



Strategies for Embedded Systems Research

EU Project FP7-ICT-215594
<http://www.cosine-ist.org>

Deliverable

D4.2.1a Best-practice examples of Embedded Systems SMEs (takeup of innovative R&D results)

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1. Introduction

COSINE2 aims at aligning RTD strategies between different countries and with EU activities and at opening more national ES research programmes for international (EU) participation by supporting this opening through information and best-practice examples. COSINE2 will offer support to all countries willing to co-operate regardless of their participation in the Support Action.

2. Acknowledgement

Work reported here was funded by the Information and Communication Technologies Programme of the European Commission under the COSINE2 Grant agreement No. FP7-ICT-215594. COSINE2 stands for “Co-ordinating Strategies for Embedded Systems Research”.

The COSINE partners are:

- eutema Technology Management GmbH (Co-ordinator, AT)
- Finnish Funding Agency for Technology and Innovation (FI)
- Deutsches Zentrum für Luft- und Raumfahrt (DE)
- The Israel Directorate for EU FP6 (IL)
- Institute of Information Theory and Automation, Academy of Sciences (CZ)
- Swedish Governmental Agency for Innovation Systems (SE)
- Bundesministerium für Verkehr, Innovation und Technologie (AT)
- Nemzeti Kutatási és Technológiai Hivatal (HU)
- Flanders Institute for the Promotion of Innovation (BE)
- Ministry of Universities and Research (IT)
- Atomic Energy Commissariat (FR)

3. Description of Work

Task 4.2 Best-practice in ES take-up

COSINE will collect best-practice examples of successful take-up of ES technologies. The focus is on take-up of innovative ES RTD results by SMEs in Europe. The partners will contact their national agencies but also include EU initiatives such as the Framework Programme or the project of the ARTEMIS JTI. A collection of successful examples of technology take-up will be produced and disseminated to intermediaries but also to a broad public through the web page. This material should be freely available for others to use and include in their strategies and policy papers.

4. Best-practice examples of Embedded Systems SMEs (takeup of innovative R&D results) - preliminary results:

So far 9 SME examples from Germany, Finland, Austria, Israel, Estonia and Hungary have been collected and compiled. Most of them focus on software development in safety critical environments, only a few SMEs are focussed on hardware aspects (e.g. the SMEs from the IMG4 consortium from Israel).

4.1. AICAS GmbH Karlsruhe (Germany)



AICAS develops Java tools for embedded systems, realtime and safety critical applications. The company was founded in March 2001 as a spin off from FZI Karlsruhe, Germany. Their main target is the promotion of Java in critical control systems. Due to this, AICAS has brought up a realtime Java Virtual Machine called JAMAICA VM, an object oriented software development environment, and an analysis tool. These components increase productivity, improve application reliability, provide safe execution and simplify code reuse and encapsulation. Results are a more efficient development process and a higher software quality.



Today AICAS has 30 employees with branches in USA, France and Japan. Their customers come from many different industrial sectors, e.g. avionics, industrial automation, automotive, telecommunications, medical systems, etc.

AICAS was recently awarded with two awards as follows:



The "Embedded Award" is donated every year by the organization committee of the „Embedded World Conference“ to the best new software product presented at the Embedded World trade fair.



The “Cyber Champion” is a special award of the ministry of economics of Baden-Württemberg, which is dedicated to successful companies in the hightech cluster Karlsruhe that combine a high grade of innovation with a good market growth.

From the beginning on AICAS has also been successful in applying for public research funding. They are currently involved in two ARTEMIS projects and one FP7 project. In former times AICAS was involved in two FP6 projects. Due to this, the company staff became more and more experienced in transforming public funded research results into valuable products.

Contact details:

aicas GmbH, Dr. Fridtjof Siebert

e-Mail: siebert@aicas.com

phone: +49 721 663 968-23

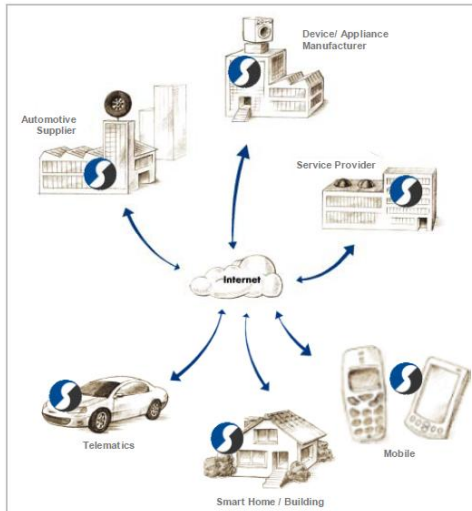
web: www.aicas.com

4.2. ProSyst Software GmbH Cologne (Germany)



ProSyst is an OSGi(former Open Services Gateway initiative) and Java pioneer. The company is entirely focussed on open standards technology. ProSyst offers products and services for all vertical markets that use OSGi technology, such as mobile devices, smart home, automotive, enterprise and industrial applications.

ProSyst provides software platforms that enable the deployment of services and applications in devices and over servers. The devices covered include -among others- mobile devices, desktop clients, automotive telematic systems and set-top-boxes, modems, routers, home servers, etc.



ProSyst was founded in October 1997, actually employs 120 people, and runs offices in Bulgaria and Korea.

The involvement of the company in public funded research projects has been and still is abundant. The economic success of ProSyst is - among other aspects - based on four FP6 projects, one ITEA2 project and two national funding projects run by the German Federal Ministry of Economy. Embedded Systems is one of the main technological topics of the majority of these projects.

Furthermore ProSyst won the “Eclipse Community Award 2009” for the best commercial Equinox (a Java-based framework) application which recognizes the top products in the Eclipse community.



Contact details:

ProSyst Software GmbH, Kai Hackbarth

e-Mail: k.hackbarth@prosyst.com

phone: +49 221 6604-410

web: www.prosyst.com

4.3. preeTEC (Austria)



preeTEC is a pioneer in the area of portable, deterministic embedded software components. It has been founded in 2004 as a university spin-off located in Salzburg, Austria. A project that was nationally funded by the so-called FIT-IT Embedded Systems initiative formed the basis for founding preeTEC. Since then the company has been involved in several public research projects funded both by Austria and the EU.

preeTEC offers products for embedded software development that allow the correct-by-construction of ultra-reliable embedded software components for safety-critical real-time systems at a fraction of today's costs. The explicit description of the timing behavior of these components allows a guarantee that the components exhibit exactly that timing behavior in any constellation on a specific execution platform and topology.

preeTEC's products are based on cutting-edge research at the University of California, Berkeley (Electrical Engineering and Computer Sciences Department) and at the University of Salzburg (Computer Science Department).

The founder and Chief Executive Officer of preeTEC is Prof. Dr. Wolfgang Pree.

Contact details:

preeTEC—Wolfgang Pree GmbH

e-Mail: office@preeTEC.com

phone: +43 676 38 48 000

web: www.preeTEC.com

4.4. IMG4 Consortium under MAGNET framework (Israel)

IMG4 means Imaging Machines, the 4th Generation. It is a consortium of 11 companies, which aims to create a new generation of imaging machines. This new generation will automatically observe, learn and optimize performance and will though ultimately provide a better cost-effectiveness.

IMG4 deals with technology gaps such as image noise, drifts and errors due to multiple reasons. The solutions are implementing automated monitor, calibration and machine learning procedures by looking for available data around the imaging machine. So the business key drivers of IMG4 are competitive features accuracy and cost effectiveness.

IMG4 firms and Academia are coming from the following areas:

- Semiconductors
- PCB and Flat Panel Display
- Medical Diagnostics
- Automotive and Aerospace
- Academic technology research (Technion, Ben Gurion and Tel Aviv Universities)

IMG4 firms exported in 2007 more than \$1B. IMG4 total available market size is about \$5.7B.

Among the participants of this consortium there are also SMEs which contribute substantially to the aims of IMG4.

One of these SMEs is ***Tevet Process Control Technologies (PCT) Ltd.***

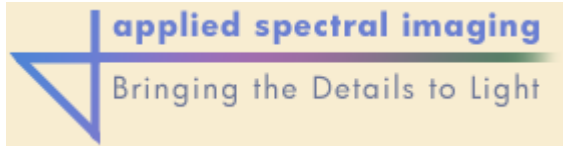
- Tevet provides the semiconductor processing industry with innovative integrated metrology solutions for improved process control technologies. Tevet's In-situ Thickness Measurement System, IsTMS, offers a measurement tool that seamlessly integrates into all manufacturing platforms for thin film applications. Tevet's large spot size broad band spectral reflectometry combined with proprietary algorithms make the IsTMS a perfect candidate for integrated or in-situ metrology.

Tevet employs 35 people and was founded ten years ago in March 1999. As of May 7, 2008, Tevet Process Control Technologies, Ltd. operates as a subsidiary of Nanometrics, Inc.

Contact details:

Building 2, Area 7
Industrial Park
Yokneam, 20692
Israel
Phone: (972) 4 959 1775

Another SME within the IMG4 consortium is **Applied Spectral Imaging (ASI) Ltd.**



- Applied Spectral Imaging (ASI) is a leading provider of cytogenetics systems to clinical and research labs all over the world. ASI develops, manufactures, and markets state of the art imaging systems to answer the rising need of bio-markers in life science and health care markets. In addition, ASI provides all aspects of Imaging, Image analyses and Image Management (PACS) for Clinical and Research Cytogenetics Laboratories for prenatal, postnatal and cancer diagnosis. The company expands its productline to address Pathology Labs Imaging needs. In addition to that ASI develops and manufactures imaging spectroscopy instruments for applications in Microscopy and Remote Sensing for Research, Medical and Industrial environment.
- ASI was founded in Feb. 1993 and actually employs 36 people.
- Web site: <http://www.spectral-imaging.com/>

IMG4 is hosted under Israel's **MAGNET Framework**. The MAGNET Program run by Israel's Office of the Chief Scientist of the Ministry of Industry, Trade & Labor, sponsors innovative, generic, industry-oriented technologies to strengthen the country's technological expertise and enhance competitiveness. Any company with a forward vision can find a framework that can promote its needs and it is welcome to participate in the MAGNET activities.

The program by definition is high risk and the ROI is only obtained after a long period of time. Therefore the grant rate to an industrial company is up to 66% of the total recognized expenses and no royalties are expected to be paid back. Academy partners are granted 66%, 80% or 90% according to the chosen (funding framework) track, with the balance borne by the industrial companies. The program period of a (funding) track which runs under the type "consortium" is 3 to 6 years.

4.5. Space Systems Finland



Space Systems Finland is a software engineering company specialised in high reliability embedded software and one of the established European space software providers. The company was founded in 1989.

Currently, six live satellites are carrying software that was developed by SSF. Besides space-related software, SSF also has experience in the fields of telecommunications and GPS navigation devices. Half of SSF's current business involves space application software. Meanwhile, one quarter relates to software quality assurance services, with the remaining quarter consisting of software and hardware development services for the electronics industry (notably GPS signal sources and navigation solutions).

Research and development activities at SSF have a clear goal: to enable the latest discoveries in fields such as testing, formal methods and model driven development to benefit their customers

Space Systems Finland is currently involved in one FP-7 project and one national funding project:

- EU-FP-7 ICT project Deploy

The Deploy project aims at the deployment of formal engineering methods in different domains. The goal is to develop sector specific tools and methodology which allow the use of Event B, a correct by design method based on formal proofs of correctness. Other industrial partners participating in the project are Siemens Transportation Systems, Bosch GmbH and SAP.

- LIME

The goal of the LIME project is to support the component-based development for embedded systems. By using lightweight interface specifications, the LIME toolset will allow the automatic detection of interface violations. In addition, technology will be developed to automatically test components against interface specifications.

The project is supported by Tekes, the Finish national funding agency. Other industrial partners participating in the project are Nokia, Conformiq and Elektrobit.

Contact details:

Space Systems Finland
Mika Jahkola (Managing Director)
eMail: Mika.Jahkola@ssf.fi
phone: +358 9 6132 8622
web: www.ssf.fi

4.6. ELVIOR - software testing professionals (Estonia)

Elvior provides SW testing services and tools and is specialized in embedded and distributed software testing. Their primary focus is on the telecom software industry. ELVIOR have been providing software testing services and tools for top-tier telecom industry players since 1992.

SW testing services comprise

- analysing and improving SW testing processes
- SW module, integration and system tests
- embedded systems production tests
- building automated regression test environments
- TTCN-3 testing

ELVIOR is actually involved in public funded projects run by ELIKO, an Estonian independent, state supported research organization and Competence Centre in Electronics-, Info- and Communication Technologies.

ELIKO has been active mostly within two public support programmes, a Competence Centre Programme as well as a Product Development Grant Programme. The establishment of ELIKO is connected to the Competence Centre programme as ELIKO was one of the centres getting the support in 2004 and again from the new programming period in 2009.

ELIKO's mission is to improve competitiveness of Estonian and European ICT industry through the deep integration of research and production institutions. ELIKO will enable reducing risks of development and validation of emerging ICT solutions for tomorrow.

ELIKO's team and its partners have 10+ years of practical experiences in development of complex embedded hardware and software systems to be supported by academic advisors from Estonia, Finland, Germany, Italy, Japan, Sweden. The centre has an access to the top edge electronic measurement equipment and modern rapid prototyping tools.

Besides ELVIOR, ELIKO has eleven further partners, many of them are SMEs, established in either software or hardware business.

Web addresses: <http://www.elvior.ee/en> & <http://www.eliko.ee/>

Contact:

ELIKO Competence Centre in Electronics-, Info- and Communication
Technologies
Akadeemia tee 23 A
Tallinn, 12618
Phone: +372 65 99 881
E-mail: info@eliko.ee

4.7 OptXware LLC (Hungary)



OptXware is a big potential start-up company. It was established in 2005 by a team of experts from the Fault-tolerant System Research Group of the Budapest University of Technology and Economics. OptXware offers its customers professional services in dependability consolidation. Members of the OptXware team are active participants in multiple European Union initiatives, among them the very successful DECOS FP6-IP project and the INDEXYS (INDustrial EXploitation of the genesYS cross-domain architecture) project. OptXware is the authorized maintainer of the DECOS PIM metamodel.

One of the key business areas of OptXware is embedded systems development, where they offer services in Eclipse based tool integration and MDD (model-driven development) compliant tool-chain development. Their recent activities include optimization based system synthesis, software-hardware integration, and communication synthesis, including the scheduling of various core network protocols (e.g. TTP/C, FlexRay). They have experience in code generation for UML2.0 compliant state-charts based on a formal behavioral semantics and system architecture configuration generation.

Contact:

György Csertán (CEO)

e-mail: csertan@optxware.com

Tel: +36 20 4289602

Web: www.optxware.com

4.8 Régens Inc. (Hungary)



Régens operates as a solution provider with knowledge in multiple areas of domain and ICT technology. Since its establishment in 1993, the company has developed a leading role on the Hungarian software and consultancy markets. The two main forces driving the management's attitude are the urge to provide high quality and flexible services, and to exploit cutting-edge technology. This innovative approach inspires and allows them to extend their core activities geographically and to diversify their product & service portfolio. As a result, they have been working on large-scale software development and integration projects both at home and abroad. Their clients include Hungarian SMEs, as well as global companies and governments.

Their strengths lie in designing and developing integrated business applications, developing portals, and offering interoperability services for B2B and B2C relations. Régens provides a strong background to their developments through reliable maintenance & client support services, in addition to secure & trusted infrastructure services.

Régens develops new-generation devices and technologies to support automatic data capture, data processing, and the distribution of information on demand, continuously ensuring information retrieval. They are constantly seeking to improve themselves and the technologies which they use. Régens' applications use a vast array of embedded systems such as RFID and smart wireless sensing.

Régens is performing applied research and innovation activities under FP6 co-financed by the European Commission and by national research programs co-financed by the Hungarian Government and the Structural Funds.

Régens is one of the most successful Hungarian SMEs in FP6 ICT projects. They participated in more than 6 project proposals (e.g. FLUID-WIN, STREP, Business Networking), and furthermore they were successful in applying for an ARTEMIS project.

contact:

Réka Moksony

e-mail: moksony.reka@regens.hu

Tel: + 36 30 655 5070