TOWARDS GREEN EFFICIENCY WITH SCALABLE MICRO-& NANOTECHNOLOGY

JAAKKO RAUKOLA/CEO

ISCENT UNIQUE ROLL TO ROLL TECHNOLOGY

- Solution for circular economy to reduce the amount of materials – no additional material adding during process
- Sustainable roll to roll technology fufilling Enviromental, Social and Economical market demand
- CO2 reduction
- No waste chemicals – No VOC
- Easy to scale up from promotion to brand building
- Nano- & Microstructuring of different materials roll to roll

Inductrial production line ensure speed to market

1. Solar Cell Efficiency: Antireflective and powerful

- Iscent nanostructured embossing technology increase solar cell efficiency to the level 10%.
- Micro/nanopatterned film to be applied on top of solar panel.
- First production scale active films has been produced in 2023

2. Bioglitter for Cosmetics – termination of microplastics by biodegradable materials

Cosmetic global brands has to to replace microplastics

- **5 year intensive co-operation – quality acceptance 2023.**
- **Based on Iscent patent to apply optics directly on biomaterials**
- **Biodegradable glitter material to fulfill new EU-legislation**

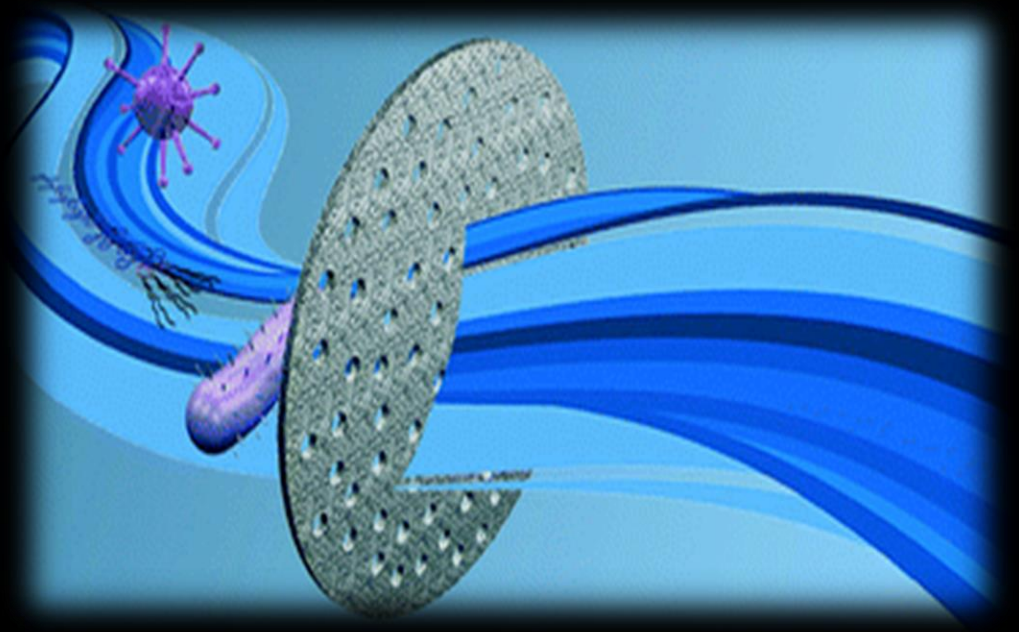
3. Brand protection

- Diffractive effects on paper
- Diffractive effects on biobased materials – Iscent IP
- Brand protection – fight against counterfeits
- Replacing plastics in packages with compostable and recyclable solutions – Iscent IP

4. Water purification

Our technology to improve water purification processes

- Nano-/ microdesign with our technology improves water purification capacity in water filter membranes
- Pilot manufacturing results from the field approved
- Full production scale trials passed Q1/2024
- Full production to start 2024



EUROSTARS PROJECT R2R MON: In-line Monitoring and Control of Roll-to-Roll Replication Processes

In this project, Danish metrology institute DFM is developing scatterometry based camera system that is able to calculate the dimensions of nano- and micro-patterns from the hyperspectral camera image. DFM has a long research in scatterometry systems. Danish company NILT is coordinating this project, producing shims (production tools for nano- and micropatterning) for testing the scatterometry system and making small scale laboratory testing. NILT has background in making nanoimprint silicon masters and stamps and now they want to expand to roll-to-roll shims. Iscent will make the R2R-testing of the scatterometry system and will coordinate the marketing efforts.

Criterias in evaluation

RANKING 1-6

Basic Assessment (project and consortium)	Market and Commercialisation	Innovation and R&D
• Quality of the consortium • Added value through co-operation • Realistic and clearly defined project management and planning • Reasonable cost structure	• Market size • Market access and risk • Competitive advantage • Clear and realistic commercialisation plans	• Degree of innovation • New applied knowledge • Level of technical challenge • Technical achievability and risk

Ranking position	13	out of 325 eligible applications
BASIC ASSESSMENT **Quality and efficiency of the implementation**	172	/200 - threshold set at 120 points (60 %)
MARKET and COMMERCIALIZATION **Impact**	161	
INNOVATION and R&D **Excellence**	160	
Total score	493	/600 - threshold set at 402 points (67 %)
Quality Result	Above threshold	

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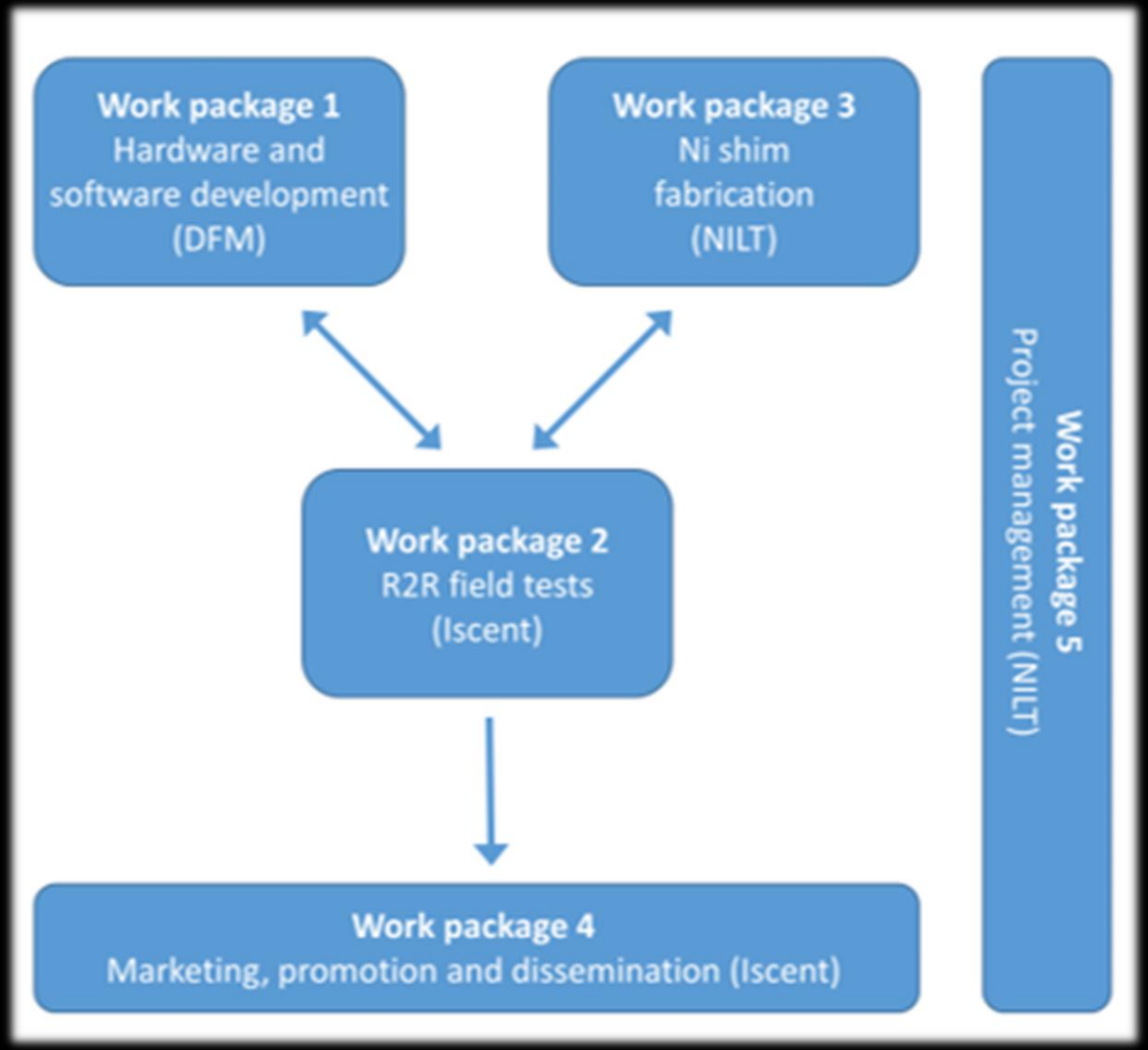
1. KERTA EI MENE MAALIIN..

Work Packages



Budget

Cost item	Year 2019	Year 2020	Year 2021	Total
Salary cost	5.000	47.000	47.000	99.000
Side cost	2.500	23.500	23.500	49.500
Overhead	750	7.050	7.050	14.850
Material purchases	2..000	14.000	14.000	30.000
Subcontracting	5.000	20.700	27.800	53.500
Travel	2.000	8.000	8.000	18.000
Total	17.250	120.550	127.350	264.850

Proceedings of the 2021 International Conference on Micro- and Nano-devices Enabled by R2R Manufacturing

Lab to Fab for R2R Thermal Nano- and Microimprinting

Raimo Korhonen1, Jaakko Raukola1, Petri Peltonen1
Iscent Oy, Ylöjärvi, Pirkanmaa, Finland

ABSTRACT

Iscent makes large scale R2R thermal nano- and microimprinting production and production lines. Iscent has developed a seamless path from Lab to Fab to help researchers and companies to scale up their ideas of functional surfaces based on nano- and micropatterns. The cornerstones of this path are Iscent's laboratory, pilot and production machines that make R2R thermal nano- and microimprinting. In-line measurements are important for successful production. In this paper, thermal measurements and nanopattern analysis by scatterometry camera system are described.

Keywords: R2R imprinting, R2R embossing, large scale R2R embossing

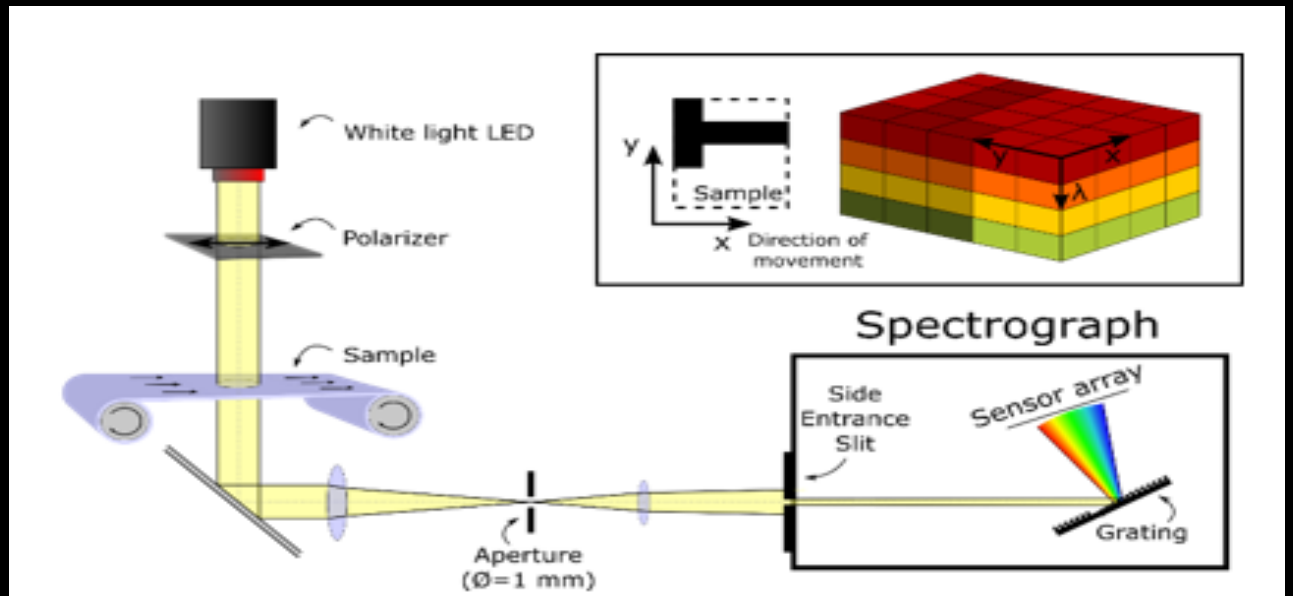
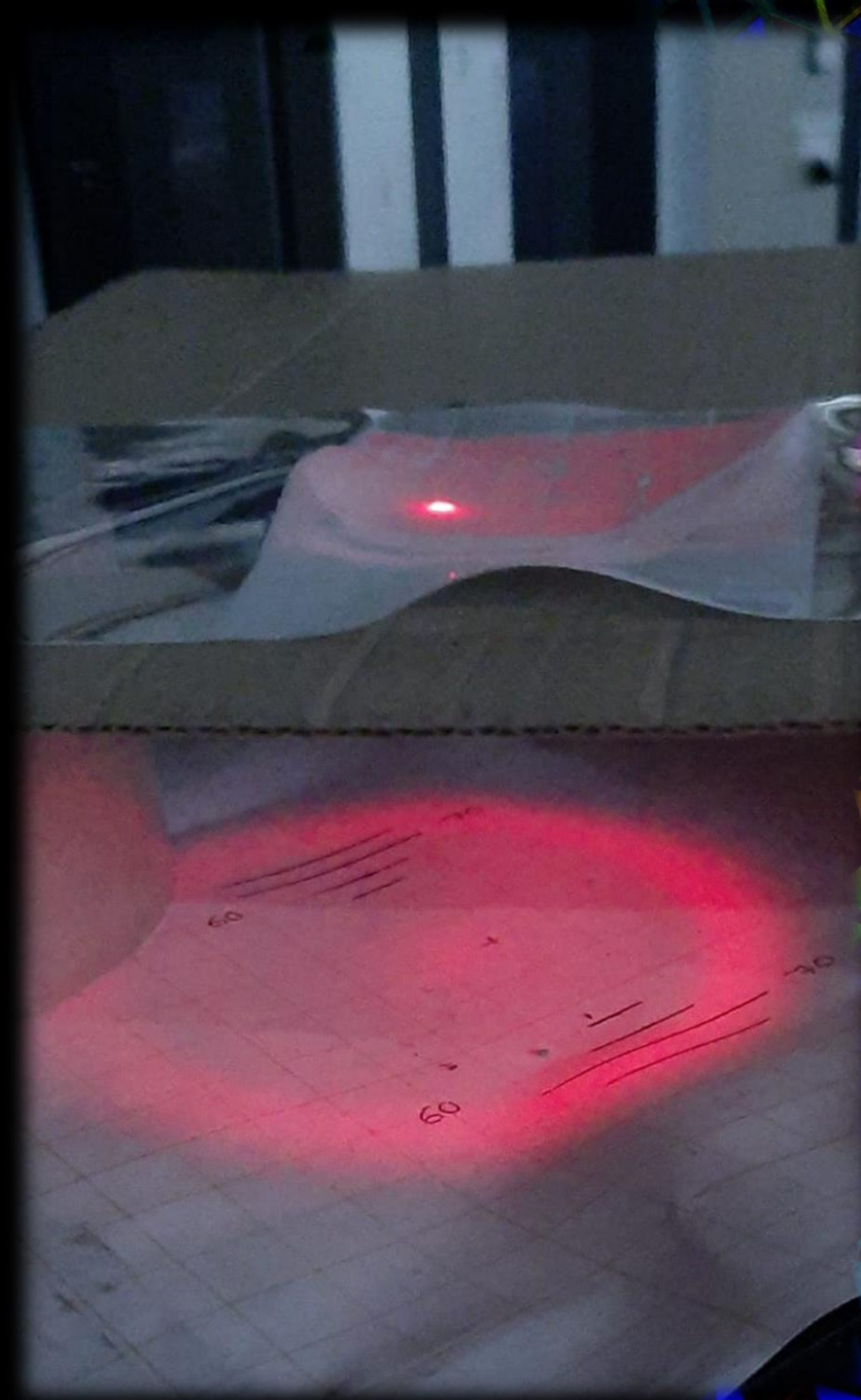


Figure 5: The measurement setup for scatterometry [1]

EUROSTARS PROJECT QUALSURF:

Quality monitoring system for roll-to-roll fabricated functional surfaces and multilayer structures

Employing a new, fast characterization method based on scattered light, we will develop a machine module that enables non-destructive, in-line optical characterization of electronic thin films and functional surfaces, employing a spectrally sensitive camera-based technique capable of real-time monitoring of product quality at several m/min. The module will be applied to organic photovoltaic panels with antireflective surface structures. This use case requires the ability to measure layer thicknesses, bulk optical and surface scattering properties, which will be demonstrated in the QualSurf project. After projects end, the module can be marketed to a broad range of applications employing roll-to-roll (R2R) fabrication.



Kokemukset Eurostars hankkeista:

1. Hakemus
2. Projektin käynnistäminen
3. Projektityö, kokoukset
4. Raportointi / väliraportit, loppuraportti
5. Kustannustilitykset, kirjanpito, tuntikirjaukset, tilintarkastajan lausunto
6. Hyöty
   - messukokemukset
   - julkaisunäkyvyys
   - verkostoituminen
   - taloudellinen avustus
   - teknologinen/kaupallinen edistyminen

iscent

Green efficiency by

OPTICAL FEATURES

NANOSTRUCTURES

MICROSTRUCTURES

FUNCTIONAL SURFACES

Dr. Jaakko Raukola
Founder / CEO
jaakko.raukola@iscent.fi