PRINSE
Oulu, Finland

PRINSE'18 Demonstrators
31st January - 1st February 2018

DEMO TITLE	SHORT DESCRIPTION	
Smart Bottle	A smart bottle demonstrator was developed in VTT-coordinated Roll-Out EU H2020 project by Logoplaste, Fraunhofer IISB and Uninova. The bottle has temperature and fill-level sensors to monitor the condition and consumption of a drink. The solution is meant for opaque bottles for drinks that cannot be exposed to light. The bottle has been tested with consumers revealing interest to it. **CONTACT NAME: ARI ALASTALO, VTT**	
FlexNode	The VTT FlexNode platform of wireless sensors enables new wearable applications that are not accessible via conventional solutions. The sensors are thin, lightweight and conformal - with the additional option of being stretchable. The implementation examples cover multiple bio-signal measurements. **CONTACT NAME: TOMI MATTILA, VTT**	
RGB Alpha-numeric Display	Flexible alfa-numeric display demonstrator based on seamless tool rotary screen printed PET substrate and adhesive bonded 3535 SMD RGB LEDs. Displayed information transmission is wireless utilizing Android mobile phone Bluetooth™ connection to control electronics via VTT's TinyNode V3.0. A JavaScript-powered webpage that utilizes the experimental Web Bluetooth API in Google Chrome browser creates user interface for the display system. **CONTACT NAME: KIMMO KERÄNEN, VTT**	
CosPatch	VTT has developed a disposable patch that will let consumers perform microcurrent skin treatment at home. This patch is manufactured using printing and lamination techniques and derives its power from an enzyme catalyzed oxidation reaction cell. The microcurrent produced by the patch will enhance the transfer of cosmetic substances into the skin. **CONTACT NAME: MARIA SMOLANDER, VTT**	
SmartFish	SmartFish demonstrator presents a printed temperature sensor on a thin plastic substrate embedded to a hybrid wireless communication real-time cloud-based temperature and location monitoring system for monitoring fish transport chain. Temperature conditions are very important to easily-perished products and therefore temperature measurement is crucial in cold chain. Effective tracking of temperature conditions is the most important point to be focused with technical and organisational solutions. **CONTACT NAME: HARRI MÄÄTTÄ, OULU UNIVERSITY OF APPLIED SCIENCES**	

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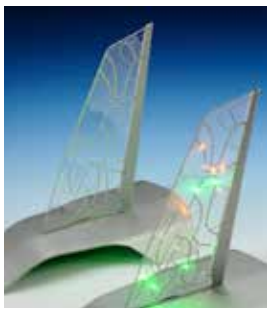
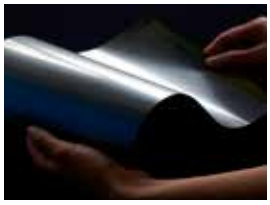
Digital Beer	Digital Beer - Smart tags based on functional ink for enabling context aware digital services. **CONTACT NAME: LIISA HAKOLA, VTT**	
Wireless LED Display (Flex-in-Glass)	Flex-in-glass project develops solutions for intelligent laminated glass products and related services. The demonstration consists of a transparent and flexible plastic foil with assembled LEDs, sensor components and IoT connectivity laminated as an integrated part of glass surface. The wireless powering and communication enables fully sealed and easy to assemble smart window for public transportation and building applications. **CONTACT NAME: JUNTUNEN EVELIINA, VTT**	
Interactive Cellulose Fibre Acoustic Panel	VTT has developed an interactive acoustic panel demonstrator based on foam formed porous cellulose fibre materials and embedded RGB-LED display foil. The Grid-EYE infrared array sensor is capable of detecting movement of people, which is illustrated by the display panels. **CONTACT NAME: MARKUS TUOMIKOSKI, VTT**	
LYTEUS Flexible OLED	Flexible OLEDs have the potential to be integrated into formed parts or seamlessly bonded onto curved surfaces, and the commercialisation of this technology will open up a host of exciting design opportunities to create new value adding lighting products in many different application areas, such as architecture, automotive, aerospace fashion and consumer electronics. PI-SCALE is a European collaboration to create an open access pilot line service offering world class capability in customised flexible organic light-emitting diodes (LYTEUS OLEDs) in order to accelerate the commercial adoption of this technology. **CONTACT NAME: MARKUS TUOMIKOSKI, VTT**	
A Design Accessory for Monitoring the Indoor Air Quality	VTT has developed a design accessory for monitoring the indoor air quality in facilities such as offices and classrooms. It detects carbon dioxide, temperature and humidity, and uses light signals to guide people to healthy space. The monitor, which is based on IoT technology, uses comfort light signals to guide people if, for example, carbon dioxide levels in a room become too high. LEDs of different colours indicate when the level of gas measured by the sensor exceeds a certain threshold. **CONTACT NAME: MARKUS TUOMIKOSKI, VTT**	
In-molded RGB-display	VTT presents display and light indicator demonstrator based on RGB-LED with integrated driver chip on plastic foil, which is injection over moulded into thermoplastics to form a product with improved durability and usability. The purpose of this demo is to prove the suitability of the technique for the highly cost-effective manufacture of products such as flexible LED displays containing printed electronics. **CONTACT NAME: MARKUS TUOMIKOSKI, VTT**	
Roll-to-Roll Monolithic Interconnection of Customizable Thin-film Solar Modules	The aim of the MONOSCRIBE project is the development of an industrial roll-to-roll (R2R) machine based on a new interconnection concept for thin-film photovoltaic modules. This new technology allows for the efficient batch production of individually fabricated photovoltaic modules especially adapted to the customer's demands. **CONTACT NAME: KIM EIROMA, VTT**	

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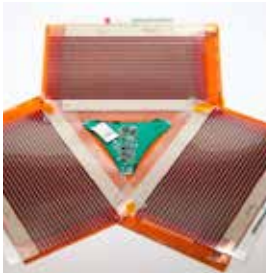
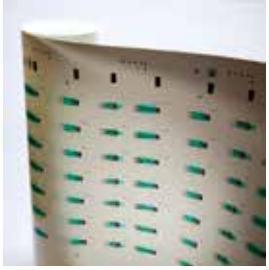
Hilla Growth Mill	HILLA is a large program focusing on accelerating research to business and ICT to new industries through smart specialization. HILLA is intended as a new agile growth engine to create scalable products, services and businesses to global markets in our future hyper-connected societes. Top-line target of HILLA is to invest in raising industrial sectors, whose growth is either dependent or greatly benefitted by the extensive utilization of ICT. More precisely, HILLA accelerates the creation and commercialization of wireless, knowledge and data intensive smart products and solutions - the core research and development competencies of Finnish and Oulu ICT Hub. **CONTACT NAME: HARRI HYVÄRI, VTT**	
Energy-autonomous Sensor System for Weather Station	Thin film organic PV is powering sensors to observe the ambient weather conditions (temperature, humidity, pressure, light level) and the readout is taking place with mobile phone. Printed, organic-based solar cells can be customized to any shape/size and, embedded as a part of interior design to harvest energy that can control e.g. air conditioning, lighting or security for both indoor and outdoor applications. **CONTACT NAME: MARJA VÄLIMÄKI, VTT**	
Design Competition Winners	3rd PrintoCent Design Competition was held in early summer 2017. Here are presented the top 3 works of the competition which challenged this time young designers to develop future lamp utilizing flexible RGB-LED-foil as a base element for their design work. Grand Winner: White Mango Light - Playful lamp inspired by the Taiwanese way of enjoy mangoes by Yi-Chiao Tien. Best Business Potential: X - Combining cross-stitch decorations and flexible LED films by Brigitte Lanz. Wildest Idea: Wave - Interactive illumination based on flexible RGB-LED foil by Veli Kouri. **CONTACT NAME: JARNO VEHMAS, NORDLOOP**	
Car Door Handle	Surface integrated pressure sensor for front and rear side window controls of automotive applications. The pressure sensors are printed, hybrid integrated and overmoulded to a seamless and low profile sensor panel that is connected to the car control electronics. **CONTACT NAME: SAMI IHME, VTT**	
Wraplight	WrapLight demonstrator is a R2R overmoulded flexible wristband that is illuminated with a row of LEDs. The hybrid integrated foil is fed into the overmoulding tool with a foil feeder system and overmoulded for a fully seamless and integrated plastics-electronics device. All the manufacturing steps of R2R printing, hybrid integration and overmoulding has been demonstrated for the first time. **CONTACT NAME: SAMI IHME, VTT**	
Electrochemical Sensors	Roll-to-roll printed electrochemical sensors. Four-layer rotary screen printed electrodes include carbon layer, conductor layer (silver or silver chloride), mediated carbon and dielectric layer. Commercial pastes were printed in register with VTT's pilot line. The electrodes were activated with enzyme deposited on the working electrodes and used for e.g. glucose detection. Electrochemical signals were measured with a low-cost reader unit developed at VTT which enables smart phone connectivity through NFC communication board **CONTACT NAME: CHRISTINA LIEDERT, VTT**	

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Microfluidic Immunoassay Chip and Low Cost Reader Device	Quad Industries is a leading technology provider specialised in Printed Flexible Electronics. We create innovative user interfaces by supplying a wide range of touch and switch solutions, such as, capacitive touch, Haptic Touch, force sensing and membrane switches. We focus on creating smart surfaces that include the latest technologies in backlighting and haptic feedback. We are skilled in many application domains, from home appliances to industrial, medical, automotive and many more. **CONTACT NAME: CHRISTINA LIEDERT, VTT**	
Optofluidic Device for Cancer Detection	A novel plasmonic-based device for minimal-invasive, ultrasensitive colorectal cancer diagnosis. Cartridge includes integrated microfluidics and functionalized nanostructures for the detection of DNA, microRNA and tumour autoantibodies. Cartridge was fabricated with laser processing and UV nanoimprinting using VTT's roll-to-roll printing lines. Device is developed in collaboration with H2020 Ultraplacad consortium. **CONTACT NAME: CHRISTINA LIEDERT, VTT**	
Sensor Card - Device to Monitor Your Environment	UO has developed as sensor card which enables external sensors for smart phones. The device has an open interface for new type of sensors to be connected to smart phones. **CONTACT NAME: CHRISTIAN SCHUSS, UNIVERSITY OF OULU**	OULUN YLIOPISTO
Innovations Boosted by PrintoCent	Innovations created in PrintoCent innovation activities during year 2015-2018 will be presented. These include: 1. ESD-IOT sandal by Juha Hannula 2. Thermostrip-simple outdoor-indoor thermometer by Esa Pollari 3. Dynamic Modular LEDFOIL system product by Heikki Kantola 4. Pressure Deviation Sensor by Jani Korpinen 5. Rapid diagnostics for different environments by Ville Rautiainen 6. Smart mouse for monitoring inflammatory changes in users hand by Jarkko Ruottinen **CONTACT NAME: MINNA LAPPI, MINERO**	PrintoCent
Electrochemical Sensor on Paper	The paper based electrochemical biosensor with sample channel can be used as disposable platform for health or environment. The paper platform absorbs fluid sample and leads it to the biosensing area. The paper based sensor platform is screen printed as multilayered structure and can be customized for several different biosensing and sample pretreatment needs. **CONTACT NAME: MARJA NISSINEN, OULU UNIVERSITY OF APPLIED SCIENCES**	OAMK OULU UNIVERSITY OF APPLIED SCIENCES
Naked Approach & Towards Digital Paradise	Technologies for Nearables - i.e. digital interfaces that will be embedded in our environment. The booth presents research demonstrators from the Naked Approach and Towards Digital Paradise projects. Demonstrators include Ambient sheet lightsources and smart connected tile concept, integrated flexible energy harvesting and storage module, low power microcontrollers, interaction design examples from Vaana exhibition, and blockchain based solutions for IoT data, smart contracts and payments. The examples have been produced in co-operation between RTD partners (VTT, Tampere University of Technology, University of Oulu, Aalto University, University of Lapland, Demos Helsinki) and companies (Nokia/Kuha, Streamr, Skandal Technologies, Nextfloor, NextBase Napapiiri, LMInfo, and Premix) **CONTACT NAME: JANNE AIKIO, VTT**	VTT