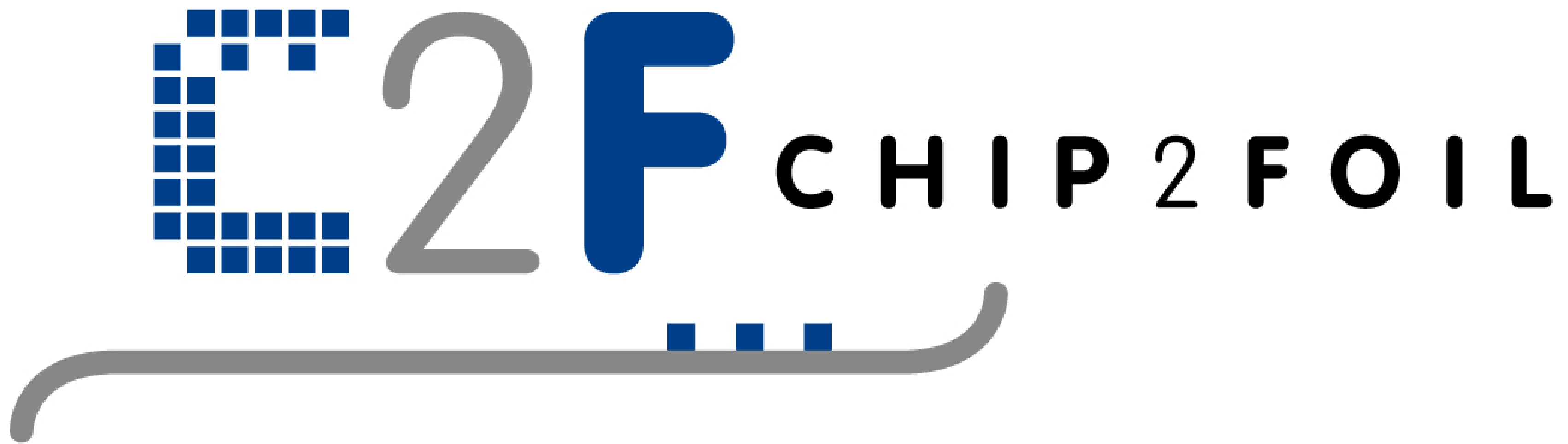

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OLAE Cluster Concertation Meeting
Brussels, June 14-15, 2010

Chip2Foil in a nutshell

- Chip2Foil main aim: *to develop a technology platform for high speed, low cost placement and interconnection of ultra thin chips on thin polymer foils*

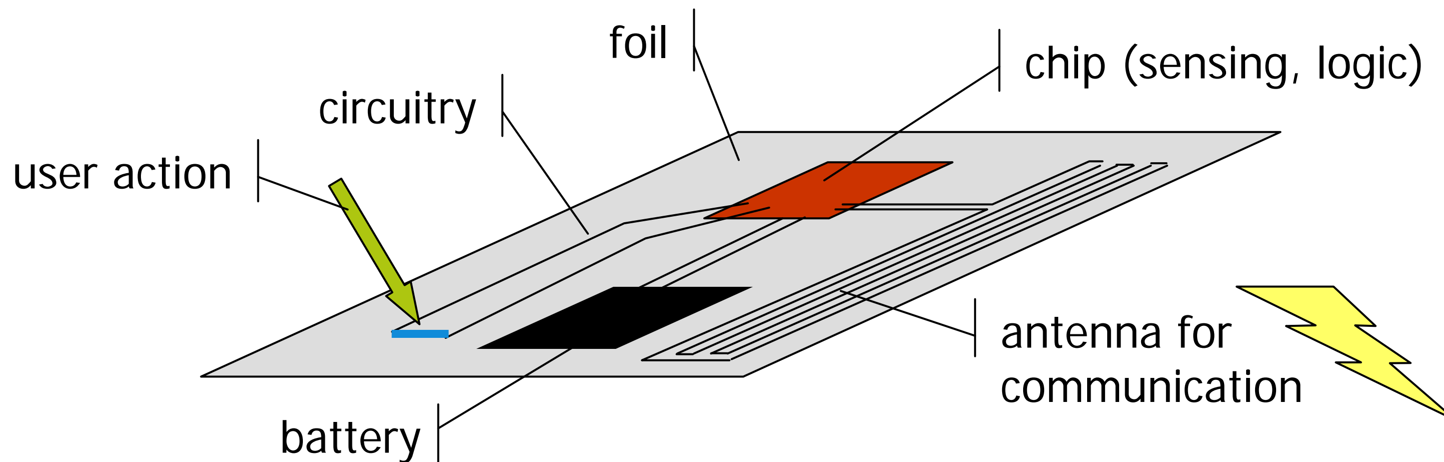
- EU FP7 STREP
- Call ICT-2009.3.3 – Flexible, organic and large area electronics
- Started Jan 1, 2010; duration 3 years
- ~M€4.7 project size, ~M€2.9 EU contribution
- 7 partners: TU Delft (NL), Holst Centre (NL), IMEC (B), DSM (NL), Orbotech (ISR), Datacon (A), Plastic Electronic (A)

Communicative foil-based packages

Smart Blister

Food labels

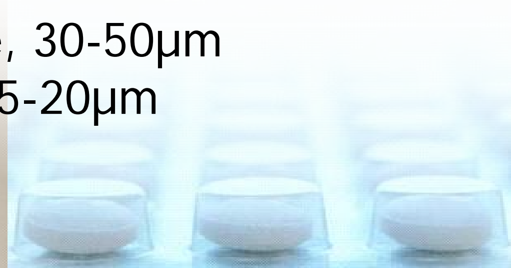
Functions communicative foils



- Focus of Chip2Foil: ultra thin chip integration
- Total process flow: from processed wafer to bonded and interconnected chip
- Demonstrate process flow by realising SmartBlister device

Demands

Flexible package
- Foil-based thin package, 30-50μm
- Ultra thin chip (UTC), 15-20μm



Low cost
- Single foil
- PEN or PET
- Single chip, $1x1mm^2$

Advanced RFID chips
- 20-40IO
- Clock function

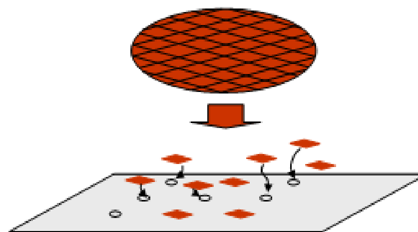
High volume
- Billions of packages/yr, 10-50 chips/s
- Reel-to-reel compatible

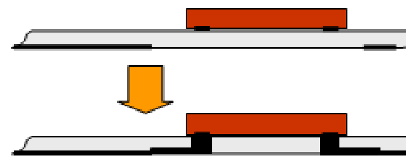
Process progress

A

B
Self-assembly

C
Adaptive circuitry





- **Self-assembly:** high throughput and low cost, moderate precision
- **Adaptive circuitry:** flexible low-cost interconnection

Chip-placement

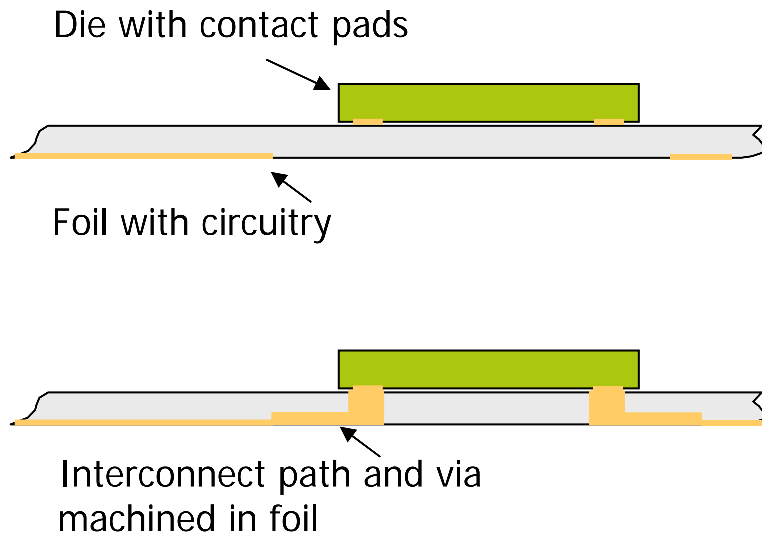
- Chip release and presentation – *speed up for ultra thin chips*
- Self-assembly – *high throughput, low cost, moderate accuracy*
- Mechanical bonding – *underfill, overcoat*

Self-assembly = autonomous assembly
Physical principle to be selected

Magnetisable material on chip
Trapping range ~1-2 chip size
Alignment precision ~40-60μm (x,y)
Speed: less than 0.5 second/chip

Adaptive circuitry

- Various techniques for interconnect writing will be explored
- Laser-based machining



Status

- Device specifications finished (June 2010)
- Technological options identified for all processes
  - Chip release and presentation
  - Self-assembly
  - Mechanical bonding
  - Electrical interconnection
- Research on individual technologies started

- Selection of feasible combination of technology options expected Dec 2010-June 2011

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