PRIAM
Printable functionalities for truly autonomous, intelligent lighting and signalling systems

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Duration 36 months

Progetto di ricerca: PRIAM

PRINTABLE FUNCTIONALITIES FOR TRULY AUTONOMUS, INTELLIGENT LIGHTING

AND SIGNALLING SYSTEMS

ICT – Information and Communication Technologies

SEVENTH FRAMEWORK PROGRAMME

OBIETTIVI E COERENZA CON IL BANDO

•The general goal of PRIAM is associated to **emerging printed electronics and converging technologies of production such as Roll-to-roll. Particularly the goal is to address such needs as:**

•Low cost disposable electronics (printed organic sensors, smart packaging, batteries and RFID tags)

•Large area low cost electronics (signage displays, printed photovoltaic panels, smart shelving, smart textiles, printed memories)

•Flexible opto-electronics (foldable, rollable displays, e-papers, e-books)

PRIAM

Printable functionalities for truly autonomous, intelligent lighting and signalling systems

OBJECTIVE 1

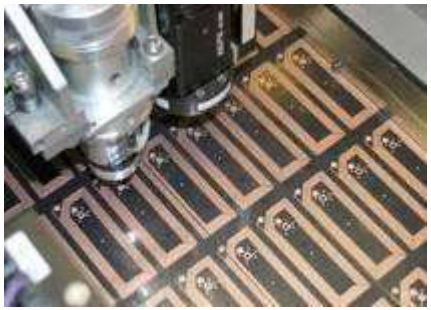
Autonomous integrated systems

- •Light-emitting autonomous road signs
- •Autonomous car signals and taillights

OBJECTIVE 2

Converging R2R approaches for a proof-of-concept






IL CONSORZIO

1(coordinator) **CRF** **IND**

Project coordination. Ink-jet and screen printing processes. Final assessment of devices demonstrators.

Exploitation into other area of transportation (Magneti Marelli, FGA, IVECO, CNH) of the developed lighting modules.

2 **CEA** **RES**

Lamination for flexible batteries. Encapsulation**. Improvement of lamination approach within converging technologies**.

3 **VTT** **RES**

Roll-to-roll line. Substrates investigation and analysis. Packaging. **Proof-of-concept production line** and upgrading of existing production line

4 **microTEC** **SME**

Process development for polymer microstructuring (RMPD® and 3D-CSP) technologies. **Supply of packaging and assembly product solutions**. **Business and demonstrator development** with expertise in integration using heterogeneous technologies

5 **CRP** **IND**

Production line for COB, COF, COG matrices. Attaching of rigid components onto plastic foils. Cooperation with the taillight division of Automotive Lighting for the automotive application. Final assessment of devices demonstrators. **LED systems (taillight) pre-productions**.

6 **AXMC** **SME**

Ink-jet processes and materials. Development of inks for metal bonding and electrical circuitry printing.

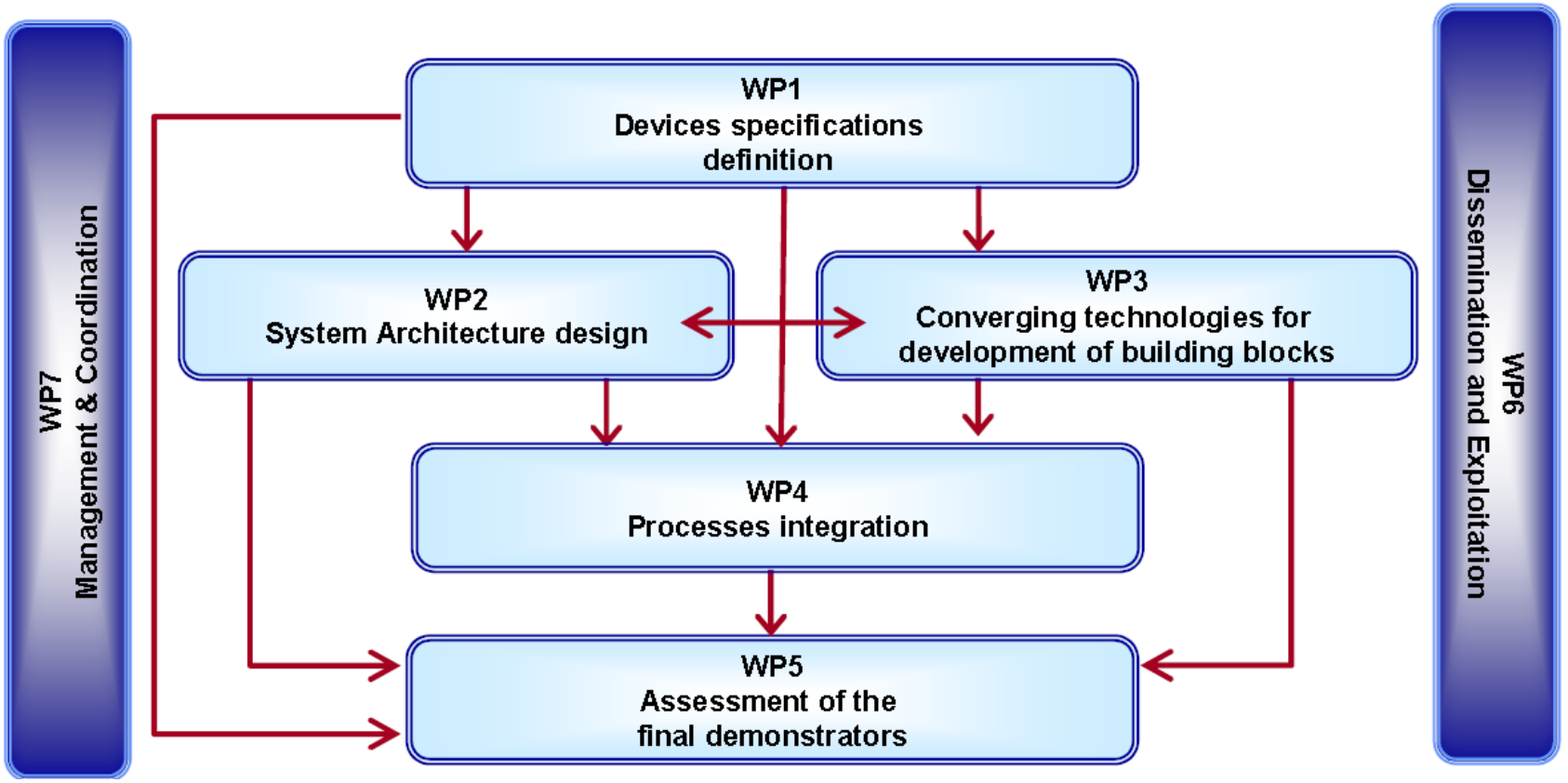
Improvement of ink-jet printing within converging technologies

7 **SOLARI** **SME**

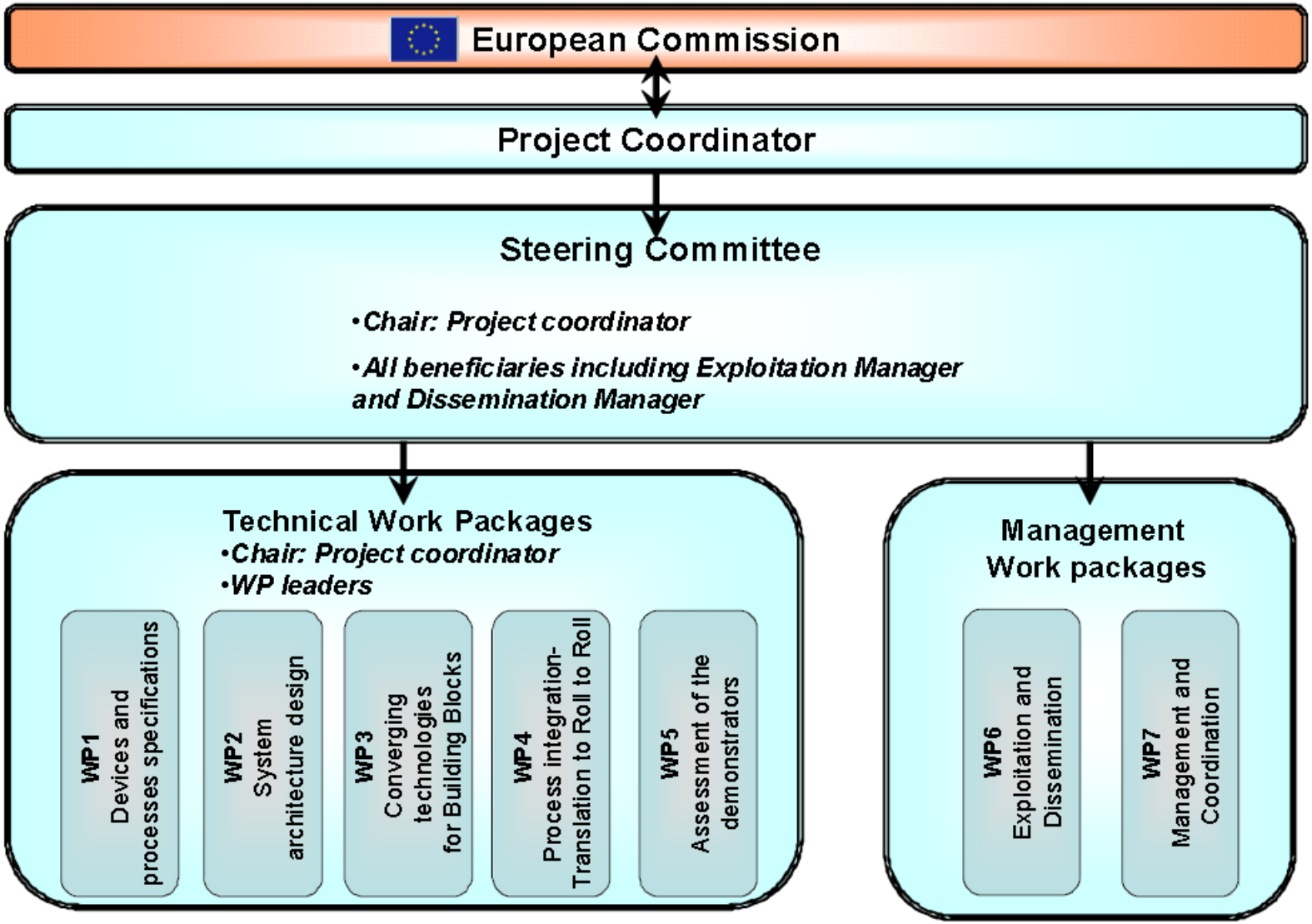
End-user. Marketing and commercialization. Final assessment of road sign devices. Installation of the demonstrators.

Road-sign and info panel production plans.

LA STRUTTURA DEL PROGETTO

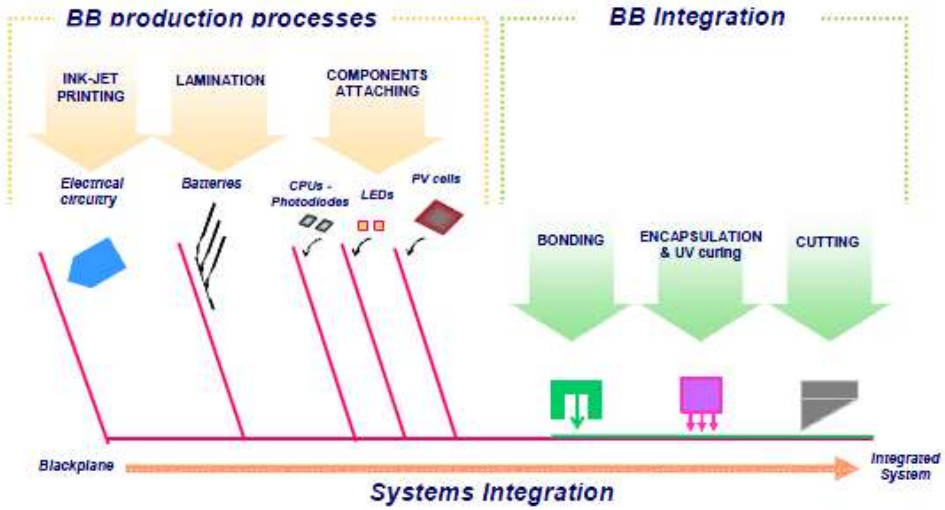


ORGANIZZAZIONE TECNiCA DEL PROGETTO



Objectives

- the design of advanced BBs to prepare high efficient and low-cost assembly stage the adaptation of all processes such printing (ink-jet and alternatively screen), lamination, attaching processes for BBs fabrication.
- the development of the methodologies for process integration between sub-assemblies (sub-assemblies on the foil will be developed with tight co-operation within previous WPs) and backplane.
- the proposal of an homogeneous process based foil lamination/interconnection to fulfil the future
- device requirements and open new applications

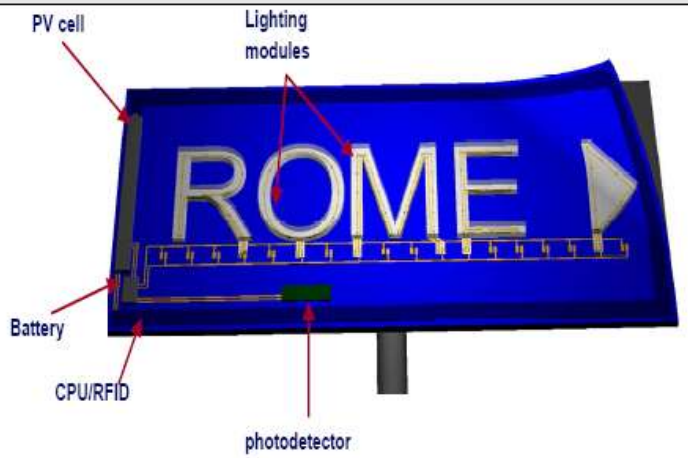


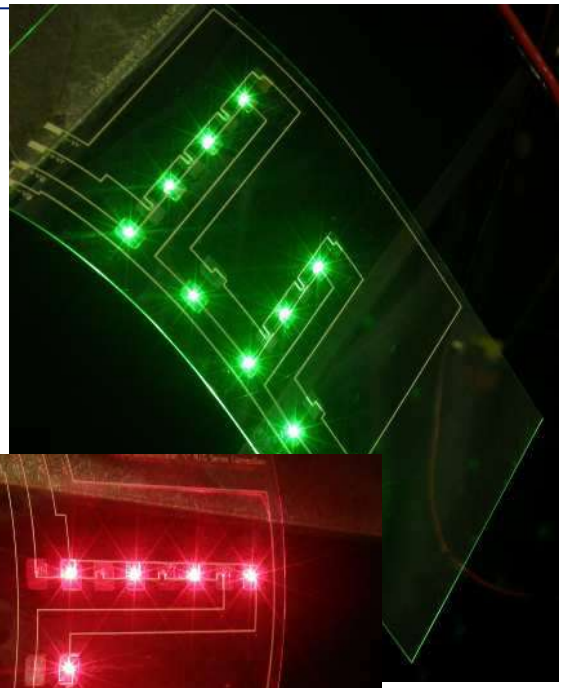
DIMOSTRATORI

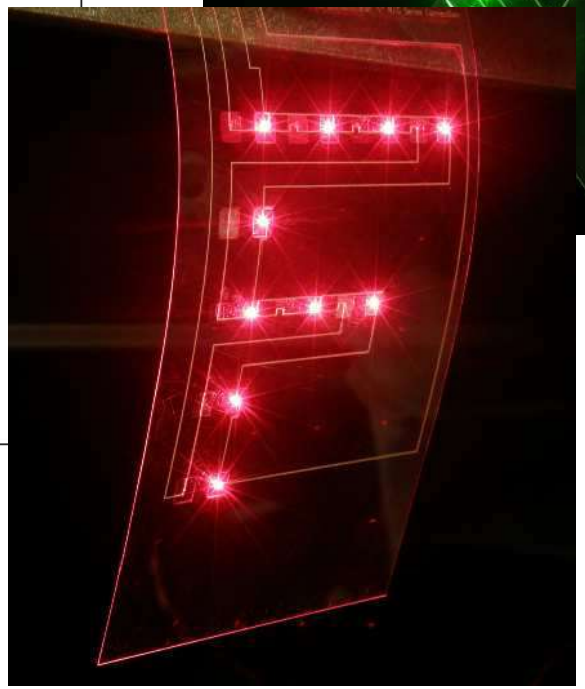
A. Light-emitting autonomous road signs

Signalling

Flexible multifunctional road-signs or signboards including light emitting alfa-numeric letters, batteries, RF, PV cell, photodiode and CPUs

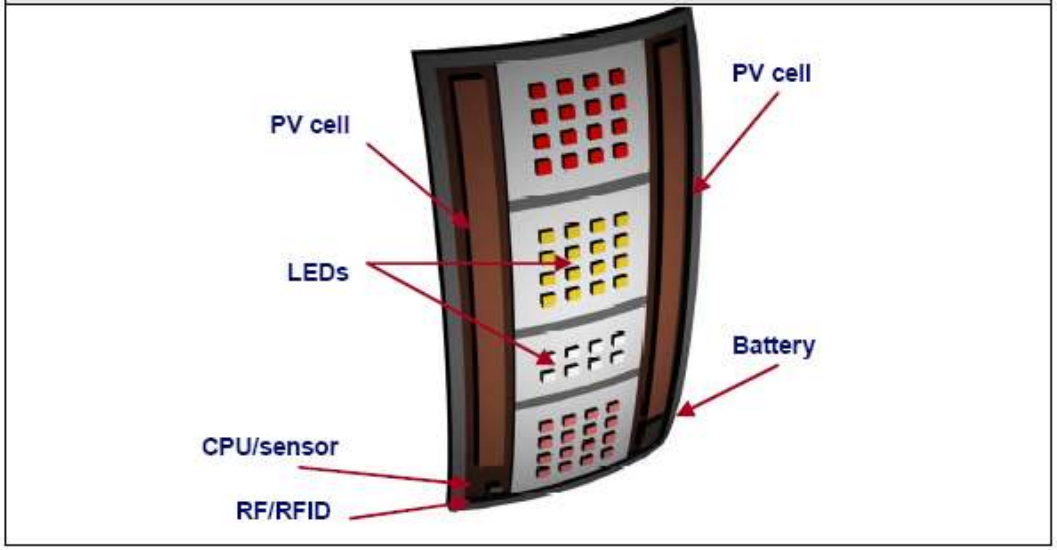




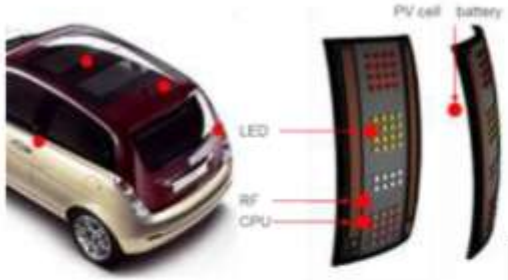


B. Autonomous car signals and tail lights

Lighting
Conformable lighting module for general lighting or taillight (automotive) including LEDs, photovoltaic



DIMOSTRATORI



- ✓ Reduced plastic consumption
- ✓ Reduced volume
- ✓ Increased power safety
- ✓ Improved intelligence and communication
- ✓ Validation of integration of several functionalities on single device for automotive applications

TRASFERIMENTO TECNOLOGICO

3 main BBs were identified: electronics, lighting, energy scavenging

Electronics	Lighting	Energy scavenging
Whole system on single face **Substrates:** PI for electronics sheet **Photodiode sensor:** SMD solution to allocate in front of device **Distance sensor:** no-SMD solution, flex connections to allocate the sensor in proper site **Antenna RF:** rigid solution in reduced size (NORDIC transceiver or MICREL receiver) **m-controller:** SMD solution **Driver for LEDs:** SMD solution **Processes**: printing for wiring; standard soldering or adhesive dispensing for components attachment	**Whole system** on single face **Substrates:** PET-PC sheets **Chip dies:** selected top-top LED (naked die) **Driver for LEDs**: SMD solution **Optics:** Suitable foils directly on dies (to improve contrast a black shield with holes in correspondence of each LED for info panels) + metal layer on the back **Processes**: printing for wiring; FlipChip, RMPD® for die attaching	**Whole system** on single face **Substrates:** PET-PC sheets **Battery cells:** Li-ions solution **PV Cells:** amorphous solution (flexible) or mono-polycrystalline solution (semirigid) **Charging module:** depending on battery stack; PV cells; **Processes**: standard manufacturing approaches for battery; standard soldering or adhesive dispensing for components attachment

PRINCIPALI RISULTATI

- RISULTATI TECNICI
- TRASFERIMENTO TECNOLOGICO
- CREAZIONE RETE DI IMPRESE E CENTRI DI RICERCA INTERNZIONALE
- FORMAZIONE DEL PERSONALE DI R&D KN UN CONTESTO INTERNAZIONALE

OULU in Febbraio