In 1986, within the framework of the University Reform Act and the Statutes of this University, the faculty of the Area of Knowledge of Signal Theory and Communications agreed to propose to the Council of the Universitat Politècnica de Catalunya that the previous departments of Communications, Electrophysics, Control systems, Information Processing and Transmission, and the Sections of Television and Electroacoustics, should be grouped together in a single department of the School of Telecommunications Engineering of Barcelona (ETSETB), which would be called the "Department of Signal Theory and Communications".

The teaching and research of the Department of Signal Theory and Communications is carried out in the area of Telecommunications Engineering in the School of Telecommunications Engineering of Barcelona and the Technical College of Vilanova i la Geltrú. The academic and research activity of the Department covers the spectrum of frequencies from base band to optical frequencies: generation, transmission, reception and processing of signals, associated information, propagation through different media, and all applications. The Department studies and develops in particular the technologies of:

- Electronic circuits.

- HF, VHF and UHF.
- Microwaves.
- Antennae.
- Integrated optics, optical fibres and optoelectronic devices.

With the following applications:
- Radio and Television Broadcasting.
- Radio links.
- Transmission by cable.
- Satellite communications.
- Teledetection.
- Mobile communications.
- Systems of transmission by optical fibre.
- Radar and navigational aids.
- Sonar.
- Voice and image processing.
- Biological applications of radio frequency.
- Electroacoustics.
and others.

Courses

In accordance with the current syllabus (the modified 1964 plan), the ETSETB offers the following courses:

- 2nd year
  - Circuit theory.
• 3rd year
  - Electromagnetic fields.
  - Networks (Analysis and synthesis).
  - Signal processing.
• 4th year
  - Antennae.
  - Emitters, Receivers and Radio links.
  - Lines and cables.
  - Microwaves.
  - Telecommunications systems.
• 5th year
  - Electromechanics and Electrooptics.
  - Radar.
  - Space telecommunications.
  - Television.
  - Servosystem techniques.

The EUPVG offers the following third cycle subjects:
  - Wave transmission techniques.
  - Information transmission.
  - Signals and systems.
  - Data transmission units and systems.

The Department also offers the following doctorate programme:

• First year
  - Communications.
  - Electromagnetism (optional).
  - Mathematical methods for Communications.
  - Digital Signal Processing (optional).
• Second year (all subjects are optional)
  - High velocity communications by optical fibre.
  - Microwave circuits.
  - Integrated Optical Devices.
  - Modern Spectral Estimation and signal processing in sensor arrays.
  - Electronic optics.
  - Adaptive processing for Communications.
  - Digital image processing.
  - Microwave receivers.
  - Speech recognition and synthesis.
  - Advanced aspects of Electromagnetism.

In the 1988-89 academic year the Department taught 2,000 students, and 70 master theses were supervised and read.

Groups and Lines of Research

In the area of research, the Department is divided into autonomous research groups, each of which develops one or more lines of research within a specific sub-area. At present these groups are:

- Antennae, Microwaves and Radar (AMR).
- Optical Communications.
- Radio Communications.
- Communications Electronics.
- Laboratory of Digital Communications.

- Integrated Optics.
- Signal Processing.

The lines of research which are currently active are:

- Subsystems of Microwaves and Millimeter Waves (UNESCO code 3307.08). Developed by the AMR Group. Design, analysis, implementation and measurement of active and passive subsystems of microwaves and millimetric waves.
  - Mixers, oscillators, PLL oscillators, low noise and power amplifiers, etc.
  - "Microstrip", "line line" and waveguide circuits: filters, hybrids, direction couplers, transitions, etc.
- Characterization of active devices up to 60 GHz.


- Land Stations for Satellite Communications (UNESCO code 3325.04). Developed by the AMR Group. Design, analysis, implementation and measurement of land stations for satellite communications in frequency bands higher than 14 GHz, with specific development for the load of 20 to 30 GHz of the European satellite Olympus.

- Integrated Optics and Optical Communications (IUB code 2202.09). Developed by the Integrated Optics Group. Optical guides: Study of homogeneous and non-homogeneous structures in electro- and magneto-optical materials. Theoretical design of passive and active optical components, unions, insulators, modulators, detectors, etc.
- Optical switching.
- Non-linear devices.

- Radar Systems (UNESCO code 3307.10). Developed by the AMR Group. Study and design of radar surveillance systems (monostatic and multistatic), image radars, characterization of targets and radar environments, electronic countermeasures and counter-countermeasures, data processing and analysis and design of data fusion centres.


- Radio Links (UNESCO codes 3325.04 and 3325.05). Developed by the Radio Communications Group. Study and design of radio links. Development of Spread Spectrum techniques. Adaptive channel matching and matching of diagrams of modulation-coding suitable for environments subject to strong interferences (deliberate and accidental) and fading.

- Mobile Communications (UNESCO codes 3325.04 and 3325.05). Developed by the Radio Communications Group. Characterization and modeling of the communications channel in the bands 1-3 GHz. Simulation of transmission systems. Design and imple-
Power amplifier with MESFET AsGa at 28 GHz. Laboratory of Antennae, Microwaves and Radar.

Display of the chaotic behaviour of a non-linear circuit. Laboratory of Communications Electronics.


- Digital Radio communications in decametric Waves (HF and Meteor Burst) (UNESCO code 3325.04). Developed by several groups in the Laboratory of Digital Communications. Study and design of systems based on TSM 320 c10 and c50 microprocessors for HF and "Meteor Burst".

- Digital Communications using TDMA techniques (UNESCO code 3325.05). Developed in the Laboratory of Digital Communications. Design and analysis of digital transmission systems for physical supports and radio (rural and spatial communications) by using TOPSIM IV simulator packages.

- Design of modems for transmission of data through telephone line (UNESCO code 3304.13). Developed in the Laboratory of Digital Communications. Study and applications of new technologies to the use of the latest norms dictate by the CCITT for data transmission.

- Design of Circuits for Communications Electronics (UNESCO code 3307.06). Developed by the Communications Electronics Group. Developed and implementation of electronic circuits for Communications Systems up to VHF frequencies, with special attention to the design of passive and active filters and switched condensers.

- Optical Communications in the Atmosphere in the Infrared Spectrum (UNESCO code 3307.11). Developed by the Communications Electronics Group. Development of non-guided optical communications systems for applications such as links for data transmission between nearby buildings in urban areas, intelligent photobeaconing of vehicles and internal communications.

- Digital and Adaptive Control Systems (UNESCO code 3307.06). Development by Albert Bertrán Alberi. Design and realization of control systems with application to tele-control of large scale systems (generation and transmission of electrical energy and water distribution centres) and to integrated manufacturing environments (CIM).


- Systems of Transmission by Optical Fibre (UNESCO code 3325.99). Developed by the Optical Communications Group.

- Research and Development of systems of coherent transmission by optical fibre at high speed and in third window (λ = 1.55 µm). Characterization and measurement of DF, DBR, multielectrode and multicyrstality lasers.

- Laser transmissions for coherent FDM systems by optical fibre. Multiple stabilization of lasers for high density coherent FDM systems. Study of techniques of reduction of the optical spectrum of emission of the semiconductor laser with optical and/or electronic feedback.

- Optical amplifiers with doped fibre. Study, design and implementation of active optical devices with doped fibre (ER + 3). Application to totally optical booster structures, active resonant filters, preamplifiers and amplifiers in line.

- Wide band analog communications by optical fibre. Development of an analog system of transmission and reception of multiplexed TV channels with AM or FM modulation in a band width of 1 GHz.

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Equipment and material and human resources

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ANTENNAE, MICROWAVES AND RADAR GROUP

Lecturers:
- Albert Agusacs Solé (Tel. Eng. Assoc. Lect.)
- Javier Bará Temes (Ph. D., Dr. Tel. Eng., Univ. Prof.)
- Antonio Broquetas Ibars (Dr. Tel. Eng., Univ. Lect.)
- Sebastià Blanch Boris (Tel. Eng. Assoc. Lect.)
- Àngel Cardama Aznar (Ph. D., Dr. Tel. Eng., Univ. Prof.)
- Adolfo Comerón Tejero (Dr. Tel. Eng., Univ. Lect.)
- Ignasi Corbella Sanahuja (Dr. Tel. Eng., Univ. Lect.)
- Antoni Elías Fusté (Dr. Tel. Eng., Univ. Prof.)
- Lluís Jofre Roca (Dr. Tel. Eng., Univ. Prof.)
- Lluís Pradell Cara (Dr. Tel. Eng., Univ. Lect.)
- Jordi Romeu Robert (Tel. Eng., Univ. Sch. Lect.)
- Francisco Torres Torres (Tel. Eng. Assoc. Lect.)
- Mercè Vaií-Liosera Ferran (Tel. Eng., Univ. Prof.)
- Xavier Fabregas Canovas (Grad. Physics, F.P.I.)
- Jordi Clavera Calvet (Tel. Eng. Scholarship, F.P.I.)
- Francisco Andrade Giralt (Tel. Eng., Univ. Prof.)
- Albert Porta Frias (Tel. Eng.)

**Associate Research staff:**
- Àncico Belmonte Molina (Grad. Physics, Scholarship, F.P.I.)
- Manuel Cáceres Marzal (Tel. Eng.)
- Luis M. Carrasco Urbano (Tel. Eng.)
- Jordi Clavera Calvet (Tel. Eng., Scholarship, F.P.I.)
- Xavier Fábregas Cánovas (Grad. Physics, Scholarship, F.P.I.)
- Javier Fdz. de Munain (Tel. Eng., Scholarship, F.P.I.)
- Albert Porta Frias (Tel. Eng.)

**Equipment:**
- A 500 m³ anechoic chamber for measuring antennae and RCS of radar targets, instrumented up to 40 GHz.
- Complete instrumentation for the characterization of microwave circuits up to 75 GHz.
- Complete instrumentation for the generation and analysis of complex wave forms up to 3 GHz.
- Unit for measuring phase noise of oscillators up to 40 GHz.
- Software for analyzing linear and non-linear microwave circuits with automatic mask generation.
- Software for analyzing, characterizing and designing antennae, RCS and systems and radar environments.
- Support laboratory:
  - Photoengraving.
  - Coordinatograph.
  - Thermo-compression welder.

**Computer Equipment:**
- HP-UX Cluster. HP 9000380 TSRX server system, 20 MIPS work station, subsystem for representing 3D solids, 3 graphic accelerators.
- HP 9000/340 station (20 MIPS, 3.5 MFLOPS, 1280 x 1024 pixels).
- HP 9000/380 station (5 MIPS, 1024 x 768 pixels).
- HP 9000/320 station (2 MIPS, 1024 x 768 pixels).
- HP 9000/319 station (2 MIPS, 1024 x 768 pixels).
- Hard disc capacity of 1900 MB. 130 MB dumping unit on magnetic tape cartridge.
- HP LaserJet IIF and IIP and HP Paintjet printers.
- Instrument control systems:
  - HP Apollo 9000/4251 system (for automatic control of antennae measurement in anechoic chamber). 20 MIPS, 3.5 MFLOPS. VRX colour graphic subsystem (1280 x 1024), X-Window colour terminal 1024 x 768 16". Hard disc capacity of 664 MB.
  - Reading/writing optical disc unit of 650 MB, operating system HP/UX, connection with Ethernet local network.
  - HP 9000/332 station with BASIC SO for controlling a system for measuring phase noise. Connection to the Ethernet local network.
- HP 9000/310 station with BASIC SO for controlling an HP 8510 automatic network analyzer.
- HP 9000/217 station with BASIC SO and PASCAL for controlling an HP 8510 automatic network analyzer.
- HP E and HP PaintJet printers.
- LAN Manager/X network of personal computers:
  - HP 9000/825 Server, 1 HP Vectra 486 (440 MB hard disc) HP Vectra 386, 6 HP Vectra 286, 12 PC-AT 386 SX and 1 PC-AT 286. HP LaserJet, HP PaintJet, Epson LX800 and Digital LA50.

**OPTICAL COMMUNICATIONS GROUP**

**Lecturers:**
- Gabriel Junyent Giralt (Dr. Tel. Eng., Univ. Prof.)
- Jesús Rollán Andrade (Tel. Eng., Univ. Sch. Lect.)
- Sergio Ruíz Moreno (Dr. Tel. Eng., Univ. Lect.)
- María José Soneira Ferrando (Dr. Tel. Eng., Univ. Lect.)

**Associate Research staff:**
- Jordi Guitart Felip (Tel. Eng., Scholarship, F.P.I.)
- Ramón Jané Crumols (Tel. Eng.)
- André Mandiaux (Electr. Eng., Scholarship EEC prog. STIMULATION)
- José Antonio Navarro García (Tel. Eng.)
- Javier Pérez Sanjuan (Tel. Eng., Scholarship, F.P.I.)
- José Prat Gomà (Tel. Eng., Scholarship, F.P.I.)
Equipment:
- HP 8970A Noise Factor meter.
- HP 8703A Network analyzer (characterization of optoelectronic components up to 20 GHz).
- Complete instrumentation for characterizing optical devices.
- TEKTRONIX TL14 Spectrum analyzer.
- EALING 24-6074+24-6322 vibration proof optical table for characterizing optical fibres and optoelectronic components.
- 7 PCs, one VAX terminal and 2 laser printers.
- Low frequency laboratory.
- EESOF Software for designing microwave circuits (Academy, Libra, Microwave Spice).

RADIO COMMUNICATIONS GROUP

Lecturers:
- Ramón Agustí Comes (Dr. Tel. Eng., Univ. Prof.)
- Fernando Casadevall Palacio (Dr. Tel. Eng., Univ. Lect.)
- Guillem Femenías Nadal (Tel. Eng., Univ. Sch. Lect.)
- Juan J. Olmos Bonafé (Dr. Tel. Eng., Univ. Sch. Lect.)
- Silvia Ruiz Bequé (Dr. Tel. Eng., Univ. Sch. Lect.)

Associate Research staff:
- Xavier Barba Miquel (Tel. Eng.)
- Pilar Díaz Romero (Tel. Eng., Scholarship, F.P.I.)
- Antonio Valdovinos Bardaji (Tel. Eng., Scholarship, F.P.I.)

Radio frequency equipment:
- Complete instrumentation for characterizing HF, VHF, UHF and logical circuits composed of:
  - HP and Anritsu network analyzers up to 3 GHz.
  - HP spectrum analyzers up to 2 and 6 GHz.
  - RF generators of 2 GHz, 1 GHz and 500 MHz.
  - Hp 5372A Frequency-Time analyzer.
  - 400 MHz Digital oscilloscope and 100 MHz analog oscilloscope.
  - AFM-2 Radiometer modulation analyzers up to 1 GHz.
  - Logical analyzer.
  - Photographic laboratory for design of printed circuit plates.
  - Basic instruments of electronic support.
  - Faraday chamber.

Computer equipment:
- Local area cluster consisting of:
  - 1 HP-9000/375 work station.
  - 2 HP-9000/400 DL work stations.
  - 1 HP-9000/550 work station.
  - 28 Mbyte RAM memory capacity.
  - 700 hard disc capacity.
  - 70 Mips (11 Mflops) computing capacity.
  - UNIX operating system.
  - 12 PC-AT-386 composed of:
    - 640 Kbytes RAM, 20 Mbytes hard disc and mathematical coprocessor.
  - 2 PC-AT-386 composed of:
    - 1 Mbyte and 8 Mbytes RAM and 20 Mbyte hard disc, mathematical coprocessor.

- A development system for TEXAS TMS 320C30 microprocessors.
- A system for designing ASIC circuits by means of XILINX Programmable Gate Arrays.
- Software for the work stations and PC CAE/CAD and RF.

COMMUNICATIONS ELECTRONICS GROUP

Lecturers:
- José María Miguel López (Dr. Tel. Eng. Univ. Lect.)
- Joan Maria Miró Sans (Dr. Tel. Eng., Univ. Lect.)
- Margarita Sanz Postiès (Dr. Tel. Eng., Univ. Lect.)

Equipment:
- Complete instrumentation for the characterization of circuits up to 1 GHz.
- 3 work stations, CAD software.
- Laboratory of electronic support.

LABORATORY OF DIGITAL COMMUNICATIONS

Lecturers:
- José Antonio Delgado Penín (Dr. Tel. Eng., Univ. Prof.)
- Juan Serrat Fernández (Dr. Tel. Eng., Univ. Lect.)
- Rafael Valle Alarcón (Dr. Tel. Eng., Univ. Sch. Lect.)
- Jordi Dalmau Royo (Tel. Eng., Assoc. Lect.)

Detection of guided optical modes. Laboratory of Integrated Optics.

Automatic characterization of optoelectronic components. Laboratory of Optical Communications.
Associate Research staff:
- Matías Martínez Albert (Ind. Eng.)
- José L. Núñez Freile (FP2, Scholarship CI-RIT)
- Santiago Ribas Roca
- Miguel Sedo Gómez

Equipment:
- HF modems and transceivers.
- TMS 320 development microprocessor unit.
- Specialized programmes for design and analysis of transmission systems (TOPSIM-III).
- PDP 11/23 unit and 2000 VAX station + DEC (8 inputs).

INTEGRATED OPTICS GROUP

Lecturers:
- Ferran Canal Bienzobas (Dr. Physics, Univ. Prof.)
- Víctor F. Dios Otín (Tel. Eng., Univ. Sch. Lect.)
- Jordi Hernández Marco (Dr. Tel. Eng., Univ. Lect.)
- Lluís Torner Sabata (Dr. Tel. Eng., Univ. Lect.)

Associate Research staff:
- David Artigas Garcia (Grad. Physics, Scholarship, F.P.I.)
- Sergi Benloch Petit (Tel. Eng., Scholarship, F.P.I.)
- Mauricio Moreno Sereno (Grad. Physics, Scholarship, F.P.I.)
- Juan Pérez Torres (Grad. Physics, Scholarship, F.P.I.)
- Jaime Recolons Martos (Grad. Physics, Scholarship, F.P.I.)

Equipment:
- Unit for characterization of materials, cryostat, vacuum pump, KGauss 22 electromagnet, 632.8 nm and 1.152 um laser tubes; a 5 W argon ionic laser, with power modulator and laser power meter; two Vidicon cameras for optical detecting in the visible and near infrared ranges, with and image process subsystem.
- Optically equipped bench for characterizing integrated optical devices.
- System for depositing file layers with double card by the technique of "sputtering".

Computer Equipment:
- HP-APOLLO/42ST WORK STATION (3.5 Mflops, 400 Mb)
- PC 386 COMPUTER (33 mHz), 2 PC/386 (16 mHz), PC/AT (12mHz) and 3 PCXT with Ethernet connection.
- Macintosh SE/20 computer, Mac computer, connection to Phone Net appeal to me.
- 2 HP-7475A plotters and 2 matrix printers.

SIGNAL PROCESSING GROUP

Lecturers:
- Margarita Cabrera Bean (Tel. Eng. Assoc. Lect.)
- Antonio Carrión Isbert (Dr. Tel. Eng., Univ. Lect.)
- Juan Antonio Fernández Rubio (Dr. Tel. Eng., Univ. Prof.)
- Antoni Gasull Llampallas (Dr. Tel. Eng., Univ. Lect.)

- Miguel Angel Lagunas Hernández (Dr. Tel. Eng., Univ. Prof.)
- Eduardo Uleida Solano (Dr. Tel. Eng., Univ. Sch. Lect.)
- José Bernardo Mariño Acebal (Dr. Tel. Eng., Univ. Prof.)
- Enrique José Masgrau Gómez (Dr. Tel. Eng., Univ. Lect.)
- Enric Monte Moreno (Tel. Eng. Assoc. Lect.)
- Asunción Moreno Bilbao (Dr. Tel. Eng., Univ. Lect.)
- Climent Nadeg Camprubi (Dr. Tel. Eng., Univ. Prof.)
- Adrián J. Rodríguez Fonollosa (Dr. Tel. Eng., Univ. Sch. Lect.)
- Miguel Serra Aguilera (Tel. Eng., Assoc. Lect.)
- Lluís Torres Urgell (Ph. D., Dr. Tel. Eng., Univ. Lect.)
- Francesc Vallverdú Bayes (Dr. Tel. Eng., Univ. Lect.)
- Gregori Vázquez Grau (Dr. Tel. Eng., Univ. Lect.)
- Miguel Serra Aguilera (Tel. Eng., Assoc. Lect.)
- Lluís Torres Urgell (Ph. D., Dr. Tel. Eng., Univ. Lect.)
- Francesc Vallverdú Bayes (Dr. Tel. Eng., Univ. Lect.)
- Gregori Vázquez Grau (Dr. Tel. Eng., Univ. Lect.)

Associate Research staff:
- Antonio Bonafonte Cavez (Tel. Eng., Scholarship, F.P.I.)
- José Ramón Casas Pla (Tel. Eng., Scholarship, F.P.I.)
- Ricard Dalmàu (Tel. Eng.)
- Fco. Javier Hernández Pericas (Tel. Eng., Scholarship, F.P.I.)
- Fernando Marqués Acosta (Tel. Eng., Scholarship, F.P.I.)
- Pere Montoliu (Tel. Eng.)
- Albert Oliveras Verges (Diplom. Tel., Grad. Comp. Sc.)
- Josep Vidal Manzano (Tel. Eng., Scholarship, F.P.I.)

Equipment:
- Computer Equipment:
  - Local area VAX-Cluster, VMS software, composed of:
    - One uVAX-3600, three uVAX-3100, one VAX-Station 3200 and a VAX-750.
    Total disc capacity of 3165 MB and a total processing capacity of 15.75 VPU's (1 VPU = 1 VAX 780).
    - One MARS-432 Numerix vector processor (32 bits) with A/D and D/A units.
    - One VTE DVSR-50-3 unit for displaying sequences of images.
    - DC-DOS Network, composed of 14 PC-ATs and one PS/2 working with PCSA software and connected to the VAX-Cluster via Ethernet.
  - Mac-Apple Star-Net, composed of 19 Mac SEs, 1 Mac II and a Laser Writer printer interconnected in star form and connected to the VAX-Cluster via Apple-Talk and Ethernet networks with DEC Lan Works software (Apple-Digital).
  - IBM RT, one RT-6151-180 and one RT-6150-135 with three disc units of 310 Mb each.

Instrumentation:
- Complete instrumentation for processing image, voice and hardware developments for DSP:
  - Two Matrox cards for displaying images, three monitors, a hard copy, a DSP plate based on the ATT32 with A/D and D/A converters (Loughborough S.I.), a complete rack of I/O for voice processing, DSP56001, ATT32C and TMS32030 processor development plates, an HP-16500 A digital analyzer and complete electronic instrumentation.
  - Instrumentation for Sonar and Acoustics:
    - HP-9000 series 330 Computer.
    - Complete instrumentation (B&K) for acoustic measurements: Amplifier, recorder, spectrometer, noise generator and FFT Advantest TR9404 analyzer.
    - Live room and Audition-Recording Room with complete equipment for Sonar simulation.
Characterization of a low noise amplifier for a radio link of 27.5 to 29.5 GHz. Laboratory of Antennae, Microwaves and Radar.

tion: Tank for simulation of sonar channel, subsystems of acquisition and emission of sonar signal (transducers, A/D and D/A multichannel converters), PC HP-Vectra for control of instrumentation with HP-1B bus and connection to the Ethernet network.

TECHNICAL COLLEGE OF VILANOVA I LA GELTRÚ

Head of Local Office:
- Antoni Barlabé Dalmau (Tel. Eng., Univ.

SCH. Lect.)

Other Lecturers for the TCVG:
- Marcel Massana i Esteve (Dip. Elect. Univ., Sch. Lect.)
- Constanti Muñoz i Porcar (Dip. Elect. Univ., Sch. Lect.)
- Vicente Sales Zaragoza (Dip. Elect. Univ. Sch. Lect.)
- Josep Segarra Mulerat (Tel. Eng. Univ. Sch. Lect.)

OTHER LECTURERS OF THE DEPARTMENT
- Eduard Bertrán Alberti (Dr. Tel. Eng., Univ. Lect.)

RESEARCH ASSISTANTS
- Jaume Herranz Lluis (M. Sc., Dr. Ind. Eng., Univ. Lect.)
- Pedro Vicente del Fraile (Dr. Tel. Eng., Univ. Lect.)

SPECIALIST TECHNICIANS
- Fc. Xavier Bergadà Riba.
- Alfredo Cano Sánchez.
- Melchor Fuentes Gómez.
- Joaquín Giner Nos.
- José María Haro Sánchez.
- J. Carlos Nistal Muñoz.
- Carlos Díaz Peris.

ADMINISTRATION
- Elena Esteve Barredo.
- Angela Noguera Navarro.
- Filo Silva Gallego.
- Isabel Toribio Pérez- Moreno.

Awards and Distinctions

1st Prize for the Best Article of Professional Electronics, 4th Mundo Electrónico
Awards, 1979, for the article "Transmission of Television images by digital methods", written by the Signal Processing Group of the Department of Signal Theory and Communications.

- 1st Prize for the Best Product, Development or Project performed with Spanish technology. Actualidad Electrónica Magazine, 1985, for the "R.F. front end for reception of TV signals broadcast directly from satellite". Dept. of Electrophysics of the ETSETB (AMR Group), TAGRA, S.A. and MIER ALLENDE.

- "J. Bertrán Marqués" research prize at S.O.NIMAG for the work "Oral Communication between man and machine: application to games", carried out by the Signal Processing Group of the Dept. of Signal Theory and Communications.

- 1st prize for the Best Professional Electronics Article, 10th Mundo Electrónico Awards, 1985, for the article, "Oral Communication with the Computer", written by the Signal Processing Group of the Dept. of Signal Theory and Communications.

- 1st prize of Application of Technology of the Dept. of Industry and Energy of the Generalitat of Catalonia, 1986, Dept. of Electrophysics of the ETSETB (AMR Group), TAGRA, S.A. AND MIER ALLENDE.

- Invitation by the Ministry of Education and Science to present the research project "R.F. front end for the reception of TV signals broadcast directly from satellite" at EXPOCIENCIA 90, 1987, AMR Group of the Dept. of Signal Theory and Telecommunications.

- 1st Prize at the 8th Awards: "Tribune of the Innovating Inventor", "Prize for innovation for researchers belonging to Institutions and Universities", 12th Mundo Electrónico Awards, 1987, for the development "Microwave Tomograph", AMR Group of the Dept. of Signal Theory and Communications of the ETSETB.


- 1st Prize for the Best Product, Development or Project performed with Spanish technology. Actualidad Electrónica Magazine, 1989, for the 3-D LANZA radar. CESEL SA, Dept. of Signal Theory and Communications of the ETSETB and the Dept. of Signals, Systems and Radiation of the STEM.

**Address:**
ETSETB-UPC
Dept. T.S.C.
C/ Sor Eulalia de Anzizu, s/n
08034 BARCELONA - SPAIN

**Mail address:**
ETSETB-UPC
Dept. T.S.C.
PO BOX 30002
08080 BARCELONA - SPAIN

**Telephones:**
34 3 4016440
34 3 4016849
34 3 4016850

**Telefax:**
34 3 4016447

**MANAGEMENT TEAM**

**Head of Department:**
- Ramón Agustí Comes.

**Head of Studies:**
- Antoni Elias Fusté.

**Secretary:**
- Jordi Hernández Marco.

**Coordinator of the Doctorate programme:**
- Juan A. Fernández Rubio.

This booklet was sent to press on May 1, 1991.