ANNUAL REPORT 2014

Summary

EVOLVING INTERNET TECHNOLOGIES TOWARDS A GLOBAL COLLABORATORY

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PRESENTATION

For the first time in many years, Catalonia has a state strategy in the field of ICT. SmartCat is the government policy to turn Catalonia into a "smart" country, within the trail marked by its capital and taking advantage of the new generation of smart technologies. The i2CAT Foundation, as **a reference instrument of the Catalonia Government regarding research and innovation in the Internet field**, plays a key role in this new opportunity to make Catalonia the leading country in the knowledge society at a global scale.

JORDI PUIGNERÓ I FERRER
President of i2CAT Foundation

The permanent emergence of new technologies, of new and innovative applications and the vision of new business models require us to be "smart" and sensitive to change, to adapt and anticipate.

There is no better way to adapt to this new environment that anticipating it, creating it.

The first Internet era has produced a glut of information and communication. The next step is to advance to "the Internet of knowledge." If until now computers and networks have been integrated, the challenge now is to integrate the Internet with artificial intelligence and expert systems that help people to learn and develop knowledge and their creative skills.

This "Internet of knowledge" requires a new basic research for new architectures and services that massively interconnect people, objects and nature. It also needs new knowledge generation and management systems that turn information into new knowledge and manage it by creating smart environments.

In this regard, the i2CAT Foundation is an example to follow; not only for what it does, what it produces, but also for the vision of its nature and how integrates it into society.

An institution that is genetically creative and open, ready to cooperate in order to integrate, enrich, produce and contribute, one which is ready to apply its knowledge to the transformation of cities, territory, industry, health and culture.

i2CAT has been since 2006 a pioneer research institution in the adoption of the "quadruple helix" and open living labs as a model of innovation, generating new spaces for research with users, companies, universities and government, ensuring that technology transfer goes into the social network to improve quality of life.

I2CAT is leader in activities aligned with the SmartCat strategy defined by the Catalan Government, and an active participant in several RIS3CAT communities promoting different industrial fields.

The transformation of the Industrial Ring 4.0 as a major cooperative service platform for the business sector and the organization of multiple workshops, seminars and hackathons to boost the creativity of users and SMEs, are just some of the activities that i2CAT undertook in 2014.

In the research field, i2CAT has continued to strengthen its excellent relations with Europe and attract new European funds. The foundation has been granted six new i2CAT projects in the area of 5G within the new H2020 program demonstrating the role of i2CAT technologies in Europe in the field of Internet research.

In this large network of knowledge and cretivity called Internet, i2CAT will continue to provide research and innovation. Its mission and vision, to decisively and resolutely contribute to strengthening the social and business fabric of Catalonia, has placed it at the forefront of an increasingly globalized and interconnected world, a world that can be transformed in a distributed collaboratory.

10TH ANNIVERSARY

FOSTERING YOUR INNOVATION

On November 6th 2014, i2CAT celebrated his 10th anniversary in an event hosted in the Palau de la Generalitat de Catalunya, attended by the Ministry for Business and Labour of the Generalitat de Catalunya, Mr. Felip Puig, and many personalities from the ICT sector, the public administration, the universities, and companies.

In the last 10 years, i2CAT has participated in the development of more than 300 research and innovation projects, and has cooperated with more than 150 entities, universities, large companies and SMEs, both locally and internationally.

In the following years i2CAT will continue generating knowledge and Internet research, but with a higher commitment in business generation and social impact.

To generate impact through technological innovation, strategic alliances are needed to:

- Co-create and co-design with the industry and users, innovative solutions to meet real needs.
- Define new business models and operating programs, and to ensure the commercial viability of the developed solutions.
- Collaborate with international organizations and with other technological centers and research institutions in Catalonia in those areas where we are able to complement our knowledge.

FACTS AND FIGURES

14 ASSOCIATED PERSONNEL

48 PHD, ENGINEERS, GRADUATES

13% PUBLIC CORE FUNDING

87% COMPETITIVE FUNDING, SERVICES AND CONTRIBUTIONS

19 FINALIZED PROJECTS

32 PROJECTS IN EXECUTION

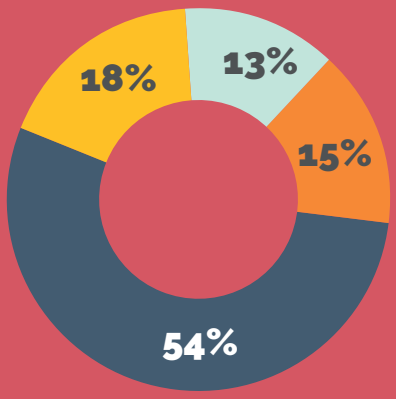
- 23 European projects
- 9 Local projects
- 6 European projects starting in 2015

PUBLICATIONS

In the 2014, it have been generated 44 publications. Following are some of the 44 publications generated in 2014:

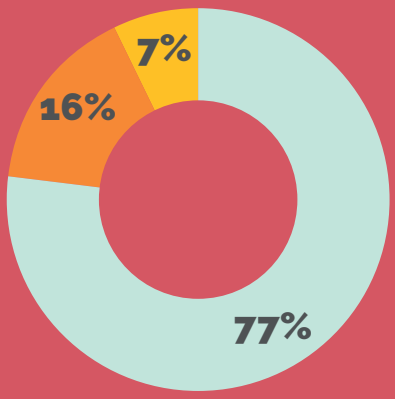
1. A.Garcia-Saavedra; B. Rengarajan; P. Serrano; D. Camps-Mur; X Costa-Perez, "SOLOR: Self-Optimizing WLANs With Legacy-Compatible Opportunistic Relays," Networking, IEEE/ACM Transactions on , vol.PP, no.99, pp.1,1, doi: 10.1109/TNET.2014.2321975.
2. Anna Tzanakaki, Markos P. Anastasopoulos, Konstantinos Georgakilas, Giada Landi, Giacomo Bernini, Nicola Ciulli, Jordi Ferrer Riera, Eduard Escalona, Joan A. Garcia-Espin, Xavier Hesselbach, Sergi Figuerola, Shuping Peng, Reza Nejabati, Dimitra Simeonidou, Damian Parniewicz, Bartosz Belter, and Juan Rodríguez Martinez. IEEE Communications Magazine 52(1):26-34 (2014).
3. S. Vrijders, D. Staesses, D. Colle, F. Salvestrini, E. Grasa, M. Tarzan and L. Bergesio "Prototyping the Recursive Internetwork Architecture: The IRATI Project Approach", IEEE Network, Vol. 28, no. 2, March 2014. Available online.
4. A. Betzler, C. Gomez, I. Demirkol, and J. Paradells. "A holistic approach to ZigBee performance enhancement for home automation networks." Sensors 14, no. 8 (2014): 14932-14970.
5. P. Garfias, S. Sallent, L. Gutiérrez, M. de Andrade, M. Tornatore, A. Buttaboni, "A novel traffic-aware mechanism for energy-saving at the OLT in WDM/TDM-PON," European Conference on Network and Optical Communications and Conference on Optical Cabling and Infrastructure. pp. 225-232, July 2013. DOI: 10.1109/NOC-OCI.2013.6582894.

FUNDING DISTRIBUTION



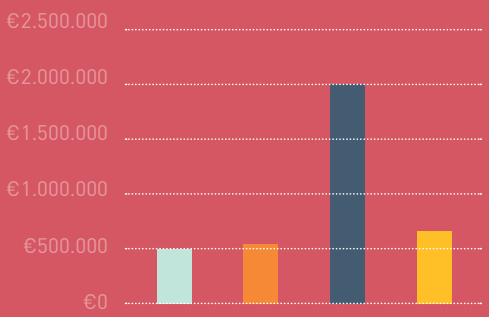
- Generalitat (DGTSI) Core funding
- Companies and entities project contributions
- Competitive Grants
- R+D+i Services

EXPENSES



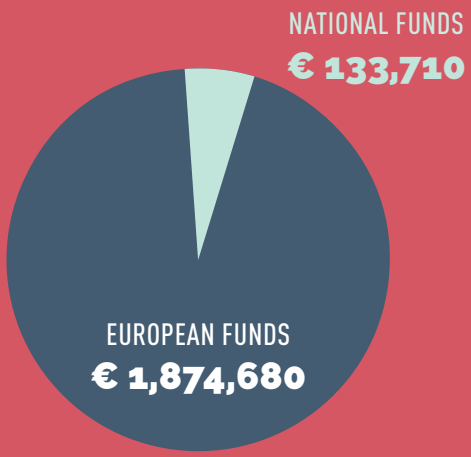
- R+D+i projects execution and coordination
- Support and operational expenses
- Depreciation

FUNDING

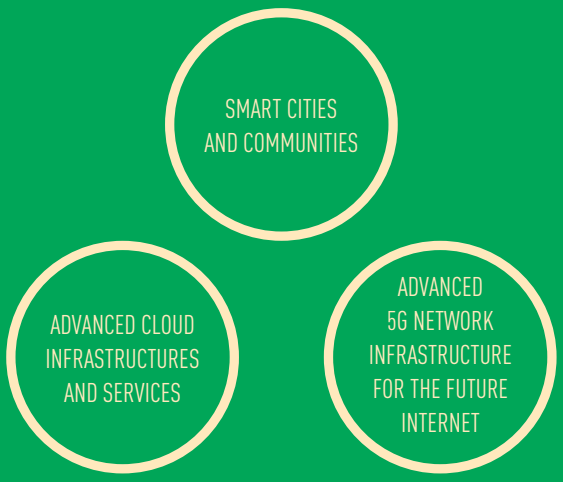


- Generalitat (DGTSI) Core Contribution
- Companies and entities project contributions
- Competitive Grants
- Invoicing to companies

COMPETITIVE GRANTS



INTERNATIONAL R+D+I ACTIVITIES



H2020

6 projects funded by European Commission

CYCLONE, A NEW PROJECT FUNDED IN THE TOPIC OF ADVANCED CLOUD INFRASTRUCTURES AND SERVICES

Leader: Interoute

CYCLONE targets ASPs, providing them with software and tools that facilitate the deployment, management, and use of their complex, multi-cloud applications and enhance the end-to-end security and network management of those applications.

GROWSMARTER, BARCELONA'S 'LIGHTHOUSE' SMART CITY PROJECT

Leader: City of Stockholm

i2CAT is participating in the development of the large-scale pilot that will be deployed in the city of Barcelona, in conjunction with Barcelona City Council and other local partners/entities.

I2CAT AS A KEY PARTNER IN THE EUROPEAN ADVANCED 5G NETWORK INFRASTRUCTURE FOR THE FUTURE INTERNET

i2CAT will be participating in 4 of the 16 projects approved by the European Commission, becoming a key center in Europe for research in the field of 5G. These four projects represent a **EU grant for i2CAT of more than two million euros** for undertaking these projects over the next 3 years.

CHARISMA (Converged Heterogeneous Advanced 5G Cloud-RAN Architecture for Intelligent and Secure Media Access).

Leader: i2CAT Foundation.

CHARISMA proposes intelligent hierarchical routing and paravirtualized architecture that unites two important concepts: devolved offload with shortest path nearest to end-users and an end-to-end security service chain via virtualized open access physical layer security (PLS).

SONATA (Service Programing and Orchestration for Virtualized Software Networks).

Leader: ATOS

The project adresses the deployment of the more complex user-facing applications and services envisioned for 5G software networks presents significant technological challenges for development and deployment.

SESAME (Small cEllS coordinAtion for Multi-tenancy and Edge services).

Leader: Hellenic Telecommunications Organization S.A.
SESAME targets innovations around three central elements in 5G: the placement of network intelligence and applications in the network edge through Network Functions Virtualisation (NFV) and Edge Cloud Computing, the substantial evolution of the Small Cell concept, and the consolidation of multi-tenancy in communications infrastructures.

5G-XHAUL (Dynamically Reconfigurable Optical-Wireless Backhaul/Fronthaul with Cognitive ControlPlane for Small Cells and Cloud-RANs).

Leader: INNOVATIONS FOR HIGH PERFORMANCE MICROELECTRONICS/LEIBNIZ-INSTITUT
5G-XHaul proposes a converged optical and wireless network solution able to flexibly connect Small Cells to the core network.

NEW AGREEMENTS AND INTERNATIONAL PARTNERSHIP

i2CAT joins the **FLEX** and **T-NOVA** Consortiums

I2CAT'S SODALITE PROJECT FUNDED BY THE FLEX CONSORTIUM

Through an Open Call procedure, i2CAT has been selected to enter the FLEX (FIRE LTE testbeds for Open Experimentation) consortium, led by the University of Thessaly, which is developing a truly open and operational LTE experimental facility. i2CAT will evaluate and extend generic SDN wireless backhauling technology that has been developed at i2CAT.

I2CAT JOINS THE T-NOVA PROJECT LED BY THE NATIONAL CENTRE FOR SCIENTIFIC RESEARCH "DEMOKRITOS"

T-NOVA leverages and enhances cloud management architectures for the elastic provision and (re-) allocation of IT resources assigned to the hosting of Network Functions. It also exploits and extends Software Defined Networking platforms for efficient management of the network infrastructure.

120 PARTICIPATIONS IN FAIRS, CONGRESSES AND WORKSHOPS

231 INTERNATIONAL TRAVELS

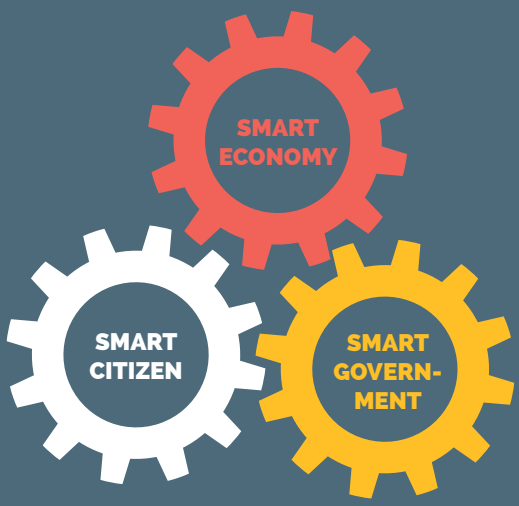
AWARDS

- HIPERMED Project receives the Celtic-Plus Silver Excellence Award 2014.
- Best FIA session Award in the Future Internet Assembly.
- The APP TERRASSA AUGMENTADA has been awarded from the Ibero-American Awards for Education and Museums 2014.

CATALONIA R+D+I INITIATIVES

SMART TECHNOLOGIES, THE BASIS OF SMARTCAT.

In 2014, i2CAT worked together with the General Directorate of Telecommunications and Information Society of the Catalan Government in defining the SmartCat strategy, especially defining the importance of smart technologies as the new stage of digital research. Once the convergence of Internet and telecommunications has been completed, next comes a phase of integration of ICT in the structures of nature, economy and society: we move forward to the era of smart cities and regions, smart industries, smart health or smart culture.



MOVERIO COMPETENCE CENTRE

Epson and i2CAT create a reference center for developing augmented reality applications for Moverio Smart Glasses.

EPSON, multinational company leader in technological innovation, and I2CAT have signed a cooperation agreement to promote innovation in the area of smart glasses through the implementation of the MOVERIO Competence Center. The agreement, which gives Epson a seat on the i2CAT board, seeks to encourage the development of augmented reality applications for the Moverio smart glasses and to identify new use cases in professional areas. Catalonia will be consolidated as a center of excellence at European level, a strategic meeting point for developers, customers and suppliers of applications for smart glasses.

RIS3CAT

In 2014 i2CAT has been involved in the 4 RIS3CAT communities:

Health Technologies

Cultural Industries

Advanced Manufacturing

Sustainable Mobility

i2CAT is actively participating in several RIS3CAT communities that in 2014 began to be defined in the areas of Sustainable Mobility, Advanced Manufacturing, Health Technologies, and Cultural Industries.

In some of these communities, i2CAT has a role within the steering committee, defining how ICT can help these communities and giving a perspective as to how new industries may appear as a result of the merger of ICT with certain sectors.

In all these communities, i2CAT is engaging and driving the definition of innovation projects that allow to generate a new SmartTIC industry oriented to meet the present and future needs of the different industrial sectors.

INDUSTRIAL RING 4.0

A large collaboratory to promote industrial innovation.

An advanced Internet platform of more than 70 companies, mainly in the automotive industry, working together with research centers to promote industrial innovation.

The Industrial Ring 4.0 will be configured as a large Collaboratory where the industry, research centers, public administrations and users will be able to create, validate and accelerate innovation processes for the Industrial sector.

The Industrial Ring 4.0 will be a constant evolving platform according to the needs of users and the technological developments in architecture, protocols and standards of the new Internet Industry, creating an open, safe, trusted and reliable cloud infrastructure with new services, ensuring the privacy of information, processes and applications when required, and offering the possibility of creating communities that will trigger innovation processes.

RESEARCH AREAS

The next step is to advance in the research of an Internet based on intelligent systems and Smart technologies.

THE INTERNET OF KNOWLEDGE AND CREATIVITY IS THE NEW CHALLENGE TO FACE

INTERNET ARCHITECTURES AND SERVICES

MOBILE WIRELESS INTERNET

MEDIA INTERNET

Internet has produced a superabundance of data, information and networks. The next step is to move forward in the research and innovation of an Internet based on Artificial Intelligence and Smart technologies. The Internet of knowledge and creativity is the new challenge.

i2CAT has a wide experience in multiple national and European R+D+I projects, leading research lines in new fixed and mobile network architectures, wireless sensor networks, and content-based multimedia technologies, with the aim to develop new products, services and applications in the fields of eHealth, Smart Cities and Smart Regions, Advanced Manufacturing and Culture/Creativity. This work has provided successful results in the first calls of the new Horizon 2020, the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020).

Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness.

The challenges of the three i2CAT research areas, Media Internet, Mobile Wireless Internet and Internet Architectures and Services, are aligned with the following topics defined by European Commission within Horizon 2020:

TOPICS

- Reducing impacts and costs of freight and service trips in urban areas.
- Energy strategies and solutions for deep renovation of historic buildings.
- New ICT-based solutions for energy efficiency.
- Smart Cyber-Physical Systems.
- FIRE+ (Future Internet Research and Experimentation).
- Smart System Integration.
- Advanced digital gaming/gamification technologies.
- Cybersecurity, Trustworthy ICT.
- Smart Networks and novel Internet Architectures.
- Smart optical and wireless network technologies.
- Advanced Cloud Infrastructures and Services .
- Advancing active and healthy ageing with ICT: service robotics within assisted living environments.
- Advancing active and healthy ageing with ICT: ICT solutions for independent living with cognitive impairment.
- Self management of health and disease: citizen engagement and mHealth.
- Establishing effectiveness of health care interventions in the paediatric population.
- Advanced 3D modelling for accessing and understanding European cultural assets.
- Smart Cities and Communities solutions integrating energy, transport, ICT sectors through lighthouse (large scale demonstration - first of the kind) projects.
- Open Call Project Flex.
- Advanced 5G Network Infrastructure for the Future Internet.

Thanks to the effort and joint accurate work developed in this fields, i2CAT has obtained 6 projects under the following topics:

- ICT7.B Smart Optical and Wireless Network Technology.
- SCC-2014 Smart Cities and Communities.
- ICT-14-2014 Advanced 5G Network Infrastructure for the Future Internet.

It is remarkable that under the latter topic, i2CAT has obtained 4 of the 16 projects funded by the European Commission and coordinates 1 of them.

RESEARCH AREAS

INTERNET ARCHITECTURES AND SERVICES

MOBILE WIRELESS INTERNET

MEDIA INTERNET

TEAM: Jose Ignacio Aznar, Josep Batallé, Leonardo Bergesio, Carlos Bermudo, Carolina Fernández, Jordi Ferrer, Bernat Gaston, Eduard Grasa, Daniel Guija, Amaia Legarrea, Oscar Moya, Miquel Tarzan. **DIRECTOR:** Eduard Escalona.

Key player in the 5GPPP community

An Internet of knowledge requires new architectures and services that could interconnect people, objects and nature in more efficient and dynamic ways than the current Internet.

i2CAT is focused on exploring and defining new ways to manage the Future Internet networks, enabling new functionalities and business models integrating technologies like Cloud, Software Defined Networking (SDN) and Network Function Virtualization (NFV) and developing pioneer architectures based on new paradigms beyond TCP/IP such as Recursive Inter Network Architectures (RINA).

RESEARCH CHALLENGES

1. Infrastructure Control and Management

DESCRIPTION AND GOALS

Research on Network technologies in the areas of SDN and NFV. The team has extended and promoted OpenNaaS as its reference framework for network management. With the developments performed within research projects, OpenNaaS now supports SDN network control and the implementation of NFV.

KEYWORDS/ TOPICS

SDN, NaaS, NFV, Virtualisation, Management, Control Plane, Service delivery, Orchestration, 5G, Cloud.

2. Cloud technologies

DESCRIPTION AND GOALS

End-to-end service provisioning including edge technologies for enabling distributed applications. Cloud technologies are evolving extremely fast and represent a relevant research field when considering a holistic approach of service provisioning, including convergence of compute, storage and network resources in a distributed environment.

KEYWORDS/ TOPICS

Cloud computing, big data, fog computing, storage, containers, openstack, virtual machines, dockers.

3. Recursive Inter-Network Architecture (RINA)

DESCRIPTION AND GOALS

The Recursive InterNetwork Architecture (RINA) is a new Internetwork architecture which fundamental principle is that networking is only inter-process communication (IPC). The research line is focused on working closely with the pioneers of this technology and position i2CAT as one of the global leaders in the RINA R&D community, as well as take part in early RINA dissemination and standardisation activities.

KEYWORDS/ TOPICS

RINA, recursive internetwork architectures, distributed computing support, naming and addressing, data transfer, layer management, distributed network management systems, programmability of network functions (separation of mechanism from policy).

RELEVANT PROJECTS

SODALES – EU FP7 – 2012-2015 i2CAT is the coordinator of project SOftware-Defined Access using Low-Energy Subsystems (SODALES). It aims to develop a novel wireless access interconnection service that offers transparent transport services (syncE based) for fixed and mobile subscribers on a convergent network architecture. It also implements an open Access control and management architecture based on SDN.

IRATI – EU FP7 – 2013-2014 The main goal of IRATI is the implementation of a clean-slate architecture for the Linux kernel, over two of the most currently used technologies: TCP/UDP/IP and Ethernet. The Project aims at improving and contributing to the RINA specifications, specially in the fields of routing, policies for the discovering of applications and interoperability with Ethernet.

GN3+ - EU FP7 Infrastructures – 2013-2015 GÉANT is the pan-European research and education network that interconnects Europe's National Research and Education Networks (NRENs) connecting over 50 million users at 10,000 institutions across Europe, supporting research in areas such as energy, the environment, space and medicine.

T-NOVA – EU FP7 – 2014-2016 With the aim of promoting the NFV concept, T-NOVA introduces a novel enabling framework, allowing operators not only to deploy virtualized Network Functions (NFs) for their own needs, but also to offer them to their customers, as value-added services.

RELEVANT ACHIEVEMENTS

- Development of a RINA prototype for the Linux Operating System, targeting both the kernel and user spaces and allowing RINA to be used directly over Ethernet. The final prototype has been the outcome of the IRATI project, the first EU project funding research on RINA technologies.
- Release of a novel restructured version of OpenNaaS, an open source network service management platform developed mainly by i2CAT and adopting SDN and NFV philosophies and concepts.
- Design of a service orchestrator system following the ETSI NFV specifications for the T-NOVA project.
- Successful completion of the OFERTIE project, showcasing and demonstrating the implementation of SDN extensions for OpenNaaS.

MAIN PARTNERS

RESEARCH AREAS

INTERNET ARCHITECTURES AND SERVICES

MOBILE WIRELESS INTERNET

MEDIA INTERNET

TEAM: August Bletzer, Marisa Catalan, Laura Herrera. **DIRECTORS:** Daniel Camps, Josep Paradells.

Pioneers in the implementation of the standard of 802.15.7r1 (Visual light communications]

The Mobile Wireless Internet Area is a tight partnership between i2CAT and UPC Barcelona Tech that has developed more than 30 projects in the area of wireless communications since 2003. Its main areas of expertise are Wireless Sensor Networks (WSN) and high capacity wireless access technologies that are key enablers for the future Internet of Things and 5G systems.

Its expertise spans from the physical design of embedded systems, to the design of scalable platforms for data collection, and algorithms for radio resource management. Among the main market sectors impacted by Mobile Wireless Internet Area technology we can find: Smart Cities, Smart Buildings, Smart factories and Mobile telecom networks.

RESEARCH CHALLENGES

Wireless Sensor Networks WSN

DESCRIPTION AND GOALS

The goal of the Wireless Sensor Network (WSN) research line is to bring Internet technology to everyday objects. In order to accomplish this goal, it is essential to be able to embed Internet technology into devices constrained in terms of battery and computational resources.

KEYWORDS/ TOPICS

6LoWPAN/CoAP/ZigBee, IoT, Energy Harvesting, Radio wake up systems, low power, Delay tolerant Networks.

Software Defined Wireless Networks (SDWN)

DESCRIPTION AND GOALS

The Software Defined Wireless Network (SDWN) research line was established in the last quarter of 2013. The goal of the SDWN research line is to complement the WSN line and to research wireless infrastructure solutions that enhance the capacity of future mobile networks and can cope with the forecasted growth in connected devices and number of connected devices.

KEYWORDS/ TOPICS

5G, SDN, small cells, cloud RAN, high capacity, LTE, IEEE 802.11

RELEVANT PROJECTS

ENERGRID project defined an energy management system that empowers the user to control the way energy is used, thus allowing to reduce its energy footprint.

The ENERGRID technology was developed by i2CAT for ENDESA, who is now bringing it to the market.

TRESCIMO FP7 project enhances Future Internet Research Experimentation (FIRE) testbed capabilities in Europe and in South Africa, through the deployment of Smart City pilots, which will become enablers for technological and social innovation around green and smart city technologies.

In Trescimo, i2CAT has deployed a pilot with 60 energy and cost efficient sensors in the municipality of Sant Vicenç dels Horts, which generate data recovered by moving gateways mounted on buses.

DINUBE development of a novel technology that provides secure mobile payment mechanism based on proximity and visual light communications. This technology has been transferred to Dinube that provides a cloud based payment solution.

SOFT-WIBACK a dense deployment of Small Cells is one of the promising ways to increase the capacity of mobile networks, hence being able to cope with forecasted increased in demand for mobile bandwidth in the upcoming years.

This project designes a non-intrusive system that performs real-time estimation of traffic flows in cities based on ultrasound sensors. Sensors are deployed in strategic points in the city center and networked using a Wireless Sensor Network. A pilot demonstrating the technology has been deployed in Sant Cugat del Valles.

RELEVANT ACHIEVEMENTS

The following are the technological highlights of the Mobile Wireless Internet Area during 2014:

- Design and development of an indoor localization technology based on the ambient light sensor of commercial smartphones and on the use of Visible Light Communication (VLC) technology. This technology was successfully demonstrated at the Mobile World Congress 2014.
- Development of a wake-up radio technology for ultra-low power sensors with coverage of up to 80 meters.
- Development of Software Defined Networking (SDN) technology that allows to control the forwarding of traffic between wireless devices using an extended version of the Openflow protocol.
- Development of a novel technology that provides secure mobile payment mechanism based on proximity and visual light communications. This technology has been transferred to Dinube that provides a cloud based payment solution.

MAIN PARTNERS

effilogics endesa urbiotica orange dinube

RESEARCH AREAS

INTERNET ARCHITECTURES AND SERVICES

MOBILE WIRELESS INTERNET

MEDIA INTERNET

TEAM: Pau Adelantado, Marc Aguilar, Xavier Artigas, Xavier Carol, David Cassany, Gerard Castillo, Victor Jimenez, Marc Palau, Pau Pamplona. **DIRECTOR:** Sergi Fernández.

Cutting-edge media technologies for new content and experiences

Internet is already the global media network. Most of the current on-net traffic is user-generated entertainment video. The next step will be live interacting video merged with virtual/augmented realities for all kind of activities like gaming, education, performing arts, cultural heritage and industry. The Internet user will become media generator, producer and actor in the connected smart augmented world.

i2CAT was pioneer 10 years ago in merging the Internet and media technology. Now Media Internet Area wants to lead this interactive and mobile Smart media challenge.

RESEARCH CHALLENGES

1. Media Networks

DESCRIPTION AND GOALS

The main goal of this research line is to study and develop efficient software systems to manipulate digital media over the network by using and aggregating the key industry standards. Modular server side services are gaining in relevance as the Cloud Computing Era is becoming a reality. The Media Internet Area has been researching core services easy to orchestrate that are suitable in this cloudified context, where the delivery and scalability are and will be major objectives.

KEYWORDS/ TOPICS

CDN, MPEG-DASH, AVC, HEVC, UHD/4K

2. Interactive Applications

DESCRIPTION AND GOALS

This research line works towards the creation of new interactive services, in mobile devices and head mounted displays. Location-based and personalized services are the main research focus of this research line, and in particular, we are addressing augmented reality and second screen applications, addressing the cultural and the broadcast sectors.

KEYWORDS/ TOPICS

Second screen, HBBTV, mixed reality, location based services, HMDs cultural heritage.

3. Social Science

DESCRIPTION AND GOALS

The confluence between technical infrastructures, technologies and the cultural and creative sectors allow to explore new perspectives of a product or a service. From this research line the focus is on the application of User Centered Design methodologies to evaluate the usage and impact of technological products and to design or improve concepts.

KEYWORDS/ TOPICS

Creative Ring, User-driven Innovation, Living Labs, User Centered design, collaboratories.

RELEVANT PROJECTS

TV-RING explores the great potential of next generation networks and mobile devices in the Connected TV market, which is a strong focus of interest for the media industry.

SPECIFI combines NGA and IoT infrastructures and platforms for setting up a European Creative Ring of Smart Cities and Regions facilitating the set-up, customization, delivery and sharing of innovative, user co-designed arts, media and leisure services locally, regionally, and across Europe.

FICONTENT/CREATIFI is aimed at developing and experimenting cutting edge ICT platforms across Europe devoted to applications and services in the areas of social connected TV, smartcity services, and pervasive games.

I AM aims to cooperate in and develop applications to enhance the visitors' experience of natural and cultural heritage sites. It focuses on the use of Augmented Reality (AR), multimedia and interactive techniques.

RELEVANT ACHIEVEMENTS

- Finalization of the Visionair project, executing more than 10 collaborations that have resulted in small research action and software integrations with key international partners. Different SMEs have been trained in the usage of our transmission and distribution technologies.
- Closure of the Networked Production project obtaining an automatic realization prototype that it is expected to be launched in 2016.
- Coordination and consolidation of the social sciences research team and creation of the first Hybrid TV collaboratory in Spain, though the user panel in Gurb, in the framework of the TV-Ring project. Different second screen apps for connected TVs are being developed and tested.
- Start of the CREATIFI project, bringing new opportunities and funding to the local SMEs and Startups, and also providing technical support to accelerate the adoption of the FI-WARE technologies. In addition to that, a hackathon on augmented reality has been organized.

MAIN PARTNERS

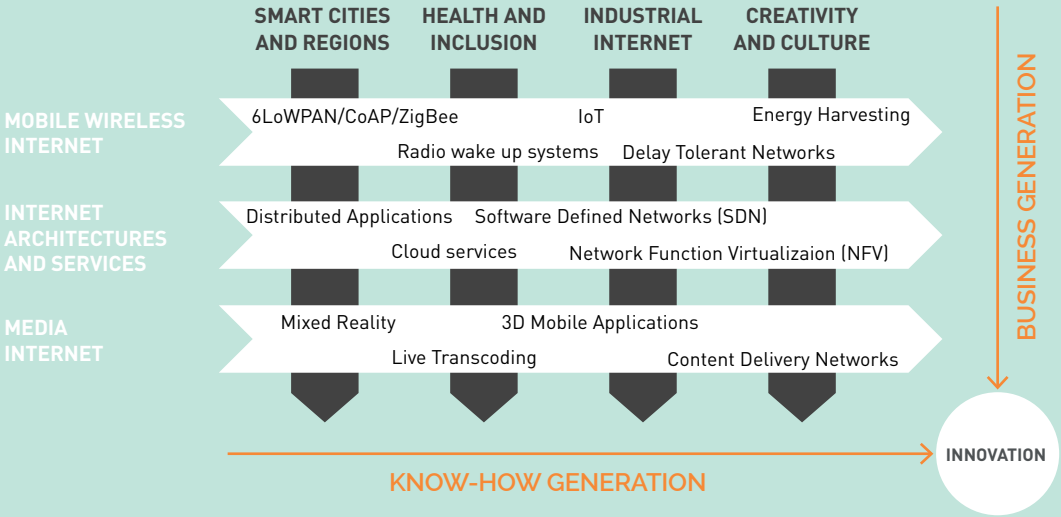
INNOVATION BUSINESS UNITS

Streghten know-how generation towards market and society needs.

Leveraging our internet research and innovation into advanced technologies and solutions focused on these sectors:

SMART CITIES AND REGIONS | HEALTH AND INCLUSION | CREATIVITY AND CULTURE | INDUSTRIAL INTERNET

In 2014, I2CAT has changed its internal organization and evolved into a matrix structure. This organization structure is composed by Research Areas (know-how generators) and Innovation Business Units (Business generators). The convergence of booth, areas and units, is the i2CAT innovation engine.



The main objective behind this structure is to strengthen the focus of i2CAT activities in order to boost innovation capabilities and increase its impact.

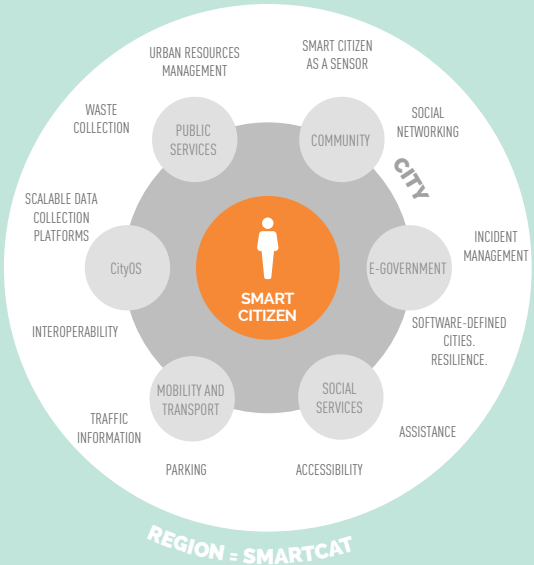
I2CAT has three horizontal research areas led by PhD researchers with a strong background in the topics. These research areas, composed of different research lines, are aligned with the 5G convergence and ICT strategy defined by the European Commission within the

H2020 research program. These areas are complementary and can provide end-to-end solutions, from the service to the infrastructure. This complementarity bring synergies and differentiation value on the completed research, and is therefore easier to cover user demands.

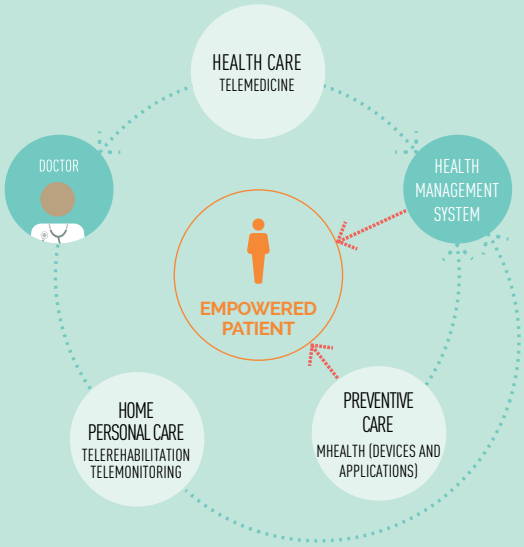
The Innovation Business Units are transversal to the different research areas and are the bridge between market needs and the i2CAT capabilities. The aim of these units is to identify the needs that different organizations from different sectors have, mapping our expertise, know-how and capabilities to provide new, innovative solutions to those organizational needs, which may come from the market or social challenges.

The four i2CAT Business Units focus on four different sectors: Smart Cities/Regions and SDN/NFV, Industrial Internet, e-Health, and Culture and Creativity.

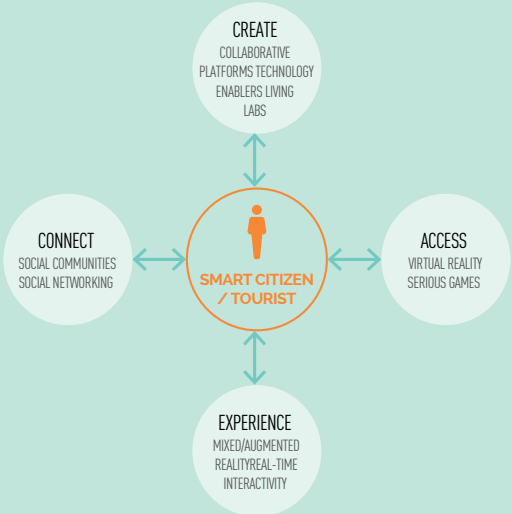
Smarts Cities and Regions unit is devoted to identify needs within the Smart City ecosystems and IoT implementations and deployments, while also strongly supporting the SmartCat region strategy of the Catalan Government.



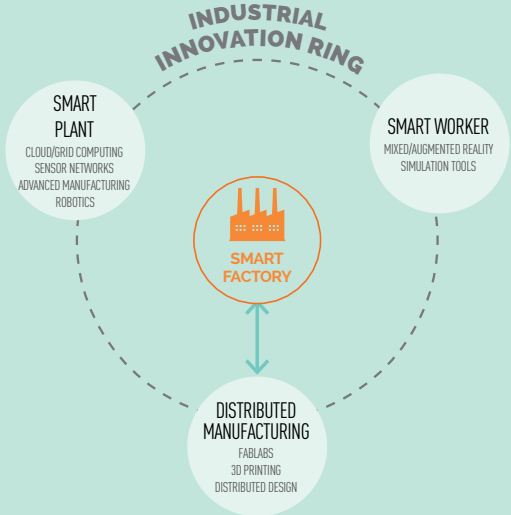
Industrial Internet identifies the needs of the Industry 4.0 roadmap, and how ICT will become the driver of the ICT revolution within the industry legacy.



Health and Inclusion focuses on foreseeable sociohealth needs in the near future, and how ICT will reduce current barriers. Telemedicine and remote monitoring have a direct impact on the e-health and social system, these improve the citizens quality life and optimize the e-Health services.



Culture and Creativity deals with museums, artists and the new creative ecosystem. It is focused on identifying how ICT will help those new communities to emerge as a new economy sector. This unit also has expertise in Living Labs and user-driven methodologies.



SMART CITIES AND REGIONS

Developing Smart Citizen technologies and services.

Intelligent cities will be based on a series of new technologies like open Big Data, software-defined networks, crowdsourcing, augmented reality and wireless sensors networks, organized finally around a city operating system. We understand the city as a software-defined territory based on user-controlled and reconfigurable networks, based on the collective intelligence of their citizens.

TRESCIMO (Testbeds for Reliable Smart City Machine to Machine Communication)
EU FP7 Project

TRESCIMO is a Future Internet Research Experimentation (FIRE) project, for EU-South Africa cooperation on future internet experimental research and testbed interconnection.

M2M platforms enable sensor data gathering, forwarding and remote control by networked embedded intelligence. I2CAT is developing in the TRESCIMO project an enhanced architecture to interconnect M2M platforms to opportunistic networks in order to get data from sensor devices with strong energy restrictions. In terms of performance, the proposed approach is expected to reduce energy consumption of the sensors in listening mode by a factor of four orders of magnitude thanks to the wake-up mechanisms.

This architecture will be evaluated with the deployment of a pilot in the city of Sant Vicenç dels Horts, Barcelona.

MORE RELEVANT ACTIVITIES AND PROJECTS

The following are main activities and projects executed during 2014:

SMARTCAT. i2CAT worked together with the General Directorate of Telecommunications and Information Society of the Catalan Government in defining the SmartCat strategy, especially defining the importance of smart technologies as the new stage of digital research.

Participation in the technical evaluation of the City Operative System proposals presented for the bidders to the Barcelona City Council. The CityOS will be able to aggregate open data coming from the sensors and citizens, and via Big Data and prediction techniques, capable of extracting actionable knowledge from the generated data to enhance public services or provide value-added services. i2CAT was a member of the competitive dialogue committee.

URBAN-T. Wireless Sensor network management System for monitoring traffic density in a Smart City. In conjunction with SUMMA, i2CAT has developed a solution to obtain real-time estimations of traffic flow using Ultrasound sensors.

MAIN PARTNERS

HEALTH AND INCLUSION

A new generation of smart health technologies is needed to empower patients and health professionals.

The Internet is helping users to play a more active role in healthcare systems. The next step is the design of personalized health programs, integrating health records and defining new systems of prevention, diagnosis, treatment and cure adapted to the conditions of each person and their environment.

PORTAL DEL PACIENT (eHealth Portal)

Currently more than 1200 doctors and patients are using the eHealth Portal, an online platform for medical care and communication between health professionals and patients, providing personalized health services, created from a close collaboration between the Hospital Sant Joan de Deu de Barcelona and i2CAT.

The eHealth Portal seeks to extend patient care beyond the physical boundaries of the hospital and to promote the exchange of knowledge between professionals and patients. Through internet-based tools, such as videoconferencing, private e-mail, access to Hospital Information Systems, and mobile apps, the platform provides accurate and reliable information and tools for patient empowerment and increased knowledge about their disease, thus improving their quality of life.

The main benefits of the eHealth Portal is that the communication channel between patients and professionals is unified and standardized, ensuring adequate, safe and personalized health information in accordance with the rules and regulations on the protection of personal data.

MORE RELEVANT ACTIVITIES AND PROJECTS

The following are main activities and projects executed during 2014

The overall aim of the FEARLESS project is the reduction of barriers, which impedes the mobility of elderly people, often suffering from dementia or light loss of cognitive activities. FEARLESS is not perceived as a surveillance system, but as an emergency aid that enables the elderly to keep self-confidence when it comes to dealing with every day challenges.

Virtual Assistance for supporting the treatment of major depression by measuring daily activity and mood. The project Help4Mood seeks to significantly advance computerized support for people with serious depression by monitoring mood, thoughts, physical activity and voice characteristics, prompting adherence and promoting behavior in response to monitored inputs.

In collaboration with the *'Area de Qualitat de Vida, Igualtat i Esports'* of the Barcelona City Council, i2CAT has developed a pilot project to facilitate, through a technological platform, the videoconference between a doctor from a Primary Health center and a patient without the need for any trip. The initiative aims to provide medical monitoring for people with mobility problems.

MAIN PARTNERS

CREATIVITY AND CULTURE

The democratization of new technologies allows users to play an active role as consumers and producers.

Barcelona and Catalonia can be transformed in a global Living Lab of creativity and culture.

BARCELONA LABORATORY (BarcelonaLab).

BarcelonaLab is an initiative of the Institute of Culture of Barcelona (ICUB), supported by the i2CAT Foundation, designed to promote and establish connections between people or communities with ideas and creative projects applied to the world of technology, science, knowledge and culture in the city of Barcelona.

This innovation ecosystem allows and catalyses the necessary synergies between the different

agents to develop and advance their research and innovation projects. BarcelonaLab is at the

same time the space for co-creation in which to solve the challenges that its community agents propose.

In 2014, BarcelonaLab encouraged the use of traditional technologies from the world of ICT for cultural and creative new uses. i2CAT enabled creative communities and organizations with ICT research expertise and organizations with cultural knowledge work collaboratively to seek out synergies, finding new uses and applications in the field of culture and creativity knowledge.

Within BarcelonaLab, five projects have been coordinated which are mainly related to the music technology community: BcnSoundscapes, Bandeed, ScreenLy, Exhibit and Concert Binaural.

MORE RELEVANT ACTIVITIES AND PROJECTS

The following are main activities and projects executed during 2014:

Augmented Reality (AR) application that allows people to discover Terrassa's industrial past by reproducing some of the city's most important buildings.

Augmented Reality (AR) application that allows experience the old Greek and Roman cities through the ruins at Empuries.

FIcontent is an initiative inside the FI-PPP EU program that provides FI- WARE enablers to SMEs and developers, empowering them with great Media & Content technologies, in order to foster the creation of innovative applications in the areas of Social Connected TV, Smart City Services, and Pervasive Games.

CreatiFI is an acceleration initiative within the FI-PPP EU program, with four creative hubs in Barcelona, Trento, Helsinki and Brussels, which offers web entrepreneurs and individuals working in the Creative Industry sector to shift innovative ideas into new applications and services through competitive open calls. I2CAT and the Institute of Culture of the Municipality of Barcelona are coordinating the Barcelona hub.

MAIN PARTNERS

INDUSTRIAL INTERNET

Internet-enabled services and technologies for the Factories of the Future.

Programs like Cyber-Physical Systems or Industrial Internet in the US, or Industry 4.0 in Germany, are trying to transform factories into smart systems, where high qualified employees can manage them by using augmented reality systems, dramatically increasing productivity and the value of the industrial sectors.

INDUSTRIAL RING

The Industrial Ring is a project that seeks to deploy leading telecommunications infrastructure and services for the interconnection of business sectors and high-tech resources, in order to increase the competitiveness of industrial sectors Catalan keys enhance collaborative R & D, facilitating real company and industrial access to the highest level of ICT infrastructure and services with high added value such as supercomputing

Currently more than 70 companies, mainly from the automotive industry, together with research centers give life to a platform that has generated a new culture of industrial cooperation in Catalonia. The Industrial Ring allows the Industry to develop advanced distributed manufacturing and controlling processes, sharing virtualized resources as a means to improving efficiency and competitiveness, and specially, enables new R+D+I initiatives and opportunities between companies in the same value chain, creating innovation platforms, leveraging knowledge and technologies from international research communities and defining high value-added intercompany services.

MORE RELEVANT ACTIVITIES AND PROJECTS

The following are main activities and projects executed during 2014

EPSON

The EPSON MOVERIO Competence Center aims to encourage the development and innovation applied to Moverio smart glasses in order to promote the use of augmented reality in professional areas, becoming a strategic meeting point for developers, customers and suppliers of applications for smart glasses.

Matching i2CAT research knowledge and companies' market vision, the Center fosters the generation of innovative solutions that provide differential value, locally and internationally.

RIS3CAT

The industrial areas of expertise defined within the RIS3CAT strategy need advanced ICTs and other KETs, such as nanotechnology, biotechnology, and advanced manufacturing. i2CAT, through its Industrial Ring project and its new strategy Industrial Ring 4.0, is actively participating in four RIS3CAT communities in the areas of Sustainable Mobility, Industrial Systems, Healthcare, Energy and Creative Industries.

In some of these, i2CAT has a role within the steering committee, defining how ICT can help these communities and raising awareness about new industries that may appear merging ICT with certain sectors.

MAIN PARTNERS

Service providers:

Applus IDIADA, orange, T-Systems, CSUC, abertis telecom, EPSON, esi get it right

Industrial manufacturers:

SEAT, NISSAN, FICOSA, Gestamp

R+D:

Fundació CIM, BSC, LEITAT

USER DRIVEN INNOVATION

INTERNET IS BREAKING DOWN THE TRADITIONAL TOP-DOWN MODEL OF INNOVATION

New distributed co-creation and user-centric processes are the results of an open distributed network like Internet.

10	3	7	2
USERS TRIALS	HACKATHONS	WORKSHOPS	OPEN CALLS

AND MORE THAN 600 USERS INVOLVED

Empowering everyone to innovate: User-driven innovation

The internet is still based on a distributed, end-to-end open-network architecture. This favors co-creation and user-centric processes which offer a pathway for radical new innovation models.

From the outset, i2CAT has been a collaboration between a large number of people, private and public, following a distinctive trait of Catalonia civil tradition which has fostered successful citizen initiatives in areas like education, health and sports.

In 2006, i2CAT was recognized by the European Network of Living Labs as the first "open living lab" in Spain and one of the first in Europe. Since then, i2CAT has promoted the creation of living labs in Catalonia.

i2CAT embodies some of the new principles that the internet is bringing into innovation systems. The Quadruple Helix is theoretically now the reference model for deploying the new Regional Specialization Strategies that the European Union is proposing for all regions for the new period 2014-2020.

i2CAT has based the new methods for user engagement on a combination of traditional applied anthropological techniques and new approaches based in user-centered design and techno-anthropological theories.

During 2014 i2CAT has facilitated the accreditation of new Living labs in Catalonia, such as the UAB Smart Campus, Orbital 40 LL and Barcelona Lab. During the summer of 2014 i2CAT took part in the definition of the new vision of ENoLL: "Empowering everyone to innovate". If "the internet is for everyone" was the motto of the Internet Society during last decade, ENoLL is setting a new horizon for the years to come.

In this sense, along the 2014, i2CAT has involved more than 600 users in different activities designed and aimed at making the users active actors in co-creation processes as hackathons, workshops and end-users trials.

WORKSHOPS	PROJECT	USERS	NUMBER OF USERS
Demo workshop of augmented reality I AM	FI CONTENT 2	ICT Professionals	24
Demo workshop augmented reality in BCNLab Day	FI CONTENT 2	Cultural environment and ICT Professional	25
AR-xperiment – augmented reality demo workshop	FI CONTENT 2	ICT Professionals	20
User-centered design methodology workshop in Bucharest	ATHENA PLUS	Cultural environment and ICT Professional	40
User-centered design methodology workshop in Roma	ATHENA PLUS	Cultural environment and ICT Professional	40
I2CAT Open Innovation Day	ATHENA PLUS	I2CAT staff	65
Barcelona Distributed Performances Workshop	SPECIFI / RICHES	Cultural environment and ICT Professional	25

USERS TRIALS	PROJECT	PROFILE OF USERS	NUMBER OF USERS
User trials of the APP Smart City Guide of Orange	FI CONTENT 2	End users	26
Field test of the web Smart City Guide of Fraunhofer FOKUS	FI CONTENT 2	End users	7
Field test of the web application Smart City Guide of Fraunhofer FOKUS	FI CONTENT 2	Cultural environment Professionals	5
Field test Empúries application	RICHES	End users	60
Usability tests of the HbbTV of TVC application prototypes	TVRING	End users	10
End users Pilot of HbbTV of TVC application	TVRING	End users	80
Check and validation of the Technology developed	COM'ON	End users	20
Check and validation of the Technology developed	FEARLESS	End users	12
Clinical trials of the Technology with patients	HELP4MOOD	End users	27
Pilot trials	BcnLab	End users	100

HACKATHONS	PROJECT	PROFILE OF USERS	NUMBER OF USERS
Augmented Reality Games Hackathon	FI CONTENT 2	ICT Professionals	24
MUSE Internet of Things Hackathon	SPECIFI	ICT Professionals	35
Interviews fot the research project RICHES	RICHES	Cultural environment and ICT Professionals	9

OPEN CALLS	PROJECT	PROFILE OF USERS	NUMBER OF USERS
Open Call	CreatiFI	Companies	10
Open Call	I AM	Companies	12

I2CAT AT A GLANCE

i2CAT is prepared to become a key international R+D+i partner in the field of Internet Technologies helping companies to foster their innovation and generating a new digital society and economy

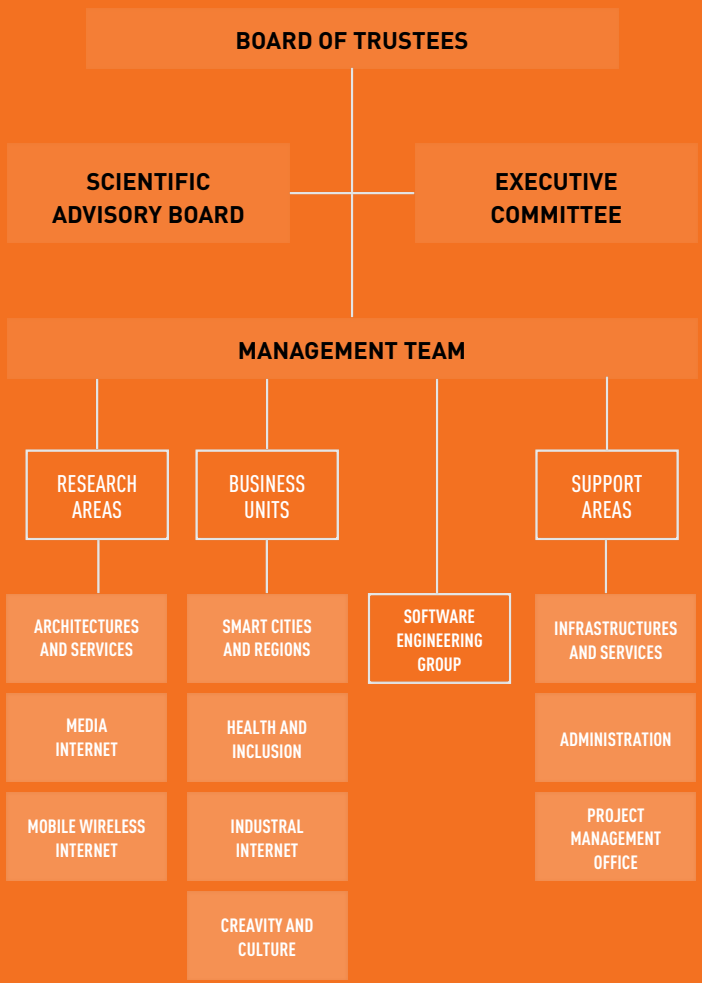
i2CAT Foundation is a non-profit research and innovation centre which promotes mission-oriented R+D+i activities on advanced Internet architectures, applications and services. The centre stands up for a new open innovation framework, fostering the collaboration between companies, public administration, the academic environment and end-users.

Internet has produced a superabundance of data, information and networks. The next step is to advance in the research and innovation of an Internet based on intelligent systems and smart technologies.

The Internet of knowledge and creativity is the new challenge to face.

The i2CAT vision for the next 10 years is a networked smart world, a collaboratory based in a new generation of networked intelligent technologies and systems, a co-creating platform between machines, people and the environment for a sustainable and smart future.

ORGANISATION STRUCTURE



BOARD OF TRUSTEES

The members' representatives are:

- Mr. Jordi Puigneró i Ferrer, President, General Manager of Telecommunications and Information Society (DGTSI), Government of Catalonia.
- Mr. Enric Fossas Colet, Vice-President I, Rector of the Universitat Politècnica de Catalunya (UPC).
- Mrs. Núria Betriu Sànchez, Vice-President II, CEO at ACCIÓ.
- Mr. Josep Maria Martorell i Rodon, General Manager of Research, Government of Catalonia.
- Mr. Carles Salvadó Usach, Secretary of the Board, Head of Telecommunications Service at DGTSI.
- Mr. Gonçal Bonhomme i Altable, Deputy Secretary of the Board, Manager of Innovation at Orange.
- Mrs. Esther Real Saladrigas, Vice-Rector for Knowledge transfer at Universitat Politècnica de Catalunya (UPC).
- Mr. Fernando Orejas, Research Vice-Chancellor at Universitat Politècnica de Catalunya (UPC).
- Mr. Javier Ruiz Fernandez, R+D+i Manager at Alcatel-Lucent.
- Mr. Jordi Escalé i Castelló, Managing Director at Centre de Telecomunicacions i Tecnologies de la Informació (CTiTI).
- Mr. Jordi Troté Escribano, Head of Institutional Relations at ACCIÓ.
- Mr. Antoni Elias Fusté, Professor at Universitat Politècnica de Catalunya.
- Mrs. Joana Sánchez Morillo, Sales Manager of Government and Public Services at Vodafone.
- Mr. Xavier Buxeda Lladó, General Manager at Fujitsu Technology Solutions in Catalonia.
- Mr. Francesc Bert i Llosa, Head of Key Account, Public Sector & Utilities at Cisco Systems.
- Mr. Amadeu Gassó Gimeno, Technical Manager at CCMA.
- Mr. Francisco Javier Marcos, R+D+i Manager at Abertis Telecom.
- Mr. Francesc García Cuyàs, Director at TICSalut Foundation.
- Mr. Joan Bennassar, Technical Manager at Media Pro.
- Mr. Ángel Lozano, Research Vice-Chancellor at Universitat Pompeu Fabra.
- Mr. Lluís Comellas i Riera, Research Vice-Chancellor at Universitat Ramon Llull.
- Mr. Diego Matas Morillo, General Manager at Interoute Iberia.
- Mr. Eduard Martin, Innovation Director at IMI (Barcelona City Council).
- Mr. David Noguer i Bau, Regional Manager at Juniper Networks.
- Mr. Mateo Valero, Director at Barcelona Supercomputing Center.
- Mr. Felip Fenollosa, General Manager at Fundació CIM.
- Mr. Ernest Quingles, Managing Director at Epson Ibérica.

EXECUTIVE COMMITTEE

In 2014 members representatives were:

- Mr. Antoni Elias Fuster, President, Professor at Universitat Politècnica de Catalunya.
- Mr. Carles Salvadó Usach, Vice-President of Delegate Committee, Head of Telecommunications Service at DGTSI.
- Mr. Gonçal Bonhomme i Altable, Deputy Secretary of the Board, Manager of Innovation at Orange.
- Mr. Jordi Escalé i Castelló, Managing Director at Centre de Telecomunicacions i Tecnologies de la Informació (CTiTI).
- Mr. Jordi Troté Escribano, Head of Institutional Relations at Acció.
- Mr. Lluís Comellas i Riera, Research Vice-Rector at Universitat Ramon Llull.
- Mr. Javier Ruiz Fernández, R&D Coordinator at Alcatel-Lucent.
- Mr. Ángel Lozano, Research Vice-Rector at Universitat Pompeu Fabra.
- Mr. Amadeu Gassó Gimeno, vocal, Technical Manager of CCMA.
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- Mr. Francesc Subirada, Deputy Director at Barcelona Supercomputing Center.
- Mr. Felip Fenollosa, Director at Fundació CIM.
- Mr. David Moure, Business Manager at Epson Ibérica.
- Mr. Sebastià Sallent i Ribes, Director at Fundació i2CAT.
- Mr. Joan Manel Martín Almansa, Managing Director at Fundació i2CAT.

MANAGEMENT

Mr. Sebastià Sallent i Ribes, Director.

Mr. Artur Serra, Deputy Director.

Mr. Joan Manel Martín Almansa, Managing Director.

Mr. Sergi Figuerola, Chief Technology and Innovation Officer.

SUPPORT STAFF

Project Management Office:
Flaminio Minerva, Vanessa Llobet Raúl Pertierra, Susana Otero, Sandrine Schwartz.

Administration
Rocío Segura, Sonia Beltrán.

Infrastructures and Services
Josep Paredes, Júlia Ferràndiz.

SOFTWARE ENGINEERING GROUP

Javier Fernández, Josep Pons Adrián Rosselló, David Roldan, Isart Canyameres, Julio Carlos Barrera.

BUSINESS UNITS

Jordi Figueras, Yolanda Lupiáñez, Andrea Cervera, David Delgado, Soraya Estévez.

SCIENTIFIC ADVISORY BOARD

The Board, created in 2012, is composed of the following members:

- Prof. Dimitra Simeonidou. University of Bristol, United Kingdom Head of the University of Bristol's High Performance Networks Group. BScand MSc in Physics from the Aristotle University of Thessaloniki (Greece), PhD from the University of Essex.
- Prof. Dae-Young Kim, Chungman National University, South Korea Professor of the Department of Information Communications Engineering atChungnam National University.
- Bill St Arnaud, Independent R&E Network and Green IT consultant, Canada. Independent Consultant specialising in advanced networks and Green IT.
- Prof. Carsten Bormann, Universität Bremen (University of Bremen), Germany. Professor of Internet Technology at the University of Bremen and member of the board of directors of the Centre for Computing and CommunicationsTechnology (TZI).

ASSOCIATIONS, NETWORKS AND PLATFORMS

OUTREACH ACTIVITIES

JANUARY

23 The virtual Psychologist
ARA · LA VANGUARDIA · 324.CAT

FEBRUARY

25 Innovation awareness
LA VANGUARDIA

24 — 27 i2CAT at the Mobile World Congress

MARCH

18 — 20 i2CAT and DANA experiences at the FIA 2014 event

APRIL

8 OpenNaaS 0.28 released!

25 8 new companies join the Industrial Ring of i2CAT
LA VANGUARDIA

MAY

8 Terrassa Augmented reality APP
TERRASSA DIGITAL · NOTICIAS.COM

International Demo at TNC2014 of Distributed Networks

JUNE

30 Successful closure of AAL project Fearless
AAL-EUROPE · YOUTUBE

JULY

30 International consolidation
TECNONEWS.INFO

SEPTEMBER

30 Exhibition at Palau Robert *Temps del romànic: Art, vida i consciencia*
ROMANICOBERT.CAT

OCTOBER

1 Promotion events of the digital technology
ELPUNTAVUI.CAT

8 The project CreatiFI supports innovative projects using Future Internet technologies in the creative industries
LAMEVA.BARCELONA.CAT

21 A system of rehabilitation after stroke
ELCORREO.COM

30 ASLAN 2014 "Authomatization of the SDN and NFV Networks Management", by Eduard Escalona
ELPUNTAVUI.CAT

NOVEMBER

17 — 19 i2CAT Exhibitors at Smart City Expo
SMARTCITYEXPO.COM

19 Radio program *Preferències:* interview to J.M. Martín and S. Figuerola
RTVE.ES

A system of rehabilitation after stroke
ELCORREO.COM

DECEMBER

6 Connected TV in Gurb: TV3, i2CAT i Abertis Telecom start with the Connected TV trials in Gurb
CCMA.CAT · ITCIO.ES

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HERE'S TO 2014...

READY TO FACE THE 2015 NEW CHALLENGES!

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