

Els Embedded Systems en el context de la quarta revolució industrial a Catalunya

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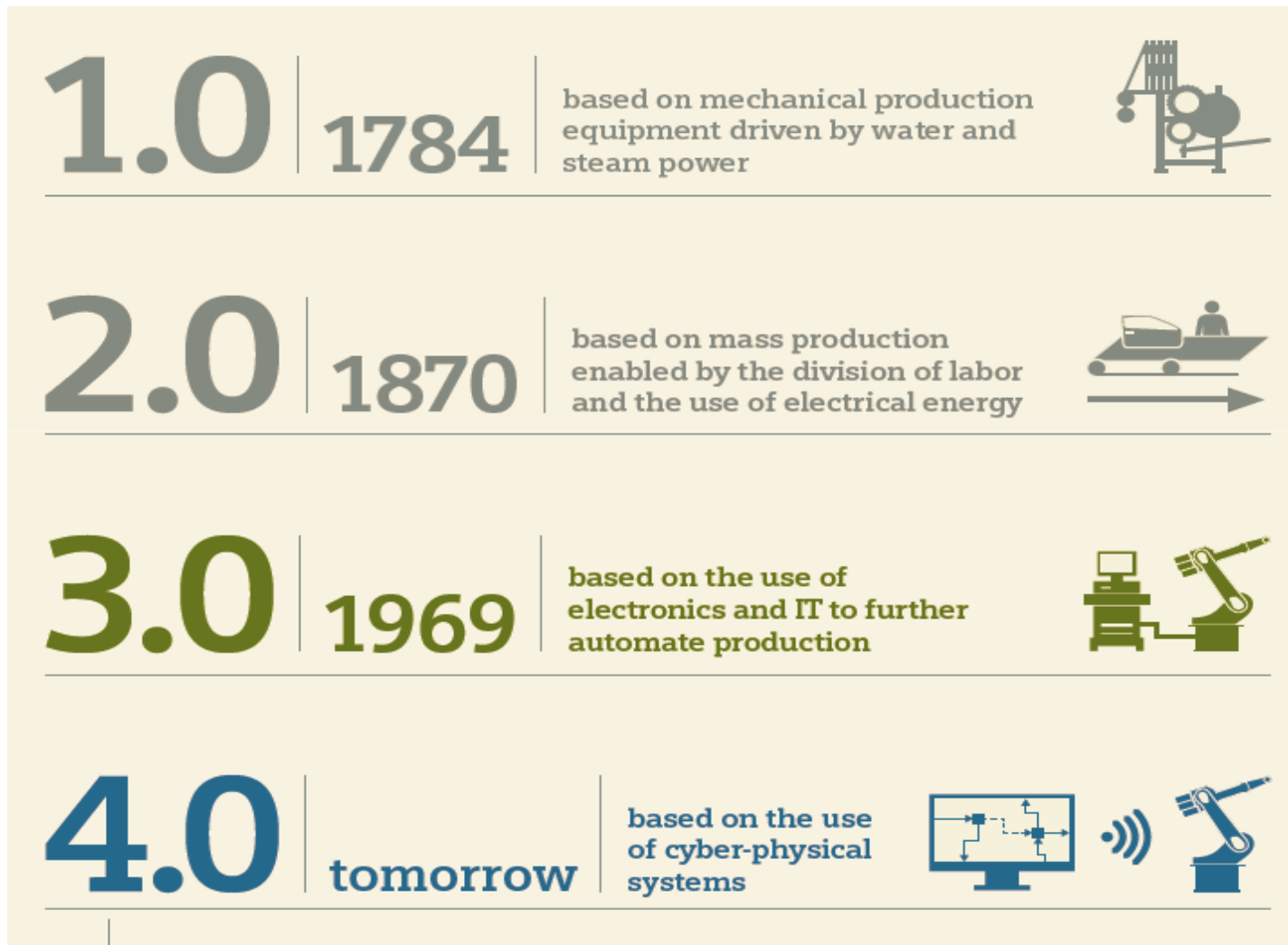
Novembre 2014 – COEIC



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Les revolutions industrials

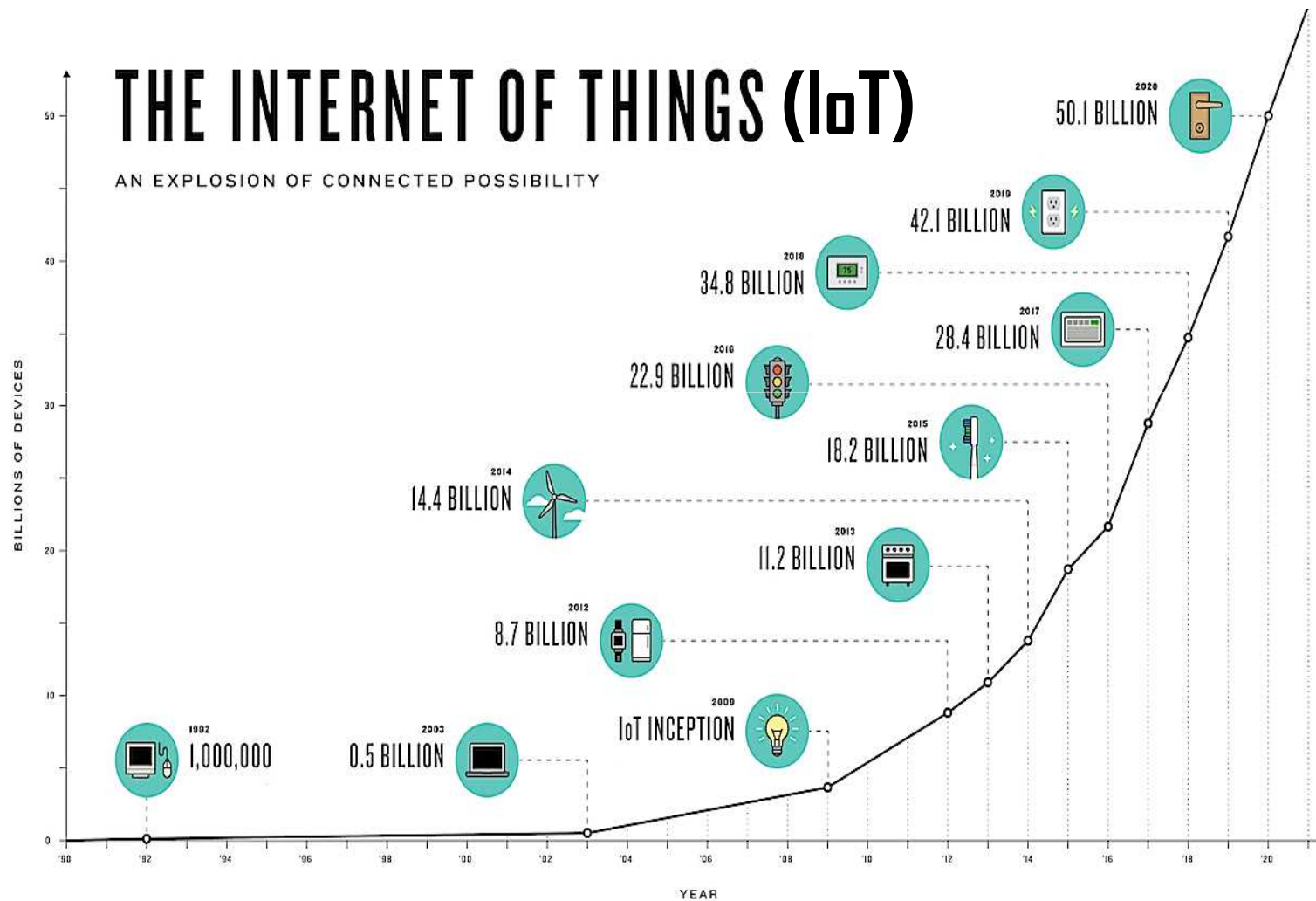
Industry 4.0



01

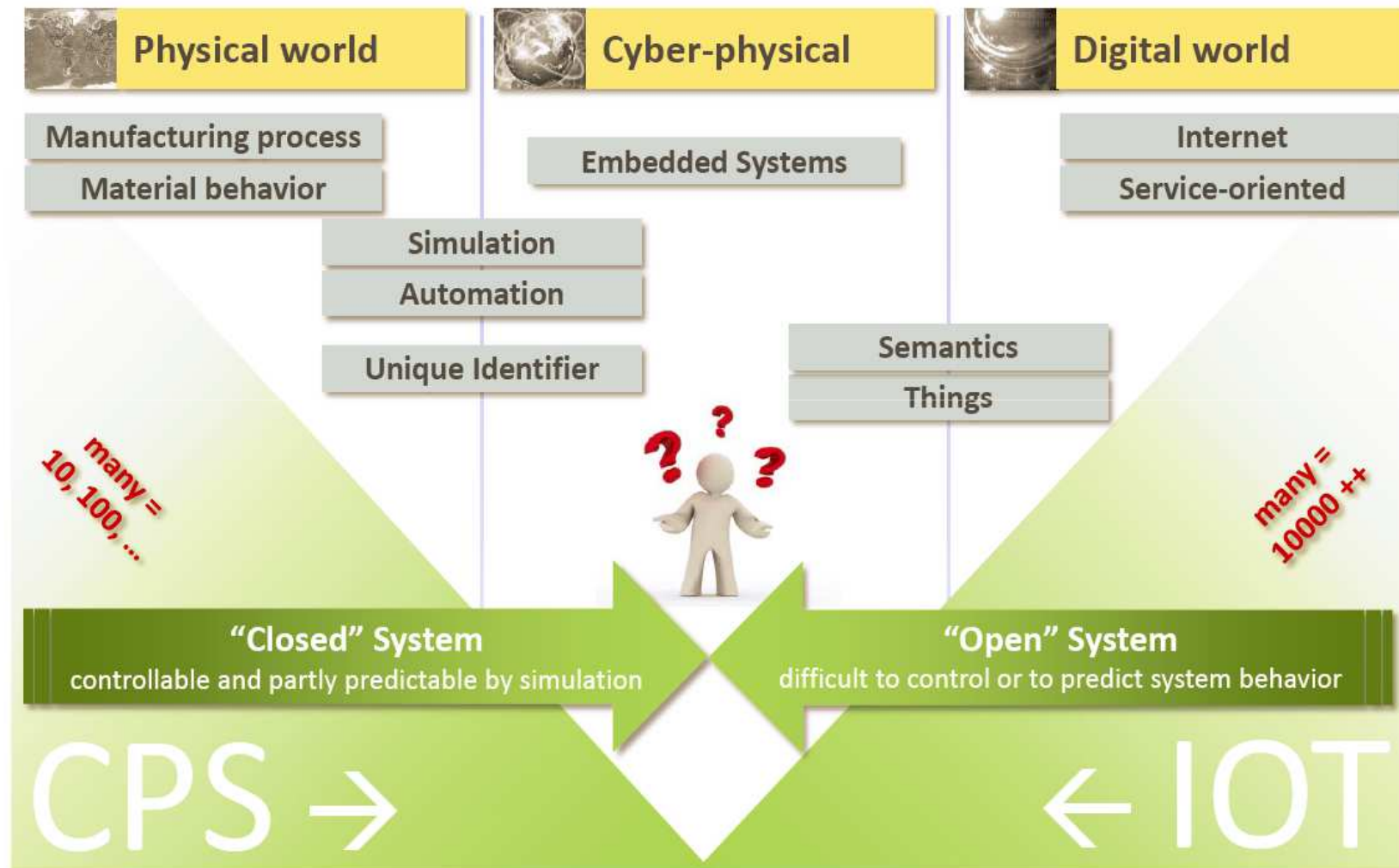
Idees clau de la 4ta revolució industrial

La Internet de les coses i serveis



Font: The Connectivist

Els sistemes ciberfísics



Cyber-physical systems: Joseph Sifakis (Turing Prize 2007)

Proposed Vision

By their nature, **Embedded Systems** need results and paradigms from both **Computing Systems** and **Physical Systems** Engineering

We need a new formal foundation for **Embedded Systems**, which systematically and even-handedly marries **computation** and **physicality** **performance** and **robustness**

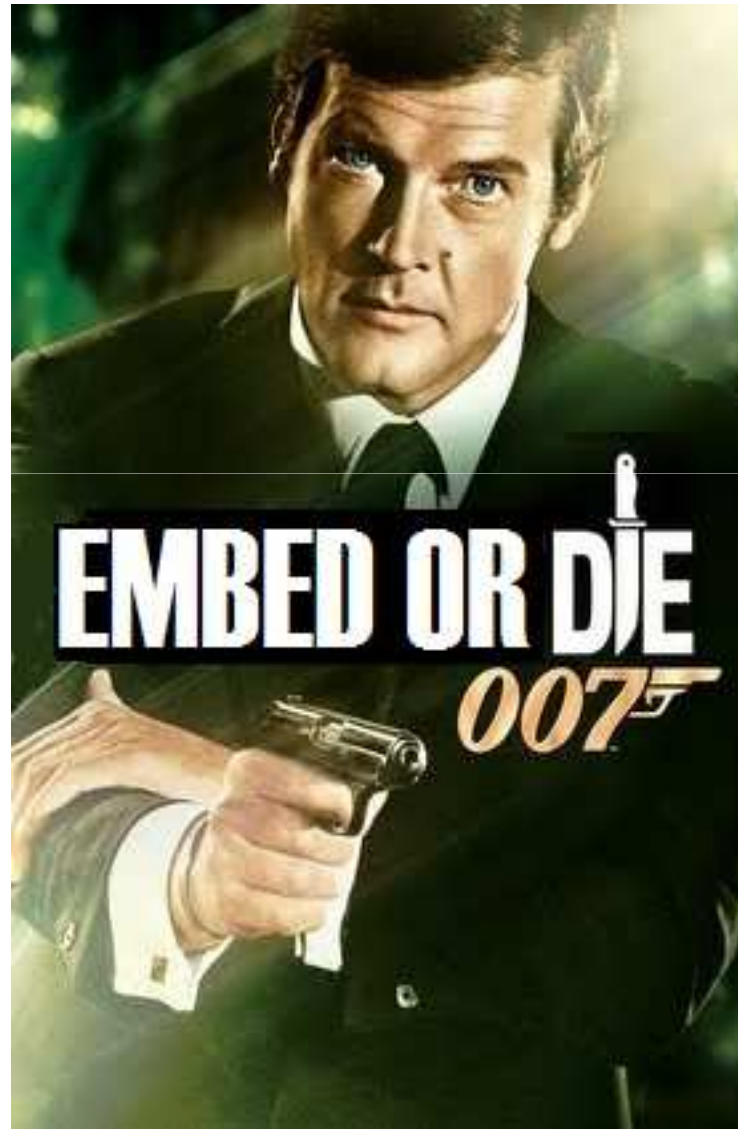
What is being
computed? At what cost?

How does the performance
change under disturbances?
(change of context; change of
resources; failures; attacks)

Mínim cos de coneixement (Document de consens del grup de treball)

- Definició:
“Un sistema embedded és una combinació de maquinari i programari orientada a suportar un conjunt finit i numerat de funcions ben definides, sovint amb capacitats de procés en temps real i integrat en un sistema més gran”
- Classificació dels Embedded Systems
 - Per complexitat (Segons el prof. Raj Kamal)
 - Escala Petita (Microcontroladors)
 - Escala mitjana (DSPs, multicontroladors)
 - Escala sofisticada (Pràcticament un ordinador complet amb sistema operatiu)
 - Segons factor de forma
 - Estándard (SGET, SMARC, QSeven, PC/104, etc)
 - Propi
 - Segons propietat intel·lectual
 - Obert (Open Source Hardware/Software)
 - Tancat
- Un lema:

Lema del grup de treball



02

Cadena de valor a Catalunya: alguns actors

Catalan actors identified: KET providers from the universities



Generalitat de Catalunya
Departament d'Innovació,
Universitats i Empresa

**EL CITCEA-UPC HA ESTAT RECONEGUT GRUP DE RECERCA CONSOLIDAT
PER LA GENERALITAT DE CATALUNYA DURANT EL PERÍODE 2009-2013**



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CITCEA-UPC is a technology transfer centre of the Technical University of Catalonia (UPC BarcelonaTech), specialized in responding to the needs of enterprises to build functional prototypes

www.teknocea.cat



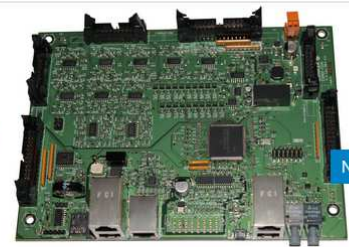
HOME PRODUCTS DEVELOPMENT SYSTEMS ABOUT US CONTACT

"Custom power electronics systems and services"

F28M35 general purpose control board

teknoCEA launches the new general purpose control board at EPE14 conference [+ info]

The CDA01-CU3 is a general purpose control board based on the F28M35 Concerto microcontroller from Texas Instruments for control and automation applications, and will allow you to implement complex control algorithms in any converter typology implemented with the PCO-10T800 three phase, 10 kVA power converter.



- ✓ Power converters, DSP based control cards, HMI with industrial communications
- ✓ Custom cabinets, Custom application systems
- ✓ Application oriented DSP starter kits, educational test-benches

[Development Systems](#) [Products](#)

Catalan actors identified: KET providers from the universities

esaii.upc.edu

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Cerca... CERCA

Departament d'Enginyeria de Sistemes, Automàtica i Informàtica Industrial

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Us donem la benvinguda a la web del departament d'ESAI

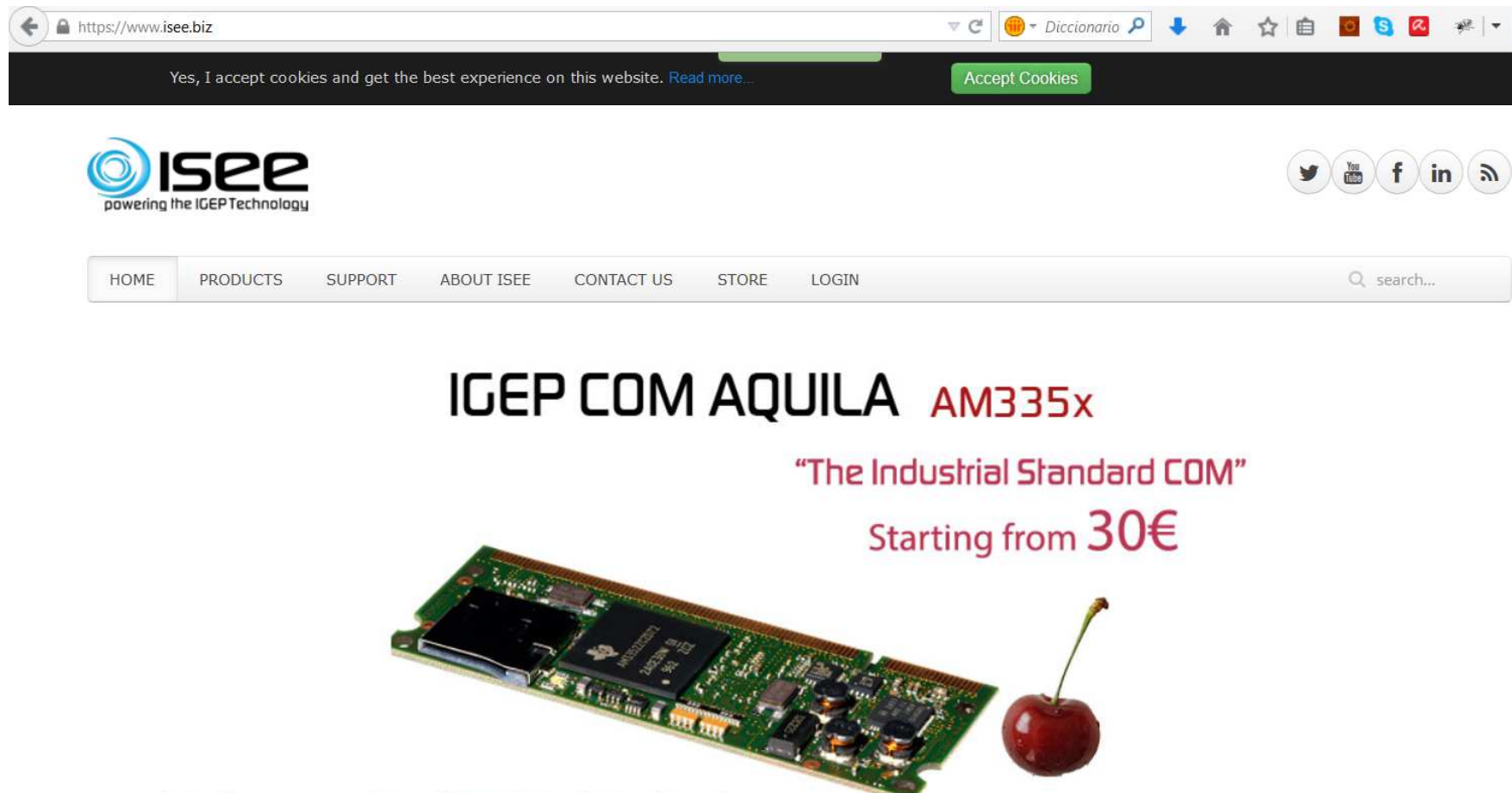
Accés Intranet

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Directori ESAII

Transfiriendo datos desde www.google-analytics.com...

Catalan actors identified: KET providers from the industry



The screenshot displays the Isee website interface. At the top, a browser address bar shows 'https://www.isee.biz'. Below it, a dark banner contains a cookie consent message: 'Yes, I accept cookies and get the best experience on this website. [Read more...](#)' and a green 'Accept Cookies' button. The Isee logo, featuring a blue circular icon and the text 'isee powering the IGEP Technology', is on the left. To the right are social media icons for Twitter, YouTube, Facebook, LinkedIn, and RSS. A navigation menu includes links for HOME, PRODUCTS, SUPPORT, ABOUT ISEE, CONTACT US, STORE, and LOGIN, followed by a search bar. The main content area features the product name 'IGEP COM AQUILA AM335x' in large black and red text. Below this, the tagline '“The Industrial Standard COM”' and the price 'Starting from 30€' are displayed in red. At the bottom, an image of the green circuit board (COM module) is shown next to a single red cherry.

Catalan actors identified: KET providers from the industry

LAB CIRCUITS, SA · PRINTED CIRCUIT BOARD MANUFACTURING

CAT · ESP · ENG · FRA · ITA · DEU

**LAB CIRCUITS**

HOMEPRODUCTSTECHNICAL INFORMATIONCOMPANYNEWSCONTACT

Welcome

Founded in 1972, Lab Circuits is an independent company with 4.000m2 facilities. Nowadays, it is formed by a team of 75 high specialized professionals and committed to the philosophy of offering the best service to the client. We manufacture printed circuits boards from 2 to 24 layers with the most advanced high-tech.

All of this gives us the possibility to offer printed circuit boards (PCB) HDI, RoHS, laser micro vias, buried vias, impedance control and special materials with the highest quality. We make prototypes, small and medium sets, with ISO 9001:2008, ISO 14001, UL and UNE-EN 9100:2010 certificates.

Latest News

**International Trade Fair ELECTRONICA 2014 Munich**
Lab Circuits, S.A. will be present as an exhibitor at the next edition of ELECTRONICA 2014 in Munich.

**MATELEC 2014: INTERNATIONAL EXHIBITION OF SOLUTIONS FOR ELECTRICAL AND ELECTRONICS INDUSTRY**
Once again Lab Circuits, S.A. will be present as an exhibitor at the next edition of Matelec, from 28 to 31 October 2014, at Feria de Madrid.

**IV Technical Conferences**



PCB's manufacture process HDI (Hight Density Interconnect)

[View](#)



Company Profile

[View](#)



PCB's manufacture parameters

0,20 mm (17 µm)	0,15 mm (17 µm)	0,125 mm (17 µm)
0,20 mm (35 µm)	0,15 mm (35 µm)	0,15 mm (35 µm)
0,25 mm (70 µm)	0,20 mm (70 µm)	0,25 mm (70 µm)

[View](#)

Catalan actors identified: KET providers from the industry

**ROMPAL®** << Leader in flexible manufacture of electronics equipment >>

01:30:04
Thursday, November 27, 2014



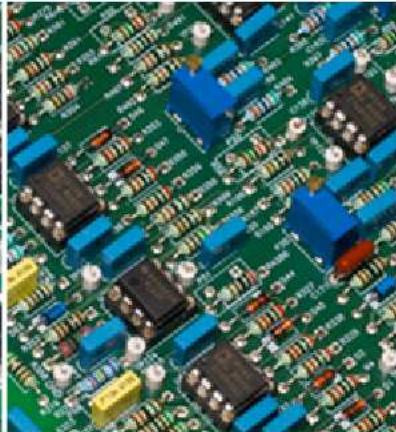
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HIGH TECHNOLOGY
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FLEXIBLE PRODUCTION



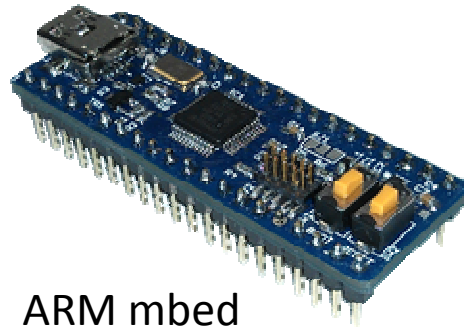
COMPREHENSIVE ELECTRONIC EQUIPMENT ASSEMBLING SERVICE

Catalan actors identified: KET providers from citizens (*Makers*) and future engineers (*Kids*)



La noció d'empoderament

Escales petita i mitjana



ARM mbed



Arduino Micro

Escala sofisticada



ISEE IGEP 3730 ARM A8

Embedded professional

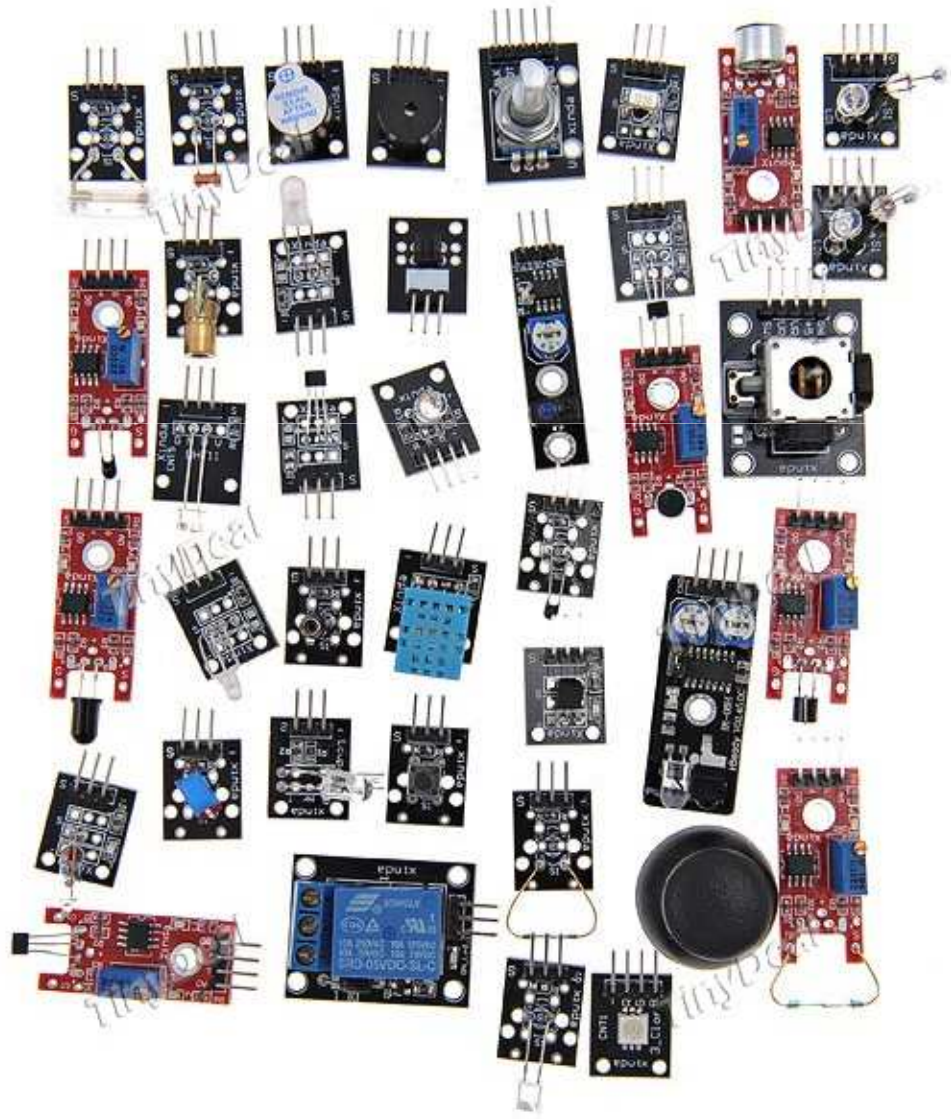


Raspberry Pi

Embedded hobby (Makers)

El kernel de Linux ha costat 91.000 mesos/home, uns 1.000 mill € (Amanda McPherson)

Sensors de hobby o *Maker* (Arduino)



- All kind of sensors for Arduino:

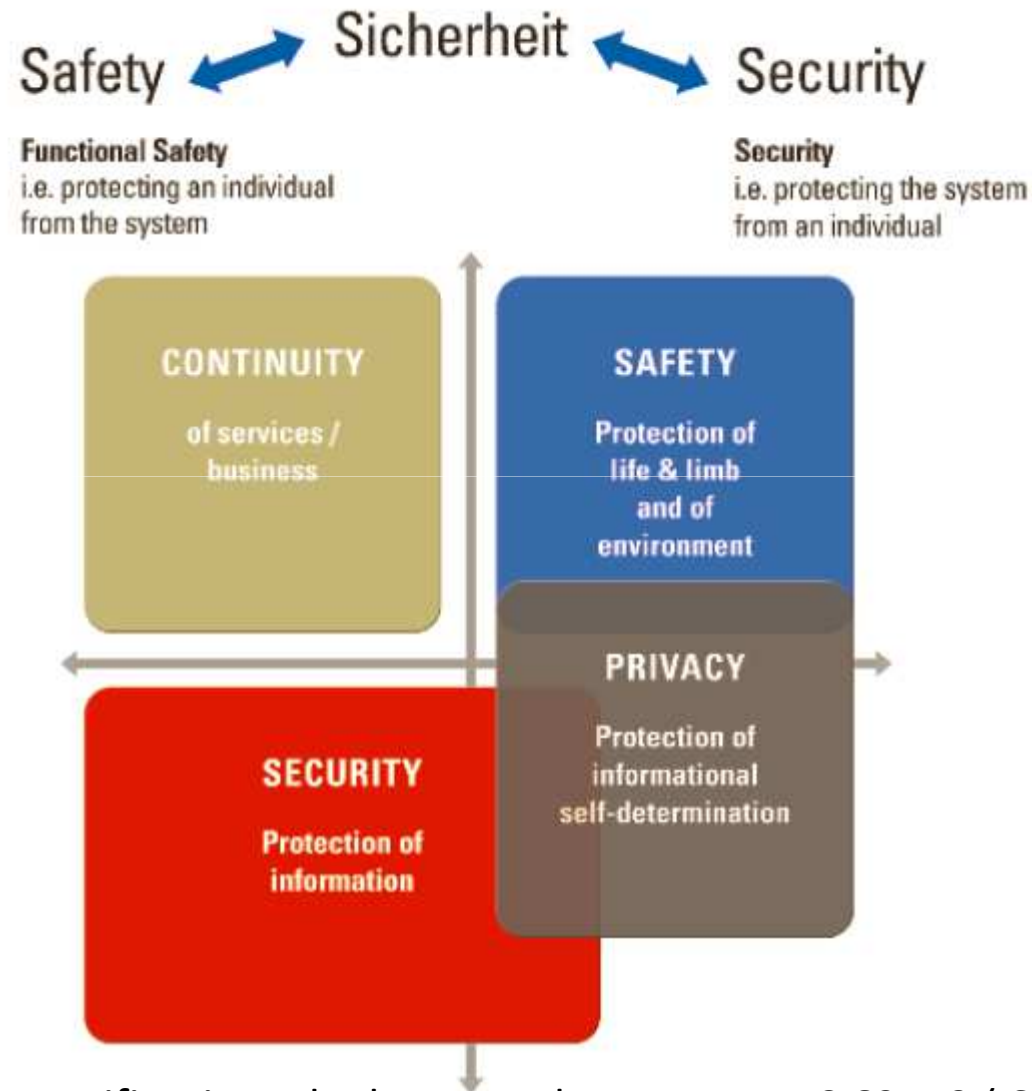
- Temperature
- Pressure
- Gas
- Light
- Etc

“37-in-1 Sensor Module Kit for Arduino (ECT-219472)”

Sensors (Industrials)



Seguretat: Safety & Security. Treball amb ISACA



La TÜV ja emet certificacions duals segons les normes IEC 62443 (ISA 99) i IEC 61508 (seguretat funcional)

Gràcies

Més informació:

Programa i vídeo de la jornada:

<http://www.eic.cat/jornades/1090597>

Article base de la presentació:

<http://issuu.com/grupotp/docs/automatica-466/63>

Més referències:

<http://dialnet.unirioja.es/servlet/autor?codigo=106372>

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Embedded Systems Working Group Chair
(www.coeic.com)