

## 6. Publishable Summary

The TAKE5 project is the next in a chain of thematically connected ENIAC JU KET pilot line projects which are associated with 450nm/300nm development for the 10nm technology node and the ECSEL JU SeNaTe project aiming at the 7nm technology node. The main objective of the TAKE5 project is the demonstration of 5nm patterning in line with the industry needs and the ITRS roadmap in the Advanced Patterning Center at the imec pilot line using innovative design and technology co-optimization, layout and device architecture exploration, and comprising demonstration of a lithographic platform for EUV technology, advanced process and holistic metrology platforms and new materials.

A lithography scanner will be developed based on EUV technology to achieve the 5nm module patterning specification. Metrology platforms need to be qualified for the 5nm node patterning of 1D, 2D and 3D geometries with the appropriate precision and accuracy. For the 5nm technology modules new materials will need to be introduced. The introduction of these new materials brings challenges for all involved deposition processes and the related equipment set. Next to new deposition processes also the interaction of the involved materials with subsequent etch steps will be studied. The project will be dedicated to find the best options for patterning.

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<sup>20</sup> Article 37.1 of Model Grant Agreement. *Before disclosing results of activities raising security issues to a third party (including affiliated entities), a beneficiary must inform the coordinator — which must request written approval from the Commission/Agency; Article 37. Activities related to ‘classified deliverables’ must comply with the ‘security requirements’ until they are declassified; Action tasks related to classified deliverables may not be subcontracted without prior explicit written approval from the Commission/Agency.; The beneficiaries must inform the coordinator — which must immediately inform the Commission/Agency — of any changes in the security context and — if necessary — request for Annex 1 to be amended (see Article 55)*

The TAKE5 project relates to the ECSEL work program topic Process technologies – More Moore. It addresses and targets as set out in the MASP at the discovery of new Semiconductor Process, Equipment and Materials solutions for advanced CMOS processes that enable the nano- structuring of electronic devices with 5nm resolution in high-volume manufacturing and fast prototyping.

The project touches the core of the continuation of Moore's law which celebrates its 50<sup>th</sup> anniversary and covers all aspects of 5nm patterning development. The cost aware development process, which is at the core of the project, will support the involved companies in the upper end of the value chain, and will place them in an enhanced position versus their worldwide competition. Through their worldwide affiliations, the impact of the TAKE5 project will be felt outside Europe in America and Asia Pacific semiconductor centers and is expected to benefit the European economy tremendously by supporting its semiconductor equipment and IC sectors with innovations in manufacturing and export expenditures.

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