Research at ETS for Communication Technologies

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ÉTS — Le génie pour l'industrie

INFORMATION AND COMMUNICATIONS TECHNOLOGIES sector

Telecommunications

Basic design features
- Analog and digital signal processing in real-time and with high rate
- Antennas
- Autonomous sensor networks
- Communication protocols
- Design, implementation and simulation of modulation and coding
- Digital signal processing
- Multimodal dialogue systems

Performance, optimization and management
- Navigation, positioning and guiding precision (RTK)
- Performance and optimization of systems and networks
- Quality of service over IP
- Resistance to failure, reliability, network security
- Resource management in next generation networks
- Simulation of systems and networks
- Technology robustness and antijamming

Systems
- 4G & LTE networks
- CDMA systems with multiple access
- Cognitive radio networks
- Communication Machine Machine (M2M)
- Digital wireless receivers
- Femtocell (poor mobile coverage)
- Heterogeneous networks
- Imaging radar sensing
- IP Phone & new generation of IP
- Local networks Ad hoc, MPLS, VPN, optical, wireless
- Multicast services
- Network communication with the Cloud
- Radio satellite navigation (GPS, Galileo, Glonass, Compass)

Optical communication networks

Optical components and devices
- Devices (Laser, Neon, LED, etc ...)
- Laser and fiber optic technologies
- Nanophotonics
- Optical fibers (doped & microstructured materials)
- Silicon photonics

Optical test and measurement
- Test and measurement
- Test instrumentation based on optical fiber

Systems and networks
- Agile photonic networks
- Coherent optical networks without filters (without grid)
- Design, architecture and plans for monitoring
- Fiber optic communications (modeling, performance, applications)
- Physical layer of communication systems based on fiber optic DWDM

Micro/Nano-electronics

Applications
- Energy gleaning
- Integration of microelectronic systems
- Microcontrollers and DSP (Real time)
- RFID technology
  - Identification
  - Security
  - Traceability

Design
- Architecture of distributed systems
- Design methodology, verification and test of radiation-tolerant systems
- Design of dedicated and programmable electronic circuits
- Digital and analog circuits
- MEMS
  - Design of MEMS microwave
  - MIC and MMIC Design
- Microwave systems, millimeter wave, microwave
- Programmable VLSI design
- Very low CPU consumption

Quality
- Design methodology highly integrated and highly reliable hybrid systems
- Impact of encapsulation techniques on the quality of the power source and on the process of testing and diagnosis

Researchers and departments involved

Departments
- Department of Automated Production
- Department of Electrical
- Department of Software and IT

Researchers
- Number of researchers "Core": 16 (researchers who have this area as a central research theme)
- Number of researchers "No Core": 6 (researchers who participate in research projects may be related to this topic)

Chairs and research units

Accredited research units
- LACIME – Communications and Microelectronic Integration Laboratory

Laboratories
- Network technology laboratory

Research chairs
- Canada Research Chair in Hybrid Optoelectronic Materials and Devices
- Chair in Design Methodology for Highly Integrated and Reliable Hybrid Systems
- NSERC-Ultra Electronics Chair on Wireless Emergency and Tactical Communications

Research units recognized
- COMunity – Advanced Research in Telecommunications
- LAGRIT – Telecommunications and Computer Networks Management Laboratory