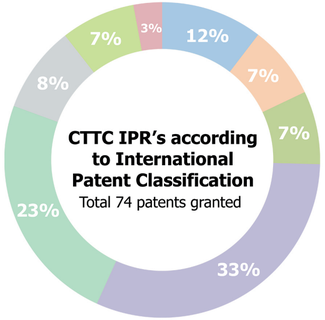
Patents



X9 **G01S..** Measuring Testing Radio direction finding
USA 7,982,670, EPO 20056207, Japan 4990919
EPO 2413158, ES 2355340

X5 **H04Q..** Electric Communication Technique, selecting two way links
USA 8,208,952, EPO 2160849, ES 2325713

X5 **H04J..** Electric Communication Technique, Multiplex Monitoring arrangements
USA 8,295,179, EPO 2188947

X25 **H04B..** Electric Communication Technique, Transmission
USA 8,290,459, EPO 2297588
EPO 2039019
USA 8,792,577
USA 8,929,495, EPO 2782304
USA 8,310,980, EPO 2203988, ES 2332077
USA 8,472,500, EPO 2332267, ES 2355999

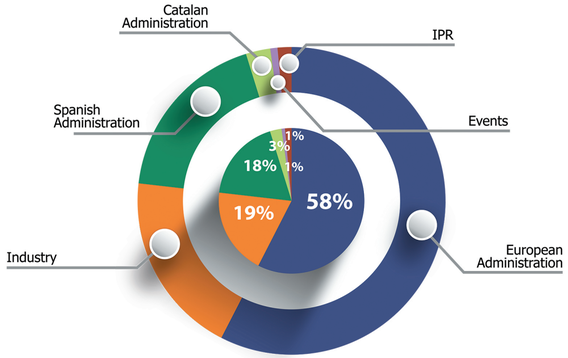
X17 **H04L..** Electric Communication Technique, transmission of digital information
USA 8,111,632, EPO 2098028, Japan 4851595
USA 8,259,829, EPO 2070200
USA 8,441,932, EPO 22272297
ES 2393093

X6 **H04K..** Electric Communication Technique, secret communication, jamming
USA 8,503,552, EPO 2281376, HK1154137, ES 236759

X5 **G01C..** Measuring Testing, distance levels or bearings, Navigation
USA 8,364,4014, EPO 2064568, China 101765787

X5 **H01Q..** Electric Elements, Aerials
USA 8,364,4014, EPO 2064568, China 101765787

Income Projects 2017



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cost

ACCIÓ Generalitat de Catalunya

eniac JOINT UNDERTAKING

European Commission

CTTC in numbers

BUDGET

6.9 EURO Million €

STAFF

117

- Administration
- Management
- PhD Students
- R&D

LABORATORIES

8 Facilities
280 m2

TESTBEDS

- ADRENALINE Testbed ®
- EXTREME Testbed ®
- GEDOMIS ®
- GESTALT ®
- GEMMA NAVIGATION ®
- IoTWORLD ®
- CASTLE PLATFORM ®

334 R&D Projects
91 Currently active

PUBLICATIONS

623 Journals (ISI Indexed)
1652 International Conferences
111 Books & Chapters

PROJECT RANKINGS

18th in H2020 in Spain
22nd in LEIT-ICT (5th in Spain)
2nd in 5G PPP (1st in Spain)

21st in H2020 in Spain*
26th in LEIT-ICT (5th in Spain)*
5th in 5G PPP (2nd in Spain)*

*Ranked in terms of project participation

EVENTS/ SEMINARS

494

SPIN-OFF 1

GRANTED PATENTS 74

AWARDS 43

Professor Miguel Ángel Lagunas
Director

The Centre Tecnològic de Telecomunicacions de Catalunya (CTTC) is a non-profit research institution based in Castelldefels (Barcelona), resulting from a public initiative of the Regional Government of Catalonia (Generalitat de Catalunya). Research activities, both fundamental and applied are organized onto four research divisions: Communication Networks, Communication Systems, Communication Technologies and Geomatics.

Since its creation in 2001, CTTC has participated in more than 300 projects funded by European , Spanish or Catalan administrations for by direct contracts with industry, in the fields of, among others, 4/5G broadband communication systems, embedded systems, next-generation all-optical transport networks, software defined networking, satellite communications, positioning systems, M2M communications, smart grids. CTTC also develops strategic internal research projects and experimental prototypes.

In terms of scientific production, the CTTC annually produces over 85 and 150 papers in peer-reviewed journals and international conferences, respectively. Currently more than 115 people work at CTTC. In addition, CTTC hosts a pre-doctoral research program that since its creation has provided scientific guidance to more than 60 students, and produced more than 50 PhD thesis, many of them awarded with prizes from academic institutions or technical societies. CTTC also manages an IPR portfolio of 74 granted patents, belonging to 26 families, awarded in different countries in EU, USA, Japan, Hong Kong, and China.

A portfolio of Products & Solutions (P&S) in the fields of: Communication networks, technologies, systems, position, navigation, and remote sensing, in different technology readiness levels (TRL), is offered to the industry and investors for further development.

DIVISIONS & DEPARTMENTS

ONS
Optical Networks & Systems

MONET
Mobile Networks

COMMUNICATION NETWORKS

- Machine learning based multi-layer and multi-domain network management
- SDN/NFV/MEC for verticals
- Orchestration of optical and wireless/mobile networks and computing
- Coexistence of fixed and mobile networks (incl. LTE-U, LAA, mmwave)
- Software-defined optical transmission and performance monitoring
- Optical systems and subsystems exploiting novel photonic technologies
- Testbed development and ns-3 mobile LTE simulation/emulation framework

ASIP
Advanced Signal and Information Processing

A&MSP
Array and Multi-Sensor Processing

SI
Statistical Inference for Communications and Positioning

COMMUNICATION SYSTEMS

- Signal and Information Processing for the Communication Systems Air Interface
- Positioning and tracking: C-ITS, high precision agriculture, advanced GNSS SDR receivers
- Spectrum sharing techniques, Machine Learning for Communications, Signal processing for Big Data and the Smart Grid
- Technologies: 5G, satellites (GEO/LEO), URLLC, MIMO/arrays, spectral efficient/robust modems, system-on-chip SDR/HW prototyping
- Experimental platforms: hybrid satellite/terrestrial, GNSS/INS/indoor(radio) positioning

M2M
Machine to Machine Communications

PHYCOM
PHYLayer Implementation of High Performance Comms Systems

SMARTECH
Smart Energy Efficient Comms Technologies

COMMUNICATION TECHNOLOGIES

- Communication technologies for energy and bandwidth efficiency enhancement
- 5G digital front end prototyping and HW/SW reconfigurability
- MTC for IoT including SDN/NFV solutions
- IoT prototyping: end-to-end experimental platform for smart environments
- Slicing solutions for connected vehicles, smart grid, smart cities, security/public protection and m-health vertical applications
- Data driven solutions for 5G networks

RSE
Remote Sensing

GEON
Geodesy and Navigation

GEOMATICS

- Radar remote sensing
- Optical remote sensing
- Deformation monitoring
- UAV mapping
- Multi-sensor navigation
- Sensor orientation and calibration
- Geodetic trajectory determination

TESTBEDS

ADRENALINE Testbed®
An SDN/NFV Packet/Optical Transport Network and Edge/Core Cloud Platform for End-to-End 5G and IoT Services

EXTREME Testbed®
SDN/NFV-based testbed for 5G mobile network services

GEDOMIS®
Platform to develop, test and validate the PHY-layer of 5G wireless communication systems

GESTALT®
An open source global navigation satellite systems signal testbed

GEMMA NAVIGATION®
Generic, Extensible and Modular Multisensor navigation Analysis system

IoTWORLD®
An experimental platform for the Internet of Things

CASTLE PLATFORM®
Cloud Architecture for STandardization deveLopmEnt

PRODUCTS & SOLUTIONS

CO-OFDM TX/RX · DD-OFDM Monitoring · DSP-enabled DD-OFDM TX/RX · Big-data enabled SON · AS-PCE · Virtual LSGW · SDN Orchestrator · Cloud Network Orchestrator · Network Hypervisor · DISCO SW · NFV MANO · Backpressure · ECOFDS · AVEMEDIA · S-BVT

Array GNSS · GNSS-SDR® · FBMC TX/RX · DL-LITE TX/RX

PSI · Mini TAG · GEMMA iPOLE · Micro TAG

DLITE · VLC Silence · LTE FPGA Implementation · DQ Algorithms · 5GWave