

## Electronic Instrumentation

This research area includes:

- Instrumentation and measurement systems: design, test and prototyping
- Integration of measurement devices and sensors in complex control systems.

### Recent Projects

- **Preliminary study of tubes for buried AT cables.** Uralita sistemas de tubería in collaboration with Instituto de Microelectrónica de Madrid (CSIC). November 2003-February 2004
- **Automatic water elimination in diesel-fuel filters,** Robert Bosch. June 2001-December 2001
- **Development of a flame monitoring system for PUERTOLLANO Power plant.** Elcogas. June 2001-September 2001

### Recent Publications

- B. Tellini, R. Giannetti, S. Lizón Martínez, "Sensorless Measurement Technique for Characterization of Magnetic Materials Under Nonperiodic Conditions", in Accepted for publication on IEEE Transaction on Instrumentation and Measurement, pp. 1465-1469, ISSN 0018-9456, July 2008
- B. Tellini, R. Giannetti, S. Lizón-Martínez, M. Marracci, "Accommodation Study via a Sensorless Measurement Technique", in Physica B, vol. 403, pp. 482-485, ISSN 0921-4526 (DOI: 10.1016/j.physb.2007.08.080). February 2008
- S.M. López-Silva, J.P. Silveira, M.L. Dotor, R. Giannetti, D. Golmayo, L. Herrera Noreña, "Transmittance photoplethysmography with near-infrared laser diodes in intra-peritoneal organs", in Physiological Measurements, vol. 27, pp. 1033-1045, ISSN 0967-3334, October 2006
- R.R. Pecharrmán, R. Giannetti, C. Heller, J. Herrero, "Inside Tech USA" Summer Course: A Leadership Program that Offers New Qualifications for Engineers", Meeting the Growing Demand for Engineers and Their Educators 2010-2020. Munich, Germany, 9-11 November 2007
- R. Giannetti, A. Muñoz, J. Rodríguez, R.R. Pecharrmán, "WIP: Design of a New European Higher Education Area Degree in Electronics and Control Engineering", 37th ASEE/IEEE Frontiers in Education Conference. Milwaukee, USA, 10-13 October 2007

## Active collaborations with:

Centro Nacional de Microelectrónica del Consejo Superior de Investigaciones Científicas, Ministerio de Ciencia y Tecnología. Planes de I+D+I, Universidad Politécnica de Madrid, Comisión Europea, Dimetronic, S.A., ISOFIXTOR TEAM ARTECHE, ENDESA, TELVENT, EVERIS, Astrium-CRISA (EADS), SOCOIN, ELDU-Automatización, Unión Fenosa, S.A., Iberdrola, S.A., Red Eléctrica de España S.A., Robert Bosh, Ericsson España, Fundación Airtel, Diseño y Consulting en Electrónica y Comunicaciones. DYCEC., Sistemas Electrónicos de Potencia S.A., SEPSA, Sistemas Integrados de Climatización. MERAK, Broadnet Consorcio S.A., RENFE, ...

## Members

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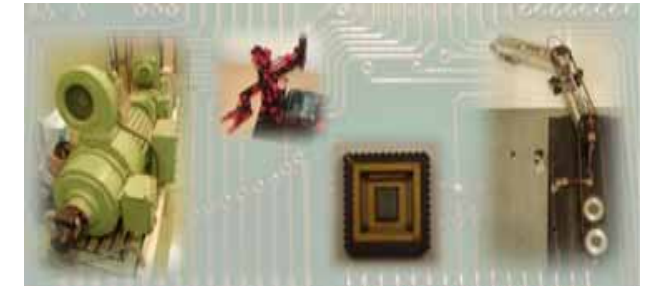
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December 2008



# ELECTRONICS AND CONTROL ENGINEERING RESEARCH UNIT (GEA)



## Information

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## Who are we and what do we offer?

GEA is an interdisciplinary group within IIT. Its activities span various topics such as industrial electronics, control, automation and industrial communications.

In the GEA, we design and develop systems using cutting edge technology in the fields of instrumentation, electronics and automatic control of processes.

Example of applications and areas of expertise are:

- Railways networks (CCMVB-SEPSA projects)
- Energy providers (DENISE-61850, DENISE-EVERIS y ADDRESS)
- Control systems (CRISA-MOET project, CRISA-VIBRATIONS project)
- Communications industry (PRO-TVD y OPERA)

## Main research areas

- Automation, Communications and Industrial Informatics
- Power electronics and control systems
- Electronic Instrumentation
- Electromagnetic Compatibility

## Automation and Industrial Communications

This research area includes:

- Industrial communication systems.
- System automation.
- Industrial Informatics: electrical and railway power system control.
- Design and implementation of embedded electronic systems.

### Recent Projects

- **EVERIS-CIM. Harmonization of CIM and IEC 61850 models within the Framework DENISE (Intelligent, Secure and Efficient distribution of electricity).** EVERIS. October 2007 - March 2009
- **TELVENT-61850. IEC 61850 within the Framework DENISE (Intelligent, Secure and Efficient distribution of electricity).** TELVENT. October 2007 - December 2010
- **Design and integration of embedded systems in trains.** SEPSA (Sistemas Electrónicos de Potencia, S.A.). July 2007 - June 2010
- **OPERA2: Open PLC European research alliance for new generation PLC integrated network - Phase 2 - Contract no.: 26920.** European Commission. January 2007 – December 2008
- **ADDRESS: Active distribution networks with full integration of demand and distributed energy resources.** European Commission
- **PRO-TVD. Integral Research Project on Digital Television.** Comunidad de Madrid. January 2006 – December 2009

### Recent Publications

- C. Rodríguez-Morcillo, S. Alexandres, J.D. Muñoz, "Broadband system to increase bitrate in train communication networks", *Computer Standards & Interfaces* 31 (2009) 261–271, February 2009
- R. Santodomingo, E. Pilo, J.A. Rodríguez Mondéjar, M.A. García-Vaquero, "Adapting the CIM model to describe electrified railway systems", *WIT Transactions on The Built Environment*, vol. 103, pp. 381-390, ISSN: 1743-3509. September 2008
- C. Mateo, F.M. De Espinosa, Y. Gómez-Ullate, J.A. Talavera, "Experimental validation of ultrasonic guided modes in electrical cables by optical interferometry", *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, vol. 55, no. 3, pp. 629-636, ISSN: 0885-3010. March 2008
- R. Santodomingo, E. Pilo, J.A. Rodríguez Mondéjar, M.A. García-Vaquero, "Adapting the CIM model to describe electrified railway systems", *XI International Conference on COMPRAIL2008 - Computer System Design and Operation in the Railway and Other Transit Systems*. Universidad Castilla-La Mancha. ISBN: 9781845641269. Toledo, Spain, 15-17 September 2008

## Power Electronics and Control Systems

This research area includes:

- Control algorithms for electronic power devices in power distribution systems.
- Control algorithms for FACTS devices in for flexible energy transport systems.
- Control of electrical machines and parameter extraction.
- Control algorithms for electrical machines in windmills.
- Control, optimization and parameter extraction algorithms for industrial application.
- Applications of thermoelectricity.

### Recent Projects

- **FAPSAI: Control of active power filters for uninterruptible power supply systems.** Ministerio de Educación y Ciencia. October 2006-September 2009
- **Development of Peltier effect-based air-conditioning equipment for buildings.** Ministerio de Educación y Ciencia. December 2004- December 2007
- **Active vibration control in cryocoolers.** CRISA. December 2007-July 2008
- **Control for a radiant-floor heating system.** Euroestudios. November 2007-September 2008
- **Development of a dynamic simulator for the transport gas network.** Socoin ingeniería y construcciones industriales. June 2007-October 2007
- **HELICOP-II: Development of an auto-pilot system for the VISICOPTER helicopter. Application to aerial image acquisition to support precision agriculture.** Universidad Pontificia Comillas. October 2005-October 2007

### Recent Publications

- R. A Gottschalk, X. Burgos-Artizzu, A. Ribeiro, G. Pajares, A. Sánchez-Miralles. "Real-time Image Processing for the Guidance of a Small Agricultural Field Inspection Vehicle", 15th International Conference on Mechatronics and Machine Vision in Practice (M2VIP'08), to be held in Auckland, New Zealand, 2-4 December 2008
- P. Roncero-Sánchez, E. Acha, J.E. Ortega-Calderón y A. García-Cerrada. "A versatile control scheme for a dynamic voltage restorer for power-quality improvement", *IEEE Trans. On Power Delivery*, vol. 24 (1). Pp 277-284. January 2009.
- A. García-Cerrada, O. Pinzón-Ardila, V. Feliú-Battle, P. Roncero-Sánchez and P. García-González. "Application of a repetitive controller for a three-phase active power filter". *IEEE Trans. On Power Electronics*. Vol. 22(1), pp. 237-246. January 2007
- A. Arenas, R. Palacios, R.R. Pecharrmán, F.L. Pagola, "Full-size prototype on active thermal windows based on thermoelectricity", *ECT2008 - 6th European Conference on Thermoelectrics*. pp. O.18.1-O.18.4. L'Ecole Nationale Supérieure de Chimie. Paris, France, 2-4 July 2008