

PROSURF

Promotion and Support of SME Research and
Innovation in the Surface Finishing and Printed Circuit
Manufacturing Sectors

A Technology Roadmap for the Surface Finishing Sector

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Project Objectives

- PROSURF is a Co-ordination Action, which is taking place with the financial support of the European Community 6th Framework Programme.
- The primary objective is to support SME competitiveness in the medium and long term.
- PROSURF aims to assist SMEs and all other stakeholders in the surface finishing and printed circuit industries, by building the capability to innovate through greater involvement in Research and Development



Project Partners

Participant name	Country
C-Tech Innovation Ltd	United Kingdom
Deutsche Gesellschaft für Galvano und Oberflächentechnik e.V.	Germany
EIPC Services BV	Netherlands
RTC NORTH Ltd	United Kingdom
Syndicat National des Entreprises d'Applications de Revêtements et Traitments de Surfaces	France
International Project Management Plating and Materials	France



Main Project Outputs

- Analysis and benchmarking of the technological and business / market needs of the sectors
- Roadmaps defining future research strategies: two road maps providing recommendations for research strategies to SMEs in the printed circuit and surface finishing industries
- An enabling platform to establish collaborative research links: a database of research organisations and a mechanism for finding research partners
- A best practice methodology to enable SMEs to become involved in research and innovation



Reports available on website

- Current industrial technologies – limitations and future aims
- Economic intelligence on market trends and opportunities
- Review of new technologies and research
- Simplified life cycle analysis methodology
- Economic sustainability assessment using LCA
- Environmental legislation
- Separate Road Maps for Printed Circuit and Metal Finishing Sectors (summaries and full reports)
- Best Practice Methodology for SME involvement in research and innovation



Road Map Structure - Purpose

- **Purpose – Market Drivers**
- Increase competitiveness - global competition
- Added value products based on new technologies
- New surface finishes and effects
- Environmental issues & legislation
- Throughput limitations
- Limited flexibility
- Long established processes



Road Map Structure - Resources

- **Resources – Technological Innovations**
- *Emerging technologies*
 - Either at or near their first full scale operation, or which have perhaps achieved local or regional adoption but have yet to become pervasive in the European marketplace.
- *Strategic Research Directions*
 - Research topics are generally those which either remain to be demonstrated at or near commercial scale, or where the nature of the research undertaken is a particularly exploratory version of a generically familiar technology



Road Map Structure - Delivery

- **Delivery – Research Programmes**
- *EU Framework Programme 7 (FP7) Research*
 - Identification of most relevant funding programmes (e.g. Cooperation and Capacities)
 - Identification of most suitable project types (e.g. Collaborative Research, Research for the benefit of SMEs, Eurostars)
- *Other research funding routes and opportunities*
 - Member state national funding programmes
 - Private/Commercial R&D



Technology Road Map for Surface Finishing

SURFACE FINISHING INDUSTRY		Matrix Connecting Research Directions with Market Drivers				
Colour = Timescale for Industrial Impact (output from research work)					Number = expected type of industrial impact	
Short Term	1-3 Years	2008-2010				1 Niche application with small market
Medium Term	4 - 7 Years	2011-2014				2 Extension of existing market
Long Term	8 - 10 Years	2015 - 2017				3 New/improved products for a single generic market
					4 New/improved products for a range of generic markets	
		Market Drivers				
Research Directions	Anti-corrosion	Anti-wear	Friction	Aspect	Electrical Properties	Adhesion
Trivalent Cr	4			4	4	2
Electroless, Alloy nickel	2		2		2	
Ionic Liquid	2	2	2	2	2	2
PVD / CVD	4	4	4			
Heat Treatment	4	4	4			
Thermal Projection	4	4	4	4	4	
Duplex multilayer composite	4	4	4		4	
Laser loading		4	4			
Zn/Ni, Sn/Zn	4		4		4	
Weld methods					2	2
Metal filled ceramic		4	4			4
Stainless alloys					3	
Organic and powder coatings	4			4		
Inorganic coating ceramic		4	4		4	
Phosphating	3	3	3			3
Hydroxyapatite						2
Plastic surface treatment				4	4	4
Nanotechnology	1	1	1			1
Surface finishing	4	4	4	4	4	4
Dissolution methods				2	4	
Deposition methods	4	4	4	4	4	4
High energy and reactive beam	4	4	4	4	4	4
Switchable layers					4	
Self healing layers	4				4	
Easy to clean						4
Catalytic action					4	4
Main Customer Sectors						
Automotive	✓	✓	✓	✓	✓	✓
Aeronautics	✓	✓	✓		✓	✓
Electronics	✓			✓	✓	✓
Construction	✓			✓	✓	✓
General mechanics	✓	✓	✓		✓	✓
Plastics				✓	✓	✓



Market Drivers

- The main market drivers for the Surface Finishing sector were defined in terms of generic applications:
 - Anti-corrosion
 - Anti-wear
 - Friction
 - Aspect
 - Electrical Properties
 - Adhesion.



Market Sectors

- All the generic applications represent major markets across the main industry sectors that are customers of the SME manufacturing companies in surface finishing:
 - Automotive
 - Aeronautics
 - Electronics
 - Construction
 - General Mechanics
 - Plastics



Current and Short Term Topics

- Replacement of CrVI - Chromium plating
- Electroless autocatalytic metal coatings
- Replacement of Cd - Zn/Sn and Zn/Ni
- Aluminium coatings
- Thermal projection: technical coatings against wear: Plasmas, HVOF (high velocity oxygen fuel), Cold spray, Laser, PVD and CVD



Medium to Long Term - Nanotechnology

- Nanotechnology
 - Nanoporosity
 - Deposition methods
 - Nanoparticles
 - Thin films
 - Dissolution methods
 - Patterning and structuring of surfaces
 - Annealing



Medium to Long Term Topics – Other Examples

- Ionic Liquids
- Switchable Layers and Surfaces
- Self Healing Layers
- Easy-to-clean Surfaces
- Composite Materials with Complex Morphology
- Fast Degradation and Corrosion Test Methods
- Modelling and Simulation



Short Term Research Funding

- The timescales necessary for EU-funded Framework Programme 7 Research are too long to have a significant impact in the short term. National initiatives, particularly those directed towards SME interests, are likely to be the most relevant research funding programmes.
- UK research programmes
 - Grant for R&D
 - TSB Collaborative Research
 - Carbon Trust Industrial Research
- The new Eurostars programme is specifically designed for SME needs. It will be market driven and should result in high impact outputs. Most European countries (a total of 27) are taking part in the programme, the main exception being the UK - considering joining the programme in the near future.



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Medium and Long Term Research Funding

- The EU (FP7) research areas are relevant to the medium and long term. The programmes of greatest relevance are:
- Capacities Programme (medium term)
 - Research for SMEs and SME associations
 - Innovation programme
- Cooperation programme (long term)
 - **Nanotechnologies, Materials, New Production Technologies (NMP)**
 - **Other relevant themes:** Environment; Energy; Security; Transport including aeronautics;



Summary

- Register with the PROSURF website www.prosurf-online.eu
- Project output documents are freely available, e.g. roadmaps for Surface Finishing and for PCB Manufacture
- Register your organisation research interests
- Complete an Expression of Interest to search for partners with any ideas for research topics
- Assistance in identifying research funding opportunities
- Involvement in refining and updating roadmaps

