
Jean-Marc MOSCHETTA

Professor of Aerodynamics at *Institut Supérieur de l'Aéronautique et de l'Espace* (ISAE),

Consultant at ONERA/DMAE

Director of *Groupement d'Intérêt Scientifique (GIS) « Micro-Drones »*



« **Habilitation** » *Advanced degree to conduct research* (2000)

Doctoral degree in Fluid Dynamics (1991)

Engineer degree in Aeronautics & Astronautics SUPAERO (1987)

Master of Science in Pure Mathematics (1986)

Doctoral degree in Theology (2012)

Decoration awarded “**Officier des Palmes Académiques**” (2016)

“**Expert Scientifique**” Ministère de l'Éducation Nationale, de l'Enseignement Supérieur et de la Recherche (2015-2017)

1979 – 1981 Military High School, Saint Cyr l'École

1982 – 1984 Preparatory classes – Lycée Hoche, Versailles

Professional career

1987-1991, Research engineer – *Aérospatiale Division Engins Tactiques*, Theoretical Aerodynamics.

1991-2000, Assistant Professor of Aerodynamics at SUPAERO

1994-1995, « Visiting Professor of Aeronautics », *California Institute of Technology*, Pasadena, Californie. Lecturer in « Computational Fluid Dynamics ». Research project in Hypersonic Aerodynamics

Since 2000, Professor of Aerodynamics at SUPAERO then ISAE (founded in 2007). Coordinator of the Research team « Aerodynamics and Propulsion of Micro-Drones ».

From 2004 to 2008, dean of studies for first year students (engineer syllabus). Since 2008, in charge of a special advanced program on UAVs for Armement engineers.

Since 1991, consultant at ONERA/DMAE on Hypersonic Aerothermodynamics.

From 2008 to 2011, Director of Doctoral School “Aeronautics and Astronautics”.

Teaching activities

- Undergraduate courses : Introduction to Airplane Aerodynamics.
- Graduate courses : Hypersonic Aerodynamics, Advanced Airplane Aerodynamics, Aerodynamics and Propulsion of Mini-UAVs.
- Program coordinator of « UAV Systems », part of a Master program in Aeronautics (TAS Aero).

Research grants and expertise

- Research grant on MAVs from the French Armament Procurement Agency (DGA) since 2000.
- Research grant from the Regional Government on Electroactive morphing actuators as applied to UAVs (since 2010)
- Research grants on 2 UAV projects for long endurance vehicle and for a multi-tasking micro-drone, University of Toulouse (since 2010).
- Since 2008, Associate Editor of the *International Journal of Micro Air Vehicles*
- Chairman of 5 international conferences and flight competitions on Micro Air Vehicles (2011, 2002, 2003, 2004, 2007) and member of the International Oversight Committee for the organization of IMAV conferences and flight competitions (since 2006).

Consulting

- Consultant in Aerodynamics since 1992 for : ONERA, Bertin Technologies, Silverlit, Delair-Tech, Lacroix Defence & Security.

Selection of recent publications (2008-2015)

Journal papers

- P. Lv, S. Prothin, F. Mohd-Zawawi, E. Benard, J. Morlier, J.-M. Moschetta, “Performance improvement of small-scale rotors by passive blade twist control”, *Journal of Fluid and Structure*, Vol. 55 (2015), p. 25-41.
- V. Bonnin, E. Bénard, J.-M. Moschetta, C. Toomer, “Energy-Harvesting Mechanisms for UAV Flight by Dynamic Soaring”, *International Journal of Micro Air Vehicles*, vol.7, n°3 (2015), pp.212-230. ISSN 1756-8293
- A. Sun, D. Bajon, J.-M. Moschetta, E. Benard, C. Thipyopas, “Integrated static and dynamic modeling of an ionic polymer-metal composite actuator”, *Journal of intelligent material systems and structures*, Vol. 20, n°3 (2015), p. 273-282. ISSN: 15308138
- K. Chinwicharnam, D. Gomez Ariza, J.-M. Moschetta, C. Thipyopas, “A computation study on the aerodynamic influence of interaction wing-propeller for a tilt-body MAV”. (2015) *Aircraft Engineering and Aerospace Technology: An International Journal*, vol.87 (n°6). pp.521-529. ISSN 0002-2667
- Z. Liu, L. Dong, J.M. Moschetta, J. Zhao and G. Yan, “Optimization of Nano-Rotor Blade Airfoil Using Controlled Elitist NSGA-II”, *International Journal of Micro Air Vehicles*, vol. 6, n° 1, (2014), pp. 29-42. ISSN 1756-8293.
- J.M. Moschetta, “The Aerodynamics of Micro Air Vehicles: Technical Challenges and Scientific Issues”, *Int. J. Engineering Systems Modelling and Simulation*, Vol. 6, Nos. 3-4 (2014), p. 134-148.
- F. Mohd-Zawawi, S. Prothin, P. Lv, E. Benard, J.-M. Moschetta, J. Morlier, “Study of a Flexible UAV Proprotor”. *International Journal of Engineering Systems Modelling and Simulation*, Vol. 6, N°3/4 (2014), p. 149-161.

- M. Bronz, G. Hattenberger and J.-M. Moschetta, « Development of a Long Endurance Mini-UAV : ETERNITY », *International Journal for Micro Air Vehicles*, vol. 5, n°4, Déc. 2013, p. 261-272.
- P. Lv, Fazila Mohd-Zawawi, E. Benard, S. Prothin, J.-M. Moschetta and J. Morlier, “An Application of Adaptive Blades on Convertible MAVs”, *International Journal for Micro Air Vehicles*, vol. 5, n°4, Déc. 2013, p. 229-244.
- K. Chinwicharnam, D. Gomez Ariza, J.-M. Moschetta and C. Thipyopas, « Aerodynamic Characteristics of a Low Aspect Ratio Wing and Propeller Interaction for a Tilt-Body MAV », *International Journal for Micro Air Vehicles*, vol. 5, n°4, Déc. 2013, p. 245-260.
- F. Mohd-Zawawi, J. Morlier, G. Grondin, J.-M. Moschetta, “Design of Optimum Torsionally Flexible PropRotors for Tilt-Body MAVs,” *Journal of Applied Mechanics and Materials*, vol. 225, pp. 281–286, Nov. 2012.
- C. Thipyopas, A. B. Sun, E. Benard, J.-M. Moschetta, “Application of Electro-Active Materials to a Coaxial-Rotor NAV”, *International Journal of Micro Air Vehicles*, Volume 3, Number 4, pp. 247-260, December 2011.
- Z. Liu, R. Albertani, J.-M. Moschetta, C. Thipyopas, M. Xu, “Evaluation of Nano Coaxial Rotors in Hover with a validated Five-component Balance », *AIAA Journal of Aircraft*, Vol. 48, n.1, p. 220-229, 2011.
- M. Itasse, J.-M. Moschetta, Y. Ameho, R. Carr, « Equilibrium Transition Study for a Hybrid MAV », *International Journal of Micro Air Vehicles*, Volume 3, Number 4, pp. 229-246, December 2011.
- Z. Liu, J.-M. Moschetta and M. Xu, “Design, Fabrication and Hovering Performance Study of Nano Coaxial Rotor”. *International Journal of Aerospace and Lightweight Structures*, 2011, Volume 1, n. 1, pp. 119-132.
- Z. Liu, J.-M Moschetta, N. Chapman, R. Barènes, M. Xu, “Design of Test Benches for the Hovering Performance of Nano-Rotors”, *International Journal of Micro Air Vehicles*, Volume 2, Number 1, pp. 17-32, 2010.
- C. Thipyopas, J.-M. Moschetta, “Experimental Analysis of a Fixed-Wing VTOL MAV in Ground Effect”, *International Journal of Micro Air Vehicles*, Volume 2, Number 1, pp. 33-54, March 2010
- C. Thipyopas and J.-M. Moschetta, “Development of Experimental Facilities for Multi-Mission MAVs”, *International Journal of Micro Air Vehicles*, Sept. 2010, Vol.2 no.3
- Z. Liu, M. Xu, J.-M. Moschetta, S. Yang, " A review on conceptual design of nano air vehicles", *Chinese Science Bulletin*, Volume 55, n. 34, pp. 3257-3268, 2010.
- C. Thipyopas et J.-M. Moschetta. « A fixed-wing biplane MAV for low speed missions” *International Journal of Micro Air Vehicles*, Vol.1(1), 2009.
- B. Bataillé, J.-M. Moschetta, D. Poinot, C. Bérard et A. Piquereau. « Development of a VTOL Mini-UAV for Multi-Tasking Missions”, *The Aeronautical Journal*, Vol. 113(1140), p. 87, 2009.
- S. Shkarayev, J.-M. Moschetta, B. Bataillé, “Aerodynamic Design of Micro Air Vehicles for Vertical Flight”, *Journal of Aircraft*, vol. 45, n°5, Sept.-Oct. 2008, pp. 1715-1724.

Invited lectures

- J.-M. Moschetta, “The Aerodynamics of Micro Air Vehicles : Technical challenges and scientific issues », *48th International Symposium of Applied Aerodynamics*, 25 mars 2013, Saint-Louis, France.
- J.-M. Moschetta, “Research activity in Micro Air Vehicles at ISAE”, *Linköping University*, 22 novembre 2012, Linköping, Sweden.

- J.-M. Moschetta, “Micro Unmanned Air Vehicle: Innovative designs for long endurance”, *Airbus Innovation Cell Symposium*, 20 avril 2012, Toulouse, France.
- J.-M. Moschetta, “Multi-tasking Micro aerial Vehicles for the urban environment”, *Short Range and Tactical UAVs*, 24-26 mai 2011, Londres, Grande-Bretagne.
- J.-M. Moschetta, “Les drones, recherches et innovation à l’ISAE”, *Colloque du Centenaire de SUPAERO*, 14-16 oct. 2009, Toulouse, France.
- J.-M. Moschetta, S. Shkarayev, « Hovering Capabilities of Fixed-Wing Micro Air Vehicles », *1st US-Asian Demonstration & Assessment of Micro-Aerial & Unmanned Ground Vehicle Technology (MAV08)*, 10-15 March, Agra, India
- J.-M. Moschetta, B. Bataillé, C. Thipyopas, S. Shkarayev, « On Fixed-Wing Micro-Air Vehicles with Hovering Capabilities », *AIAA Paper 2008-221, 46th AIAA Aerospace Sciences Meeting and Exhibit*, 7-10 January 2008, Reno, Nevada
- J.-M. Moschetta, “New Trends and Capabilities for Micro Air Vehicle Systems”, *UAV World 2007*, Oct. 24-25 2007, Frankfurt, Germany
- J.-M. Moschetta, « MAV07: compétition internationale de micro-drones », *Journées Univ’Air*, Le Bourget, 22-25 mars 2007.

Patents

- J.-M. Moschetta & C. Thiopyopas, « Micro/nano véhicule aérien commandé à distance comportant un système de roulage au sol, de décollage vertical et d’atterrissage », Brevet en France FR11 52585 du 29 mars 2011. Extension internationale déposée auprès de l’Office Européen des Brevets de La Haye le 27 mars 2012. Publié le 4 octobre 2012 sous le numéro 2012/130856 par le Bureau International de l’OMPI.
- J.-M. Moschetta et M. Bronz, « Drone longue endurance », Brevet en France FR 1259268 déposé le 1^{er} octobre 2012.

Conference papers (2010-2013)

- V. Bonnin, C. Toomer, E. Bénard, J.-M. Moschetta, “Energy-Harvesting Mechanisms for UAV Flight by Dynamic Soaring”, *AIAA Atmospheric Flight Mechanics Conference*, 19 August 2013 - 22 August 2013, Boston, Massachusetts.
- Y. Prevereaud, J.-L. Verant, J.-M. Moschetta, F. Sourgen, M. Blanchard, “Debris Aerodynamic Interactions during Uncontrolled Atmospheric Reentry”, *AIAA Atmospheric Flight Mechanics Conference*, AIAA Paper 2012-4582, 13-16 août 2012, Minneapolis, Minnesota, USA.
- D. Gomez, S. Moretti, E. Benard, J.-M. Moschetta, “Wake analysis of UAV propeller at incidence”, *47th Applied Aerodynamics Conference*, 3AF, Paris, 26-28 mars 2012.
- M. Bronz, J.-M. Moschetta, P. Brisset, “Flying Autonomously to Corsica : A Long Endurance Mini-UAV System”, *International Micro Air Vehicle Conference and Flight Competition*, Braunschweig, Germany, (IMAV2010), July 2010.
- R. Carr, J.-M. Moschetta, C. Thipyopas, G. Mehta, ” A Tilt-body Fixed-wing Micro Aerial Vehicle for Autonomous Transition Flight”, *International Micro Air Vehicle Conference and Flight Competition*, Braunschweig, Germany, (IMAV2010), July 2010.
- L. Ferrier, J.-L. Vérant, J.-M. Moschetta, “Aerothermodynamical Study for the Entry of an Apophis-Like Asteroid”, *AIAA paper 2011-1037, 49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition*, Orlando, Florida, Jan. 4-7, 2011.

- L. Ferrier, J.-L. Vérand, J.-M. Moschetta, F. Sourgen, Y. Prévèreaud, « The protective role of the Earth atmosphere against the threat of asteroids », *2nd IAA Planetary Defense Conference*, Bucharest, Romania, May 2011.
- C. Thipyopas, A. B. Sun, E. Benard, J.-M. Moschetta, “Application of Electro-Active Materials to a Coaxial-Rotor NAV”, *International Micro Air Vehicle Conference and Flight Competition*, T’Haarde, The Netherlands, (IMAV2011), September 2011.
- M. Itasse, J.-M. Moschetta, Y. Ameho, R. Carr, « Equilibrium Transition Study for a Hybrid MAV », *International Micro Air Vehicle Conference and Flight Competition*, T’Haarde, The Netherlands, (IMAV2011), September 2011.
- D. Gomez, J.-M. Moschetta, “The lateral force effects on rotors at incidence: application to a coaxial rotor mini-UAV tail-sitter”, *46th Applied Aerodynamics Symposium*, 3AF, Orléans, France, 28-30 March 2011.
- G. Grondin, C. Thipyopas, J.-M. Moschetta, “Aerodynamic Analysis of a Multi-Mission Short Shrouded Coaxial UAV: Part III - CFD for Hovering Flight”, AIAA paper-2010-5073, *28th AIAA Applied Aerodynamics Conference*, Chicago, Illinois, June 28-1, 2010.
- C. Thipyopas, S. Poutriquet, R. Barènes, J.-M. Moschetta, « Aerodynamic Analysis of a Multi-Mission Short-Shrouded Coaxial UAV: Part II – Translation Flight », AIAA paper-2010-1427, *8th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition*, Orlando, Florida, Jan. 4-7, 2010.