector displays the progress on NIR Organic-based Photodetectors (OPDs) from material to optimized device stack and demonstrates a prototype for a specific application: biometric vein recognition. These NIR OPDs excel in all of the OPD figures of merit: a low dark current, a high external quantum efficiency and a high detectivity at the wavelengths of interest. The values are amongst the highest ever reported.

INJECTION MOULDED LIGHT IN CURVED SHAPE

Flexlines has developed a demonstrator generating light from integrated sources that are injection moulded in a curved shape with ultra thin features of 4 mm. The driving architecture as realized in the handle allows dynamic effects of the curved light sources. Controls are based on capacitive touch sensing. The applied technology is circuitry based on printed electronics and adhesive bonding technology for the assembly of components. The flexible substrate and the stack built up of graphics and electronics are compatible with the process window of injection moulding, i.e. exposure to extreme pressure and temperature.



THERMOFORMED IMAGER

The thermoformed imager combines high pressure forming with advanced organic photodetector (OPD) technology. By lamination of a 16 by 16 pixels array OPD on thermoformable substrate the combination could be thermoformed into a curved shape of a radius of 12 mm. The technology was developed for this as the temperature sensitive organic stack of light absorbing material can easily damage the performance. Moreover the deformation occurring when forced into the mould shape is another challenge that was conquered. The curved OPD was fully functional after thermoforming. A curved photodetector has big potential as imager of curved objects or body parts and allows to use the angle of incidence as parameter for detection.

INTEGRATION OF ELECTRODE ARRAYS IN MICROTITER PLATES

Biochemical experiments are generally performed in standardized microtiter wellplates according to ANSI/SBS standards. Therefore, integrated electronic readout of microbiological systems need to be rendered compatible with these standards. Flexlines realized a number of prototype demonstrators have been realised for the introduction of Metal Electrode Arrays (MEAs) and high density Active-Matrix Electrode Arrays into (3D printed) COC microtiter plates. The added value of large-area mesh electronics – high density electrode array membranes with open structures in between the electrode pads – has been demonstrated by realisation of suspended electrode arrays in multiwells, enabling fully 3D growth of tissue around the electrode arrays.

ONE-STOP-SHOP

REALISE YOUR OWN PROTOTYPE!

Need help realising flexible electronics prototypes?

Don't hesitate to use our one-stop-shop. After all, it's for your service!

Contact Romano Hoofman at: Romano.Hoofman@imec.be

Flexlines brings together leading partners:

imec · TNO · Holst Centre – Open Innovation by imec and TNO · dsp valley · Brightlands Materials Center · TU/e · KU LEUVEN

With support from:

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