

Annex - List of publications

JOURNALS:

F. Barato, E. Paccagnella, and D. Pavarin, *Explicit Analytical Equations for Single Port Hybrid Rocket Combustion Chamber Sizing*, Journal of Propulsion and Power, Vol. 36, No. 6, Nov 2020. <https://doi.org/10.2514/1.B37992>

G. Bertolucci, F. Barato, E. Toson, D. Pavarin, *Impact of propulsion system characteristics on the potential for cost reduction of earth observation missions at very low altitudes*, Acta Astronautica, Vol. 176, November 2020 pp. 173-191. <https://doi.org/10.1016/j.actaastro.2020.06.018>

M. Franco, F. Barato, E. Paccagnella, M.Santi, A. Battiston, A. Comazzetto and D. Pavarin, *Regression Rate Design Tailoring Through Vortex Injection in Hybrid Rocket Motors*, Journal of Spacecraft and Rockets, 7 November 2019. <https://doi.org/10.2514/1.A34539>

M. Santi, E. Paccagnella, A. Ruffin, F. Barato, D. Pavarin, G. Misté, G. Venturelli, N. Bellomo, *Testing of a Long-Burning-Time Paraffin-based Hybrid Rocket Motor*, Journal of Propulsion and Power, Vol. 35, No. 2 (2019), pp. 432-442. <https://doi.org/10.2514/1.B37144>

E. Paccagnella, F. Barato, D. Pavarin, and A. Karabeyoğlu, *Scaling Parameters of Swirling Oxidizer Injection in Hybrid Rocket Motors*, Journal of Propulsion and Power, Vol. 33, No. 6 (2017), pp. 1378-1394. <https://doi.org/10.2514/1.B36241>

F. Barato, N. Bellomo, D. Pavarin, *Integrated approach for hybrid rocket technology development*, Acta Astronautica, Vol. 128, November–December 2016 pp. 257-26. <https://doi.org/10.1016/j.actaastro.2016.07.023>

M. Lazzarin, M. Faenza, F. Barato, N. Bellomo, A. Bettella, and D. Pavarin, *Computational Fluid Dynamics Simulation of Hybrid Rockets of Different Scales*, Journal of Propulsion and Power, Vol. 31, No. 5 (2015), pp. 1458-1469. <https://doi.org/10.2514/1.B35528>

F. Barato, N. Bellomo, M. Faenza, M. Lazzarin, A. Bettella, and D. Pavarin, *Numerical Model to Analyze Transient Behavior and Instabilities on Hybrid Rocket Motors*, Journal of Propulsion and Power, Vol. 31, No. 2 (2015), pp. 643-653. <https://doi.org/10.2514/1.B35282>

M. Lazzarin, M. Faenza, F. Barato, N. Bellomo, and A. Bettella, *Numerical Simulation of Hybrid Rockets Liquid Injection and Comparison with Experiments*, Journal of Propulsion and Power, Vol. 31, No. 1 (2015), pp. 352-364. <https://doi.org/10.2514/1.B35223>

N. Bellomo, M. Lazzarin, F. Barato, A. Bettella, D. Pavarin, M. Grosse, *Investigation of Effect of Diaphragms on the Efficiency of Hybrid Rockets*, Journal of Propulsion and Power, Vol. 30, No. 1 (2014), pp. 175-185. <https://doi.org/10.2514/1.B34908>

N. Bellomo, F. Barato, M. Faenza, M. Lazzarin, A. Bettella, D. Pavarin, *Numerical and Experimental Investigation of Unidirectional Vortex Injection in Hybrid Rocket Engines*, Journal of Spacecraft and Rockets, 2020. <https://doi.org/10.2514/6.2020-1111>

Journal of Propulsion and Power, Vol. 29, No. 5 (2013), pp. 1097-1113.
<https://doi.org/10.2514/1.B34506>

M. Lazzarin, F. Barato, A. Bettella, D. Pavarin, *Computational Fluid Dynamic Simulation of Regression Rate in Hybrid Rockets*, Journal of Propulsion and Power, Vol. 29, No. 6 (2013), pp. 1445-1452. <https://doi.org/10.2514/1.B34910>

CONFERENCE PAPERS:

Chemical propulsion

2020

F. Barato, E. Toson, D. Pavarin, *Variations and Control of Thrust and Mixture Ratio in Hybrid Rocket Motors*, IAC-20-C4.3.11, 71th International Astronautical Congress (IAC), Cyberspace Edition, 12-14 October 2020.

M. Santi, M. Fagherazzi, F. Barato, D. Pavarin, *Design and Testing of a Hydrogen Peroxide Bipropellant Thruster*, AIAA 2020-3827, AIAA Propulsion and Energy 2020 Forum, 24-28 August, Virtual Event. <https://doi.org/10.2514/6.2020-3827>.

F. Barato, E. Paccagnella, M. Franco, D. Pavarin, *Numerical Analyses of Thermal Protection Design in Hybrid Rocket Motors*, AIAA 2020-3769, AIAA Propulsion and Energy 2020 Forum, 24-28 August, Virtual Event. <https://doi.org/10.2514/6.2020-3769>.

2019

F. Barato, N. Bellomo, A. Ruffin, E. Paccagnella, M. Santi, M. Franco and D. Pavarin, *Status and Achievements of the Hydrogen Peroxide Chemical Propulsion Research at Padua University*, Italian Association of Aeronautics and Astronautics (AIDAA) XXV International Congress, 9-12 September 2019, Rome, Italy.

M. Santi, I. Dorgnach, F. Barato, D. Pavarin, *Design and Testing of a 3D Printed 10 N Hydrogen Peroxide Monopropellant Thruster*, AIAA 2019-477, AIAA Propulsion and Energy 2019 Forum, 19-22 August, Indianapolis, IN, USA. <https://doi.org/10.2514/6.2019-4277>

A. Ruffin, E. Paccagnella, M. Santi, F. Barato, D. Pavarin, *Real-Time Deep Throttling Tests of a Hydrogen Peroxide Hybrid Rocket Motor*, AIAA 2019-4266, AIAA Propulsion and Energy 2019 Forum, 19-22 August, Indianapolis, IN, USA. <https://doi.org/10.2514/6.2019-4266>. **2019 AIAA Best Hybrid Rocket Paper Award**

F. Barato, E. Paccagnella, G. Venturelli, D. Pavarin, F. Picano and J-Y Lestrade, *Numerical Simulations of an Isochoric Hybrid Rocket Combustion Chamber and Comparison with Tests*, 8th European Conference for Aeronautics and Space Sciences (EUCASS) 2019, 1-4 July, Madrid, Spain.

2018

E. Paccagnella, R. Gelain, F. Barato, D. Pavarin, P. van den Berg, F. Barreiro, *CFD Simulations of Self-Pressurized Nitrous Oxide Hybrid Rocket Motors*, AIAA 2018-4534, 54th AIAA/SAE/ASEE Joint Propulsion Conference, AIAA Propulsion and Energy Forum, 09-11 July, Cincinnati, OH, USA. <https://doi.org/10.2514/6.2018-4534>

A. Ruffin, M. Santi, E. Paccagnella, F. Barato, N. Bellomo G. A. Miste, G. M. Venturelli, D. Pavarin, *Development of a Flow Control Valve for a Throttleable Hybrid Rocket Motor and Throttling Fire Tests*, AIAA 2018-4534, 54th AIAA/SAE/ASEE Joint Propulsion Conference, AIAA Propulsion and Energy Forum, 09-11 July, Cincinnati, OH, USA. <https://doi.org/10.2514/6.2018-4664>

2017

F. Barato, E. Paccagnella, D. Pavarin, *Explicit Analytical Equations for Single Port Hybrid Rocket Combustion Chamber Sizing*, AIAA 2017-4641, 53rd AIAA/SAE/ASEE Joint Propulsion Conference, AIAA Propulsion and Energy Forum, 10-12 July, Atlanta, GA, USA. <https://doi.org/10.2514/6.2017-4641>

M. Santi, E. Paccagnella, A. Ruffin, F. Barato, D. Pavarin, G. Misté, G. Venturelli, N. Bellomo, *Development and Testing of a Long Burning Time Lab-scale Paraffin-based Hybrid Rocket Motor*, AIAA 2017-4829, 53rd AIAA/SAE/ASEE Joint Propulsion Conference, AIAA Propulsion and Energy Forum, 10-12 July, Atlanta, GA, USA. <https://doi.org/10.2514/6.2017-4829>

A. Ruffin, F. Barato, M. Santi, E. Paccagnella, N. Bellomo, G. Misté, G. Venturelli, D. Pavarin, *Development of a Cavitating Pintle for a Throttleable Hybrid Rocket Motor*, 7th European Conference for Aeronautics and Space Sciences (EUCASS) 2017, 3-6 July, Milan, Italy.

J-Y Lestrade, J. Messineo, J. Anthoine, A. Musker, F. Barato, *Development and Test of an Innovative Hybrid Rocket Combustion Chamber*, 7th European Conference for Aeronautics and Space Sciences (EUCASS) 2017, 3-6 July, Milan, Italy.

2016

F. Barato, M. Ghilardi, M. Santi, D. Pavarin, *Numerical Optimization of Hybrid Sounding Rockets through Coupled Motor-Trajectory Simulation*, AIAA 2016-4749, 52nd AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 25-27 July, Salt Lake City, UT, USA. <https://doi.org/10.2514/6.2016-4749>

E. Paccagnella, F. Barato, D. Pavarin and A. Karabeyoglu, *Scaling of Hybrid Rocket Motors with Swirling Oxidizer Injection – Part 2*, AIAA 2016-4750, 52nd AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 25-27 July, Salt Lake City, UT, USA. <https://doi.org/10.2514/6.2016-4750>

F. Barato, E. Paccagnella, G. Venturelli, M. Scarpa, F. Picano, D. Pavarin, J-Y Lestrade, *Numerical Simulation of an Isochoric Combustion Chamber for Hybrid Rocket Propulsion*, 5th SPACE PROPULSION CONFERENCE, 2-6 May, Rome, Italy.

M. Faenza, F. Olufsen, L. Krogstie, O. Verberne, F. Barato, G. Venturelli, M. Scarpa, D. Pavarin, *C/C-SiC Nozzle for a Long Burn-Time Hybrid Rocket: Design and Optimization, Manufacturing and Testing*, 5th SPACE PROPULSION CONFERENCE, 2-6 May, Rome, Italy.

2015

F. Barato, N. Bellomo, D. Pavarin, *Integrated approach for hybrid rocket technology development*, International Astronautic Conference 2015, 12-16 October 2015, Jerusalem, Israel.

E. Paccagnella, F. Barato, D. Pavarin and A. Karabeyoglu, *Scaling of Hybrid Rocket Motors with Swirling Oxidizer Injection*, AIAA 2015-3833, 51st AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 27-29 July, Orlando, FL, USA. <https://doi.org/10.2514/6.2015-3833>

M. Faenza, F. Barato, M. Lazzarin, D. Pavarin, *Hybrid Rocket Motor Regression Rate Prediction through CFD Simulations*, 6th European Conference for Aeronautics and Space Sciences (EUCASS) 2015, 29 June - 3July, Krakow, Poland.

A. Ruffin, F. Barato, D. Pavarin, *Numerical Model to Analyse Nozzle Thermochemical Erosion*, 6th European Conference for Aeronautics and Space Sciences (EUCASS) 2015, 29 June - 3July, Krakow, Poland.

E. Di Sotto, A. Cojocar, A. Danciu, C. Chitu, F. Barato, D. Pavarin, *Ascent Trajectory Optimisation for Hybrid Propulsion Micro Launcher*, 6th European Conference for Aeronautics and Space Sciences (EUCASS) 2015, 29 June - 3July, Krakow, Poland.

2014

F. Barato, M. Grosse, A. Bettella, *Hybrid Rocket Residuals – An Overlooked Topic*, AIAA 2014-3753, 50th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 28-30 July, Cleveland, OH, USA. <https://doi.org/10.2514/6.2014-3753>

2013

F. Barato, A. Bettella, D. Pavarin, *Numerical Investigation of Pressure-Fed Solutions for Paraffin-Based Hybrid Rocket Motors*, AIAA 2013-3897, 49th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 14-17 July, San Jose, CA, USA. <https://doi.org/10.2514/6.2013-3897>

M. Faenza, F. Moretto, F. Barato, A. Bettella, D. Pavarin, *Numerical and Experimental Activities in Support of the Development of Hybrid-Rocket Engines for Soft-Landing Applications*, 5th European Conference for Aeronautics and Space Sciences (EUCASS), 1-5 July, Munich, Germany.

M. Lazzarin, N. Bellomo, M. Faenza, F. Barato, A. Bettella, D. Pavarin, *Analysis of Fluid-dynamic Systems to Increase Combustion Efficiency in Hybrid Rockets*, 5th European Conference for Aeronautics and Space Sciences (EUCASS), 1-5 July, Munich, Germany.

2012

F. Barato, N. Bellomo, M. Lazzarin, F. Moretto, A. Bettella, D. Pavarin, *Numerical Modeling of Paraffin-Based Fuels Behavior*, AIAA 2012-3750, 48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 29 July - 01 August, Atlanta, GA, USA. <https://doi.org/10.2514/6.2012-3750>

N. Bellomo, M. Faenza, F. Barato, A. Bettella, D. Pavarin, *The “Vortex Reloaded” project: experimental investigation on fully tangential vortex injection in N₂O – paraffin hybrid motors*, AIAA 2012-4304, 48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 29 July - 01 August, Atlanta, GA, USA. <https://doi.org/10.2514/6.2012-4304>

N. Bellomo, M. Faenza, F. Barato, A. Bettella, D. Pavarin, A. Selmo, *The “Vortex Reloaded” project: numerical investigation on fully tangential vortex injection in N₂O – paraffin hybrid motors*, AIAA 2012-3903, 48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 29 July - 01 August, Atlanta, GA, USA. <https://doi.org/10.2514/6.2012-3903>

M. Lazzarin, N. Bellomo, M. Faenza, F. Barato, D. Rondini, M. Manente, A. Bettella, D. Pavarin, *Numerical Investigation of Hybrid Motors for the EU FP7 SPARTAN Program*, AIAA 2012-3748, 48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 29 July - 01 August, Atlanta, GA, USA. <https://doi.org/10.2514/6.2012-3748>

F. Barato, M. Faenza, N. Bellomo, M. Lazzarin, A. Bettella, D. Pavarin, *Numerical Simulations of an H₂O₂ Vortex Hybrid Rocket Motor*, SPACE PROPULSION 2012, 7-10 May, Bordeaux, France.

M. Lazzarin, F. Barato, A. Bettella, D. Pavarin, *CFD Simulation of Regression Rate in Hybrid Rockets*, SPACE PROPULSION 2012, 7-10 May, Bordeaux, France.

2011

F. Barato, N. Bellomo, M. Faenza, M. Lazzarin, A. Bettella, D. Pavarin, *A Numerical Model to Analyze the Transient Behavior and Instabilities on Hybrid Rocket Motors*, AIAA 2011-5538, 47th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit. 31 July - 03 August, San Diego, CA, USA. <https://doi.org/10.2514/6.2011-5538>. **2012 AIAA Best Hybrid Rocket Student Paper Award**

M. Lazzarin, M. Faenza, F. Barato, N. Bellomo, A. Bettella, D. Pavarin, M. Grosse *CFD Simulation of a Hybrid Rocket Motor with Liquid Injection*, AIAA 2011-5537, 47th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit. 31 July - 03 August, San Diego, CA, USA. <https://doi.org/10.2514/6.2011-5537>

N. Bellomo, F. Barato, M. Faenza, M. Lazzarin, A. Bettella, D. Pavarin, *Numerical and Experimental Investigation on Vortex Injection in Hybrid Rocket Motors*, AIAA 2011-5675, 47th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 31 July - 03 August, San Diego, CA, USA. <https://doi.org/10.2514/6.2011-5675>

A. Bettella, M. Lazzarin, N. Bellomo, F. Barato, D. Pavarin, M. Grosse, *Testing and CFD Simulation of Diaphragm Hybrid Rocket Motors*, AIAA 2011-6023, 47th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 31 July - 03 August, San Diego, CA, USA. <https://doi.org/10.2514/6.2011-6023>

2010

D. Pavarin, M. Pessana, A. Bettella, M. Manente, M.Lazzarin, F. Barato, N. Bellomo, *CFD Simulation in Support of SPARTAN Research Program*, Proceedings Seventh International Conference on Flow Dynamics ICFD2010, November 1-3, 2010, Sendai, Miyagi, Japan, pp. 194-195.

N. Bellomo, M. Lazzarin, F. Barato, M. Grosse, *Numerical Investigation of the Effect of a Diaphragm on the Performance of a Hybrid Rocket Motor*, AIAA 2010-7033, 46th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 25 - 28 July, Nashville, TN, USA. <https://doi.org/10.2514/6.2010-7033>

Other

2019

G. Bertolucci, F. Barato, E. Toson, D. Pavarin, *Impact of propulsion system characteristics on the potential for cost reduction of earth observation missions at very low altitudes*, IAC-19-C4.6.4, 70th International Astronautical Congress (IAC), Washington D.C., United States, 21-25 October 2019.

G. Katsonis et al. (included F. Barato), *Modeling and Optical Diagnostics of Iodine Fed Helicon Type Thrusters by a Detailed Global Model (DGM)*, IEPC-2019-448, The 36th International Electric Propulsion Conference, University of Vienna, Austria, September 15-20, 2019.

M. Manente et al. (included F. Barato), *REGULUS: Know-How Acquired on Iodine Propellant*, IEPC-2019-419, The 36th International Electric Propulsion Conference, University of Vienna, Austria, September 15-20, 2019.

M. Manente et al. (included F. Barato), *REGULUS: Iodine Fed Plasma Propulsion System for Small Satellites*, IEPC-2019-417, The 36th International Electric Propulsion Conference, University of Vienna, Austria, September 15-20, 2019.

2018

M. Manente, F. Trezzolani, N. Bellomo, M. Magarotto, E. Toson, R. Mantellato, F. Barato, D. Pavarin, *Magnetic Enhanced Plasma Propulsion System for small-satellites IOD development*, International Astronautical Conference 2018, 1-5 October 2018, Bremen, Germany.

2015

F. Barato, F. Trezzolani, M. Manente, D. Pavarin, T. Andreussi, M. Andrenucci, *Electric Propulsion Technology for Low Earth Mission of Micro/Nano-Satellites*, International Astronautic Conference 2015, 12-16 October 2015, Jerusalem, Israel.

2012

M. Lazzarin, N. Bellomo, F. Barato, D. Paulon, D. Rondini, F. Moretto, A. Selmo, A. Bettella, D. Pavarin, SPONGE: *a Sounding Rocket Experiment for PMDs*, AIAA 2012-4174, 48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 29 July - 01 August, Atlanta, GA, USA. <https://doi.org/10.2514/6.2012-4174>

2011

M. Lazzarin, N. Bellomo, F. Barato, D. Paulon, F. Moretto, D. Rondini, S. Rinaldi, A. Aboudan, M. Cesaro, M. Pessana, D. Pavarin, *THE SPONGE REXUS PROJECT: OVERVIEW OF A SOUNDING ROCKET EXPERIMENT FOR PMD DEVICES*, proceedings 20th ESA PAC SYMPOSIUM 2011, 22 - 26 May, Hyères, France, (ESA SP-700, October 2011, pp. 253-258).