

# Andrés Marcos Esteban

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## APPOINTMENTS

My professional career reflects my personal understanding that a research engineer must have both, academic scholarship and industrial experience. Thus, in pursuit of a coherent development I made my professional choices based on the capacity for excellence and the inter-sectorial nature of the applied position. The knowledge and professional network that has resulted from such intertwined career has led to **extensive experience in the research and development (R&D) aerospace control field recognized as a leader capable of successfully bridging the gap between theory and practice**. This is evidence by the high number, and calibre, of awarded projects (see "RESEARCH" section). The reverse chronological list of positions held is given by:

- Senior Lecturer** Oct 2013 → present  
*University of Bristol*  
*Aerospace Engineering Department*  
Main interests are the research and application of modern robust control techniques to aerospace vehicles, from aircraft to satellite, and including launchers and atmospheric re-entry vehicles.
- Leader Control Systems Center of Competence /** Jan 2012 - Aug 2013  
**Project Manager /** Oct 2007 - Jan 2012  
**Senior Engineer** Jan 2006 - Oct 2007  
*Deimos-Space S.L.U., Spain*  
*Aerospace Engineering Business Unit – Flight Mechanics AA*  
Control leader of advanced control, fault detection and autonomous systems for R&D projects with the European Space Agency (ESA) and the European Commission (FP7 programs).
- Post-doctoral Research Fellow** Feb 2004 - Dec 2005  
*University of Leicester UK*  
*Control & Instrumentation Group*  
Participant in the Group for Aeronautical Research and Technology in Europe (GARTEUR) Action Group 17: "Nonlinear Analysis and Synthesis Techniques in Aircraft Control."
- Engineering Research Fellow** Jun 2003 - Dec 2003  
*Honeywell Labs, Minneapolis, MN, USA*  
*Engine Systems & Services – Vehicle Health and Logistics Management Lab*  
Participate in Honeywell Control Center of Excellence "Predictive Trend Monitoring (PTM)" project.
- Graduate Research Assistant** Jun 1999 - Dec 2003  
*University of Minnesota, Minneapolis, MN, USA*  
*Aerospace Engineering and Mechanics Department*  
PhD work funded by NASA's Aviation Safety Program (AvSP).
- Undergraduate Research Assistant** Jun 1996 - May 1997  
*St. Louis University, St. Louis, Mo, USA*  
*Aerospace and Mechanical Engineering Department*  
Design, construction and water/wind-tunnels testing of a scaled flexible empennage for a High-Speed Civil Transport aircraft for buffet identification studies.

## ACADEMIC QUALIFICATIONS

- Ph.D. Aerospace Engineering** (3 years) *GPA: 3.447 / 4.000* Feb 2004  
*University of Minnesota, Minneapolis, MN, USA.*  
Thesis: “Aircraft Applications of Fault Detection and Isolation Techniques”.
- M.Sc. Aerospace Engineering** (2 years degree) Jan 2001  
*University of Minnesota, Minneapolis, MN, USA*  
Thesis: “A Linear Parameter Varying Model of the Boeing 747-100/200 Longitudinal Motion”.
- B.Sc. Aerospace Engineering** (4 years degree) *Cum Laude* Dec 1997  
*St. Louis University, St. Louis, Mo, USA.*

## TEACHING

Since joining the Aerospace department at the University of Bristol in October 2013 I have been involved with teaching within the Dynamics and Control (D&C) group. Among my responsibilities I consolidated the 3<sup>rd</sup> and 4<sup>th</sup> year controls’ courses (AENG-31300 and AENGM-1300) by ensuring a coherent and incremental teaching from classical controls (AENG-31300) to advanced techniques (AENG-M1300). In addition, I lead the Space group-design projects (AENG-M0013) as well as carrying out my duties as personal tutor of 1<sup>st</sup> and 2<sup>nd</sup> year students. A complete list of classes is:

- Signals, Sensors and Control (AENG-31300)** 2015→2017  
*University of Bristol, UK*  
3<sup>rd</sup> year control course (20 credits), in charge of 22 lectures and Quanser lab for 80/120 students.
- Aircraft Dynamics and Control (AENG-M1300)** 2016→2017  
*University of Bristol, UK*  
4<sup>th</sup> year control course (10 credits), in charge of the advanced control lectures (6hr).
- Space Systems 2 (AENG-22300)** 2014→2017  
*University of Bristol, UK*  
2<sup>nd</sup> year course on Space Systems. In charge of the AOCS lectures (1hr).
- Aerospace Vehicle Design & Systems Integration AVDASI-4 (AENG-M0013)** 2014→2017  
*University of Bristol, UK*  
4<sup>th</sup> year team-based design course, 8/10 students per group, in collaboration with Industry.
- Individual Exploratory (AENG-30003) & Final Research (AENG-M0005) Projects** 2014→2017  
*University of Bristol, UK*  
3<sup>rd</sup> and 4<sup>th</sup> year individual students’ projects.

Although until joining UoB my professional career was mostly Industrial-based, except for the 7 years of Post-graduate and Post-Doctoral time, I always have had an educator profile and have been active in dissemination activities. Thus, for the better part of my career I have participated very actively in short courses and workshops at Universities, Research centers and technical conferences. It is noted that the workshops mentioned in this section are specifically created short-courses (taught by me, or in collaboration with other researchers). In total I have participated in over 34 workshops and seminars from which I will highlight a few (due to the topic, the audience or the host’s relevance):

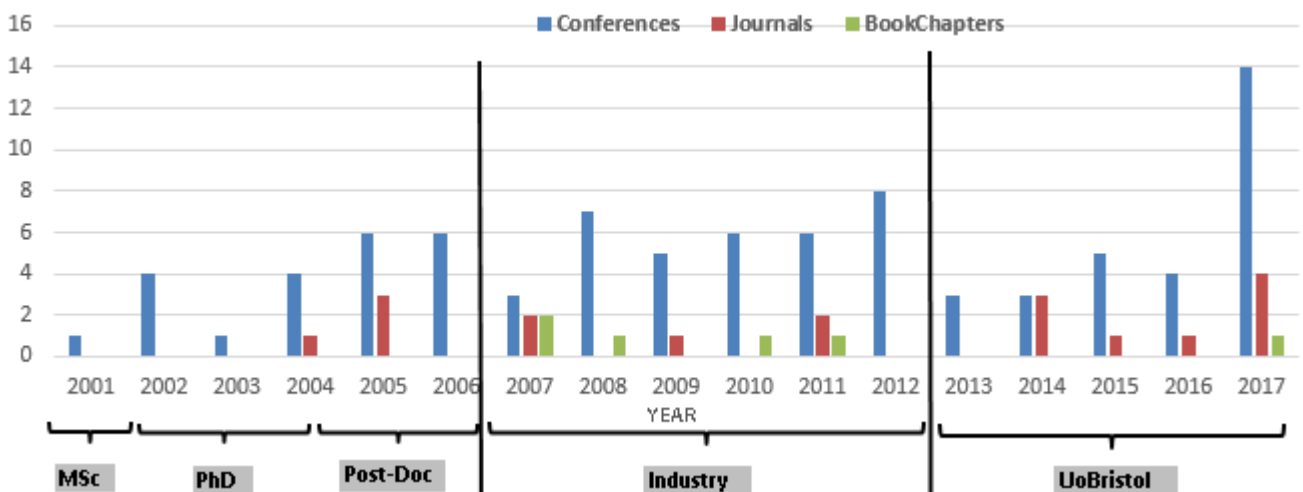
- **Invited Seminar**, “H-infinity Fault Detection and Isolation Application to a Turbofan Engine,” Honeywell Research Laboratories, Minneapolis, USA, October 2003.
- **Invited Seminar**, “Aircraft Time-Domain System Identification,” Vehicle Health and Logistics Management Group, Honeywell Research Laboratories, Minneapolis, USA, October 2003.
- **Invited Seminar**, “Application of H-infinity Fault Detection and Isolation to a Transport Aircraft,” Systems Control and Flight Dynamics (DCSD) ONERA, Toulouse, France, November 2005.
- **Invited Seminar**, “Linear Fractional Transformation Modeling and its applications,” Stability & Control Department, AIRBUS, Toulouse, France, November 2005. Jointly with Dr.Jean-Marc Biannic (ONERA).

- **PLENARY Speaker**, “Robust FDI Estimation in Aerospace Applications,” 17<sup>th</sup> International Workshop on Principles of Diagnosis DX’06. Peñaranda del Duero, Burgos, Spain, June 2006.
- **ESA Workshop Invited Speaker**, “Deimos Experience, Insight and Perspective on Space Control R&D,” ESA Workshop on Avionics Data, Control and Software Systems (ADCSS), ESA-ESTEC, October 2007.
- **ROUND-TABLE Speaker**, ESA-CNES-DLR-CIRA European Working Group on Atmospheric Re-entry guidance & control, ESA-ESTEC, October 2007.
- **EU Workshop Invited Speaker**, “Future technological needs for FDI/FTC/HMS for aerospace systems,” Workshop on Advanced FDI/FTC in future EC-FP, University of Duisburg-Essen, Germany, March 2009.
- **IEEE-CSS Workshop Speaker**, IEEE-CSS International Workshop on The Future of Control in Transportation Systems, University of Sannio, Benevento, Italy, May 2010.
- **PLENARY Speaker**, “EU ADDSAFE project: advanced diagnosis for sustainable flight guidance and control,” V international Summer School on Fault Diagnosis of Complex Systems, Madrid, July 2013.
- **ESA Workshop Invited Speaker**, “LPV Control and Analysis for Re-entry Vehicles,” ESA-CNES-DLR Workshop on Linear Parameter Varying Control, ESA-ESTEC, Noordwijk, The Netherlands, Feb 2014.
- **IEEE CSS UK&I Seminar Invited Speaker**, “Aerospace Control,” Cranfield, UK, December 2015.
- **Royal Aeronautical Society Workshop Invited Speaker**, “Recent Developments and Advances in Aeroelasticity,” London, UK, March 2016.
- **Universidad Carlos III de Madrid (UC3M) Seminar**, “LFT and mu: Robust Modelling and Analysis of aerospace systems” Bioengineering and Aerospace Engineering Department, Madrid, Spain, Sep 2016.
- **University of Tokyo Seminar**, “LFT and mu: Robust Modelling and Analysis of aerospace systems” Aerospace Engineering Department, Tokyo, Japan, Dec 2016.
- **UoB Seminar**, “Flight Testing Advanced Controllers: an EU-Japan collaborative experience,” University of Bristol, UK, Dynamics and Control group Seminar, February 2017.
- **ROUND-TABLE Speaker**, “Managing Innovation in Control Technology and Applications: Insights from Industry and Academia,” 1<sup>st</sup> IEEE Conf. on Control Technology and Applications, Hawaii, Aug2017
- **Course** on “Robust Control Theory and Applications” at ESA-ESTEC, Three-day (20hrs) workshop on robust modeling, analysis and control to around 20 ESA engineers. Jointly with profs. P. Seiler (UMN, USA), A. Packard (UC Berkeley, USA), and Dr. B. Vanek (SZTAKI, HU)

## PUBLICATIONS

Although not exactly seen in the figure below, during my post-graduate education period, including the Post-Doc period, I published in **1 journal & 1 conference (during the MSc period)**, **3 journals & 11 conferences (from the PhD)** and **2 journals & 10 conferences (during the Post-Doc)**. All these publications were in peer-reviewed top journals and conferences in the control field. Following this period, and in contrast to what will be expected from an industry career, due to the particularities of my choices (always striving to keep an R&D profile and collaborate with University) during my industrial time I was still successful in publishing in **4 journals & 39 conferences**. Note that the large difference of the latter with the former resides in the time versus impact trade-off performed in industry for dissemination objectives (which results in the favouring of conference activities). From October 2013, when I joined Bristol, the output has been **8 journals and 24 conference articles**.

**In summary, I have published: 6 book chapters, 17 journals and 86 conference articles.**



## RESEARCH

With respect to research funding, in total I have been involved in projects for a **total funding of 41M€**, with **10.8M€ obtained directly by me as main proposal lead (and subsequently Coordinator (CO) of multi-partner projects) and an additional 15.3M€ as Principal Investigator (PI)**. This funding activity has yielded a total of 7.5M€ of direct funding to the organizations where I have worked (of which **1.3M€ has come to UoB since I joined in October 2013 from 7 projects as PI**).

A highlight of several important projects is as follows (shaded funding indicates funding obtained by me as coordinator of multi-team project or as principal investigator of my organization):

- “**HEALTH MANAGEMENT SYSTEM FOR REUSABLE SPACE TRANSPORTATION (HMS)**”  
ESA/ESTEC contract; Coord.: Astrium-ST; My task: Deimos tech-lead; Funding: 700,000€ Jan 2006
- “**LINEAR PARAMETER VARYING MODELING, ANALYSIS AND DESIGN (LPVMAD)**”  
ESA/ESTEC contract; Coord.: Deimos Space (me); 3 teams; Funding: 300,000€ May 2017
- “**ADVANCED FAULT DIAGNOSIS FOR SUSTAINABLE FLIGHT GUIDANCE AND CONTROL (ADDSAFE)**”  
European FP7 contract; Coord.: Deimos Space (me); 8 teams; Funding: 4,280,357€ Oct 2008
- “**MAIN STAGE PROPULSION TECHNOLOGY HEALTH MONITORING SYSTEM ACTIVITIES (FLPP-HMS)**”  
FLPP ESA contract; Coord.: SNECMA; My task: Deimos’ PI; Funding to Deimos: 90,000€ Jul 2009
- “**MAIN STAGE PROPULSION TECHNOLOGY PERIOD 2 HMS ACTIVITIES (SCORE-FDI)**”  
FLPP ESA contract; Coord.: SNECMA; My task: Deimos’ PI; Funding to Deimos: 100,000€ Jul 2010
- “**ROBUST FLIGHT CONTROL SYSTEM DESIGN VERIFICATION&VALIDATION FRAMEWORK (RFCS)**”  
ESA/ESTEC contract; Coord.: Deimos Space (me); 4 teams; Funding: 450,000€ Jun 2010
- “**RECONFIGURATION CONTROL IN-FLIGHT FOR INTEGRAL GLOBAL UPSET RECOVERY (RECONFIGURE)**”  
European FP7 contract; Coord.: Deimos Space (me); 8 teams; Funding: 5,579,613€ Mar 2012
- “**FLUTTER FREE FLIGHT ENVELOPE EXPANSION ECONOMICAL PERFORMANCE IMPROVEMENT (FLEXOP)**”  
European H2020 contract; Coord.: SZTAKI; My task: PI UoB; Funding: 6,692,164€ (649,968€) Jun 2015
- “**VALIDATION INTEGRATED SAFETY-ENHANCED INTELLIGENT FLIGHT CONTROL (VISION)**”  
EU H2020 contract; Coord.: ONERA; 11 teams; My task: PI UoB; Funding: 3,621,630€ (350,126€) Jan 2016
- “**ROBUST NONLINEAR GUIDANCE AND CONTROL FOR LANDING ON SMALL BODIES (NTSP-2)**”  
UK Space Agency contract; Airbus D&S-UK (lead) & UoB (me, PI); Funding: £110,000 (£55,000) Apr 2016
- “**ADVANCED FLIGHT CONTROL SYSTEM DESIGN WITH ACTIVE LOAD & RELIEF CAPABILITIES (TAILOR)**”  
German Aerospace Center (DLR) project; Funding: 90,000€ Feb 2017

Of the **total of 18 grants**, **15 of them were as Principal Investigator (PI)**, including **2 as coordinator of European Union large consortiums** (ADDSAFE and RECONFIGURE, each >8 partners & >4M€). Nonetheless, the excellence of this grant activity does not reside in the importance of the numbers but rather in its **reflection of a continuous, consolidated strategic plan for R&D** in my field along my two main lines of research: [1] fault detection and isolation / fault tolerant control (FDI/FTC), and [2] advanced analytical robust techniques. This can be seen through the alignment of the awarded projects with my lines of research, visually represented by the following table divided in terms of the year the project was awarded and the aerospace systems used (re-entry vehicle, aircraft, satellite, launcher, UAV).

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Re-entry	HMS	LPVMAD		FQA	RFCS							
Aircraft				ADDSAFE			RECONFIGURE			FLEXOP	VISION	
UAV						PERIGEO						
Satellite			SATFDI								NTSP-2	
Launcher				HTE-HMS	SCORE-FDI				VVprob	Vvprob-II	VEGAdapt	TAILOR

**Project Acronym** # Fault Detection and Isolation (FDI) / Fault Tolerant Control (FTC)

**Project Acronym** # Advanced Analytical Robust Modelling, Analysis and Design Techniques

**Proposal/Project Coordinator**

**Principal Investigator**