

# Curriculum Vitae of Gonzalo Seco-Granados

(updated 2 June 2017)

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## **Vita**

Gonzalo Seco-Granados received the Ph.D. degree on Telecommunications Engineering from Universitat Politècnica de Catalunya in 2000 and an MBA from IESE in 2002.

From 2002 to 2005, he was member of the technical staff of the European Space Research and Technology Center (ESTEC) of the European Space Agency (ESA) in The Netherlands. Since 2006, he is Associate Professor at the Department of Telecommunications and Systems Engineering, Universitat Autònoma de Barcelona. He has been coordinator of the Telecommunications Engineering degree (2007-2011) and vice-director of School of Engineering (2011-2014). He coordinates the SPCOMNAV group, dedicated to the research on signal processing mainly applied to wireless communications and positioning systems. Gonzalo Seco-Granados has authored over 150 technical papers and has been principal investigator of over 25 research projects.

He has held visiting appointments at Universidad de Vigo (Spain), Brigham Young University (USA), and University of California in Irvine (USA). In March 2009, he was granted one of the six UAB Chairs of Technology and Knowledge Transfer "UAB Research Park – Santander". In 2014, he was awarded an ICREA Academia Fellowship. In 2015, he was Fulbright Visiting Scholar at University of California, Irvine.

## **1. Professional Profile**

### **1.1. Education**

- 09/2000 – 04/2002, Master in Business Administration (MBA), IESE - Universidad de Navarra, Barcelona, Spain (including a four-month exchange at Columbia University, NY).
- 01/1997 – 12/2000, Ph.D. (cum laude) in Telecommunications/Electrical Engineering, Universitat Politècnica de Catalunya, Barcelona, Spain (including a three-month visit at Brigham Young University). Dissertation: "Antenna Arrays for Multipath and Interference Mitigation in GNSS Receivers," Advisor: Prof. Juan A. Fernández Rubio. Highly cited PhD thesis (40+ citations in Google Scholar)
- 09/1990 – 11/1996, Telecommunications Engineer (equivalent to Master of Science in Electrical Engineering), Universitat Politècnica de Catalunya, Barcelona, Spain. Qualification: maximum possible mark, 10 over 10.

## 1.2. Academic Positions

Since 01/2006	Associate Professor, Department of Telecommunications and Systems Engineering, Universitat Autònoma de Barcelona, Spain <i>University Appointments / Additional Responsibilities:</i> <ul style="list-style-type: none"> <li>• 05/2011 – present: Vice-Dean of Finance and Infrastructure, School of Engineering.</li> <li>• 03/2009 – present: Director of the Chair of Technology Transfer “UAB Research Park– Santander”</li> <li>• 03/2010 – 04/2011: Director of the Telecommunication Systems Engineering Degree (EHEA) and the Telecommunication Engineering Degree. He has been the promoter and responsible for obtaining the acceptance of the new Telecommunication Systems Engineering Degree (EHEA).</li> <li>• 03/2007 – 02/2010: Director of the Telecommunication Engineering Degree</li> <li>• 01/2006 – 02/2007: Coordinator of Student International Exchanges</li> </ul>
10/2005 – 12/2005	Visiting Professor, Department of Telecommunications and Systems Engineering, Universitat Autònoma de Barcelona, Spain

## 1.3. Industrial Positions

07/2002 – 09/2005	Radionavigation Systems Engineer at the RF Payload Systems Division of the European Space Research and Technology Center (ESTEC) of the European Space Agency, The Netherlands. Member of the technical staff. Responsible for the R&D on GNSS receivers and indoor-positioning.
05/2001 – 07/2001	Analyst, Winphoria Networks (later acquired by Motorola), Madrid, Spain

## 1.4. Honors, Awards and Distinctions

06/2015 – Fulbright Visiting Scholarship

06/2014 – ICREA Academia Fellow (grant and recognition of the research merits).

03/2013 – Accreditation of Advanced Research (requirement for the level of Full Professor), Catalan Agency for the Quality of the University System (AQU).

03/2009 – present: Director of Chair of Technology and Knowledge Transfer “UAB Research Park – Santander”. Endowment: 100,000€

11/2008: IEEE Senior Member

10/2008 – Accreditation of Research (requirement for the level of Associate Professor), Catalan Agency for the Quality of the University System (AQU).

09/2003: “Best Presentation Award” for the paper “Autonomous Formation Flying RF Ranging Subsystem” at the conference ION GPS/GNSS 2003.

2001 Alcatel Award of the Spanish Association of Telecommunication Engineering to the best Ph.D. in Access Networks (granted on April 26, 2002)

2000/2000 Extraordinary Ph.D. Award within the area of of Information Technologies and Communications by the Universitat Politècnica de Catalunya, Spain.

08/2001 - 12/2001: Grant from the Chazen MBA Exchange Program to study at Columbia University.

2000: Grant for MBA tuition, Arthur Andersen Foundation. Amount: 25% of the total tuition

1999: Travel grant by Generalitat de Catalunya to perform a research stay at Brigham Young University.

1997 - 2000: Doctoral Grant (FI) by Generalitat de Catalunya.

1996/1997: Special Mention at National Awards of University Studies (published at BOE num. 113, May 12, 1998, article num. 11117)

## 2. Research

### 2.1. Funded Research Projects (research grants and industry sponsored research)

**Summary of funding: ~3.2M€ as PI since 2006.**

1. 03/2017 - 02/2019, "FANTASTIC - Field Aware Navigation and Timing Authentication Sensor for Timing Infrastructure and Centimeter Level Positioning", Galileo Supervisory Authority (GSA), GSA/GRANT/01/2016. Partners: Septentrio (Belgium), Fraunhofer IIS (Germany), GMV (Spain), Istituto Superiore Mario Boella (Italy). UAB budget: 126,153€ VAT and co-financing excl. **Role: PI** at UAB.
2. 12/2016 - 05/2018, "SW/HW Tools for Cloud, Hybrid and 5G Positioning", European Space Agency, ESA RFP/3-14763/16/NL/GLC. Budget: 350,000€ VAT excl. Role: Participant (PI: J. A. López-Salcedo).
3. 10/2016 - 07/2017, "Advanced GNSS Reference Station Breadboard", European Space Agency, AO7935 - General Support Technology Programme 6 - Element 2. Partners: Indra (Spain). UAB budget: 98,250€ VAT excl. **Role: PI** at UAB.
4. 10/2016 - 12/2017, "HO-GNSS: Techniques for GNSS Navigation at High Orbits (GEO/GTO/HEO)", 4000117413/16/NL/LF, European Space Agency. Partners: GMV (Spain), Airbus (Germany). UAB budget: 35,000€ VAT excl. Role: Participant.
5. 10/2015 - 04/2017, "E-GNSS Blind Signal Processing Validation and Performance Methodology Development", European Space Agency. Budget: 186,000€ VAT excl. **Role: PI.**
6. 09/2015 - 03/2017, "SCARBOC - Techniques for Subcarrier Resolution in High-order BOC signals and Performance Analysis in Realistic Environments", European Space Agency, European GNSS Evolution Programme ID89.18. Partners: GMVIS (Portugal), Tampere University of Technology (Finland). UAB budget: 20,000€ VAT excl. **Role: PI** at UAB
7. 01/2015 - 12/2017, "Positioning in Urban and Adverse Scenarios using GNSS and 5G Systems (GGPOS)", Proyectos de I+D+I "RETOS INVESTIGACIÓN", Ministerio de Economía y Competitividad. Budget: 134,552€. **Role: PI.**
8. 09/2014 - 03/2016, "HISENS - Techniques for High Sensitivity GNSS Receivers", AO/1-7763/13/NL/AK, European Space Agency. Partners: GMVIS SKYSOFT (Portugal), Ruag Space GmbH (Austria). Budget: 63,000€ VAT excl. **Role: PI** at UAB.
9. 05/2014 - 04/2016, "Development and Test of Assistance Technologies for Navigation Receivers", 4000110586/14/NL/HK, European Space Agency. Budget: 100,000€ VAT excl. **Role: PI.**
10. 03/2014 - 02/2017, "Satellite/terrestrial hybrid localization systems", Networking/Partnering Initiative (NPI), European Space Agency. Budget: 90,000€ VAT excl. **Role: PI.**
11. 10/2013 - 09/2014, "ADAPT - Adaptive Tracking Techniques for Navigation Signals", AO/1-7389/12/NL/AK, European Space Agency. Partners: GMVIS SKYSOFT (Portugal), École Polytechnique Fédérale de Lausanne - EPFL (Switzerland). Budget: 70,000€ VAT excl. Role: Participant (PI: J. A. López-Salcedo).
12. 10/2013 - 09/2014, "Hybrid Navigation and Mass Market Receivers Platform", European Space Agency. Budget: 70,000€ VAT excl. **Role: PI.**

13. 01/2013 – 12/2013, “Review of the Design of Data Collection System of the Meteosat Third Generation”, Mier Comunicaciones S.A. Budget: 10,000€ VAT excl. **Role: PI**.
14. 06/2012-06/2014, “IGNSSRX - Integrity GNSS Receivers”, ENTR/129/PP/ENT/SP2/11/5502, Enterprise and Industry Directorate-General, European Commission, Partners: GMV (Spain), Nottigham Scientific Ltd (UK), Transport Research Laboratory (UK). UAB budget: 197,692€ VAT excl. **Role: PI** at UAB.
15. 10/2012 – 9/2016, “Multi-technology positioning professionals”, Marie Curie Action, Multi-Partner Initial Training Network, Partners: Tampere University of Technology, Chalmers Technical University, University of Nottingham, Pildo Consulting, Vrije Universiteit Amsterdam, Fastrax, GMV Aerospace & Defense, Ptolemus, Honeywell International. UAB budget: 236,032€ VAT excl. **Role: PI** at UAB.
16. 11/2012 - 12/2013, “MOON-GNSS – Weak GNSS Signal Navigation on the Moon”, AO/1-7097/12/NL/AF, European Space Agency. Partners: GMV Aerospace & Defense S.A.U. UAB budget: 67,500€ VAT excl. **Role: PI** at UAB.
17. 07/2012 - 06/2013, “ROCAT – Techniques for Robust Carrier Phase Tracking Under High Dynamic, Strong Fading and Scintillation Conditions”, AO/1-6918/11/NL/AT, European Space Agency. Partners: GMVIS Skysoft (Portugal), Instituto de Telecomunicações (Portugal), UAB budget: 69,160€ VAT excl. Role: Participant (PI: J. A. López-Salcedo).
18. 2012-2014, “Ambiguity Mitigation in High-Order BOC Signals,” EIC-ESA-2011-0080, National Program for the Internationalization of I+D – Subprogram for the Specialization in Scientific Facilities and International Organizations, Spanish Ministry of Economy and Competitiveness. Destination: European Space Technology and Research Center of the European Space Agency, (129,247€). **Role: PI**.
19. 10/2012 – 09/2013, “California-Catalunya Engineering Innovation Program: Multicarrier Signals for Combined Positioning and Communication Systems: Contributions to Positioning in LTE,” Pete Balsells Foundation and the Henry Samueli School of Engineering at University of California in Irvine, (\$18,000). Role: participant (PI: J. A. López-Salcedo and A.L. Swindlehurst).
20. 2012-2014, “Signals for Combined Communication and Navigation Systems: Theoretical Bounds, Design and Implementation Aspects (SICCNALS),” TEC2011-28219, Project for Fundamental Research, Spanish Ministry of Science and Innovation, (53,845€). **Role: PI**.
21. 2011-2013, “ESA PRESTIGE Programme: Practical Design of Multicarrier Signal Synchronization Schemes in Realistic Navigation Channels,” European Space Agency, (60,000€). **Role: PI**.
22. 2011-2012, “California-Catalunya Engineering Innovation Program: Multicarrier Signals for Combined Positioning and Communication Systems: Contribution to the Scheduling and Synchronization in LTE,” Pete Balsells Foundation, Generalitat de Catalunya, the Henry Samueli School of Engineering at University of California in Irvine, (\$40,000). Role: participant (PI: J. A. López-Salcedo and A.L. Swindlehurst).
23. 2010-2011, “California-Catalunya Engineering Innovation Program: Multicarrier Signals for Combined Positioning and Communication Systems: Design and Implementation Aspects,” Pete Balsells Foundation, Generalitat de Catalunya, the Henry Samueli School of Engineering at University of California in Irvine, (\$41,000). **Role: Co-PI** with A. Lee Swindlehurst.
24. 2009-2010, “California-Catalunya Engineering Innovation Program: Signal Design for Combined Positioning and Communications Systems,” Pete Balsells Foundation, Generalitat de Catalunya, the Henry Samueli School of Engineering at University of

- California in Irvine, Indra Espacio S.A, (\$34,989). **Role: Co-PI** with A. Lee Swindlehurst.
25. 2011, "Design of Code-Carrier Coherence (CCC) algorithms for EGNOS NLLP ground stations: test phase", Indra Espacio, (25,520€). Role: participant (PI: J.A. López-Salcedo).
  26. 2009-2010, "ADIBEAM - Adaptive Digital Beamforming Techniques for GNSS Receivers," European Space Agency. Partners: Indra Espacio (Spain), DLR (Germany), TTI (Spain). UAB budget: 74,240€. **Role: PI** at UAB.
  27. 2009-2010, "DESSO Satellite – Development of Satellite TV Services for Uruguay," Spanish Ministry of Industry, Tourism and Commerce. Partners: Indra, Hispasat, Tmira, Sidsa, Fundación Bip-Bip (UAB budget: 50,000€). Role: participant (PI at UAB: J. López-Vicario).
  28. 2009-2010, "XALOC – Sensor Networks for the Management of Public Parking Spaces and Localization," 2009REGIO 00016, Generalitat de Catalunya. Partners: Worldsensing S.L, CTTC (UAB budget: 51,673€). Role: participant (PI at UAB: J. López-Vicario)
  29. 2009-2012, "SINTONIA – Unmanned Systems for Null Environmental Impact," Center for the Technological Industrial Development – Spanish Ministry of Science and Innovation. Partners: Boeing, Adex, Aernnova, Amper, Applus, Cesa, Dmp, Greenpower, Guascor, Indra, Inpromat, Insa, Integrasys, Mib, Mdu, Protos, Sener, Sertec, TTI, UAV Navigation, Xsat (UAB budget: 183,553€). Role: co-PI at UAB (PI at UAB: J. López-Vicario).
  30. 2009-2010, "Design of Code-Carrier Coherence (CCC) algorithms for EGNOS NLLP ground stations," Indra Espacio, (34,800€). Role: participant (PI: J.A. López-Salcedo).
  31. 2009-2013, "Emerging Research Group – Program SGR: Research Group on Signal Processing for Communications and Navigation SPCOMNAV," 2009 SGR 298, Generalitat de Catalunya, (41,600€). **Role: PI.**
  32. 06/2009-06/2011, "PEGASE - Provision of Expertise to GSA And Support to Enabling activities: Technical support for the GAMMA-A FP7 project," Galileo Supervisory Authority / European Commission, (32,800€). **Role: PI.**
  33. 2009-2011, "Design of Location-Aware Physical and Link Layers in Cooperative Communication Systems (LAWCOM)," TEC2008-06305, Project for Fundamental Research, Spanish Ministry of Science and Innovation, (57,233€). **Role: PI.**
  34. 2008-2011, "INTEGRA – Research on Technologies for Border Control and Migration Management," Center for the Technological Industrial Development – Spanish Ministry of Science and Innovation. Partners: Telvent, Knosos, Aertec, Amper Programas, Amper Sistemas, Biometric, Boeing, GMV, Integrasys, Isdefe, Ngaro, S21sec, SHS, Vaelsys (UAB budget: 679,620€). **Role: PI** at UAB.
  35. 2008-2012, "RF/Microwave Communication Subsystems for Emerging Wireless Technologies", COST Action ic0803, Role: PI at UAB. Substitute Member of the Management Committee until May 2011; Member of the Management Committee from May 2011 until the end of the Action.
  36. 2007-2009, "DINGPOS - Signal Processing Techniques and Demonstrator for Indoor GNSS Positioning," European Space Agency, Partners: GMV, Thales Alenia Space France, Skysoft, Nemerix, Nokia, Advanced Digital Institute. UAB budget: 79,986€. **Role: PI** at UAB.

37. 2007-2010, "ATLANTIDA – Application of new Unmanned Air Vehicles Technologies to the Research and Development of Automatic Traffic Management," Center for the Technological Industrial Development – Spanish Ministry of Science and Innovation, Partners: Boeing, Atos Origin, Indra, Iberia, Aernnova, Aerovision, Aertec, Caton, GMV, Indra Sistemas, Isdefe, Insa, Intelligent Dialogue Systems, Integrasys, MDU, Altran, Qualitas Training, TCP, TTI. UAB budget: 232,000€. **Role: PI** at UAB.
38. 2007-2008, "INTERRURAL – Rural Internet Access with Heterogenous and Itinerant Networks," Spanish Ministry of Industry, Tourism and Commerce, Partners: IBER-X, Hispasat, Telefonica I+D, Gige Semiconductor. UAB budget: 57,000€. **Role: PI** at UAB.
39. 2006-2007, "Quantum Satellite Communications," Spanish Ministry of Science and Education, (49,800€). **Role: PI.**
40. 2006-2008, "CDMA Algorithms for the Galileo Mission Receiver," Mier Communications S.A., (54,868€). **Role: PI.**
41. 2007, "Development Plan of a Hybrid Indoor and Urban Positioning Platform", Aerospace Research & Technology Centre (Spain), (1,160€). **Role: PI.**
42. 2006, "Digital Receiver for Ranging," Tinytronic S.L, (2,500€). **Role: PI.**
43. 10/2005 – 3/2007, "SATNEX: Satellite Network of Excellence" (SATNEX I: 10/2005 – 3/2006. SATNEX II: 04/2006 – 3/2007), European Commission. Role: participant (PI: M. A. Vázquez-Castro).
44. 2005-2007, "Cross-layer Design for Resource Management in Multibeam Wideband Satellite Communication Systems with Adaptive Physical Layer" Spanish Ministry of Science and Education. Role: participant (PI: M.A. Vázquez-Castro).
45. 2005-2008, "Emerging Research Group – Program SGR: Research Group on Wireless Communications," Generalitat de Catalunya, (37,600€). Role: participant (PI: M.A. Vazquez-Castro).
46. 2005-2007, IP-Friendly Cross-Layer Optimization of Adaptive Satellite Systems," European Space Agency, Partners: Indra Espacio, UPC (UAB budget: 65,400€). Role: participant (PI at UAB: M.A. Vazquez-Castro).
47. 1997-1999, "Application of Algorithms Based on Natural Processes to Prediction, Decision and Communications", Spanish Interministerial Commission of Science and Technology (62,000€). Role: participant (PI: A. Pérez-Neira).
48. 1997-1998, "Satellite Transponder for TC and Ranging," Alcatel Espacio S.A. Role: participant (PI: G. Vazquez Grau).
49. 1997-1998, "Orbit and Atmospheric Parameters Determination using GNSS and the MINISAT," National Institute of Aerospaciales Techniques and Catalan Institute of Spatial Studies. Role: participant (PI: J. Fernández-Rubio).
50. 1997, "Spread Spectrum DS-CDMA Link for the ATV of the Alpha Station," European Space Agency, Alcatel Espacio. Role: participant (PI: G. Vazquez Grau).



## 2.2. Publications

Bibliometric parameters: H-index (Hirsch Number): 18. i10-index: 43. Total Cites: 1539. Maximum number of cites in one publication: 217.

### 2.2.1. Books

1. J. Nurmi, E.-S. Lohan, H. Wymeersch, G. Seco-Granados, G. Nykänen, (Eds.), "Multi-Technology Positioning", Springer, 2017.
2. J. A. López-Salcedo, J. López-Vicario, G. Seco-Granados, *Radionavigation Systems* (in Catalan), Ed. Open University of Catalonia, February 2012.

### 2.2.2. Invited Book Chapters

1. A. Shahmansoori, G. Seco-Granados, H. Wymeersch, "Survey on 5G Positioning," chapter in *Multi-Technology Positioning*, J. Nurmi, E.-S. Lohan, H. Wymeersch, G. Seco-Granados, G. Nykänen, (Eds.), Springer, 2017.
2. J. Pérez Bartolomé, X. Maufroid, I. Fernández Hernández, J. A. Lopez-Salcedo, G. Seco-Granados, "Overview of Galileo System", chapter in *GALILEO Positioning Technology, Series on Signals and Communication Technology*, vol. 182, pp. 9-34, Springer, Jan 2015.
3. A. L. Swindlehurst, B. D. Jeffs, G. Seco-Granados, Jian Li, "Applications of Array Signal Processing", chapter in *Elsevier Reference Signal Processing, Vol 3: Array and Statistical Signal Processing*, Chapter 20, pp. 859-953, Jan 01 2014
4. A. Bel, J. L. Vicario, G. Seco-Granados, "A Pragmatic Approach to Cooperative Positioning in Wireless Sensor Networks", chapter in *Microwave and Millimeter Wave Circuits and Systems: Emerging Design, Technologies and Applications*, Editors: A. Georgiadis, H. Rogier, L. Roselli, P. Arcioni, pp. 135-172, Wiley, Jan 01 2013.
5. T. Pecorella, G. Mennuti, N. Celandroni, F. Davoli, E. Ferro, A. Gotta, S. Karapantazis, A. Morell, G. Seco-Granados, P. Todorova, M. A. Vazquez-Castro, "Dynamic Bandwidth Allocation," in *Resource Management in Satellite Networks: Optimization and Cross-Layer Design*. Ed. G. Giambene, pp. 207-242, Springer, London, 2007.
6. G. Fairhurst, M. A. Vazquez-Castro, G. Seco-Granados, A. Vanelli-Coralli, F. Viera, "Cross-Layer Methods and Standardisation Issues," in *Resource Management in Satellite Networks: Optimization and Cross-Layer Design*. Ed. G. Giambene, pp. 313-333, Springer, London, 2007.
7. M. A. Vazquez-Castro, J. Bito, J. Ebert, B. Heder, O. Koudelka, P. T. Mathiopoulos, S. Morosi, C. Novak, A. Quddus, G. Seco-Granados, A. Vanelli-Coralli, "Multiuser Communications," in *Digital Satellite Communications*. Ed. G. E. Corazza, Springer, 2007.
8. G. Seco-Granados, A. L. Swindlehurst, D. Astely, "Exploiting Antenna Arrays for Synchronization," in *Signal Processing Advances in Wireless and Mobile Communications, Volume 2: Trends in Single- and Multi-User Systems*. Eds: G. B. Giannakis, Y. Hua, P. Stoica, L. Tong., pp. 403-430, 2000.

### 2.2.3. Journal Papers

1. S. Lohan, D. Alonso de Diego, G. Seco-Granados, J. A. López-Salcedo, P. Boto, P. Fernandez, "A Survey of Unambiguous Techniques in GNSS Modernized Signals", *IEEE Signal Processing Magazine*, accepted for publication.

2. H. Wymeersch, G. Seco-Granados, G. Destino, D. Dardari, F. Tufvesson, "5G mm-Wave Positioning for Vehicular Networks", *IEEE Wireless Communications*, accepted for publication, June 2017.
3. Yongzhi Li, Cheng Tao, G. Seco-Granados, A. Mezghani, A.L. Swindlehurst, Liu Liu, "Channel Estimation and Performance Analysis of One-Bit Massive MIMO Systems", *IEEE Transactions on Signal Processing*, vol. 65, no. 15, pp. 4075 – 4089, August 2017.
4. A. Shahmansoori, G. Seco-Granados, Henk Wymeersch, "Power Allocation for OFDM Wireless Network Localization under Expectation and Robustness Constraints", *IEEE Transactions on Wireless Communications*, vol. 16, no. 3, pp. 2027-2038, March 2017.
5. D. Egea-Roca, G. Seco-Granados, J. A. Lopez-Salcedo, "Comprehensive Overview of Quickest Detection Theory and its Application to GNSS Threat Detection", *Gyroscope and Navigation*, vol. 8, no. 1, pp. 1-14, Jan 2017.
6. N. Blanco-Delgado, F. D. Nunes, G. Seco-Granados, "On the Relation between GDOP and the Volume Described by the User-to-Satellite Unit Vectors for GNSS Positioning", *GPS Solutions*, vol. 21, pp.1139-1147, January 2017.
7. P. Müller, J. A. Del Peral-Rosado, R. Piché, G. Seco-Granados, "Statistical Trilateration with Skew-t Distributed Errors in LTE Networks", *IEEE Transactions on Wireless Communications*, vol. 15, no. 10, pp. 7114-7127, October 2016.
8. Liang Chen, P. Thevenon, G. Seco-Granados, O. Julien, H. Kuusniemi, "Analysis on the TOA Tracking with DVB-T Signals for Positioning", *IEEE Transactions on Broadcasting*, accepted for publication, Sep 01 2016.
9. I. Fernández-Hernández, V. Rijmen, G. Seco-Granados, J. Simón, I. Rodríguez, J. D. Calle, "A Navigation Message Authentication Proposal for the Galileo Open Service", *Navigation*, vol. 63, no. 1, Apr 01 2016.
10. N. Ferrara, M. Pasnikowski, S. Sanchez-Naranjo, F. Gonzalez, R. Ramos-Pollan, G. Seco-Granados, J. A. Lopez-Salcedo, D. Egea-Roca, M. Sole, M. Toledo, E. Lohan, "Combined Architecture Enhancing Multi-Dimensional Signal Quality in GNSS Receivers", *Inside GNSS*, April/May, pp. 54-62, Apr 01 2016.
11. J. Vilà-Valls, P. Closas, C. Fernandez, J. A. Lopez-Salcedo, G. Seco-Granados, "Adaptive GNSS carrier tracking under ionospheric scintillation: estimation vs mitigation", *IEEE Communications Letters*, vol. 19, no. 6, pp. 961-964, Jun 2015.
12. I. Fernández-Hernández, I. Rodríguez, G. Tobías, J.D. Calle, E. Carbonell, G. Seco-Granados, J. Simon, R. Blasi, "Galileo Commercial Service. Testing GNSS High Accuracy and Authentication", *Inside GNSS*, pp. 38-48, 2015.
13. S. Ali, M. Jansson, G. Seco-Granados, J. A. Lopez-Salcedo, "Kronecker-based Fusion Rule for Cooperative Spectrum Sensing with Multi-Antenna Receivers", *Electronics*, vol 3(4), pp. 675-688, 2014.
14. S. Ali, D. Ramirez, M. Jansson, G. Seco-Granados, J. A. Lopez-Salcedo, "Multi-antenna Spectrum Sensing by Exploiting Spatio-temporal Correlation", *EURASIP Journal on Advances in Signal Processing*, 16 pages, November 2014.
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158. G. Seco-Granados, J. A. Fernandez-Rubio, "Multipath and Interference Errors Reduction in GNSS by Joint Pseudorange Measurement and Array Beamforming," in *Proc. 1st European Symposium on Global Navigation Satellite Systems (GNSS)*, Munich (Germany), Apr 1997.
159. G. Seco-Granados, J. A. Fernández-Rubio, "Reducción de los errores causados por la propagación multicamino en los sistemas GNSS con un nuevo criterio de medida de las pseudodistancias", in *Proc. XII Simposium Nacional de la Unión Científica Internacional de Radio (URSI'97)*, Sep 15 1997.
160. G. Seco-Granados, J. A. Fernandez-Rubio, "Multipath and Interference Errors Reduction in GPS Using Antenna Arrays," in *Proc. ESA Intl. Workshop on Digital Signal Processing Techniques for Space Communications (DSP)*, Sitges (Spain), Sep 1996.

### **2.2.5. Submitted Conferences Papers**

### **2.2.6. Technical reports (incomplete list)**

J. Alegre-Rubio, M. Manzano Jurado, A. Pellacani, J.A. López-Salcedo, E. Guerrero-Rubio, G. Seco-Granados, "Definition of the GNSS Receiver Module: Architecture and Algorithms", 163 pages, Funding source: ESA project, MOON-GNSS, Weak GNSS Signal Navigation on the Moon, June 2013.

J. A. López-Salcedo, J. Vilà, G. Seco-Granados, F. Nunes, F. Sousa, "Techniques Definitions and Preliminary Analysis (119 pages)", Funding source: ESA project, ROCAT – Robust Phase Tracking Techniques under High Dynamics, Strong Fading and Scintillation Conditions, Jan. 2013.

J. L. Vicario, G. Seco-Granados, F. Antreich, "ADIBEAM: GNSS Receiver Sub-System Detailed Definition and Justification File (93 pages)", Funding source: ESA project, ADIBEAM - Adaptive Digital Beam-forming Techniques for GNSS Receivers, Feb. 2010.

N. Basta, F. Antreich, L. González, G. Seco-Granados, J. L. Vicario, G. Grau, M. Colina, "System and sub-systems Requirements Document, SYS-REQ (35 pages)", Funding source: ESA project, ADIBEAM - Adaptive Digital Beam-forming Techniques for GNSS Receivers, Dec. 2009.

J. A. Lopez-Salcedo, A. Morell, G. Seco-Granados, "TN1: Implementation guidelines for the Kalman-based Estimation module for NLLP CCC.", Funding source: Indra Espacio, Jul. 2009.

J. A. Lopez-Salcedo, A. Morell, G. Seco-Granados, "NLLP CCC algorithm design. Carrier-code coherence evaluation", Funding source: Indra Espacio, Jul. 2009.

J. A. Lopez-Salcedo, A. Morell, G. Seco-Granados, "NLLP CCC algorithm design. Closed-loop architecture.", Funding source: Indra Espacio, Jul. 2009.

J. L. Vicario, G. Seco-Granados, "Application of Modern COM Technologies to ATM and UAV Systems (25 pages)", Funding source: CENIT project, ATLANTIDA - Application of new Unmanned Air Vehicles Technologies to the Research and Development of Automatic Traffic Management, Feb. 2009.

M. Monnerat, D. Kubrak, Y. Capelle, G. Seco-Granados, J. A. Lopez-Salcedo, J. L. Vicario, J. J. Rosales, D. Palenzuela, "TN8: Description of aiding/assistance algorithms", Funding source: ESA project, DINGPOS - Signal Processing Techniques and Demonstrator for Indoor GNSS Positioning, Sep. 2008.

G. Seco-Granados, J. A. Lopez-Salcedo, Y. Capelle, M. Monnerat, D. Kubrak, "DINGPOS TN7: Preliminary performance assessment", Funding source: ESA project, DINGPOS - Signal Processing Techniques and Demonstrator for Indoor GNSS Positioning, Jan 2009.

J. A. Lopez-Salcedo, G. Seco-Granados, "DINGPOS TN6: Description of high-sensitivity signal processing algorithms (29 pages)", Funding source: ESA project, DINGPOS - Signal Processing Techniques and Demonstrator for Indoor GNSS Positioning, Nov. 2008.

Y. Capelle, M. Monnerat, D. Kubrak, I. Fernández, G. Seco-Granados, A. Consoli, T. Ferreira, "TN4: Platform compliance matrix against TN1 detailed requirements", Funding source: ESA project, DINGPOS - Signal Processing Techniques and Demonstrator for Indoor GNSS Positioning, Nov. 2007.

M. Monnerat, D. Kubrak, Y. Capelle, G. Seco-Granados, J. A. Lopez-Salcedo, J. L. Vicario, I. Fernández, A. Consoli, T. Ferreira, "TN3: Platform architectural design and performance justification", Funding source: ESA project, DINGPOS - Signal Processing Techniques and Demonstrator for Indoor GNSS Positioning, Nov 2007.

D. Kubrak, G. Seco-Granados, J. A. Lopez-Salcedo, J. L. Vicario, E. Aguado, "TN2: Technological challenges and state-of-the-art indoor positioning survey document", Funding source: ESA project, DINGPOS - Signal Processing Techniques and Demonstrator for Indoor GNSS Positioning, Oct 2007.

Y. Capelle, M. Monnerat, G. Seco-Granados, "DINGPOS TN1: Detailed requirements document (31 pages)", Funding source: ESA project, DINGPOS - Signal Processing Techniques and Demonstrator for Indoor GNSS Positioning, Nov. 2007.

A. Bel, J. L. Vicario, G. Seco-Granados, "Application of Cooperative Positioning Technologies to ATM and UAV Systems (26 pages)", Funding source: CENIT project, ATLANTIDA - Application of new Unmanned Air Vehicles Technologies to the Research and Development of Automatic Traffic Management, 2008.

E. Gutiérrez, J. A. Lopez-Salcedo, G. Seco-Granados, "Resultados del Análisis Efectuado sobre el sistema EGNOS y su Posible Adaptación al Control de Fronteras No Reguladas",

Funding source: CENIT project, INTEGRA - Research on Technologies for Border Control and Migration Management, 2008

R. Montalbán-Gutiérrez, G. Seco-Granados, "Fast Re-Acquisition for GPS Receivers: Computation of a Subset of DFT Samples (9 pages)," Nov 2008.

R. Montalbán-Gutiérrez, G. Seco-Granados, "Fast Re-Acquisition for GPS Receivers: Literature Review (7 pages)," May 2008.

A. Anglès, J. L. Vicario, G. Seco-Granados, O. Chabrera, J. Abad, A. Aynos, R. Muñoz, C. Peña, F. Santiago, I. Sanz, D. Soro, "Resultado de la Campaña de Medidas en Entorno Rural", Funding source: Proyecto PROFIT, INTERRURAL - Rural Internet Access with Heterogenous and Itinerant Networks, Mar. 2008.

D. Bourse, R. Tafazolli, A. Alexiou, S. Arbanowski, J. Brakensiek, B. Cardinael, I. Gaspard, L. Hiebinger, W. Koenig, B. Le Floch, C. Le Martret, J. A. Lopez-Salcedo, J. L. Vicario, J. Lundsjo, A. Mihailovic, P. Moberg, K. Moessner, J.-N. Patillon, G. Seco-Granados, D. Soro, "Beyond 3G/4G Radio Access Technologies and Standards Roadmaps, chapter in eMobility Technology Platform Whitepaper", Dec. 2007.

M.A. Vazquez Castro, G. Seco-Granados, A. Morell, F. Viera, D. Pradas, N. Sodhi, J. Matas, J. Alins, "TN2: Study cases definition (129 pages)", Funding source: ESA project, IP-friendly cross-layer optimization of adaptive satellite systems, Jul 01 2006.

M.A. Vazquez Castro, G. Seco-Granados, J. Mata, J. Alins, "TN1: Cross-layer approaches and reference scenario analysis (191 pages)", Funding source: ESA project, IP-friendly cross-layer optimization of adaptive satellite systems, May 01 2006.

### 2.3. Invited courses and talks

1. "Channel Estimation, Achievable Rate and Efficiency in One-Bit Massive MIMO Systems", École Nationale Supérieure de l'Electronique et de ses Applications (ENSEA), Cergy, France, May 26, 2017. Host: Prof. Inbar Fijalkow.
2. "GNSS Receivers and Signal Processing", e-KnoT Network - GNSS PhD Training, Warsaw (Poland), October 11, 2016.
3. "On the Use of Quickest Detection Theory for GNSS Signal Integrity Monitoring in the Presence of Local Effects", Stanford University, November 20, 2015. Host: Prof. Per Enge.
4. "On the Use of Quickest Detection Theory for GNSS Signal Integrity Monitoring in the Presence of Local Effects", University of California, Los Angeles, November 19, 2015. Host: Prof. Danijela Cabric.
5. Three-day course at Samara State Aerospace University, January 27-29, 2015. Host: Prof. Ilya Kudryavtsev.
  - GALILEO Positioning System: Technology, Status and Service
  - GNSS Receiver Basics and Technology Challenges: High-Sensitivity and Multi-Antenna Receivers
  - Application of change detection theory to signal-level integrity in GNSS
6. "Application of Change Detection Theory to Signal-Level Integrity in GNSS", Chalmers University of Technology, Gothenburg (Sweden), December 18, 2014. Host: Prof. Henk Wymeersch.

7. "GALILEO Positioning System: Technology, Status and Services", MULTI-POS Marie Curie ITN Summer School, St. Petersburg, 10 June 2014.
8. "GPS Receiver Architecture with focus on High-Sensitivity and Multi-antenna Technologies", MULTI-POS Marie Curie ITN Summer School, St. Petersburg, 9 June 2014.
9. "GNSS Antenna Array Processing and LTE/Cellular Positioning Principles", guest lecture of the IEEE Finland Section's Signal Processing and Circuits & Systems Chapter, Tampere University of Technology, Finland, 9 September 2013.
10. "Impact and mitigation of propagation effects at receiver level", lecture in Course on Propagation Effects, Channel Models and Related Error Sources on GNSS, European Space Astronomy Center / European Space Agency, Madrid, Spain, 15-17 October 2012.
11. "Overview of error sources in harsh environments and alternative positioning methods", lecture in Course on Propagation Effects, Channel Models and Related Error Sources on GNSS", European Space Astronomy Center / European Space Agency, Madrid, Spain, 15-17 October 2012.
12. "Evaluation of LTE Positioning Capabilities", Gradient (Telecommunications Technological Center of Galicia, Spain), 19 April 2012. Host: Prof. Carlos Mosquera.
13. "Applications of Convex Optimization in Signal Processing and Communications", International Conference on Optimization Theory, Algorithms and Applications in Economics, Center for Mathematical Research, UAB, October 2011.
14. "OFDM Pilot Optimization for the Communication and Localization Trade-Off" (together with Prof. A. L. Swindlehurst), Institute for Communications and Navigation, Technical University of Munich, June 2011. Host: Prof. Christoph Günther.
15. "Antenna Arrays in GNSS", 2011 IEEE AESS Workshop on Integrated Satellite Communication and Navigation Systems, Castellaneta Marina, Puglia, Italy, 27 July 2011. Host: Prof. Marina Ruggieri.
16. "Signal Design for Combined Positioning and Communications Systems", Gradient (Telecommunications Technological Center of Galicia, Spain), April 2011. Host: Prof. Carlos Mosquera.
17. Invited professor at Research Master on Signal Processing Applications in Communications, Department of Signal Theory and Communications, University of Vigo, Spain. Course: Satellite Positioning, 20 hours (3 ECTS), given in March 2009, April 2010, April 2011, April 2012.
18. "Signal Design for Combined Positioning and Communications Systems", Indra Espacio, December 3<sup>rd</sup>, 2010.
19. "Improving Primal and Dual Decompositions in Convex Optimization Problems: Application to Signal Processing and Communications," Dept. of Electrical Engineering and Computer Science, University of California at Irvine, January 26th 2010. Host: Prof. A.L. Swindlehurst.
20. "Galileo and R&D at University," Galileo Information Day at the Spanish Center for Technological and Industrial Development (CDTI), Madrid, Spain, November 22nd, 2007. Host: Mr. J. Monclús (CDTI).
21. "Estimation Problems in Wireless Communications and Positioning," Seminar at the Institute for Circuit Theory and Signal Processing – Technical University of Munich, 4 hours, 2007. Host: Prof. J.A. Nossek.

22. "Current Topics on Space-Based Positioning Systems," Seminar at the PhD program of Computer Science and Digital Communications, Universitat Pompeu Fabra, 4 hours, 2004. Host: Prof. Joan Vinyes.

#### **2.4. Research stays**

06/2015 (7 months): Department of Electrical Engineering and Computer Science & Center for Pervasive Communications and Computing, University of California, Irvine, CA, as a Fulbright Visiting Scholar.

03/2012 (2 weeks): Center for Pervasive Communications and Computing, University of California at Irvine, Irvine, CA.

11/2010 (2 weeks): Department of Electrical Engineering and Computer Science, University of California at Irvine, Irvine, CA.

09/2010 (1 week): Department of Electrical Engineering and Computer Science, University of California at Irvine, Irvine, CA.

01/2010 – 02/2010 (3 weeks): Department of Electrical Engineering and Computer Science, University of California at Irvine, Irvine, CA.

05/2007 (1 week): Institute for Quantum Computing, University of Waterloo, Canada.

05/1999 – 07/1999 (3 months): Department of Electrical and Computer Engineering, Brigham Young University, Provo, UT.

## 3. Supervision and Teaching

### 3.1. Graduated PhD Students

1. D. Egea Roca, "Change Detection Techniques for GNSS Signal-Level Integrity", Dept. Of Telecommunications and Systems Engineering, Universitat Autònoma de Barcelona, September 8, 2017.
2. A. Shahmansoori, "Localization with OFDM Signals in 5G Systems", co-supervised with Prof. Henk Wymeersch (Chalmers University of Technology, Sweden), Dept. Of Telecommunications and Systems Engineering, Universitat Autònoma de Barcelona, January 30, 2017.
3. J. A. Del Peral Rosado, "Evaluation of the LTE Positioning Capabilities in Realistic Navigation Channels", co-supervised with Prof. José A. López-Salcedo (UAB) and Francesca Zanier (European Space Agency), Dept. Of Telecommunications and Systems Engineering, Universitat Autònoma de Barcelona, May 13, 2014.
4. Sadig Ali, "Distributed Detection in WSN under Uncertain Conditions", co-supervised with Prof. José A. López-Salcedo, Dept. Of Telecommunications and Systems Engineering, Universitat Autònoma de Barcelona, March 31, 2014.
5. J. E. Barceló Lladó, "Communications in Wireless Sensor Networks: Compression, Energy Efficiency and Secrecy", co-supervised with Prof. Antoni Morell, Dept. Of Telecommunications and Systems Engineering, Universitat Autònoma de Barcelona, October 2012.
6. A. Bel i Pereira, "A Pragmatic Approach to Localization and Tracking in Wireless Sensor Networks", co-supervised with Prof. José López Vicario Morell, Dept. Of Telecommunications and Systems Engineering, Universitat Autònoma de Barcelona, October 2012.
7. I. Groh, "Efficient Time-Variant Synchronization in Spread-Spectrum Navigation Receivers". Dept. of Material Sciences, Optics and Electronic Technology, Universidad Miguel Hernández de Elche, co-supervised with Prof. Jesús Selva (Universidad de Alicante), September 2011.
8. A. Morell, "A Convex Decomposition Perspective on Dynamic Bandwidth Allocation and Applications". PhD granted by Universitat Politècnica de Catalunya (Spain) in September 2008. He joined the faculty at Universitat Autònoma de Barcelona (Spain).

### 3.2. Supervision of post-docs and visiting faculty

- Prof. Duk-Sun Shim, visitor from Chung-Ang University (Republic of Korea), June 2014 - June 2015.
- Simona-Elena Lohan, Adjunct professor in the Department of Communications Engineering, Tampere University of Technology. Stay funded by Academy of Finland Fellowship, 02/2012 – 07/2012, 09/12 – 11/12, 03/2013 – 05/2013, 06/2013, 09/2013 – 11/2013.
- J. J. Escudero Garzás, post-doc from Universidad Carlos III de Madrid, funded by grant from "Alianza 4 Universidades A4U", 10/2010 – 09/2012.

### 3.3. Supervised MSc Theses

- M. Navarro Gallardo, *Analysis of New Techniques for Sidelobe Cancellation in High-order BOCCos signals*, Universitat Autònoma de Barcelona, September 2011 (co-advised with Dr. G. López-Risueño from ESA)
- Su Yan, *Performance Analysis of OFDM*, Universitat Autònoma de Barcelona, September 2011.
- J. A. del Peral, *Kalman Filter-Based Tracking for High-Sensitivity GNSS Receivers*, Universitat Autònoma de Barcelona, September 2010. (co-advised with Prof. J.A. López-Salcedo)
- R. Montalbán Gutiérrez, *Signal Design for Capacity Maximization and Time Delay Estimation in Multicarrier Signals: Preliminary Results*, Universitat Autònoma de Barcelona, July 2010.
- M. Mañosas Caballú, *Rendimiento de los Conformadores de Haz en Estaciones de Referencia GNSS*, Universitat Autònoma de Barcelona, July 2010.

### 3.4. Supervised final degree projects

#### Telecommunications Engineering Degree (5-year degree)

- E. Guerrero Rubio, *Weak GNSS Signal Navigation on the Moon*, Universitat Autònoma de Barcelona, 2013.
- D. M. Franco Patiño (Erasmus student from Politecnico di Torino), *Signal Quality Checks for Multipath Detection in GNSS*, Universitat Autònoma de Barcelona, 2013.
- M. Gómez Ariza, *UAVs path planning and rebuilding software*, Universitat Autònoma de Barcelona, 2011.
- M. Navarro Gallardo, *Análisis comparativo de señales multicarrier spread spectrum para sistemas GNSS*, Universitat Autònoma de Barcelona, 2010.
- R. Montalbán Gutiérrez, *Beamforming robusto para redes de sensores en presencia de errores de posición*, Universitat Autònoma de Barcelona, 2009.
- A. Monserrat Borrás, *Diseño del sistemas de comunicaciones y SCADA para el telecontrol de un parque eólico marino*, Universitat Autònoma de Barcelona, 2009.
- M. Mañosas Caballú, *Conformació de feix distribuïda a xarxes de sensors sense fils*, Universitat Autònoma de Barcelona, 2009.
- J. Abad Alvarez, *Diseño de un receptor GPS L1 en Simulink sobre una FPGA Xilinx Virtex-II Pro*, Universitat Autònoma de Barcelona, 2008.
- A. Anglès Vazquez, *Despliegue y análisis de la cobertura de una red WiMAX basada en IEEE 802.16-2004* (co-directed with J. López-Vicario), Universitat Autònoma de Barcelona, 2008.
- J. Iglesias Urriza, *Filtrado y detección digital de una señal pulsante en condiciones de error frecuencial elevado*, Universitat Autònoma de Barcelona, 2007.
- A. Amills Rexach, *Enrutamiento y gestión de recursos en redes híbridas satélites/terrestre*, Universitat Autònoma de Barcelona, 2007.
- J.M. Tarrat Massó, *Análisis de la adquisición de la señal de telemetría del sistema Galileo*, Universitat Autònoma de Barcelona, 2006.

- A. Omari, *Qualité de Service dans les Systèmes Satellitaire de Nouvelle Génération : Développement et Analyse d'un Algorithme BoD pour le DVB-RCS* (co-directed with M.A. Vazquez-Castro, A. Lyhyaoui, N. Raissouni, Université Abdelmalek Essaâdi – Tanger - Marruecos, 2006.
- D. Jiménez Baños, *Enhanced Techniques for Indoor Positioning GPS Receivers*, Universitat Politècnica de Catalunya, 2006.
- M. Aguilera Forero, *Simulation of Satellite Navigation Receivers* (co-directed with Matilde Pilar Sánchez Fernández), Universidad Carlos III de Madrid, 2003.
- M. González Puigdevall, *Resolució de l'ambigüitat de fase en el sistema GPS*, Universitat Politècnica de Catalunya, 1999.

#### **Mathematics Degree (4-year degree)**

- Judit Castro Vallverdú, *Extensions del Teorema de Shannon i Aplicacions a les Comunicacions*, co-supervised with Julià Cufí, 2011.
- Iain Mac Lellan Sladden Sancho, *SDP Relaxation and Applications to Optimal Beamforming*, co-supervised with Aris Daniilidis, 2011.
- Sergi Banach, *Estimació Cega de Canals per a Sistemes MIMO-OFDM Codificats Ortogonalment*, co-supervised with Aris Daniilidis, 2011.

#### **Telecommunications Technical Engineering Degree (3-year degree)**

- P. Noguera, *Estudio comparativo de diferentes receptores GNSS*, 2013.
- A. Comajuncosas Fortuño, *Estudi comparatiu dels filtres de Kalman i IMM per a navegació*, Universitat Autònoma de Barcelona, 2013.
- X. Moré Cantero, *Cancel·lador d'ecos per repetidors de senyals OFDM*, Universitat Autònoma de Barcelona, 2012.
- E. Guerrero Rubio, *Caracterització estadística dels pics de correlació a GPS*, Universitat Autònoma de Barcelona, 2011.
- M. Romera Guardiola, *Sincronització d'una xarxa de sensors sense fils*, Universitat Autònoma de Barcelona, 2010.
- E. Herreros Comellas, *Optimització i implementació en Simulink de l'adquisició d'un senyal GPS amb blocs FFT*, Universitat Autònoma de Barcelona, 2009.
- M. Navarro Gallardo, *Adaptación de la plataforma NAMURU V2 para señales BOC*, Universitat Autònoma de Barcelona, 2009.
- E. Majà Martí, *Desplegament d'una xarxa de sensors*, Universitat Autònoma de Barcelona, 2009.
- J. Pérez Puerta, *Gestión del ancho de banda con condiciones de calidad de servicio en un sistema DVB-RCS*, Universitat Autònoma de Barcelona, 2008.
- R. Montalbán Gutiérrez, *Codificación a nivel de paquete para comunicaciones móviles por satélite*, Universitat Autònoma de Barcelona, 2007.



- A. Ares Martín, *Estudio de sistemas de navegación asistida para vehículos*, Universitat Autònoma de Barcelona, 2007.
- L. Pintó del Pozo, *Estudio de la interferencia multiusuario en el enlace de control de un satélite Galileo*, Universitat Autònoma de Barcelona, 2006.
- O. Vidal Barba, *Identificador de llamadas*, Universitat Autònoma de Barcelona, 2006.
- D. Sánchez Molas, *Simulación de la decodificación de canal en el enlace de control de los satélites Galileo*, Universitat Autònoma de Barcelona, 2006.
- J. Oliveras Fonoll, *Estudio Comparativo de diferentes técnicas de sincronización de la señal GPS*, Universitat Politècnica de Catalunya, 2000.

### **3.5. Courses taught (not complete list, only since 2005)**

- Convex Optimization (Phd course), ~30 hours/course: Fall 2006, Fall 2007, Fall 2008, Fall 2009, Fall 2010, Fall 2011.
- Multicarrier Communications (PhD course), ~30 hours/course: Spring 2007, Spring 2008, Spring 2009, Spring 2010, Spring 2011, Fall 2011.
- Design of Advanced Digital Receivers (5th year course, Engineering degree): Fall 2007, Fall 2008, Fall 2009, Spring 2011, Spring 2012, Spring 2013.
- Satellite Navigation (5th year course, Engineering degree): Spring 2007, Spring 2008, Spring 2009, Spring 2010.
- Positioning Systems (2nd year course, Engineering degree): Spring 2010.
- Data transmission (4th year course, Engineering degree): Spring 2006, Spring 2007.
- Digital Signal Processing II (4th year course, Engineering degree): Fall 2005, Fall 2006, Fall 2011.
- Digital Communications (2nd year course, Engineering degree): Spring 2006.
- Satellite Communications and Navigation (4th year course, 1/4 of the course, Bachelor degree): Fall 2014.
- Access Technologies (4th year course, 1/3 of the course, "Bachelor degree): Spring 2014.
- Communication Theory (3rd year course, 9 ECTS, Bachelor degree): Spring 2013, Spring 2014.

## 4. Research group

Head of the research group of Signal Processing for Communications and Navigation (SPCOMNAV). The group is official recognized by the Universitat Autònoma de Barcelona and by the Generalitat de Catalunya (Catalan Autonomous Government), which also provides funding under the SGR program.

### 4.1. Current Members

A. Shahmansoori	PhD Student	Since 09 / 2013
J. Vilà-Valles	Post-doc	Since 10/ 2012
S. Lohan	Visiting Professor	Since 02 / 2012
M. Navarro-Gallardo	PhD Student	Since 09 / 2011
M. Mañosas-Caballú	PhD Student	Since 09/ 2009
R. Montalbán-Gutiérrez	PhD Student	Since 09/ 2009
E. Gutiérrez-Blasco	PhD Student (co-advised with J.A. López Salcedo)	Since 06/ 2009
S. Ali	PhD Student (co-advised with J.A. López Salcedo)	Since 02/ 2009
J.A. del Peral-Rosado	PhD Student	Since 10/ 2010
M. Vergara	PhD Student (working at German Aerospace Center)	Since 05/ 2010

### 4.2. Past Visiting Students

J.J. Escudero-Garzás	Post-doc	10/2010-09/2012
N. Blanco-Delgado	PhD Student from IST, University of Lisbon	11/2009 – 09/2010
K. Dragunas	PhD Student from Aalborg University	06/2010 – 11/2010

### 4.3. Research Group at the European Space Agency (2002 – 2005)

Led the group on Indoor Positioning, which started with only one member and, when I left ESA, it consisted of four members and was financially supported by ESA.

G. López-Risueño	Post-doc working on Advanced Digital Receiver for Indoor Navigation, and Galileo Signal Analysis and Receiver Design	02/2004 – 09/2005
N. Blanco-Delgado	Graduate trainee working on the reception of Galileo L1C Signal Acquisition in Weak Signal Environments	06/2005– 09/2010
M. Aguilera-Forero	Master student Galileo E5 Band Signal Analysis and Performance	07/2003 – 12/2003

S. Mothojakan

Graduate Trainee working on  
Integration of Sensors and GNSS for  
Train Applications

03/2003 – 02/2004

## 5. Service activities

### 5.1. Editorial positions

- Associate editor and member of the editorial board of the *Hindawi Journal of Navigation and Observation* (11/2006 – present)
- Guest editor (together with A. Dogandzic, J. Riba, A. L. Swindlehurst) of the Special Issue (vol. 22, issue 44, 2005) of the *IEEE Signal Processing Magazine* on Signal Processing for Positioning and Navigation with Applications to Communications.

### 5.2. Conference Organization

- Co-organizer of the Special Session “Advances in Multi-Sensor Adaptive Processing for GNSS” at IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP) 2017.
- General Co-Chair of the International Conference on Localization and GNSS (ICL-GNSS), 2016.
- Executive Co-Chair of the 8th Advanced Satellite Multimedia Systems Conference and the 14th Signal Processing for Space Communications Workshop (ASMS/SPSC) 2016.
- Member of the Steering Committee of the International Conference on Localization and GNSS, 2011-present.
- Technical Chairman and Organizer of *2nd ESA Workshop on Satellite Navigation User Equipment Technologies, NAVITEC'2004*, The Netherlands.

### 5.3. Advisory Groups and Boards

- Member of European Space Agency GNSS Education Advisory Group (since 2010)
- Member of the Advisory Board on Navigation and Communication of the Aerospace Research & Technology Centre (CTAE), Barcelona, Spain (2006 – 2011)

### 5.4. Chaired Conference Sessions

- ION GNSS+ 2016, Portland, OR.
- ICL-GNSS 2013.
- ION GNSS 2010, Portland, OR.
- ESA Workshop on Satellite Navigation User Equipment Technologies (NAVITEC), Noordwijk, The Netherlands, 2012, 2010, 2008, 2006, 2004.

### 5.5. Technical Program Committees

Served as member of the following Technical Program Committees (non-exhaustive list):

- IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP): 2017, 2016, 2015, 2014, 2013, 2012, 2011
- IEEE Vehicular Technology Conference: 2011-S Transmission Technologies track, 2011-S Mobile Satellite and Positioning Systems Track, 2011-F Mobile Satellite and Positioning Track, 2010-F Mobile Satellite and Positioning Systems Track, 2009-S, 2007-S, 2006-S, 2006-F, 2004-S

- IEEE ICC: 2012, Symposium on Selected Areas in Communications - Satellite and Space Communications Area 2010 General Symposium on Selected Areas in Communications, 2010 Wireless and Mobile Networking Symposium, 2009 Wireless Communications Symposium, 2009 Wireless Networking, 2008 General Symposium
- International Conference on Localization and GNSS (ICL-GNSS): 2013, 2012
- IEEE GLOBECOM: 2013 Selected Areas in Communications Symposium - Satellite & Space Communications Track, 2011 Selected Areas in Communications Symposium - Satellite & Space Communications Track, 2010-2009-2008 Satellite and Space Communications Track of the Selected Area in Communications Symposium, 2008 Wireless Networking Symposium, 2007 Wireless Networking, 2006 Satellite and Space Communications
- International Wireless Communications & Mobile Computing Conference (IWCMC): 2013 Vehicular Communications Symposium, 2012 Vehicular Communications Symposium.
- International Conference on Advances in Computing, Communications and Informatics (ICACCI): 2012
- International Symposium on Communications and Information Technologies (ISCIT): 2012, 2011
- IEEE Wireless Communications & Networking Conference (WCNC): 2011
- International Workshop on Satellite and Space Communications (IWSSC): 2009, 2008, 2007, 2006, 2005
- ESA Workshop on Satellite Navigation User Equipment Technologies (NAVITEC): 2012, 2010, 2008, 2006
- EUSIPCO: 2011, 2006
- Advanced Satellite Multimedia Systems Conference / for Space Communications Workshop (ASMS/SPSC): 2012, 2010, 2008
- IEEE International Conference on Computer Communications and Networks (ICCCN): 2008 Signal Processing for Communications Track

## 5.6. Review of publications

Served as reviewer for the following journals (average about 15 papers per year):

- IEEE Transactions on Signal Processing (frequent reviewer, having received an appreciation letter from the Editor-in-Chief in 2006)
- Signal Processing (EURASIP)
- IEEE Transaction on Vehicular Technology
- IEEE Journal of Selected Topics in Signal Processing
- IEEE Transactions on Aerospace and Electronic Systems
- EURASIP Journal on Advances in Signal Processing
- EURASIP Journal on Wireless Communications and Networking
- IEEE Transactions on Communications,
- IEEE Vehicular Technology Magazine
- IEEE JSAC
- Wireless Personal Communications (Springer)
- IEEE Transactions on Antennas and Propagation
- URSI Radio Science Bulletin
- The Open Electrical And Electronic Engineering Journal (Betham Science)
- Journal of Communications and Networks (Korea Information and Communications Society)
- International Journal of Satellite Communications and Networking (Wiley)
- IEEE Geoscience and Remote Sensing Letters
- IEEE Communications Letters
- IEEE Signal Processing Letters

Served as reviewer for the following editorial houses:

- CRC Press

## 5.6. Review of projects

Expert reviewer contracted by the European Commission for the project ADVANSYS (Design of Advanced Antenna and Multi-Sensor Hybrid Receiver for Machine Control in Harsh Environment), call FP7-GALILEO-2001-ENTR-1, (Jun. 2012 – March 2014).

Expert reviewer for the European Commission project GAMMA-A (Galileo Receiver for Mass Market Applications in the Automotive Area), call FP7- GALILEO-2007-GSA-1, (Jun. 2009 – Feb. 2012).

## 5.7. Evaluation of proposals

- Evaluator of proposals for the Swiss National Science Foundation, 2013.
- Evaluator of proposals for the European Commission in the calls: H2020-SPACE PROTEC-1 2014 (June 2014), FP7-SPACE-2013-1 (Dec. 2012 – Feb. 2013), FP7-SME-2013 (Dec. 2012 – Feb. 2013), FP7-GALILEO-2011-ENTR-1 (Jan. 2011), FP7-GALILEO-2007-GSA-1 (2008).
- Rapporteur for the European Commission in the call H2020-SPACE PROTEC-1 2014 (June 2014), FP7-SPACE-2013-1 (Dec. 2012 – Feb. 2013).
- Evaluator for “Área de Tecnología Informática de las Comunicaciones y Electrónica del Fondo para la Investigación Científica y Tecnológica (FONCYT)” of Argentina (2012).
- Evaluator for the Natural Sciences and Engineering Research Council of Canada (2012).
- Evaluator for the Romanian National Council for Research and Development (call 2011).
- Evaluator of research proposals for the Academy of Finland (2010).
- Evaluator of research proposals for the Agencia Andaluza de Evaluación de la Calidad y Acreditación Universitaria (Spain) (2010).
- Evaluator of research proposals for Research Promotion Foundation (RPF) of Cyprus, (call 2013, call 2011, call 2009).
- Evaluator of proposals for the NRSCC (National Remote Sensing Center of China) call on GNSS Mass Market Receivers (2009).

## 6. Other activities

### 6.1. Doctoral Committees

1. Alexis López Riera, “Aplicaciones Avanzadas del Principio Superregenerativo a Comunicaciones por Radiofrecuencia”, Universitat Politècnica de Catalunya, 2017; committee member.
2. René Játiva Espinoza, “Dispersive Source Models in Wireless Communication’s Subscriber Location”, Universitat Politècnica de Catalunya, 2017; committee member.
3. Juan Manuel Castro-Arvizu, “Robust Indoor Positioning in WLAN Networks”, Universitat Politècnica de Catalunya, 2017; committee member.

4. Marco Bartolucci, "Cooperative Interference Detection, Localization, and Mitigation in GNSS", University di Bologna, February 2017, reviewer.
5. Jean-Baptiste Pagot, "Modelling and Monitoring of New GNSS Signals Distortion in the Context of Civil Aviation", Institut National Polytechnique de Toulouse (France), December 20, 2016; committee member.
6. Javier Rubio López, "Resource Management Techniques for Sustainable Networks with Energy Harvesting Nodes", Universitat Politècnica de Catalunya, June 22, 2016; committee member.
7. Alberto Antón Sánchez, "Statistical Techniques and Algorithms Applied in Satellite Communications Antenna Arrays for Direction of Arrival Estimation and Calibration", Universidad Politécnica de Madrid, May 23, 2016; committee member.
8. José María Vallet García, "Localization in Wireless Sensor Networks Using a Mobile Robot", Aalto University, January, 2016; reviewer.
9. Alberto Torre Fernández, "Large Aperture Antenna Arrays with Subband Delay Compensation for Reception of Wideband Satellite Signals", Universidad Politécnica de Madrid, December 12, 2014; committee member.
10. Hamza M. Benzerrouk, "Modern Approaches in Nonlinear Filtering theory Applied to Original Problems of Aerospace Integrated Navigation Systems with Non-Gaussian Noises", Saint Petersburg State University, 3 July 2014; ; committee member.
11. Gerard Zamora González, "Radio Frequency Identification (RFID) Tags and Reader Antennas Based on Conjugate Matching and Metamaterial Concepts", 2 October 2013, substitute committee member.
12. Frank Schubert, "Scattering Model for Vegetation Canopies and Simulation of Satellite Navigation Channels", Aalborg University, 14 September 2012; committee member.
13. Javier Arribas Lázaro, "GNSS Array-based Acquisition: Theory and Implementation, Universitat Politècnica de Catalunya, 28 June 2012; reviewer of PhD proposal, committee member.
14. Miguel Alejandro Salas Natera, "Contribution to the Uncertainty Analysis and Calibration of Active Antenna Arrays", Universidad Politécnica de Madrid, December 2011; committee member.
15. Mohammad Zahidul Hasan Bhuiyan, "Analysis of Multipath Mitigation Techniques for Satellite-based Positioning Applications", Department of Communications Engineering, Tampere University of Technology, September 2011; Oponent.
16. Felix Antreich, "Array Processing and Signal Design for Timing Synchronization", Institute for Circuit Theory and Signal Processing, Technical University of Munich, July 2011.
17. Nuria Blanco Delgado, "Signal Processing Techniques in Modern Multi-Constellation GNSS Receivers", Instituto Superior Técnico, Univerdade Técnica de Lisboa, June 2011; panel member.
18. Faisal Khan, "Locata Positioning System Performance Evaluation and Improvement in the Presence of RF Interference", School of Surveying and Spatial Information Systems, The University of New South Wales, Australia, March 2011; panel member.

19. Staffan Backén, "On Dynamic Array Processing for GNSS Software Receivers", Dept. of Computer Science, Electrical and Space Engineering, Luleå University of Technology, April 2011; Oponent.
20. David Gregoratti, "Randomized Space-Time Block Coding for the Multiple-Relay Channel," Universitat Politècnica de Catalunya, June 2010; panel member.
21. José Joaquín Escudero Garzás, "Optimización de Energía y Eficiencia de Transmisión con Análisis de imparcialidad en Comunicaciones Inalámbricas Adaptativas," Universidad Carlos III de Madrid, February 2010; panel member.
22. Pau Closas Gómez, "Bayesian Signal Processing Techniques for GNSS Receivers," Universitat Politècnica de Catalunya, June 2009; reviewer of PhD proposal, PhD reviewer and panel member.
23. Pere Ramos-Bosch, "Improvements in Autonomous GPS Navigation of Low Earth Orbit Satellites," Universitat Politècnica de Catalunya, October 2008; panel member.
24. Francisco Rubio, "Generalized Consistent Estimation in Arbitrarily High Dimensional Signal Processing," Universitat Politècnica de Catalunya, April 2008; panel member.
25. Ali Nassar, "Time-Varying Frequency-Selective MIMO Channel Estimation," Universitat Politècnica de Catalunya, February 2008; reviewer of PhD proposal, PhD reviewer and panel member.
26. Sandro Scalise, "Channel Modeling and Receiver Design Contributions for Emerging Satellite Communication Systems," University of Vigo, July 2007; panel member.
27. Andreu Urruela, "Signal Processing Techniques for Wireless Localization," Universitat Politècnica de Catalunya, July 2006; panel member.
28. Carles Fernández Prades, "Advanced Signal Processing Techniques for Global Navigation Satellite Systems Receivers," Universitat Politècnica de Catalunya, April 27th, 2006; reviewer of the PhD proposal, PhD reviewer and panel member.
29. Dawit Beleke, "Técnicas de Acceso Múltiple por Contienda Basadas en Espectro Ensanchado para Sistemas Multimedia por Satélite," Universidad Carlos III de Madrid, July 26th, 2005; panel member.
30. Jesús Selva Vera, "Efficient Multipath Mitigation in Navigation Receivers," Universitat Politècnica de Catalunya, February 9th, 2004; reviewer of the PhD proposal, panel member.

### **6.1. Review of PhD Proposals**

1. Francisco Ramírez Jávega, "Graph-based Techniques for Compression and Reconstruction of Sparse Sources", Universitat Politècnica de Catalunya, January 2012; reviewer of PhD proposal.
2. Josep-Font Segura, "Wideband Cognitive Radio: Spectrum Sensing and Dynamic Access," Universitat Politècnica de Catalunya, June 2010; reviewer of PhD proposal.
3. David Bernal Casas, "Advanced Techniques for GNSS/INS Integrated Navigation Systems", Universitat Politècnica de Catalunya, September 2008; reviewer of PhD proposal.



