Success Story of the Computer Engineering Department at the Tallinn University of Technology in EU Projects

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The political changes in Estonia have had strong impacts on education, research and economics. Estonian ICT industry has gone through a total reorganization with a lot of SMEs born to meet new market requirements. There is a continuous need from SMEs for experts in modern technologies to come up with competitive products.


Tallinn – Capital of Estonia

Tallinn University of Technology knows his important role in meeting the needs of ICT industry in Estonia. The content of education and teaching conceptions have been continuously updated and renewed to prepare engineers with the knowledge of latest achievements of science and technology to be innovative.

During the last decade Computer Engineering Department (CED) has participated in 10 EC projects. Supported by TEMPUS and EUROCHIP, Electronics Competence Centre was established in 1995 to coordinate teaching in the field of ICT, R&D and cooperation with SMEs. EU projects EEMCN, FUTEC, SYTIC and ATSEC (1993-1999) linked CED to European research community in microelectronics. As the result of the VILAB project (1999-2001), a virtual laboratory was created to support broad international cooperation in the field of Design and Test.

A big success story was the EU project REASON (2002-2005) which connected 23 partners to develop an integrated environment for supporting joint R&D and teaching. A unic educational chip DEFSIM was developed, which allows to investigate real physical defects in integrated circuits with remote access. 40 European universities are planning to use this chip.

By support of eVikings project (2003-2005) two new competence centres were established – Estonian Research Centre for Dependable Computing and Estonian Development Centre of Mission Critical Embedded Systems (ELIKO). ELIKO contracts between 7 private SMEs under the leadership of TUT. Both centres are working on transfer of technology to local industry. Through ELIKO very tight links have been established now between the Academia and the industry of Estonia. Recently a new Framework VI project VERTIGO was launched where CED will contribute in developing new approaches to verification of systems.

The department has a pioneering position in developing theory of Decision Diagrams for multi-level diagnostic modelling of digital systems. Hierarchical test generator DECIDER was developed which outpaces similar known systems in performance. The defect-oriented test generator DOT is unic in the world by ability to prove redundancy of physical defects in circuits. New hardware accelerator to replace traditional software simulators allowed to increase the speed of fault simulation 200 times. A unic educational tool environment TURBO-TESTER for test generation and fault simulation has gained a broad international recognition, and has been downloaded in more than 100 institutions around the world.


International cooperation: Estonian teacher is consulting Indian PhD student

International cooperation of CED can be characterized by more than 50 joint papers with 35 researchers from 20 academic institutions of 11 countries published during the last 3 years. Together with REASON partners more than 30 courses and tutorials were given in 11 countries. The teachers of CED are regularly giving courses on design for testability at universities in Germany and Sweden. CED is closely cooperating with the electronics factory Elcoteq and SMEs Artec Design and Testonica Lab in Estonia, whereas the latter is a spin-off company recently created and based on the know-how developed thanks to the EU projects. We cooperate also with different companies in Sweden and Germany.

The prototype tools developed in EU projects are integrated in e-learning environment to support university courses by hands-on training. The tasks represent simultaneously real research problems, which allow to foster in students critical thinking, problem solving skills and creativity in a real research environment and atmosphere.