Project Overview

Hi-Accμracy is developing new printable materials and innovative additive fabrication processes to create next generation display technologies at 1 μm resolution.

Materials such as quantum dots (QD), novel organic semiconductors and conductive inks that can be produced at low cost, with minimal environmental impact are being developed within the project.

Hi-Accμracy is employing a variety of deposition techniques and new additive fabrication processes including:

- Electro-static jetting (ESJET)
- Reverse-offset printing (ROP)
- Nano-imprint lithography (NIL)
- Atomic layer deposition (ALD)
- Aerosol assisted ion deposition (AAID)

The consortium team will deliver the speed and accuracy required to successfully produce μm scale structures commercially.

Display structures will be printed on flexible substrates that may be applied to virtually any surface. These technologies utilise printed electronics down to μm size for many applications including:

- Organic Large Area Electronics (OLAE)
- Thin Film Transistors (TFT)
- Large and small area high-resolution displays

Consortium

11 partners from across Europe:

BNN

CRF CENTRO RICERCHE FIAT

DYCOTEC MATERIALS

Fraunhofer IAP

HUMBOLDT-UNIVERSITÄT ZU BERLIN

imec

JOANNEUM RESEARCH

Smartkem OUR TRANSISTORS YOUR ADVANTAGE

pvi PRECISION VARIONIC INTERNATIONAL

UCL

VTT

Our advisory board:

SONY

HUAWEI

POLAR

Learn more about the project and partners at www.hi-accuracy.eu

Hi-Accμracy

Hi-Accμracy's printed, thin, flexible, low cost and sustainable displays will offer outstanding quality and resolution.

The displays will be employed in high-resolution applications from automotive interiors to affordable, light-weight wearable tech and flexible information screens.

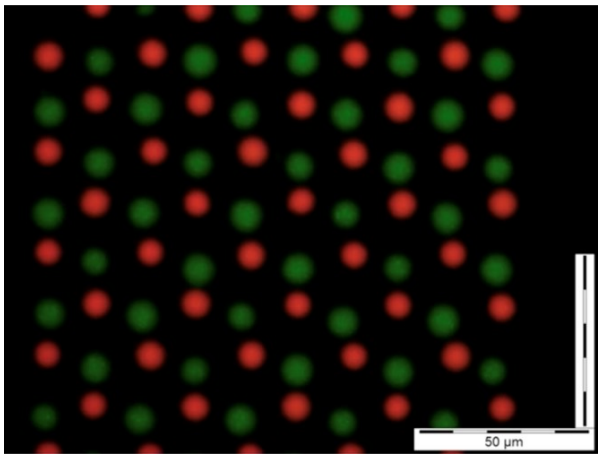


Image © Fraunhofer IAP

Hi-Accμracy has received funding from the **European Union's Horizon 2020** research and innovation programme under grant agreement 862410

Motivation

The Hi-Accμracy consortium's aim is to develop materials and techniques to allow the commercial printing of high-resolution, inexpensive, environmentally friendly displays onto almost any materials, including flexible substrates.

Applications of these displays include lightweight, wearable, networked entertainment devices (phones), health monitors and in-car infotainment / communication systems.

Low cost and sustainable, this new technology creates many opportunities for breath-taking design and product innovation.

Image © FCA

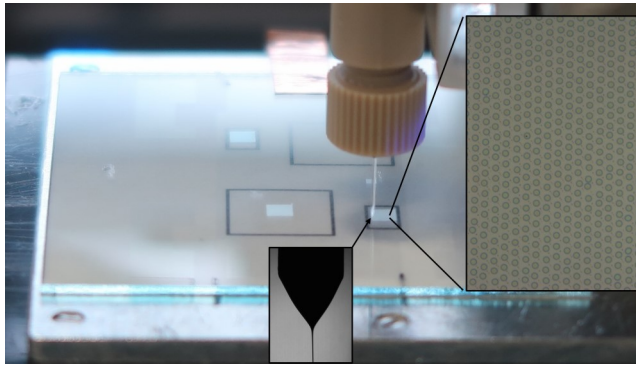
Technical Design

To demonstrate this exciting technology, the project consortium is working towards a 1", 300 ppi full-color display with a sub-pixel pitch of 28 μm x 84 μm.

In order to achieve such high resolution in a printed application, Hi-Accμracy has devised a compact 2T1C pixel, optimised for the printing processes. The system utilises an external FPGA controlled driver, with a custom-designed interface, to over 700 flexible connections on the display substrate.

Materials

The Hi-Accμracy project is developing low-temperature curable, nano-Ag / nano-Au conductors and p-type organic semiconductors with intrinsic mobility in the range of 10-20 $cm^2 V^{-1} s^{-1}$. The electroluminescent materials in the QD-LEDs consist of InP / ZnSe / ZnS quantum dots (QDs). Finally, multiple barrier layers, using materials such as Al_2O_3 and ZrO_2, lock out moisture and oxygen and ensure device durability in everyday environments.



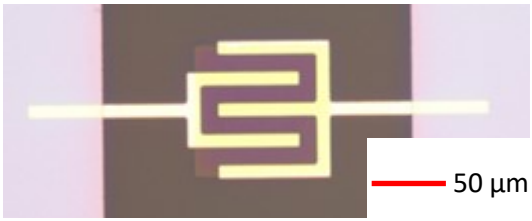
ESJET printing used to precisely deposit 10 μm droplets, forming pixels in a display screen.
Image © Fraunhofer IAP

Methods

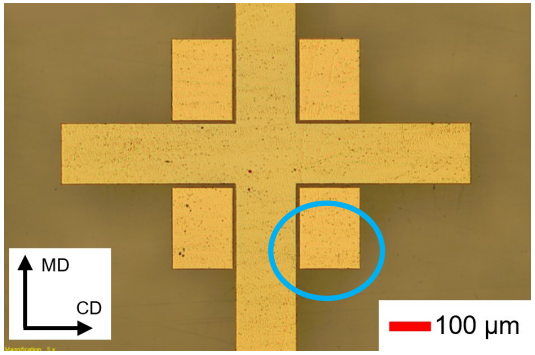
Reverse off-set and ESJET printing are both being used to create device backplane structures. Light emitting stacks are layered using ESJET, NIL, ALD and AAID techniques.

Results

A variety of deposition methods are being trialled to identify those best suited to the aims of the project. VTT—the Technical Research Centre of Finland, a Hi-Accμracy project partner, are pioneering Reverse offset Printing.



RoP printing is being used to produce intricate device features. Image © VTT



VTT have also demonstrated printing of two layer structures with extraordinary accuracy. Note how precisely the gaps in the print are being maintained. Image © VTT

Contact Us

Hi-Accμracy is focused on developing next generation, printed displays, but our outputs will extend widely across printed electronics applications. Speak with us to learn more.