Annual report ICES 2018

ICES board
The Board members during 2018 are listed in appendix A.
The Work group leaders during 2018 are listed in appendix B.

Members
During the year ICES has increased its number of members by one. The number of ICES industry members 2018-12-31 is 31. New members on silver level during 2018 are Xylem and Zacco, Bitsim and Sopra Steria both joined on bronze level.

Goals
The new ICES vision and goals document was approved, and implementation started. The changes are related to new goals table where all goals are related to a workgroup.

Students
The student representation in the board, a representative from the Embedded Systems Masters program (as before) one from each of Systems Control and Robotics, and the Mechatronics programs will continue. The extended number students reached and the possibility for the representatives to work as a group have been very successful. The students have suggested three different activities for students and companies to meet, speed dating, Pizza with an engineer and company visits. The first one is on hold, the PwE and the company visits are planned to start in 2019.

ICES arranged a Master Thesis fair for the member companies and the students from the three programs mentioned above.

Seminars, workshops, conference, courses
ICES arranged a total of 19 events during the year. ICES workgroups, competence groups and ICES board meetings amounts to another 15 internal events during the year. A rough estimate of the number of participants in total is 650 (351 registered in ICES web and estimation of R&D managers meetings and safety conference and internal meetings is 300).

The ICES annual Conference was this year a two day event celebrating the 10th anniversary of the network. The topics this year was Creating Complex and Trustworthy Systems and Managing Innovative Eco-systems. A mix of speakers from KTH, invited academic speakers and industry presentations was much appreciated. The keynotes were as follows:
-   Day 1: Self-Explaining Autonomous Systems - the SEE Initiative – by Prof. W. Damm, OFFIS
-   Day 2: Towards Verified Artificial Intelligence Sanjit Seshia, Berkeley University

The 10-year anniversary was also celebrated by a dinner with entertainment.

The 6th Scandinavian Conference on System and Software Safety had excellent presentations from multiple industrial domains and university disciplines. A total of 78 people participated in the conference.
The increasing interest in safety, mirrors the spread and societal impact of embedded and Cyber-Physical Systems. The safety conference has established itself as the Swedish industry-

academia event on Systems and Software safety. Arranging the event is a joint effort by ICES and Addalot.

The new meeting series Coffee with and expert is an effort to share knowledge in an informal way. The format is a short presentation (40min) and discussions. The events are open for everybody and free of charge (see below for these events during 2018).

ICES arranged, sponsored or participated the following events during 2018:

Date	Event
2018-01-15	Matchmaking event - Industry and academia
2018-01-23	R&D Managers meeting - Artificial Intelligence
2018-01-30	Introduction for new participants in Competence groups
2018-02-06	Interoperability Coordination Forum (ICF) Workshop in Berlin
2018-03-13	Systems engineering for future complex CPS
2018-03-22	One day course: Software Testing - Fundamentals and Emerging Technologies (Cancelled - new date will be set)
2018-04-19	Coffee with an expert - Professor Edward A. Lee - Living Digital Things
2018-04-24	Nordic Systems Engineering Tour
2018-05-15	R&D Managers meeting - Jonas Wigander from Ericsson
2018-05-17	Coffee with an expert - Professor Peter Marwedel - Drilling holes into the walls between disciplines
2018-05-21	6th Scandinavian Conference on SYSTEM & SOFTWARE SAFETY
2018-06-08	Real-time computing and platforms vs. Smart algorithms and application of tomorrow
2018-06-12	Cybersecurity and Privacy (CySeP) Summer School
2018-06-16	Midnight Sun CTF 2018
2018-08-22	Coffee with an expert - Elena Fersman, Artificial intelligence and machine learning, what's next
2018-09-06	R&D Managers meeting - Intellectual Property in a digital world
2018-09-27	ICES 10th Anniversary Conference day 1: Managing Innovative Eco-Systems
2018-09-28	ICES 10th Anniversary Conference day 2: Creating Complex and Trustworthy Systems
2018-10-02	Degree project fair
2018-10-25	Coffee with an expert - Serge de Gosson de Varennes, SopraSteria and Didem Gürdür, KTH
2018-11-05	OSLC and Linked Data Unconference
2018-11-22	Coffee with an expert - Innovating the manufacturing industry by Machine Learning & Edge Computing
2018-12-10	CANCELLED (new date to be decided) One day course: Software Testing - Fundamentals and Emerging Technologies
2018-12-10	Exhibition and presentation of student projects

Marketing

New presentation material was developed during 2018 and this will continue during 2019.

Using LinkedIn and Facebook to market events have in some cases proven successful, especially targeting students.

The new vision and goals document is easier to read and follow up is improved because of the alignment of the goals and the workgroups.

Improved newsletter design and distribution by Mailchimp

During the year ICES has sent 5 Newsletters to its subscribers. We presently reach about 1700 subscribers across academia and industry.

In the process of the COSIS application and in the following cooperation with CASTOR, it became clear that a ICES is quite unique in its networking function over time. This is influencing the way we describe the center.

Embedded Conference Scandinavia, ICES had a booth also this year.
At "Smarter Industry", ICES arranged two mini- "Coffee with an expert"

ICES sponsored the following activities/organisations during 2018:
Summer school for girls at Vetenskapens hus
Cybersecurity and Privacy (CySeP) Summer School
Midnight sun CTF
Mentorspace

ICES have contributed to a summer school activity arranged by Vetenskapens hus for 200 girls aged 11-15 to increase interest in technology and math. We also have a request for support to the same activity for 2019.

Network competence groups

The competence groups active during 2018 are listed below.

Competence group	Leader
Safety	De-Jiu Chen (ITM/KTH)
R&D managers	Anders Eklund (Prevas)
Testing of embedded systems	Karl Meinke (CSC/KTH)
Architecture for Autonomous Systems	Viacheslav Izosimov (ITM/KTH)
Embedded Real Time Systems	Zhonghai Lu (new)
Interoperability	Frederic Loiret (ITM/KTH)
System Engineering	Erik Herzog (Saab)

Interactions and Catalyzing Projects

The Nordic IIoT Hub (funded by NordForsk) is continuing to gather momentum, as a Nordic academic network on the Industrial Internet of Things, with partners in Denmark (DTU as coordinator), Sweden (KTH and LTH), Finland (Aalto) and Norway (NTNU). KTH(ICES) is working on continued education together with LTH. We also spend efforts to digitalize more of our networking activities (e.g. recording invited talks) to make them available also for our hub partners.

The KTH Innovation Hub on Industrial Digitalization is hosted by the Mechatronics and Embedded Control Systems Division at KTH and is also closely associated with the ICES center at KTH. The Stockholm based Innovation Hub is aiming to become an active core of the Sweden innovation ecosystem related to CPS and IIoT. We are located in the intersection between industry, academic research and education, as well as a multitude of innovation actors. As part of KTH we also have a large international network to leverage. The hub was

during 2018 registered as a Digital Innovation Hub with the the EC
(http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-catalogue).

CASTOR – the KTH center on Software technology is now inaugurated, and the immediate
focus is getting research started. ICES will strive to establish collaboration with CASTOR
regarding networking and other potential synergistic activities.

FED4SAE, KTH is a member of the EU Project FED4SAE. FED4SAE is a H2020 innovation
project which is part of the Smart-Anything-Everywhere Initiative under the Horizon 2020
Leadership in Enabling Industrial Technologies (LEIT). The three-year project aims to
facilitate the acceleration of European Cyber-Physical System (CPS) solutions to market and
will boost digitization of European industry by strengthening companies' competitiveness in
the CPS market.

MERIT - Methodology for Architecting Intelligent Trustworthy Infrastructures for Cyber-
Physical Systems (CPS) is a Vinnova funded research project. MERIT has the goals to, (1)
develop an architecting method, architecture proposals, and an open demonstrator for critical
CPS infrastructures, and (2) strengthen the strategic research agenda developed by the COSIS
consortium. The project targets the challenges of ensuring security, safety and resilience
properties for increasingly software intensive, automated, connected and large-scale CPS,
acting in increasingly complex environments.

TECoSA, is a Vinnova competence center proposal focusing on Trustworthy Edge
Computing Systems and Applications. The proposal will be evaluated during the spring of
2019.

Economy

The main sources of income were as follows:
- Member contributions: 787,500kSEK
- KTH rektorskontrakt: 500 kSEK (through ITM school)
- CPSE labs project (ICES part):   747 kSEK
Total income: **2034 KSEK**

The main costs were as follows:
- Personnel costs: 1 724 kSEK
       Martin Törngren, Director, 10%;
       Johanna Olsson, administrator, 40%;
       Stefan Norrwing, Co-director, 50%
       Conference/seminars: 209 kSEK
Total cost: **1933kSEK**

Total result for ICES 2018   **101kSEK**

The impact of ICES can be observed in many ways among them the ES Masters programme was initiated from ICES and is monitored via the student representatives and the education and student interaction workgroup. Another important influence of ICES is achieved by meeting the minister for higher education and research.

A very important part of the ICES network is that of in-kind efforts by industrial and KTH participants in ICES activities[1]. 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, for example research projects or educational programs. ICES has for example been successful in launching collaborative research projects involving a number of KTH research groups and companies (see above for recent examples!). 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.

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[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 2018

Member Company/KTH
Tor Ericson [Chairman], ÅF
Martin Törngren [Director], ICES, KTH, ITM school
Joakim Gustafsson/Tobias Söreling, 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
Maria Månsson, Prevas
Daniel Wengelin, Saab
Lars-Gunnar Hedström, Scania
Thomas Takanen, Stoneridge Electronics

ICES Admin:
Stefan Norrwing [Co-director], ICES
Tobias Vahlne KTH
Johanna Olsson KTH

Student representatives:
Embedded Systems – Kajsa Hjort/Jacob Cederlund
Mechatronics – Johan Ehrenfors/Joel Greberg
Systems control and Robotics – Daniel Eriksson

CASTOR representatives:
Benoit Baudry
Stefan Hagdahl

Appendix B, ICES work groups 2018

Work group Leader Company/school
Education and Student interaction: Johnny Öberg KTH, ICT school
Continued Education: Johnny Öberg KTH, ICT school
Marketing and member involvement: Stefan Norrwing ICES
Competence groups: Stefan Norrwing, ICES
Learning Network: Stefan Norrwing, ICES
Interactions and catalysing projects: Martin Törngren KTH
Management: Stefan Norrwing, ICES