1 THE PROJECT

The MicroElectronics Cloud Alliance (MECA) develop Cloud-based European infrastructure and organisation for education in micro- and nanoelectronics providing a range of open educational resources, remote access and sharing of educational and professional software, remote and practice-based learning facilities.

2 OBJECTIVES

1. Analysis of institutional, teachers’ and students’ needs in shared IT infrastructure, teaching materials and learning resources, meeting the requirement of the enterprises in micro- and nanoelectronics and translation into functional specifications of mClouds. This objective targets the challenges of the multidisciplinarity of the subject area and the needs of powerful CAD systems and servers, of sophisticated equipment and laboratories.

2. Networking of project partners from HE institutions and SMEs, to share ideas, methodologies and experiences in order to improve the HE programmes to face the rapid technological change in the sector and joint development of job-specific training modules. This objective addresses the needs of more responsive HE to the needs of the labour market.

3. Development of the mClouds system and realization of a shared server infrastructure, shared e-learning resources and the remote access to the CAD tools. This objective targets the needs of innovative and multidisciplinary approaches to teaching and learning in the interdisciplinary sector of micro- and nanoelectronics and the needs of closer cooperation between HE and business using the infrastructure, technology of partners’ universities and expertise of practitioners.

4. Pilot test of the virtual services and training teachers and technical staff in their use. This objective addresses the needs of the main users of the project results: the students and teachers in high quality educational resources and services.

5. Implementation of jointly developed cloud-based open educational resources in micro- and nanoelectronics in the partners’ educational contexts. This objective addresses the necessity of striking a balance between what is offered in the educational system and what is needed by the enterprises in the sector.

3 SHORT TERM RESULTS

1. mClouds with open educational resources. At least 16 shared MSc courses delivered in the eight EU countries developed jointly with the business representatives. Improvement of university engineering educational through innovation of educational curricula with the newest scientific and technological content and clearer relationship between learning processes in the
university and at the real workplace and shared educational resources. Measurable through the rate of employment of graduates and the higher rating on HEIs.

2. **Stable Alliance between HEIs and business.** Number of contracts for collaboration between academia and business. Job-oriented engineering HE, joint research project for the purposes of SMEs with MSc and PhD students. Measurable with the feedback from the enterprises on the new employed graduates and the number or budget of joint projects.

3. **mClouds for sharing institutional IT infrastructure.** Shared IT structure of 8 European HE institutions. An organized use of a shared infrastructure will dramatically increase the available power of each institute, expanding the training possibilities and offers. Measurable through the annual reports of system officers.

4. **mClouds for sharing CAD softwares.** Shared CAD software: CADENCE, SYNOPSIS, I-V characterization remote software tools, TamTam, VISIR remote laboratory. The expensive CAD laboratories and I-V characterization remote software tools shared between academic institutions on Cloud computing architectures; infrastructure costs can be shared accordingly. Students working at one university and access an online lab at another university from the consortium to boost learning mobility. Measurable through a survey on users’ satisfaction.

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### 4 LONG TERM OUTCOME

1. **Sustainable Alliance between HEIs and business.** Number of contracts for collaboration between academia and business with involvement of new HEIs and enterprises (including the big enterprises) from the participating on the project and other EU countries. Higher employment of graduates, better opportunities for research and innovation of enterprises. Measurable through the rate of employment of alumni and the joint projects – small between HE and SME and large within Horizon 2020.

2. **OERs and Cloud-based shared educational resources spread all over Europe and possibly in other countries.** Number of new institutions contributing to and using the mClouds OERs; Number of VET schools using OERs; and HRD departments at enterprises contributing to and using the mClouds. European Higher Education Area with shared OERs, improved virtual mobility of students and academic staff and integrated programmes of study, training and research. The impact of the university-business alliance will be in the education responsive to the labour market needs, graduated students prepared for the job, enterprises satisfied by the knowledge and skills of young specialists. Measurable through survey in HEIs and enterprises.

3. **Innovation in pedagogy – education supported by cloud computing and remote access to laboratories all over Europe.** Number of citations of the papers on mClouds project. Improved educational effectiveness are courses organization efficiency, instructors focusing on area of expertise, common experiences of students of different countries based on similar infrastructures, tools, lab organization, learning improvement, thanks to the optimization of laboratories and courses. Measurable through the performance of students/trainees (if courses used for VET) on knowledge and skill tests.

4. **Better employability of alumni in microelectronics.** Number of employed new graduates in the sector. Better quality of the engineering education, measurable by raised rating of HEIs.
5 **ROLE OF UNED IN THE PROJECT**

- Leader of WP. 6
- Needs analysis of labor market at Spain and of distance education universities in OERs and shared Cloud educational IT systems
- Development and delivery as OERs in mClouds of the courses: Computer Modeling and Simulation of Electronics Circuits, Fundamentos de Ingeniería Electrónica I and Fundamentos de Ingeniería Electrónica II with remote laboratory practice with VISIR
- Development of UNED-DIEEC remote lab access
- Conduct a pilot with students. Collect data, analyze data and writing the report for UNED-DIEEC pilot
- Pilot test and field trial with students of UNED
- Exploitation of the mClouds OERs in the Master on Information and Communication Electronics Systems and in the Bachelor degree in Electrónica Industrial y Automática
- Dissemination activities according to the dissemination plan. Disseminate the project results in all forums of the IEEE section Education which head is Prof. Manuel Castro Gil from DIEEC
- Development of videos for project dissemination in social web