



## **PROSURF - Publishable Executive Summary**

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

PROSURF is a Co-ordination Action, which is taking place with the financial support of the European Community 6<sup>th</sup> Framework Programme, as part of area 1.2.6 “Stepping up economic and technological intelligence”. The project commenced on 1<sup>st</sup> September, 2005 and is due to run for 36 months. This summary describes the current status of the project at the end of the first year (31<sup>st</sup> August, 2006).

#### *Project Main Objectives*

The project is focussed on the development and implementation of a research and innovation strategy for Small and Medium Enterprises (SME) and their Groupings in two SME-intensive industry sectors: Surface Finishing and Printed Circuit Board (PCB) manufacturing. The two sectors are closely aligned with respect to the generic technological innovations that are required to meet future challenges, with similar market, environmental, legislative and societal issues to be addressed.

With the objective of increasing involvement in framework programme research, particularly emerging and future European RTD activities and programmes, the central project aims are:

- Analysis and benchmarking of sectoral technological and business/market needs.
- Integration of SME sectoral research needs through exchange and dissemination of information and networking.
- Facilitation of SME innovation in target sectors by establishing best practice

The project will build both the capacity and capability of SMEs to innovate through greater involvement in research. The aims are to strengthen SME competitiveness in both the medium and longer term, through increasing knowledge and awareness of high-tech methods in these traditional industries. A central aim is the development of new sustainable technologies with the capacity to transform these sectors, which requires co-ordination at an EU level to enable relevant research of the highest quality to be delivered.

“Surface finishing” refers to any process that modifies the surface of a material or any process that applies a coating to the surface of a material to confer new properties. Typical processes include the preparation of metal coatings on various substrates by chemical and physical techniques, metal etching, anodising, etc. Most aspects of the technology area are long established and include very large markets such as aerospace, automotive, household and construction.

“Printed circuit board manufacturing” refers to the production of circuit boards for electronic equipment. Metal finishing processes are also in widespread use in the electronics/printed circuit board manufacturing sector.

*Results Achieved to Date (Month 12 – August 2006)*

A report on “Assessment of existing environmental legislation impact and expected future trends” provides information relevant to both SME industry sectors.

In metal finishing, the IPPC directive is dealt with in terms of societal considerations for its adoption, its purpose and best available techniques (BATs) for defining limiting emission values. Other relevant legislation considered: the VOC directive fixes limiting values for emissions for volatile organic compounds; the water directive “imposes” on the surface treatment industry a control of 33 substances in the incoming and outgoing water; the waste directive indicates the way to eliminate wastes, depending on their characteristics and toxicity.

The new RoHS legislation in conjunction with the End of Life requirements is challenging the industry to look for new solutions to maintain reliability in the fabrication processes. For the electronics industry the ban on lead as well as the move to halogen free material is impacting the fabrication plating and pre-plate cleaning processes as well as the laminate material and resin systems that are used as dielectric materials in printed circuit board (PCB) fabrication.

A new Life Cycle Analysis (LCA) methodological approach has been generated, which still operates within the overall framework of the ISO14040 standard. This has been achieved by applying suitable constraints to the scope of the study and focusing on key environmental performance indicators for the surface finishing and printed circuit manufacture sectors. Thus the LCA methodology is specific enough to prove useful for SMEs in the targeted industry sectors, whilst being broad enough to allow for new and improved technologies to be incorporated.

A technological intelligence document has been prepared to provide a comprehensive review and analysis of emerging technologies and research relevant to the target sectors of Surface/Metal Finishing and Printed Circuit Board (PCB) manufacturing. The information will provide a basis for the identification of innovations most likely to significantly impact and improve SME competitiveness.

An extensive assessment of emerging technologies was included in both SME sectors. In addition, research activities in both sectors were reviewed. In metal finishing research activities included: nanotechnology; ionic liquids; high energy and reactive beams; electroless coating; modulated current techniques; process throughput and efficiency improvements; substitutes for hexavalent chromium in passivation; surface engineering; smart surfaces. In printed circuits research activities included: embedded passives; digital manufacturing; optical interconnects; metallization; microwave technology.

Sources consulted include public domain databases, patent literature, manufacturing companies and end-user companies.

The results will provide an important input to the development of a technology roadmap during year 2 of the project.

*Expected Achievements/Impact*

The co-ordination actions aim to advance the state of the art in this area with well-defined and quantified objectives:

- Detailed assessment of current industrial technologies, their limitations and future aims for technological developments
- Specific economic intelligence analysing market trends, opportunities and societal factors
- Technological intelligence with relevant details of emerging technologies and research
- Road map defining future research strategy and addressing SME needs in the surface finishing and PCB sectors
- Formulation and dissemination of a best practice strategy to improve the level and extent of SME involvement in innovative research

The important impact of these co-ordination actions will take time to be achieved. The initial impact will be the readiness of the sectors to achieve optimum research funding during the forthcoming European Union Framework Programme 7. The number and quality of research results and the impact of research innovations on SME competitiveness will only be realised in the medium to longer term.

The development and introduction of innovative technologies is essential to the future competitiveness of the Surface Finishing and Printed Circuit Board manufacturing sectors. However, there are many barriers to the engagement of SMEs in the two sectors with European Framework RTD research, as a major vehicle for enhancing innovation.

The introduction of new technologies into industry by SMEs is frequently limited by dissemination in the requisite fields. A dissemination policy for the results of the project will be actively pursued to enable such barriers to be overcome. Because the number of SMEs in the two target sectors is very large and dispersed throughout the EU, the most effective mechanism of engagement is via national associations of companies of the sectors of interest.

The objective of the dissemination and exploitation plan is to define a set of instruments, tools and mechanisms for effective promotion of the project, its objectives and its results, in conjunction with an effective and coherent strategy for using these instruments.

A public website for the project is under construction and will be live in the near future. It is intended to be an important dissemination tool of the project. It will be regularly updated and will host all public information about the project and dissemination of project results.

*List of participants*

<b>Participant name</b>	<b>Country</b>
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
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