

Annual report ICES 2015

ICES board

The Board members during 2015 are listed in appendix A.

The Work group leaders during 2015 are listed in appendix B.

Participants

During the year ICES has increased its number of participants by 1. The total number of ICES company members 2015-12-31 is now 26. New member during 2015 is Knightec.

Goals

On November 25th ICES had a strategy meeting focused on how we can help and develop our industrial competence groups (earlier called focus groups). The strategy conference gathered about 15 persons and several useful new ideas surfaced. To streamline competence groups, support from ICES will be clarified and strengthened (now also including partial funding of activities); responsibilities of the group will also be clarified.

Students

This year ICES has invited student members on the board to get input on the progress of the Embedded Masters education from the student perspective.

ICES helped to organize a summer school at KTH on Cyber-physical systems during the summer of 2015. The school was fully booked. Speakers included Martin Törngren and competence group leader Fredrik Asplund, as well as representatives from member companies including ABB and Scania.

Seminars, workshops, conference, courses

ICES arranged a dozen events during the year. Two of them were major events each attracting about 100 participants. One of them was the 3rd Scandinavian Conference - System and Software Safety, with excellent participation from multiple industrial domains and university disciplines. In particular, the conference keynote and the 2nd day with several workshops stimulated discussions and exchange in the spirit of ICES. The increasing interest in safety, mirrors the spread and societal impact of embedded and Cyber-Physical Systems. The safety conference has a potential to establish itself as the Swedish industry-academia event on Systems and Software safety and will be held also 2016. The arrangement was a joint effort by ICES and Addalot.

The other major event during the year was ICES annual Conference; the conference took place in IVA's Konferenscenter in Stockholm. The topic this year was IT-security for embedded systems. IT-security is becoming a crucial issue as embedded systems are becoming connected and spreading all over society, in everything from electricity meters to smart vehicles. A large need exists to increase the awareness and maturity of traditional industry companies in this area. At the same time there is a large need of competence development, sharing of best practices, and further development of methodology, guidelines and standards. The conference was focused on:

- Which are the large security threats today?

- What can we do to protect us?
- What does Swedish industry do within IT-security?

In total ICES arranged the following events during 2015:

- January 15: ICES Focus Group R & D Managers Meeting on the theme “The Cyphers project”
- January 13: Software Testing - Fundamentals and Emerging Technologies, one day course given by Karl Meinke.
- February 5: ICES Workshop on Data/Tool Interoperability for Systems Engineering
- March 10-11: Co-Summit (jointly organized by ARTEMIS and ITEA).
- April 23: ICES Focus Group R & D Managers Meeting on the theme: ”The socioeconomic consequences of digitalization”
- March 24-25: 3rd Scandinavian Conference – System and Software Safety. This was a joint event between ICES and Addalot.
- May 29: GPU computing for scientific simulations
- June 3: INCOSE, The Nordic Systems Engineering Tour
- Oct 15: ICES Focus Group R & D Managers Meeting on the theme “How to achieve a more competitive Sweden?”
- Nov 3-4: ICES was participating in Embedded Conference Scandinavia in Kista
- Nov 4: Linked-Data and OSLC for Tool Interoperability – A hands-on tutorial
- Nov 25: Internal ICES membership and strategy meeting
- Nov 25: ICES annual conference, this year with focus on IT-Security
- Dec 7: Emerging Opportunities in Autonomous Systems

Marketing

In September ICES Director Martin Törngren was interviewed on SVT’s show Gomorron Sverige about the future development of autonomous vehicles. Today there are already technical systems that provide limited autonomy, for example, cars with emergency braking. KTH is working intensely within this area and is collaborating with Ericsson, Scania and Volvo cars among others, with the purpose of achieving safer driving and more efficient transports. See the whole interview through the link: [Självstyrande bilar snart i en bilkö nära dig?](#)

During the year ICES has sent 3 Newsletters to its subscribers. We presently reach about 1600 subscribers across both academia and companies. We have also started to market each new event as soon as it has become published on ICES web.

Network

ICES has started up a new competence group on Interoperability. Contact person is KTH researcher Frederic Loiret. The group is focused on interoperability across engineering tools, models, engineering disciplines and other life-cycle assets in order to increase the efficiency of software development processes for Systems Engineering. The competence group has already shown a lot of activity such as arranging a hands-on tutorial on Linked-Data and OSLC for Tool Interoperability.

The competence groups active during 2015 are listed below.

Competence group	Leader
Safety	Fredrik Asplund (ITM/KTH)
R&D managers	Anders Eklund (ICES)
Testing of embedded systems	Karl Meinke (CSC/KTH)
Architecture for Autonomous Systems	Viacheslav Izosimov (ITM/KTH)
Embedded Real Time Systems	Ingo Sander (ICT/KTH)
Interoperability	Frederic Loiret (ITM/KTH)

Research

Vinnova during 2015 opened a call for competence centres. ICES has been very active in putting together a first proposal for a KTH hosted centre application with focus on complex SW intensive systems. ICES and several of our member companies have been working together with the ACCESS centre and the recent SW initiative at KTH to create the proposal for such a new centre, tentatively named COSIS – Complex Software Intensive Systems. The work on the proposal during the autumn has been very lively and we have had several coordination meetings and writing workshops including both the KTH parties and companies to develop the proposal. Even non-ICES companies have shown an interest and participated actively in the work. The deadline for the first proposal was January 2016. Some of the applications will be selected by Vinnova during 2016 and allowed to hand in a full application. Start is in 2017.

According to an agreement with KTH, ICES provides for KTH's representation in the ARTEMIS Industrial Association. KTH representatives attend ARTEMIS meetings (including brokerage events) and provide feedback to ICES members.

CPSELabs is a new H2020 Innovation action project (2015-2018) in which KTH is a core partner (Martin Törngren was part of the consortium who wrote the winning proposal; the project is coordinated by fortiss in Munich). CPSELabs (<http://www.cpse-labs.eu/>) has the purpose to stimulate innovation eco-systems related to Cyber-Physical Systems (CPS). Key activities include sharing of best practices and innovation experiments. There are very strong synergies between ICES and CPSELabs, and part of the CPSELabs budget directly contributes to ICES activities including competence groups, training/education and innovation related activities.

Economy

The direct costs of ICES amounted to approximately 1,988 kSEK.

The main sources of income were as follows:

- Member contributions: 905 kSEK

- KTH rektorskontrakt: 500 kSEK (through ITM school)
- ICT platform project grant: 200 kSEK
- CPSE labs project: 439 kSEK
- Support by Swedsoft: 50 kSEK
- Other incomes: 202 kSEK (primarily incomes from organized conferences)

The main costs were as follows:

- Salary costs: 1 407 kSEK
 - Martin Törngren, Director, 20%;
 - Johanna Olsson, administrator, 40%;
 - Anders Eklund, Co-director, 50%
- Conference/seminars: 191 kSEK

A very important part of the ICES network is that of in-kind efforts by industrial and KTH participants in ICES activities¹. A rough estimate of the financial equivalent of this in-kind corresponds to 1,4 MSEK (with a majority provided by industry).

It is recognized that ICES as a catalyst contributes to the creation of a number of activities, be it research projects or educational programs. ICES has for example been successful in launching collaborative ARTEMIS research projects involving a number of KTH research groups and companies, as part of a larger ARTEMIS project (examples include CESAR, MBAT and iFEST). In education, ICES contributed strongly to the creation of the KTH masters program in embedded systems. While activities such as these fall outside the budget of ICES, they constitute a clear indication of the impact of ICES.

To give an indication of this impact we consider the following figures:

- Budget of the KTH Embedded Systems masters program: 5 MSEK
(~100 kSEK per year per student, about 50 students in year 1 and 2)
- Budget of CPSELabs apart from the funding that goes to ICES: ~4 MSEK.

The total estimated turnover for 2015 relating to external catalysed budgets, thus equals, $1,4 + 5 + 4 \Rightarrow 10,4$ MSEK.

Given a nominal budget of about 2 MSEK, we thus see a 5-fold multiplication effect of ICES, and this is also only for the efforts we are aware of.

¹ The estimation considers work by the ICES board chairman, board participants, work group leaders and participants, competence group leaders and participants, seminar and conference preparation, and seminar/conference contributions, amounting to in total about 200 days of full work.

Appendix A, Members of ICES board 2015

Member Company/school

Tor Ericson [Chairman], ÅF
Martin Törngren [Director], ICES, KTH, ITM school
Anders Eklund [Co-director], ICES
Stefan Svensson, ABB
Joakim Gustafsson, Atlas Copco Industrial Technique
Catrin Granbom, Ericsson
Mats Magnusson, KTH, ITM school
Karl Meinke, KTH, CSC school
Johnny Öberg, KTH, ICT school
James Gross, KTH, EES school
Carl-Gustav Jansson, KTH, ICT school
Peter Sandberg, MathWorks
Jonas Mann, Prevas
Stefan Andersson, Saab
Lars-Gunnar Hedström, Scania
Thomas Takanen, Stoneridge Electronics

Appendix B, ICES work groups 2015

Work group Leader Company/school

Education: Johnny Öberg KTH, ICT school
Student co-operation: Johnny Öberg KTH, ICT school
Continued education: Joakim Gustafsson Atlas Copco Industrial Technique
Focus groups: Anders Eklund, ICES
Conference: Tor Ericson, ÅF
Seminars: Anders Eklund, ICES
Project: Martin Törngren, ICES, KTH, ITM school
Marketing: Jonas Mann, Prevas
Internal processes: Anders Eklund, ICES