SEVENTH FRAMEWORK PROGRAMME THEME 3
Information and Communication Technologies (ICT)
ICT-2009.3.3 – Flexible, organic and large area electronics

# POLARIC

Printable, organic and large-area realisation of integrated circuits

# Deliverable D8.6

## Interim management report

### PUBLIC PART

**Responsible beneficiary:** VTT
**Nature of deliverable[1]:** R
**Dissemination level[2]:** PU
**Author:** Kimmo Solehmainen (VTT)
**Date:** 2012/09/24
**Version:** 1.0
**Status:** Final version approved by the Steering Group

[1] R = Report P = Prototype D = Demonstrator O = Other

[2] PU = Public, PP = Restricted to other programme participants (including the Commission Services), RE = Restricted to a group specified by the consortium (including the Commission Services), CO = Confidential, only for members of the consortium (including the Commission Services)

## Draft revision history (before the Consortium approval)

| Version | Date | Author | Summary of main changes and/or status of the version |
|---|---|---|---|
| 0.1 | 04.09.2012 | Kimmo Solehmainen | Draft ready for the Consortium approval |

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## Consortium approval by the Steering Group (before the submission to the Commission)

| Contributor | Meeting date | Meeting place | Remarks |
|---|---|---|---|
| Steering Group | 24.09.2012 | E-mail decision | Approved |

## Brief description of the purpose and content of the deliverable

The objective of the project is to realise high-performance organic electronic circuits using large-area processing compatible fabrication methods. The high performance of the organic circuits referred to here means high speed (kHz-MHz range), low operating voltage (below 5 V), low power consumption, and low parasitic capacitance. The OTFT fabrication development will be focused to enable a high resolution nanoimprinting lithography (NIL) step, which is compatible with R2R processing environment. Applying NIL will enable smaller transistor channel lengths (below 1 µm) and thereby an increase in the performance of the device. Another important concept to improve the performance is the self-aligned fabrication principle, in which the critical patterns of the different layers are automatically aligned in respect to each other during the transistor fabrication. This decreases the parasitic capacitances and thereby increases the operating frequency, decreases the gate leakage currents, and is one of the key elements to enable the use of large-area fabrication techniques such as printing.

Also complementary transistor technology will be developed, enabled by availability of both n- and p-type organic semiconducting materials. The high performance organic transistors will be tested in basic electronic building blocks such as inverters and ring oscillators. The technology development will be exploited in the active matrix liquid crystal display (AMLCD) and radio-frequency identification (RFID) demonstrators. In addition to showing that sufficient performance can be reached without sacrificing the mass fabrication approach, solutions for the fabrication of roll-to-roll tools in order to make serial replication viable will be provided. Finally, the circuit design, modelling, and characterisation of organic electronics will be developed to support the fabrication technology development in the project.

The purpose of this interim report is to describe the progress of the project during the period January-July 2012. The report describes the overall progress towards the objectives in the technical work, and more detailed overview of the progress in each work package. Also, dissemination and management activities, and the exploitation plans are described.

Despite skilful problem solving, active collaboration, and heavy work shown by the consortium, the project had descended heavily out of the original schedule during the first two project years. The delays in meeting the milestones and deliverables was caused by technological challenges inherent to the complex and difficult technology studied in the project. It had thus become clear that more realistic targets for the devices, circuits, and demonstrators should be defined. The definition of new technical targets took place during the winter 2011-2012.

The main objective for the first half of year 2012 was to agree with the Commission about the new targets, reorganise the activities according to the new plan and start productively implement it. One of the most important technical targets during the period was the realisation of the first demonstrator, a backplane for a flexible LCD. The completion of this demonstrator was reported to the Commission during May 2012.