



Newsletter

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Television is becoming more than just television

Preparations for a new project carrying the name of Trader are in full progress. The development of components, ICs with linked software for the modern television, occupies centre stage as an industrial application. Philips is market leader in this area and attaches great importance to the reliability of these components. The development of design methods and technology that can maximize reliability touches the very heart of the activities of the ESI. That is why parties sought cooperation. Speaking are Frans Beenker of the ESI and Louis Stroucken of Philips Semiconductors, who together carry the load of the preparations.

The Innovation Centre Eindhoven, a part of Philips Semiconductors, supplies components for TV sets, ICs with the accompanying software. Of course it supplies these components to Philips itself, but it also has other television manufacturers as its customers. Its annual market share is some 160-180 million TV sets. Beenker: "This market develops strongly at the moment: television is becoming more than just television. Gradually it is turning into a box that can communicate. A digital television is on its way. The function of the apparatus is expanding. Stroucken adds: "The content of that central box consists, for instance, of music, TV programs, and all kinds of data downloaded via the Internet. In fact, there is no longer such a large role for the data. In the future the TV will be a sort of computer, in which the various functions are merged."



Louis Stroucken and Frans Beenker (right)

Design Fest

June 1, 2004, the Systems Architecting Study Group (SASG) organized their regular meeting as a 'Design Fest'. Forty members exchanged their knowledge about designs and designing in a highly interactive one-day event.

Ben Pronk, senior system architect within Philips Semiconductors inspired the audience with a keynote presentation about 'fundamentalistic design' and addressed the relevant issues to be aware of in the context of design.

Relevant topics

After this presentation the participants were divided into six design groups, clustered around three relevant topics (streaming image processing, distribution of functionality and data handling). In each group a previously appointed chairman started with an explanation of his current favorite design for the topic. The group had to question that design on e.g. validity, context, and robustness and had to generate alternative designs.

Homework

The members (with background in several disciplines) appreciated the in-depth discussions and the involvement of others. They got new insights, viewpoints and they became aware of hidden assumptions in a relatively small amount of time. That it was a quite successful day can be deduced from their wish for advance homework for future Design Fests. They advised to get the necessary domain and/or context knowledge before the meeting, in order to have more time to discuss and argue, and by that gain more feedback from the colleagues.

Building blocks

Given the prospect of these developments and the big market served by Philips, the question presents itself what is the best way to develop and manufacture reliable digital television components. Philips will have to devote increasing financial resources to the quality of the components. Stroucken: "The ICs and the software are components of a larger system: they are the building blocks.

Philips about this project started about a year ago. The question they wrestled with was the core of the ESI research: thinking in systems. In a number of sessions Philips Semiconductors and the ESI analyzed the problems and defined potential solutions.

After this Frans Beenker, Louis Stroucken and Sijr van Loo of Philips Research traveled across the Netherlands in order to search for parties that possess relevant knowledge in this field. Stroucken: "For me the fact that the potential partners recognized the issues was of crucial importance. It gave recognition to our project."

Nine parties will now take part in the Trader project. In addition to Philips Semiconductors and the ESI they are Philips Research and Philips TASS. Leiden University, Delft University of Technology, the University of Twente, IMEC from Leuven and TU/e also participate.

The Trader project is the first project that the ESI carries out for which the financing comes from the BSIK funds. Meanwhile two discussion sessions have taken place with the nine parties: one session has been used to determine the structure in the project and quite recently there has been a meeting about the intrinsic cooperation within the project. The project has been divided into four parts: user-centered thinking, architecture, analysis and detection technology, and recovery are the four subprojects that have been defined. The project is expected to start September 1st.

Semiconductors supplies the processing capacity with which the product can then be made. The question is how we can best develop these building blocks. Beenker: "We have discussed the concept of reliability at length. We have defined it in this project as 'the customer must not be inconvenienced by any faults in the system'. In other words: the television may make an error, but the customer must not notice this: the system appears flawless to the customer."

That also gave birth to the name of Trader: Television Related Architecture and Design to Enhance Reliability. A second reason for this name is that trading refers to negotiating about acceptable use and the extent to which malfunctioning can be tolerated. Finding that balance is also a piece of 'trading' and lends the double meaning to the name of Trader.

Recognition

The discussions between the ESI and

The importance of embedded systems (embedded software in particular) for industrial SMEs increases rapidly. What is a piece of cake for one is observed with great suspicion by someone else. The Embedded Systems Institute wants to support enterprises in the development and application of software in products and sought for inspiration among those enterprises themselves.

ware, the control of software projects or the farming out of software, quality in relation to time and money proves to be a recurring issue for many enterprises. This is why support must be provided in the form of workshops and courses.

SMEs and the ESI

Brainstorming sessions

In three brainstorming sessions the ESI asked twenty entrepreneurs for their view of support. It soon turned out that many of them were contending with the same issues and that they appreciate the opportunity to learn with and from each other. The ESI, as an independent party, is expected to perform a facilitating role, and an intrinsic role if necessary.

Nevertheless there are question marks also. Can the ESI translate its know-how and expertise into the SMEs? How independent is the ESI? Is there actually sufficient marketing and organizational knowledge available? All of these are valid questions, and the ESI will have to give due consideration to each of them.

The menu

The main subject mentioned by every entrepreneur was that the ESI provides an insight into what it has to offer and compiles an SME menu in which all entrepreneurs can find what they want.

Some important "dishes" that entrepreneurs would expect to find on the ESI menu are:

- *A look behind the scenes of...?*

Entrepreneurs learn from entrepreneurs. As an independent party the ESI can bring entrepreneurs into contact with each other, not as a broker between commercial parties, but rather as a facilitator between similar, non-competitive enterprises. Knowledge circles, presentations of practical cases, and future-oriented sessions together with other entrepreneurs are just a few examples.

- *Products and organizations*

The professional embedding of software in products and organizations turned out to be a strongly felt need. Whether it concerns the specification of soft-

- *Transparency of the ICT market*

The speed of technological developments and the diversity of suppliers form a big stumbling block for many. Insight into technological trends is required if one is to make the appropriate investment decision.

Usually SMEs cannot afford to make any slips in this respect. In addition, there is a need for insight into the wide market of suppliers. In short: who is who?

Technological seminars, a survey of suppliers stating their expertise, and a brokerage event where supply and demand can meet may be potential activities.

Group-oriented activities

The number of potentially interested enterprises is large. An important conclusion from the brainstorming sessions is that the ESI should involve other partners such as intermediary organizations, trade organizations, and knowledge institutions to be capable of serving all SMEs.

Because of the diversity of SMEs, the ESI always develops group-oriented activities. Wherever the knowledge and capacity are present, the ESI will do this itself, or in collaboration.





Arjan van Gemund, senior lecturer at Delft University of Technology (TUD), participates in the Tangram project, for which he comes to the Embedded Systems Institute in Eindhoven one day every two weeks. Is it so obvious to spend almost as much time traveling as working hours on a project? What moves this man from Delft?

"It is

beyond
dispute to
collaborate
at the
national
level"

The Tangram project in which van Gemund supervises a PhD student (AIO) of TUD focuses on test methodologies for complex systems. The ASML wafer scanners are taken as a case study and act as drivers for the project. ASML is the so-called Carrying Industrial Partner. Two days a week van Gemund works as a senior lecturer in the field of embedded software in Delft. In addition, he is one of the owners of the company Science & Technology from Delft, which also takes part in the Tangram project. van Gemund: "One of the co-owners of the company represents Science & Technology in the project, while I promote the interests of TUD as the supervisor of the AIO. We found it better to separate our tasks, because the interests of a university in the project differ from those of the company. In practice, however, it poses no problems whatsoever, as we have a very open atmosphere among all participants in the project."

Matchmaker

Since the start in March 2003 van Gemund has been involved in the Tangram project. "In the initial period I was here at least one day a week. Now

this has been reduced to one day per two weeks. I come especially for the team meetings and the remaining time is spent on supervising the AIO. In this project, which involves participants from all over the country, you must choose a place to meet. It is obvious that this should be Eindhoven: most people come from Eindhoven, the ESI is properly equipped for this and the Carrying Industrial Partner from the project, ASML (Veldhoven), is located here as well." At this moment the team meets alternately in Veldhoven and in Eindhoven, because the AIOs spend a large portion of their time at ASML in Veldhoven. This choice was deliberate, as the AIOs are in the center of the ASML organization this way.

van Gemund: "I benefit a great deal from my contacts here, for it is useful to know people with a slightly different specialism. In Delft I am involved in education and the Tangram project gives me a lot of inspiration for developing an embedded software curriculum. I derive case histories from this project and I want to incorporate them in various courses. The ESI is the ideal matchmaker in that respect. It takes me half a day to get here, but there is a

great deal to be gained from this for me, both for education and for research."

Teleconferencing

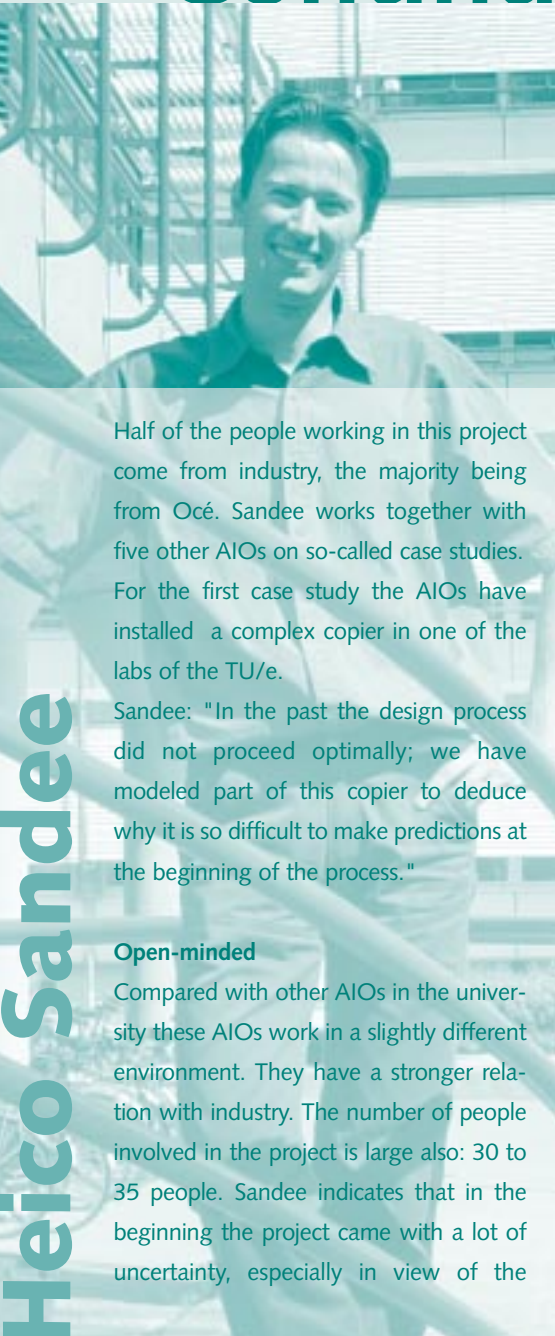
According to van Gemund problems of the industry in the area of Embedded Systems call for a national programming. An approach at a national level is beyond dispute, he thinks. "The ESI has an important task to fulfill here. Its strength lies in the formation of networks based on competences. The ESI is

good at transforming problems from industry into scientific questions. Moreover, it is subsequently capable of involving the right people at a national level in this. It is precisely the combination of these two steps that is so good." The added value of the ESI, van Gemund

indicates, lies in the area of project supervision and the support by the fellows of the ESI, who contribute specialist and scientific knowledge to the project. He, furthermore, observes a definite growth in the scientific knowledge and the knowledge transfer of the ESI. In this

context he indicates that the ESI will in the future certainly have to make investments in teleconferencing activities, so that not everybody in the nation loses so much time traveling. Besides, teleconferencing may prove to be a good tool in knowledge transfer.

"Continuous feedback from the company"



Heico Sandee has been a PhD student (AIO) in the section Control Systems of the Department of Electrical Engineering since 1 January 2003 and does his PhD research within the Boderc project. This project focuses on distributed embedded real-time controllers of complex systems. An Océ printer is taken as a case study and acts as a driver for the project. The question formulated from the perspective of the industry and the multidisciplinary approach appealed to him.

Half of the people working in this project come from industry, the majority being from Océ. Sandee works together with five other AIOs on so-called case studies. For the first case study the AIOs have installed a complex copier in one of the labs of the TU/e.

Sandee: "In the past the design process did not proceed optimally; we have modeled part of this copier to deduce why it is so difficult to make predictions at the beginning of the process."

Open-minded

Compared with other AIOs in the university these AIOs work in a slightly different environment. They have a stronger relation with industry. The number of people involved in the project is large also: 30 to 35 people. Sandee indicates that in the beginning the project came with a lot of uncertainty, especially in view of the

ensuing research questions. He approached it with an open mind. He did not feel the uncertainties in the project to be a problem.

At this moment the phase has started in which the AIOs have to fill in their own research directions very concretely. In addition, they have started a focused search for case studies into which the research questions of the AIOs as well as those of the industrial researchers may be incorporated. Sandee: "A couple of weeks ago we went to Océ to witness a current design process of a new printer. We have looked for useful case studies, in which everybody's subject may be integrated. In this way the case study becomes the binding factor among the individual designs."

Event-driven controllers

Sandee: "My design is clear now; I am

going to focus my research on 'Event-driven controllers'. To control engines the control engineers develop algorithms. These algorithms must then be implemented in the computer. This is done by the software specialist, but these two disciplines are hardly familiar with each other's language. Among control engineers there is generally little knowledge of how to develop algorithms in such a way that software specialists can easier implement them. That is the interface of my doctoral research. I see the solution in event-driven controllers in contrast to the more common time-driven controllers. Event-driven controllers do not control the printer at a fixed frequency, but for instance in the event of a change in an external condition. My objective is to write scientific publications for conferences and journals, which together can make up a large part of my doctoral thesis."

calendar

September	14-16: 20:	<ul style="list-style-type: none"> • ESA Course Stakeholders module part 1 • Colloquium at the Embedded Systems Institute Prof. D.L. Parnas (Uni. Limerick) 16:00 – 17:30 hrs
October	6-7: 20:	<ul style="list-style-type: none"> • ESA Course Stakeholders module part 2 • Architecting Event (closed meeting)
November	2: 3-4: 9-10: 16-18: 22-24:	<ul style="list-style-type: none"> • Colloquium at the Embedded Systems Institute 16:00 – 17:30 hrs • ESA Course Software module – optional block • NEW: CAFCR Course Part 1 Instructor dr. Gerrit Muller • ESA Course Software module part 1 • NEW: CAFCR Course Part 2 Instructor dr. Gerrit Muller
December	7-10: 13-17: 21:	<ul style="list-style-type: none"> • ESA Course Software module part 2 • NEW: SARCH Course Instructor Frank Pijpers • Colloquium at the Embedded Systems Institute 16:00 – 17:30 hrs
2005 January	18-20:	<ul style="list-style-type: none"> • ESA Course Software module part 3
February	28:	<ul style="list-style-type: none"> • ESA Course Silicon module part 1
March	1-3:	<ul style="list-style-type: none"> • ESA Course Silicon module part 1
May	24-26:	<ul style="list-style-type: none"> • ESA Course Systems module

Course Systems Architecting

December 2004 the ESI will offer a five-day course on Systems Architecting (SARCH). This is a valuable extension of ESI's knowledge transfer portfolio. The target audience consists of (potential) architects and stakeholders that cooperate intensely with the architect, such as project leaders, product managers, and group leaders. The maximum number of participants is 16. The course is based on a specific vision on the role of a system architect. According to that vision a system architect is responsible that a system fits in the context and that a system has a sound design. The architect collaborates with many other people in the product creation, such as project leaders, product managers, and more specialized engineers. The architect needs a significant amount of technical and non-technical know-how and a lot of

skills to perform this job. The course follows the principle of viewpoint hopping. Time boxing is applied: a half-day is reserved per viewpoint.

Nine viewpoints are used:

1. System Architecture Process
2. Role and Task of the System Architect
3. Requirements Capturing
4. System Architect Toolkit
5. Road mapping
6. Product Families, generic developments
7. Documentation, reviewing and other supportive processes
8. The role of Software in complex products
9. Psychosocial side

See www.embeddedsystems.nl, knowledge transfer for dates, subscription, and course material.

Embedded Systems Institute

The goal of the network institute, founded 1 September 2002, is to make industry more competitive with products containing embedded systems, and to stimulate education and research in embedded systems at universities and institutes. The Embedded Systems Institute contributes to this goal by carrying out research projects in an industry-as-laboratory setting, and by consolidating, sharing and transferring the knowledge thus acquired.

Participation in research projects is open to any interested party.

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