

NoE PolyNet – Network of Excellence for the Exploitation of Organic and Large Area Electronics

Lars Heinze (VDI/VDE-IT / Coordinator)

Munich, 04.12.2008

heinze@vdivde-it.de

 **PolyNet** VDI/VDE-IT (DE) / University of Liverpool (UK) / Linköping Universitet (SE) /
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Introduction to NoE PolyNet

- Participants & basic figures
- Aims & Targets
- Structure
- Platforms & Results


2007 - 2013
grant agreement
n° 214006

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Funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 214006.

- Max. EC Contribution: 3.3 Mio. EUR
- 17 partners from 10 European Countries
- Start: 01.01.2008
- Duration: 36 month

Logos of partner institutions: Cardiff University, University of Liverpool, VIT, imec, Linköping University, Fraunhofer, Paris Lodron, litem, Aristotle University of Thessaloniki, JOANNEUM RESEARCH, VDI|VDE|IT, cm, OPERA, PRODI, PolyMAP.

PolyNet within Europe: the Quadriga



- Start of three Coordination Actions and one NoE in the O&LAE area in 2008
 - OPERA
 - PRODI
 - PolyMap
 - PolyNet
- form together the “Quadriga”
- www.quadriga-org.eu => become associated member
- 1st Quadriga Newsletter was published at 27.11.2008



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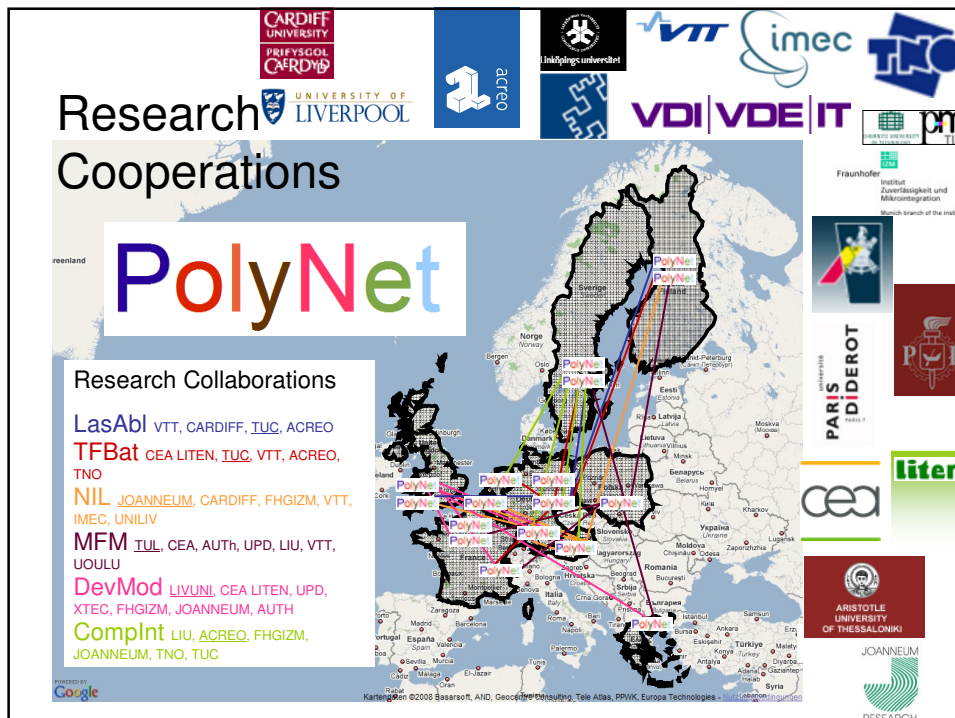
PolyNet Aims & Targets

Establish European world leadership in in the O&LAE area & Overcoming fragmentation of this specific research landscape.

Three core platforms:

- a research cooperation platform (Isak Engquist @ University Linköping / Sweden)
- a service platform (Markku Känsäkoski @ VTT / Finland)
- a knowledge platform (Isabelle Chartier @ CEA LITEN / France)

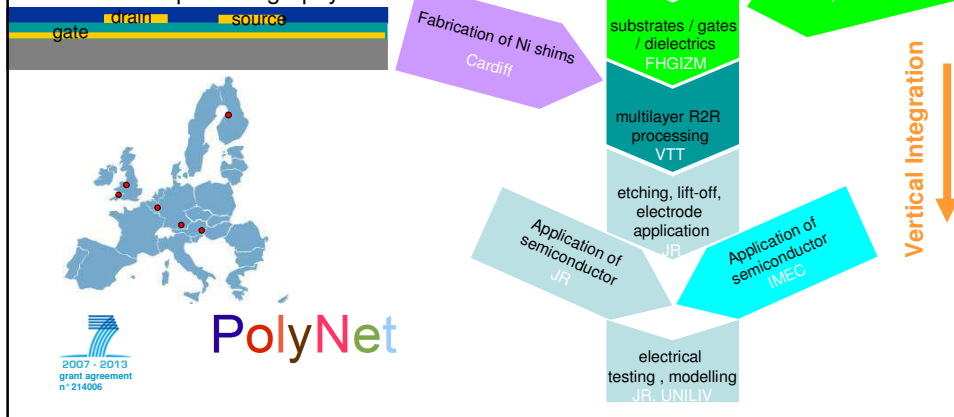
and the long-term integration of European research landscape [...].



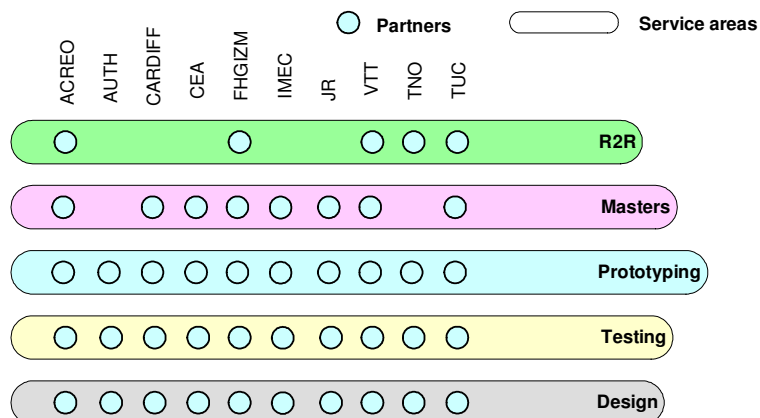
Collaboration 3: Nanoimprint Lithography

(JOANNEUM, CARDIFF, FHGIZM, VTT, IMEC, UNILIV)

- Large-Area High-Resolution Patterning for Organic Electronics on the basis of Hybrid R2R Nanoimprinting
- Goal: Sub μm OTFT with R2R Nanoimprintlithography



PolyNet – Horizontal Integration: Service Capabilities within PolyNet



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Knowledge – European Observatory for Organic Electronics (EOOE)

The Mission of the EOOE is to perform a continuous scientific and technological watch in Organic and Large Area Electronics:

- For rising weak signals:
 - Breakthroughs & Main achievements;
 - Emerging trends;
- Selected results: <http://www.vdivde-it.de/polynet/public/eooe-results>



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EOOE
A PolyNet project

Summary

Platform Output & Added Value

Research	Research Collaborations for vertical structuring of Research Competences
Service	PolyNet Service Center making fragmented OLAE Services available to European stakeholders
Knowledge	EOOE reports presenting a continuous scientific and technological watch in OLAE as a base for the structuring of the ERA in OLAE



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Thank You for Your Attention!

www.vdivde-it.de/polynet

www.quadriga-org.eu



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Presentation of WP3 Service Platform

Presentation by Markku
Känsäkoski



Objectives & Participants

- The goal of service platform is to establish an integrated service offering providing cost effective and easy access to qualified Organic and large area electronics design, modelling, simulation and engineering services, advanced manufacturing tools and methods, testing and characterisation of materials and devices through one single customer interface.
- Partners:
 - VTT Technical Research Centre of Finland – Finland (leader)
 - Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM -Germany (co-leader)
 - Joanneum Research mbH Forschungsgesellschaft – Austria (co-leader)
 - ACREO AB - Sweden
 - Aristotle University of Thessaloniki - Greece
 - Cardiff University – United Kingdom
 - CEA-LITEN - France
 - IMEC - Belgium
 - The Netherlands Organisation for Applied Scientific Research – The Netherlands
 - TU Chemnitz - Germany



Tasks

- **Exploration of Service needs**
 - Objective: is to collect the needs from industry (esp. SMEs) and identify service requirements from industry.
 - Goal is to publish a service catalogue based on the needs from industry and the offering of PolyNet
- **Development of service platform business model**
 - Objective: PolyNet is the catalyst to transfer and establish organic and large-area electronic systems into European industry
 - How? : Offers very specialized and customer oriented services on the market in a rapidly changing technological environment. Therefore a close cooperation and exchange of information between the partners is necessary for the solution of potential problems. Hence a central issue will be the establishment of trust between the partners.

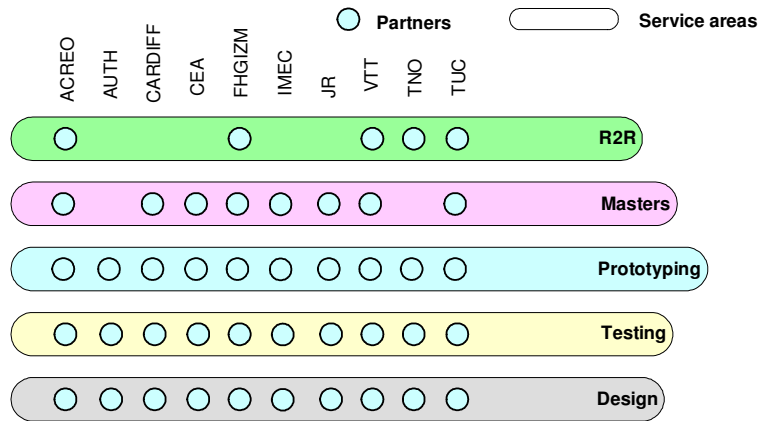
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Service capabilities within PolyNet

- Roll-to-roll printing & Pilot production lines
- Fabrication of masters, masks and tools
- Rapid prototyping (laboratory scale) and patterning
- Testing and characterisation of materials, components, circuits and devices
- Design, modelling and simulation of devices, components, circuits and systems

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Service capabilities within PolyNet



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Service capabilities, examples - Roll-to-roll printing & pilot production

- gravure, offset, rotary screen and flexo printing up to 300m/min on 450mm wide web
- reel-to-reel electronics manufacturing (lithography, thin film, etc.)
- ink jet pilot lines



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Service capabilities, examples - Fabrication of masters, masks and tools

- production of masks and printing plates
- ps laser ablation for mould inserts (MI) and hot embossing (HE) stamps manufacturing
- manufacturing of nanoimprint lithography (NIL) templates using FIB
- e-beam lithography for manufacturing of UV-NIL and HE stamps



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Service capabilities, examples - Rapid prototyping and patterning

- gravure, offset, flexo, ink jet and screen printers for lab scale printing
- lamination, dicing and sawing
- lithography, two photon 3-D lithography,
- chemical and dry etching, electroforming
- thin film and thick film coating
- hot embossing, micro injection moulding, nano imprinting

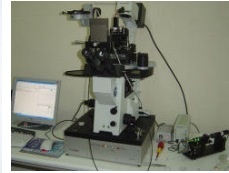


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Service capabilities, examples - Testing and characterisation of materials, components, circuits and devices

- electrical testing, optical testing, environmental testing
- printability testing
- material testing, surface characterisation
- device testing (e.g., OLED, OSCs)



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Service capabilities, examples - Design, modelling and simulation of devices, components, circuits and systems

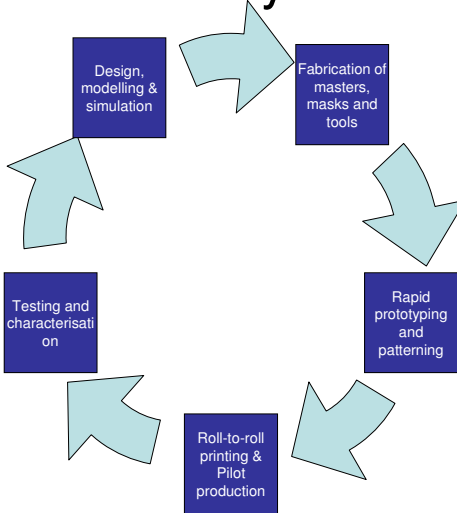
- CAD, CAM tools
- Circuit simulation and modelling
- simulation tools for polymerisation process, foil deformation and thin film growth

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PolyNet - Summary of services

- ☐ Quick query and referral service
 - provides rapid access to practical advice and information about sources of more in-depth expertise
- ☐ Technology/capability information and referral service
 - provides information about capabilities of manufacturing processes and equipment, manufacturing performance, process mapping and technology suppliers
- ☐ Technology implementation assistance
- ☐ Manufacturing services
- ☐ Testing and characterisation service
- ☐ Design, modelling, simulation and engineering services



R&D Expertise

- ☐ OLED
- ☐ OPV, OSC
- ☐ Battery
- ☐ passive components
- ☐ Diodes
- ☐ integrated circuits
- ☐ Sensors
- ☐ Antennas
- ☐ memory elements

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For further Information please contact:

Markku Käsäkoski / VTT

markku.kansakoski@vtt.de

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PolyNet OLAE R&D needs survey

Berlin 27.10.2008
Markku Käsäkoski



Business from technology

VTT TECHNICAL RESEARCH CENTRE OF FINLAND

Survey structure

- Background information
 - Contact details, company size and R&D efforts
- Involment in Organic and Large Area Electronics (OLAE)
 - Business field, activity in OLAE
- Status and future of OLAE
 - Opportunities, risks, strengths and weaknesses
- R&D service needs in OLAE
 - Training and R&D services needs, R&D services buying
- Detailed R&D service needs
 - Materials development, processing, design and modelling, testing
- Future aspects
 - Continuation after PolyNet

=> For more details please contact markku.kansakoski@vtt.fi



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Questions for Discussion

- Who & What is the Competition?
- Main European Business Potentials?
- What are the most important Obstacles for OLAE commercialisation in Europe today?
- What of kind of services are needed?



» Findings from Berlin (27.10.2008)



» Findings from Munich (04.12.2008)



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Who & What is the Competition? Main European Business Potentials?



- Classical Silicon Technology & the cost reduction in that field
- mainly Asia, partly USA
- Internal European Structures => fragmentation, desorganisation

- Broad range of application areas: Diagnostics and Sensors, OPV, Lighting
- European way: Enabling Systems which need basic technologies (Smart Systems, ...)
- Radically different applications compared to Silicon Technologies



- FhG: Other Technologies in General => Compete with available technologies
- Classical packaging industry competes to new hybrid integration technologies
- FhG: Hybrid integration supports the classical packaging towards the More-than-Moore
- Using European Material supplier base for new applications



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What are the most important Obstacles for OLAE commercialisation in Europe today?



- Lack Manufacturing sites and Expertises
- Lack of business cases and entrepreneurs



- High prototyping cost for SME



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What of kind of services are needed?



- Material-related services
- market overview, forecast & understanding
- Design kits for accessing technology
- small series and pilot production sites



- Prototyping services at reasonable costs



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