CURRICULUM VITAE (CVA)

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

CV date	07/09/2022

Part A. PERSONAL INFORMATION

First name	Rafael		
Family name	Vázquez Valenzuela		
Gender (*)	Male	Birth date (dd/mm/yyyy)	
Social Security, Passport, ID number			
e-mail	rvazquez1@us.es	URL Web http://aero.us.es/rvazquez	
Open Research and Contributor ID (ORCID)(*)		0000-0001-6904-2055	

(*) Mandatory

A.1. Current position

Position	Profesor Titular de Universidad		
Initial date	08-09-2010		
Institution	Universidad de Sevilla		
Departament/Center	Dpto. de Ingeniería Aeroespacial y Mecánica de Fluidos / Escuela Técnica Superior de Ingeniería		
Country	Spain	Teleph. number	954488148
Key words	Aerospace Engineering, Control Theory		

A.2. Previous positions (research activity interruptions, art. 45.2.c))

Period	Position/Institution/Country/Interruption cause
2000-2001	Systems Engineer at Telvent Interactiva - Spain
2002-2006	Graduate Student Researcher at University of California, San Diego – United States
2007-2008	Profesor Ayudante Doctor – Univ. de Sevilla, España
2008-2010	Profesor Contratado Doctor – Univ. de Sevilla, España

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Ingeniero Industrial	Universidad de Sevilla	1999
Licenciado en Matemáticas	Universidad de Sevilla	2003
Master in Aerospace Engineering	University of California San Diego	2004
PhD in Aerospace Engineering	University of California San Diego	2006

Part B. CV SUMMARY *(max. 5000 characters, including spaces)*

Sexenios (); 2 supervised PhD (2012,2021), 2 ongoing PhDs and 1 MCSA Postdoc; Total citations: 1936 (Researcher ID), 3774 (Google Scholar, see

https://scholar.google.com/citations?user=0Zwv3iMAAAAJ); Citations per year (2017-2021): 417 (Google Scholar); Total Q1 journal papers: 28 (JCR); H index: 23 (Researcher ID), 31 (Google Scholar). Full professor (catedrático) accreditation (18/5/22).

Rafael Vazquez received the M.S. and Ph.D. degrees in aerospace engineering from the University of California, San Diego (USA) in the years 2004 and 2006, respectively, and BS degrees in electrical engineering (Ingeniero Industrial) and mathematics (Licenciado en Matematicas) from the University of Seville (Spain), in the years 1999 and 2003.

Since 2010, he is an **Associate Professor** (Profesor Titular) in the Aerospace Engineering and Fluid Mechanics Department at the University of Seville, where he started as Assistant Professor in 2007. He has been **Chair of the Department** from 2016 to 2020. He has been **Academic Coordinator for the Master's Degree in Aeronautical Engineering and the Bs. Degree in Aerospace Engineering** from 2016 to 2019. He has taught courses in Orbital Mechanics and Space Vehicle Dynamics for more that 10 years.

His research interests include control theory, distributed parameter systems, and optimization, with applications to flow control, ATM, UAVs, and orbital mechanics. He is coauthor of the book Control of Turbulent and Magnetohydrodynamic Channel Flows (Birkhauser, 2007). He currently serves as **Associate Editor** for the journal Automatica (Q1 in the JCR category Automation and Control Systems). Among other merits, he has published **38 journal papers** (JCR-indexed journals), **85 conference proceedings** (most of them peer reviewed), and **7 book chapters**. He has supervised **two PhD theses** and is supervising **one MCSA postdoc** and **three other PhD students**, as well as having supervised or co-supervised **13 Diploma thesis (PFC), 9 Master thesis (TFM), and 21 Degree thesis (TFG)**. His main research work has been on control of distributed parameter systems; besides he has worked as a researcher in numerous research projects and contracts with companies in topics related to Air Traffic Control, Applied Mathematics, Guidance and Control of Autonomous Air Vehicles, Control Theory, and Scheduling of Ground Station Antennas. In particular, he has past expertise on the rendezvous problem and in Model Predictive Control techniques. He is the IP of an ongoing national project on advanced rendezvous algorithms and has been the IP of a project for ESA in cooperation with INDRA which dealt with uncertainty modelling and quantification to detect maneuvers in LEO. He also belongs to international committees on both Control theory and Aerospace applications, being a regular attendee in conferences on both topics.

His research career is markedly international, with short and long research stays in United States, France, Germany and Brazil (**more than 6 months of postdoctoral stays, plus his full doctoral career in United States with long predoctoral stays in France and Germany**). He has published papers with co-authors from U.S.A., France, Brazil, China, Germany and Greece.

Part C. RELEVANT MERITS *(sorted by typology)*

C.1. Publications *(see instructions)*

1. J. C. Sanchez, J.D. Biggs, F. Bernelli-Zazzera, R. Vazquez, "Asteroid station-keeping predictive control with autonomous navigation and in-situ gravity estimation," vol. 45, pp. 262-279, Journal of Guidance, Control and Dynamics, 2022.[Q2]
2. S. Chen, R. Vazquez, M. Krstic, "Folding Bilateral Backstepping Output-Feedback Control Design For an Unstable Parabolic PDE," vol. 67, pp. 2389-2404, IEEE Transactions of Automatic Control, 2021. [Q1]
3. J. C. Sanchez, C. Louembet, F. Gavilan, R. Vazquez, "Event-based Impulsive Control for Spacecraft Rendezvous Hovering Phases," vol. 44 (10), pp. 1794-1810, Journal of Guidance, Control and Dynamics, 2021.[Q2]

4. J. C. Sanchez, F. Gavilan, R. Vazquez, “Chance-constrained Model Predictive Control for Near Rectilinear Halo Orbit spacecraft rendezvous,” Aerospace Science and Technology Vol. 100, 105827, 2020. [Q1]
5. D. Steeves, M. Krstic, R. Vazquez, “Prescribed–time estimation and output regulation of the linearized Schrödinger equation by backstepping,” in Press, European Journal of Control, 2020. [Q3]
6. L. Camacho, R. Vazquez, M. Krstic, "Boundary Observers for Coupled Diffusion-Reaction Systems with Prescribed Convergence Rate," Systems and Control Letters, vol. 135, 104586, 2020. [Q1]
7. J. C. Sanchez, F. Gavilan, R. Vazquez, C. Louembet, "A Flatness-Based Predictive Controller for Six-Degrees of Freedom Spacecraft Rendezvous," Acta Astronautica, vol. 167, 391-403, 2020. [Q1]
8. G. Andrade, R. Vazquez and D. Pagano, "Backstepping-based linear boundary observer for estimation of thermoacoustic instabilities in the Rijke tube with experimental validation," in press, IEEE Transactions on Automatic Control, 2020. [Q1]
9. Nikolaos Bekiaris-Liberis, Rafael Vazquez, "Nonlinear Bilateral Output-Feedback Control for a Class of Viscous Hamilton-Jacobi PDEs," Automatica, Vol. 101, pp. 223-231, 2019.[Q1]
10. R. Vazquez and M. Krstic, "Boundary control and estimation of reaction-diffusion equations on the sphere under revolution symmetry conditions," International Journal of Control, vol. 92, pp. 2-11, 2019.[Q2]
11. Long Hu, Rafael Vazquez, Florent Di Meglio, Miroslav Krstic, "Boundary exponential stabilization of 1-D inhomogeneous quasilinear hyperbolic systems," SIAM Journal on Control and Optimization, vol. 57, pp. 963-998, 2019.[Q1]
12. G. A. de Andrade, R. Vazquez, and D. Pagano, “Backstepping stabilization of a linearized ODE-PDE Rijke tube model,” in press, Automatica, 2018.[Q1]
13. R. Vazquez, D. Rivas, A. Franco, "Stochastic Analysis of Fuel Consumption in Aircraft Cruise Subject to Wind Uncertainty," Aerospace Science and Technology, Vol. 66, 304-314, 2017.[Q1]
14. F. Gavilan, R. Vazquez, E. F. Camacho, "Pulse-Width Predictive Control for LTV Systems with Application to Spacecraft Rendezvous," Control Engineering Practice, Vol. 60, pp. 199-210, 2017.[Q2]
15. R. Vazquez and M. Krstic, "Boundary Control of Coupled Reaction-Advection-Diffusion Systems with Spatially-Varying Coefficients," IEEE Transactions on Automatic Control, Vol. 62, pp. 2026-2033, 2017.[Q1]
16. Long Hu, Florent Di Meglio, Rafael Vazquez, Miroslav Krstic, "Control of Homodirectional and General Heterodirectional Linear Coupled Hyperbolic PDEs," IEEE Transactions on Automatic Control, Vol. 61, No. 10, pp. 3301-3314, 2016. [Q1]
17. R. Vazquez and M. Krstic, "Boundary Control of Reaction-Diffusion PDEs on Balls in Spaces of Arbitrary Dimensions," ESAIM:Control, Optimization and Calculus of Variations, Vol. 22, No. 4, pp. 1078-1096, 2016.[Q1]
18. F. Perea, R. Vazquez, J. Galan-Vioque, "Swath acquisition planning in multiple-mission EOSs: exact and heuristic approaches," IEEE Transactions on Aerospace and Electronic Systems, vol. 51, No. 3, pp. 1717-1725, 2015. [Q1]
19. F. Gavilan, R. Vazquez, E. F. Camacho, "An Iterative Model Predictive Control Algorithm for UAV Guidance," IEEE Transactions on Aerospace and Electronic Systems, vol. 51, No. 3, pp. 2406 - 2419, 2015. [Q1]
20. J. Qi, R. Vazquez, M. Krstic, 2015 "Multi-agent Deployment in 3-D via PDE Control," vol. 60 (4), pp. 891-906, IEEE Transactions on Automatic Control, 2015. [Q1]
21. F. Gavilan, R. Vazquez and J. A. Acosta, "Adaptive Backstepping Control for UAV Longitudinal Flight Dynamics with Thrust Saturation," vol. 38, No. 4, pp. 651-661, Journal of Guidance, Control and Dynamics, 2015. [Q1]

22. R. Vazquez and M. Krstic, "Marcum Q-functions and Explicit Kernels for Stabilization of 2x2 Linear Hyperbolic Systems with Constant Coefficients," System and Control Letters, vol. 68, 33-42, 2014. [Q1]
23. R. Vazquez, F. Perea, J. Galan-Vioque, "Resolution of an Antenna-Satellite assignment problem by means of Integer Linear Programming," Aerospace Science and Technology, vol. 39, pp. 567-574, 2014.[Q1]
24. R. Vazquez, D. Rivas, "Propagation of Initial Mass Uncertainty in Aircraft Cruise Flight," Journal of Guidance, Control and Dynamics, vol. 36 (2), 415-429, 2013. [Q1]
25. J.-M. Coron, R. Vazquez, M. Krstic, and G. Bastin, "Local exponential H2 stabilization of a 2x2 quasilinear hyperbolic system using backstepping," SIAM Journal on Control and Optimization, vol. 51(3), 2005-2035, 2013. [Q1]
26. F. Di Meglio, R. Vazquez, and M. Krstic, "Stabilization of a system of n + 1 coupled first-order hyperbolic linear PDEs with a single boundary input," IEEE Transactions on Automatic Control, vol. 58(12), 3097-3111, 2013. [Q1]
27. F. Gavilan, R. Vazquez and E. F. Camacho, "Chance-constrained Model Predictive Control for Spacecraft Rendezvous with Disturbance Estimation", Control Engineering Practice, vol 20 (2), 111-122, 2012.[Q2]

C.3. Research projects

1. “Diseño de Algoritmos de Guiado y Control Innovadores para Aplicaciones Avanzadas de Rendezvous: Órbitas Halo y Exploración de Asteroides.” Funding from: Ministerio de Ciencia, Innovacion y Universidades. IP: Rafael Vazquez. 2019-2022. Amount: 39.930€.
2. “AIRPORTS MPC”.Funding from: CDTI - Boeing Research and Technology Institute Europe S.L. (Proyecto CIEN). IP: Eduardo Fernández Camacho (Univ. de Sevilla). 2015-2017. Amount: 200.000€. Role: researcher.
3. “Análisis de Bifurcaciones en Sistemas Dinámicos: Aplicación”. Funding from: Ministerio de Economía y Competitividad. IP: Jorge Galán Vioque (Univ. de Sevilla). 2016-2018. Amount: 51.300€. Role: researcher (50%).
4. “Analisis Y Optimizacion De Trayectorias De Avion Bajo Los Efectos De Incertidumbre Meteorologica”. Funding from: Ministerio de Economía y Competitividad. IP: Damián Rivas Rivas (Univ. de Sevilla). 2015-2017. Amount: 80.000 €. Role: researcher (50%).
5. “SINTONIA: SIstemas No Tripulados Orientados al Nulo Impacto Ambiental”. Funding: CDTI - AERTEC Ingeniería y Desarrollos S.L.U. (Proyecto CENIT). IP: Damián Rivas Rivas. 2009-2012. Amount: 126.000 €. Role: researcher.
6. “Control y optimización de sistemas híbridos de energías renovable”. Funding: Junta de Andalucía (Proyecto de Excelencia). IP: Eduardo Fernández Camacho. 2008-2012. Amount: 375.000 €. Role: researcher (desde 2009).

C.4. Contracts, technological or transfer merits

1. “Manoeuvre detection for near-orbiting objects”. Funding: Indra (subcontrato para la Agencia Espacial Europea). IP: Rafael Vázquez. 2020. Amount: 40.000€. Role:IP
2. “BASGE: diseño de Bomba Aire-Superficie Guiada para Entrenamiento”. Funding: Aertec Solutions S.L. (programa COINCIDENTE del Ministerio de Defensa). IP: Francisco Gavilán Jiménez. 2020. Amount: 27.500€. Role:researcher
3. "CEFIRO-3". Funding: Aertec Ingeniería y Desarrollos S.L.. IP: Damián Rivas Rivas. 2014-2015. Amount: 100.000 €. Role: researcher.
4. "SESAR WP-E ComplexWorld Network - Mastering Complex Systems Safely". Funding: Eurocontrol - SESAR WP-E (red europea). IP: Damián Rivas Rivas. 2010-2014. Amount: 198.000 €. Role: researcher.
5. "Diseño, desarrollo, Integración y test de un algoritmo de planificación optimizada de las operaciones de antenas de recpeción y transmisión con satélites de observación de la tierra". Funding: Taitus Software Italia. IP: Jorge Galán Vioque. 2012-2013. Role: researcher. Amount: 20.000 €.