

# Communication Materials

## Website

<http://www.fp7-pics.eu>

## Contacts

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## About PICS project

The PICS project received funding from the European Union's Seventh Framework Program managed by REA-Research Executive Agency (FP7/2007-2013) under grant agreement n° FP7-SME-2013-2-606149.

The PICS project lasted for two years (from 2013 to 2015) and the consortium consisted of three SMEs: IPDiA (France, coordinator), Picosun (Finland) and Sentech Instruments (Germany), and two leading research organizations: Fraunhofer IPMS-CNT (Germany) and CEA-Leti (France). Project objectives was to develop innovative dielectric materials deposited by atomic layer deposition (ALD) and related tools (ALD batch tool and etching tool) in order to bring to mass production a new technology of high density and high voltage 3D silicon trench capacitors.

Two new dielectric stacks were developed and integrated into the IPDiA 3D silicon trench capacitors by IPDiA, CEA-Leti and Fraunhofer IPMS-CNT. The initial specifications were fulfilled and proven by electrical measurements. A new record on capacitance density ( $>500\text{nF/mm}^2$  at 3.3V) and an extended operation voltage (10V with  $150\text{nF/mm}^2$ ) were obtained, which expands IPDiA's ability to meet current market requirements particularly in the field of medical or aeronautics. Qualification procedure was initiated during the project by launching preliminary reliability studies and it will continue in the coming months.

During the project, the manufacturability of this new technology and its financial viability were ensured by developing adequate industrial tools targeting mass production.

A novel ALD batch tool was developed by Picosun and Fraunhofer IPMS-CNT. It enables to reduce cost-of-ownership and deliver better uniformity and step coverage for high-K dielectrics into 3D structures. With its demonstrated, optimized and production-proven ALD processes, Picosun is



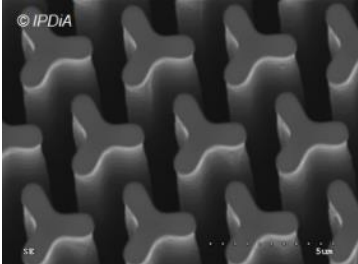
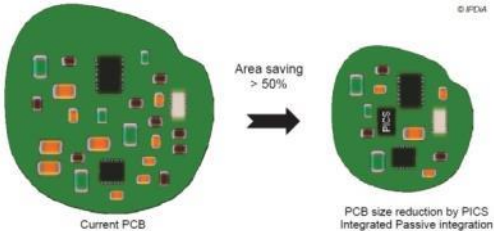
solidifying its position as a technological leader in the IC, Semiconductor, MEMS markets, from R&D to production systems.

A new process for accurately etching high-K dielectrics, which are very specific materials, was demonstrated by SENTECH with the help of Fraunhofer IPMS-CNT. As a result, SENTECH has the potential to gain market share in the field of high-k materials, which have high interest for different applications, e.g. LED, MEMS, magnetic data storage.

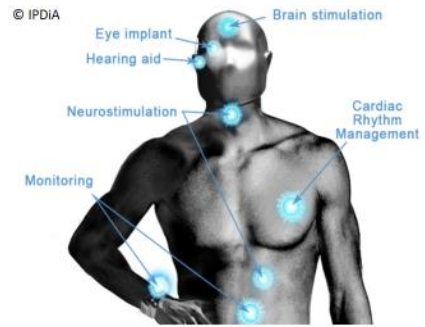
- Duration of the project: 24 months, starting 01/09/2013
- Call (part) identifier: FP7-SME-2013
- Project number: 606149
- <http://www.fp7-pics.eu>

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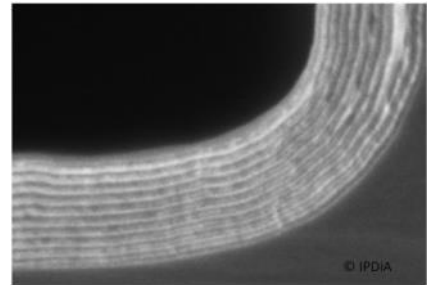
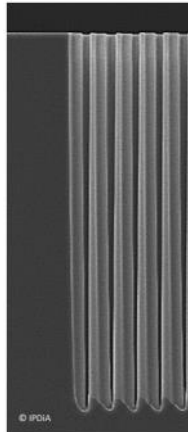
The following images are free of use to communicate around the project. High resolution images are available on request ([christophe.billard@cea.fr](mailto:christophe.billard@cea.fr)).

<p>PICS project logo</p>	
<p>Legend : Prototype of medical pills integrating temperature sensor and RF transceiver Owner : IPDiA</p>	
<p>Legend : 3D trench capacitors integrated into Silicon Owner : IPDiA</p>	
<p>Legend : PCB size reduction of a pacemaker with PICS technology Owner : IPDiA</p>	

Legend : Implantable devices containing IPDiA technologies  
Owner : IPDiA



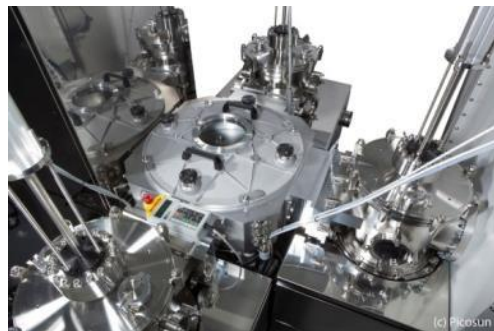
Legend :  
(left) Nanolaminate dielectric developed during PICS project  
(right) 3D silicon trench capacitors  
Owner : IPDiA



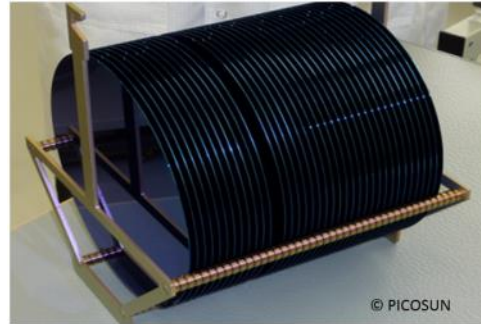
Legend : P-series Atomic Layer Deposition (ALD) systems  
Owner : PICOSUN



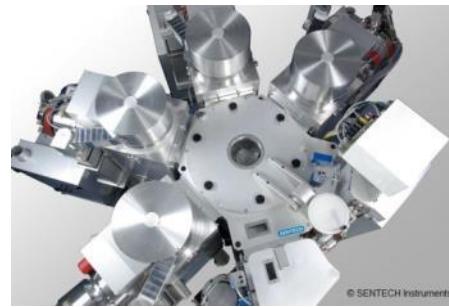
Legend : PICOPLATFORM™ vacuum cluster tool  
Owner : PICOSUN



Legend : ALD batch processing  
Owner : PICOSUN



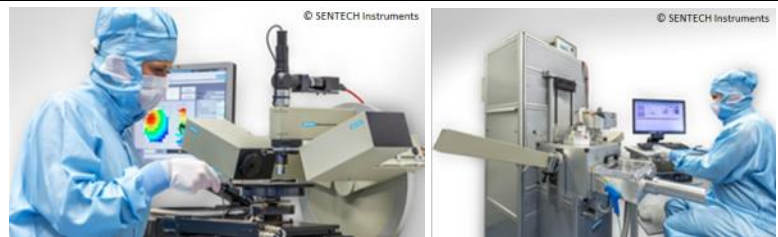
Legend: 6 ports cluster for industrial application  
Owner: SENTECH Instruments



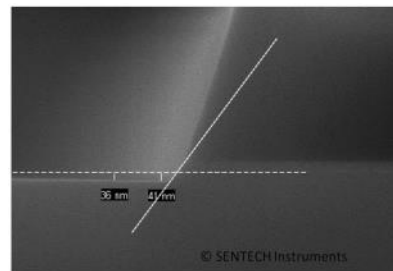
Legend: ICP-RIE plasma etcher SI 500  
Owner: SENTECH Instruments



Legend: Experts in Thin Film Measurement and Plasma Process Technology  
Owner: SENTECH Instruments



Legend: Etching of ALD  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> in a BCl<sub>3</sub>/Cl<sub>2</sub> – ICP plasma  
Owner: SENTECH Instruments



Legend: Clean-room at IPMS-CNT  
Owner: IPMS-CNT



Legend: Clean-room at CEA-Leti

Owner: CEA-Leti

