

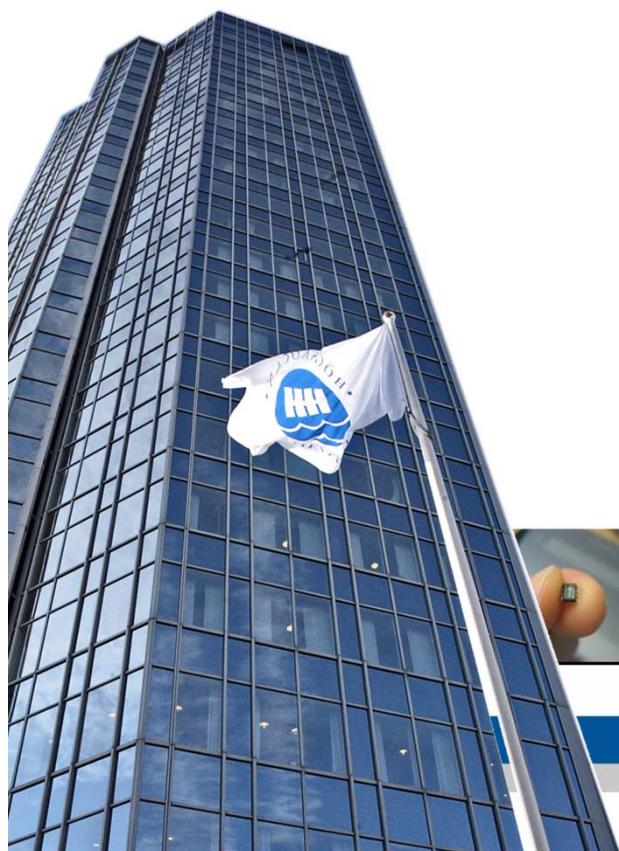
CERES – Centre for Research on Embedded Systems

Co-operating Smart Embedded Systems

- Internationally known research centre
- Research in co-production with industry
- Education at PhD, Master and Bachelor levels
- Productive innovation environment

I SAMARBETE MED

KK-stiftelsen



CENTRE FOR RESEARCH ON EMBEDDED SYSTEMS

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Welcome to CERES Open Day 20 September 2011

A Research Dialogue with
Industry, Colleagues, and Students

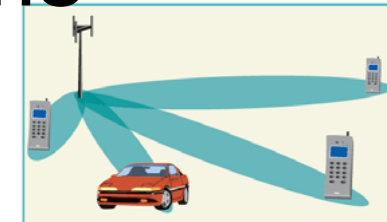
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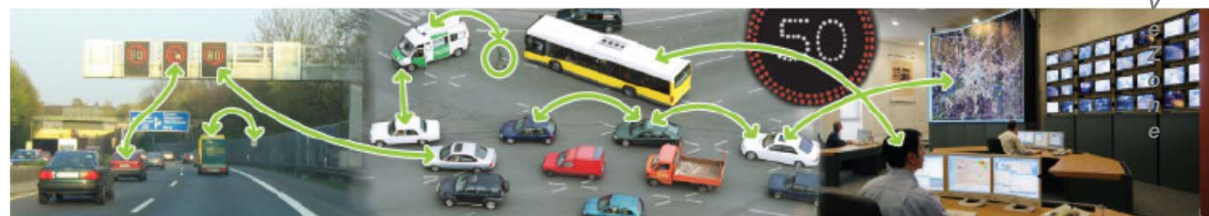
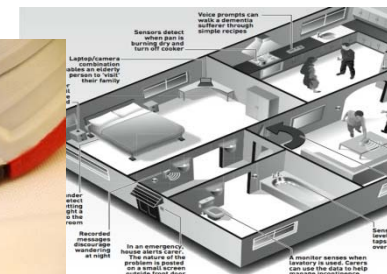
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”Cooperating Embedded Systems”

- Co-operation between and within embedded systems as an enabler for new and improved products, services and processes



- Three prioritized application areas:
 - Advanced sensor and communication systems
 - Health technology
 - Traffic and transport



Source: CVIS, 2008

- Research – Innovation - Benefit



CERES – a KK Profile

Profile:	2005 – 2011	6 years
Profile+:	2011 – 2013	2 years

A profile

- Is established as a sustainable research environment
- Is prioritized by the university
- Has a rich academic and industrial network
- Has a clearly identifiable research profile of high relevance to industry
- Has strong research competence
- Has a good international reputation



From Profile to Profile+

A profile+, in addition:

- Has developed a research edge with high scientific quality in an international perspective
- Is attractive for international research cooperation
- Is active in international networks and collaborations

Final Evaluation of CERES as Profile



- CERES evaluated together with three other KK Profiles
- Report:

”Utvärdering av
KK-stiftelsens
profilsatsningar
STC@MIUN,
Infusion, CERES
och Biofilms”

Technopolis, maj 2011

Available at www.kks.se



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Excerpts from the Report

“For each profile, **three prominent experts** have been appointed, one from Sweden and the other two from abroad.”

“All experts consider the profile to be **internationally competitive**, and they note a marked growth of both the research environment and the research education.”

“The research at CERES is generally assessed as being of **high or very high quality**, particularly within parts of the field embedded systems.”

“In the area of **innovation** CERES is judged to have achieved a great deal ("**outstanding**", "**excellent**") in terms of patents, prototypes and services, which reflect a clear and defined focus on industry relevant research problems. This is remarkable in light of the group's relatively small size.”

Further Excerpts: Industrial Relevance

“From an industry perspective, the "right" projects have been run, and they have fully met the needs of industry. The **relevance is high** for all different types of companies who have been involved, regardless of business sector or size. The results have been **useful** for businesses in different ways, ranging from a very tangible impact on the redesign of a product, through training or patents, to **foresight studies** of future technical solutions.”

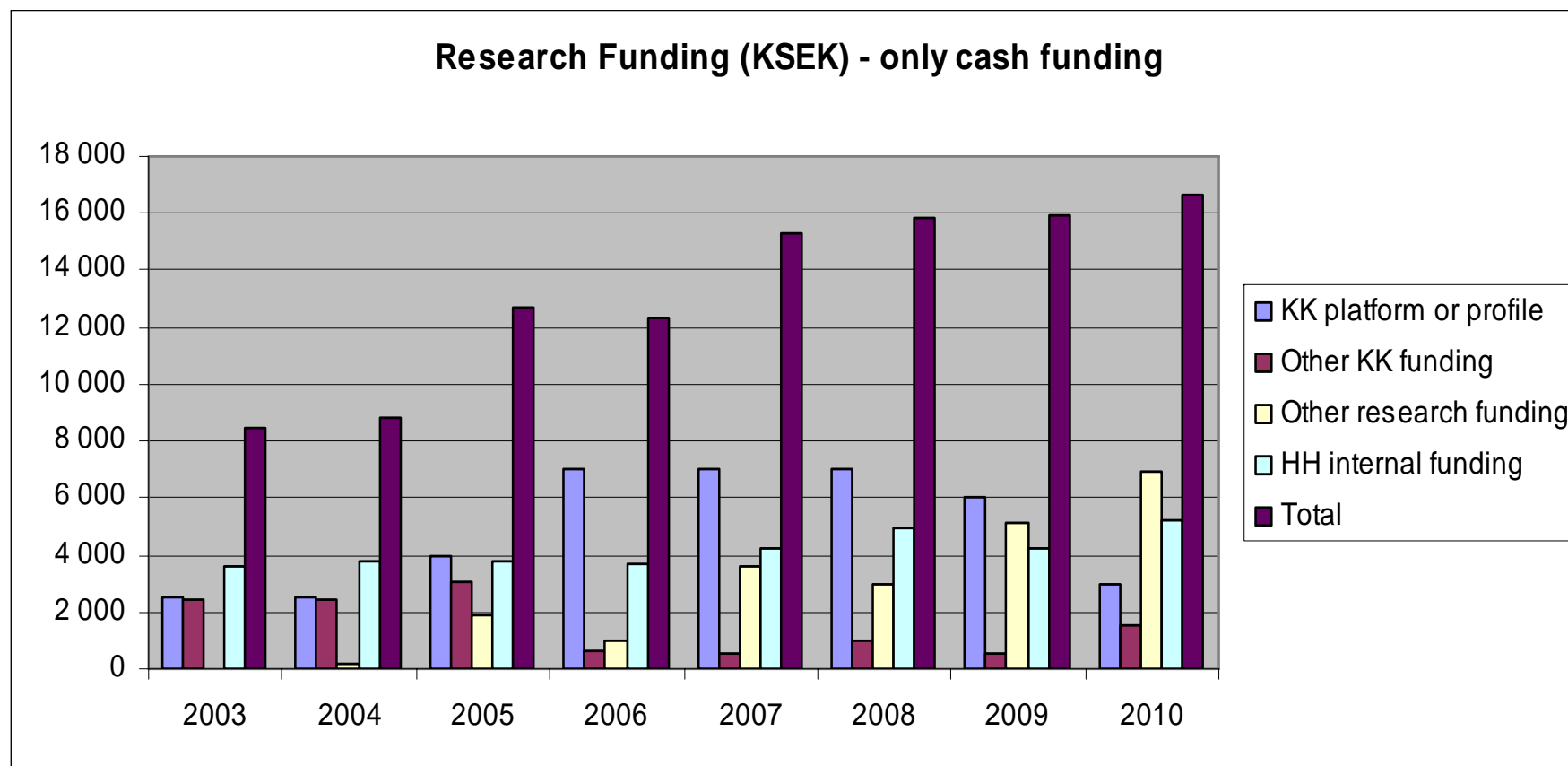
“In the light of what has emerged in this evaluation, CERES has **come a long way** in building and consolidating an **internationally competitive** research environment in a **well-defined and industry relevant knowledge area.**”



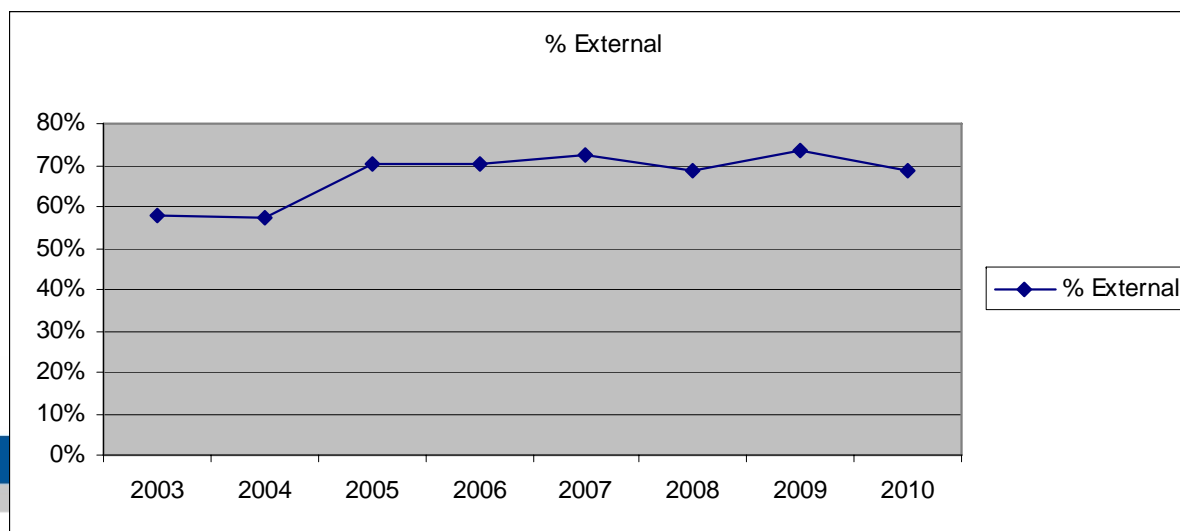
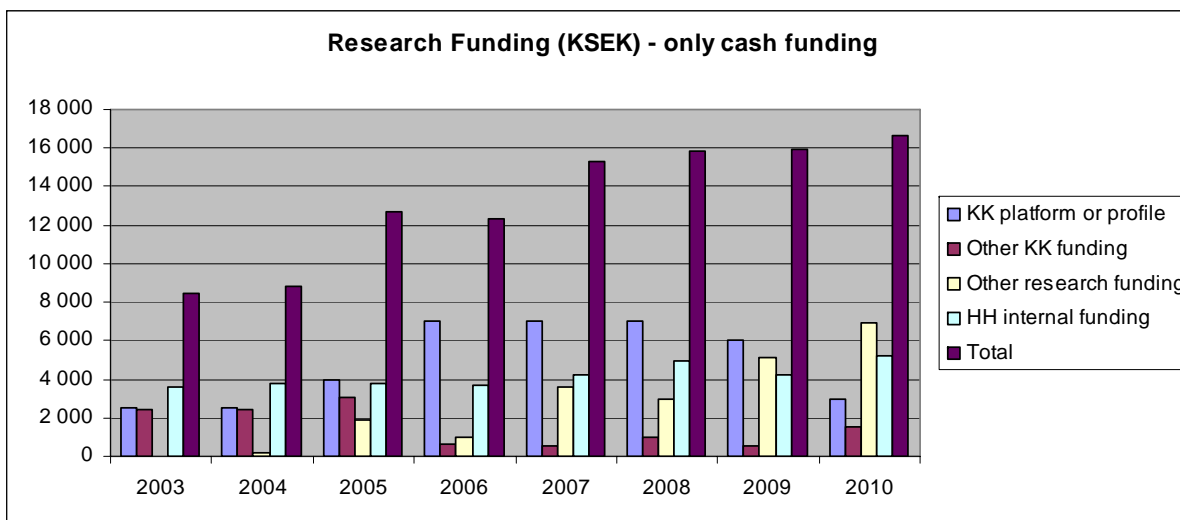
Importance to the University

“The profile has furthermore contributed to the **university's strategic development** in research and education, and to business development. The profile area represents a very important part of the university's activities. Its research has been a major contributor to the university receiving the **examination rights** at undergraduate and postgraduate levels.”

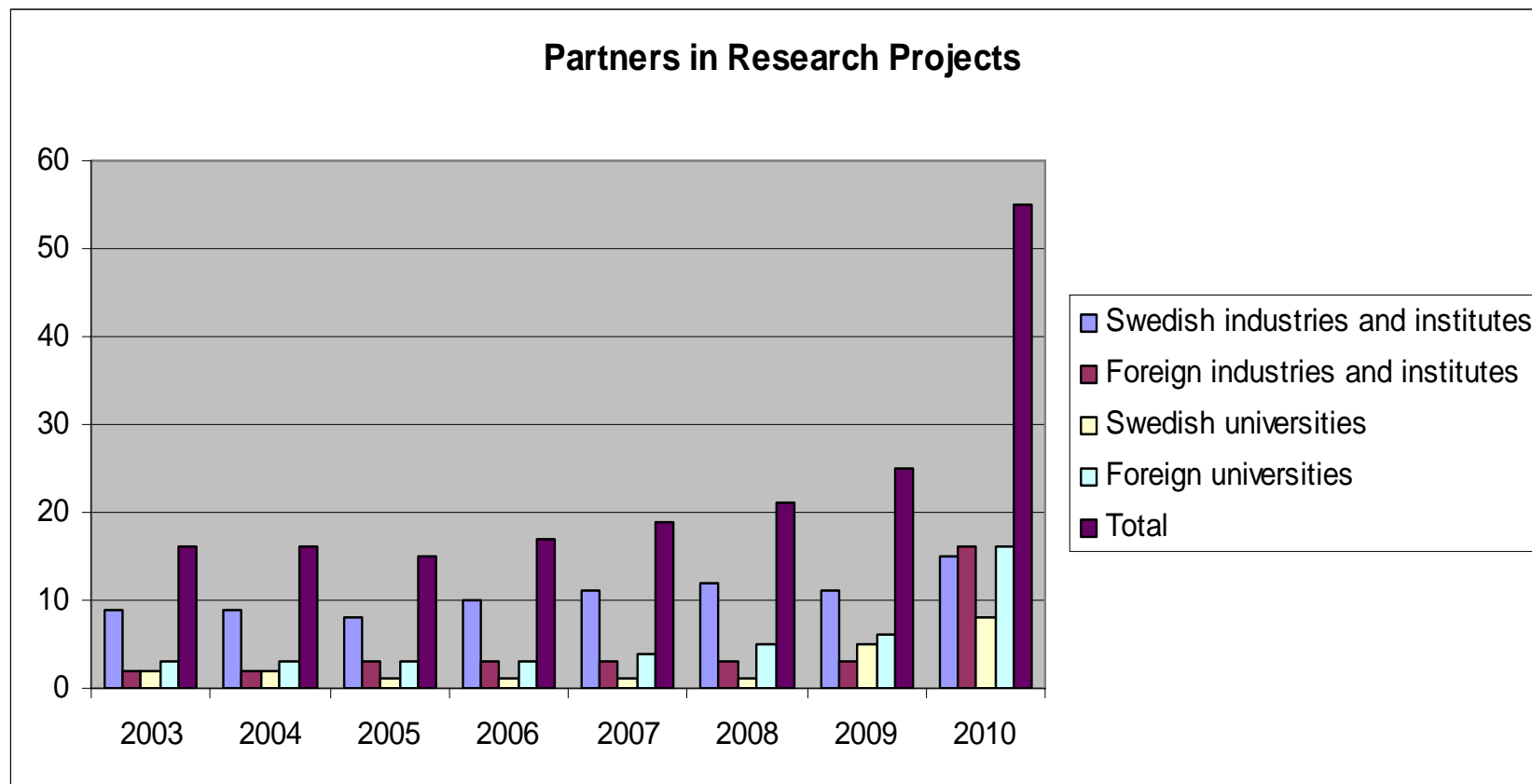
Research Funding (1)



Research Funding (2)



Partners



CERES+ Focus: Cooperating Smart Embedded Systems

- Smart cooperation and communication
 - E.g. cross-layer design
- Smart programming and execution
 - E.g. situation adaptation and energy efficiency

THE EXPERTS:

The research is generally assessed as being of high or very high quality, with particularly strong contributions in a few areas:

- Mobile Ad-hoc networks, Wireless real-time communication, Active RFID and energy-aware protocols, Energy efficient wireless sensor networks,
- High- level languages for protocol stack implementation, Models for performance evaluation of multi-and many-core platforms, Schedulability analysis, Architectures for memory intensive signal processing

CERES+ Goals (1)

- **Scientific Goal:**
Establish ourselves as leaders in the international scientific community within the following areas:
 - Efficient methods for dependable real-time communication
 - Efficient methods for programming of embedded parallel computers
 - Efficient methods for modelling and simulation of cyber-physical systems



CERES+ Goals (2)

- **Activity Goals:**
 - Increased visibility
 - Increased international collaboration
 - Strengthened collaboration with industry
 - Increased research volume



How?

- Industry projects with international participation
- Projects with key international partners
- International exchanges ("Bridges")
- International seminar series ("The Halmstad Colloquium")

CERES+ Projects

Co-production projects with industry

- VehicleNets
Dependable Real-Time Services in Vehicular Ad Hoc Networks
- MaCCWiN
Management Challenges in Cognitive Wireless Networks
- JUMP
The JUmP to Manycore Platforms

International projects

- A Virtual Test Bed for Smart Micro Grids
- Hierarchical Temporal Memory on Manycores

- The Halmstad - Vienna Bridge
- The Halmstad - Rio Grande do Sul Bridge
- The Halmstad - Maryland - Berkeley Bridge

- The Halmstad Colloquium

Research for new-recruits

- Core Enabling Technologies for Acumen

Partners

Volvo, SP

SAAB

Free2move, SAAB, Adapteva
(US)

Portland State University
Portland State University,
Numenta (US), Nethra (US).

TU Wien, FTW (Austria)
UFRGS (Brazil)
Univ Maryland, UC Berkeley
(US)

UC Berkeley (US)



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09.30-10.00	High-Level Programming of Reconfigurable Systems	Zain-ul-Abdin
10.00-10.30	Ultra Low Power Radio for Pervasive Computing	Emil Nilsson
10.30-11.00	Coffee	
11.00-11.30	Smart Multicore Embedded Systems	Jerker Bengtsson
11.30-12.00	Improving Support for Modeling and Simulation of Cyberphysical Systems	Walid Taha
12.00-13.00	Lunch	
13.00-14.00	Cyber-Physical Systems: Research Challenges and Industrial Applications	Karl H. Johansson, KTH
14.00-14.30	Automatic Implementation of Protocol Stacks	Veronica Gaspes
14.30-15.00	Coffee	
15.00-15.30	Why Real-Time Communication Matters	Magnus Jonsson
15.30-16.00	Grand Cooperative Driving Challenge	Kristoffer Lidström