

Travaux de recherche de J-C. MARE

Thesis

MARE J-C., *Contribution à la modélisation, la simulation, l'identification et la commande d'actionneurs électrohydrauliques*, Thèse de Doctorat d'Etat, Université Claude Bernard, Lyon I, 6 Juillet **1993**.

PhD direction

- 24/18.5 DE GEORGI Francesco, *Performance Improvement of Embedded Electric Actuators by means of a Thermal Management Optimisation*, soutenance 28 Juin **2021** (20%).
- 23/18.3 MKADARA Geneviève, *Contribution to the monitoring of hydraulic axial piston pumps for helicopters*, Première inscription 7 Juin 2017, soutenance 10 Octobre **2020** (100%).
- 22/17.3 MONSIMER Adrien, *Méthodologie pour l'étude conceptuelle d'un système fortement innovant - Application au cas du circuit carburant d'un moteur d'hélicoptère*, Première inscription 5 Mai 2015, soutenance 19 Avril **2018** (100%).
- 21/16.3 COIC Clément, *Model-Aided Design of a High-Performance Fly-by-Wire Actuator, Based on a Global Modelling of the Actuation System using Bond-graphs*, Première inscription 25 Novembre 2013, 1 Décembre **2016** (100%).
- 20/15.3 FU Jian, *Virtual Prototyping of Electromechanical Actuators for Position Synchronization*, Première inscription 15 mars 2013, 6 Juillet **2016** (100%).
- 19/14.3 GNESI E., *Prototypage virtuel de modules électro-hydrostatique à pompes à palettes - Application aux presses à injecter*, Première inscription 15 Février 2012, 21 Septembre **2015** (100%).
- 18/13.3 REYSSET Aurélien, *Conception préliminaire d'actionneurs électromécaniques - outils d'aide à la spécification et à la génération de procédures de dimensionnement pour l'optimisation*, 1ere inscription Décembre 2011, 23 Janvier **2015** (10%).
- 17/13.2 FRAJ Amine, *Nouvelles approches en conception basée sur les modèles des actionneurs embarquée*, Institut National des Sciences Appliquées de Toulouse, Première inscription 10 Juillet 2011, 26 Mai **2014** (50%).
- 16/12.7 VINSON Garance, *Développement d'une méthode de diagnostic et pronostic basée sur un cadre formel de modélisation générique. Application à un module électro-hydrostatique aéronautique*, Université Paul Sabatier, Première inscription 1/2/11, 21 Février **2014** (30%).
- 15/12.4 WANG Lijian, *Stratégie d'égalisation d'effort dans les systèmes d'actionnement actif-actif impliquant les technologies servo-hydraulique et électro-mécanique*, Institut National des Sciences Appliquées de Toulouse, Première inscription 1er janvier 2009, 18 Décembre **2012** (100%).
- 14/11.4 FAUGERE Emeline, *Modélisation couplée des pertes mécaniques et du comportement thermique d'un réducteur de transmission de puissance par engrenage par réseaux nodaux multi-niveaux*, Institut National des Sciences Appliquées de Toulouse, 1ere inscription 1er Décembre 2009, 10 Décembre **2012** (100%).
- 13/10.4 HOSPITAL Fabien, *Conception préliminaire des actionneurs électromécaniques basée sur les modèles. Lois d'estimation et règles de conception pour la transmission de puissance mécanique*, Institut National des Sciences Appliquées de Toulouse, 22 Octobre **2012** (50%).
- 12/9.9 El HALABI Toufic, *Méthodologies pour la conception optimale des systèmes d'actionnement électromécaniques*, Institut National des Sciences Appliquées de Toulouse, 22 mars **2012** (50%).
- 11/9.4 MARGER Thibault, *Conception d'une servocommande hydromécanique sous critère de cout et de mixabilité*, Art et Métiers, 13 Décembre **2010** (40%).
- 10/9 QI Haitao, *Research on Actuation System Architecture of More Electric Aircraft and Electro-Hydrostatic Actuator (EHA)*, Encadrement à 50% (50% Pr Fu) de Septembre 2007 à Décembre 2009, 30 Janvier **2010**.
- 9/8.5 LISCOUËT Jonathan, *Conception préliminaire des actionneurs électromécaniques : Approche hybride, directe/inverse*. Institut National des Sciences Appliquées de Toulouse, 4 Janvier **2010**, inscription 01/02/2007 (50%).
- 8/8 LISCOUËT-HANKE Susan, *A model-based methodology for integrated preliminary sizing and analysis of aircraft power system architecture*, Institut National des Sciences Appliquées de Toulouse, 21 Octobre **2008**, inscription 20/10/2005 (100%).

- 7/7 ATTAR B., *Modélisation réaliste en conditions extrêmes des servovalves électrohydrauliques utilisées pour le guidage et la navigation aéronautique et spatiale*, Institut National des Sciences Appliquées de Toulouse, 8 janvier **2008** (100%).
- 6/6 VELAZQUEZ G., *Prototypage virtuel des boîtes de vitesses automatiques - Application à une pompe à palettes à cylindrée variable*, Doctorat de l'Université de Toulouse, 12 Juillet **2008**, inscription 16/10/2003 (100%).
- 5/5 KARAM W., *Générateurs de forces statiques et dynamiques à haute puissance en technologie électromagnétique*. Institut National des Sciences Appliquées de Toulouse, 30 Novembre **2007** (100%).
- 4/4 NFONGUEM G., *Contribution au développement d'actionneurs plus électriques - Modélisation inverse et composants mécaniques spécifiques à une application aéronautique.*, Institut National des Sciences Appliquées de Toulouse, **2006** (100%).
- 3/3 BERTHE P-E., *Développement d'outils de modélisation et de caractérisation de combinés de suspension oléopneumatiques à surface libre*, 16 Décembre **1999** (100%).
- 2/2 GEIDER O., *Modélisation et commande d'un actionneur pneumatique faible cout*, 16 Décembre **1999** (100%).
- 1/1 BAUDRY X., *Couplage entre approches globales et locales CFD pour la conception d'organes hydrauliques*, 16 Décembre **1999** (100%).

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- 2è MAKDARA G. MARE J-C., PAULMANN G., *Methodology for Model Architecting and Failure Simulation Supported by Bond-Graphs—Application to Helicopter Axial Piston Pump*, Sustainability 13, no. 4: 1863. <https://doi.org/10.3390/su13041863>, gold open access 9 February **2021**.
- 2- MARE J-C.. *Practical Considerations in the Modelling and Simulation of Electromechanical Actuators*, Actuators 9, no. 4: 94. <https://doi.org/10.3390/act9040094>, gold open access 25 September **2020**
- 2(MARE J-C., *Best practices for model-based and simulation-aided engineering of power transmission and motion control systems*, Chinese Journal of Aeronautics, ISSN 1000-9361, <https://doi.org/10.1016/j.cja.2018.07.015>, Available online 18 August **2018**.
- 2' FU J., MARE J-C., YU L., FU Y., *Multi-level virtual prototyping of electromechanical actuation system for more electric aircraft*, Chinese Journal of Aeronautics, Vol 31, N°5, pp 892-913, **2018**.
- 2" MARE J-C., FU J., *Review on signal-by-wire and power-by-wire actuation for more electric aircraft*, Chinese Journal of Aeronautics, Vol 30, N°3, pp 1-14, doi.org/10.1016/j.cja.2017.03.013, **2017**.
- 22 FU J., MARE J-C., FU Y., *Modelling and simulation of flight control electromechanical actuators with special focus on model architecting, multidisciplinary effects and power flows*, Chinese Journal of Aeronautics, Available online 7 November **2016**.
- 21 MARE J-C., *Requirement-based system-level simulation of mechanical transmissions with special consideration of friction, backlash and preload*, Simulation Modelling Practice and Theory, Volume 63, Pages 58–82, DOI: 10.1016/j.simpat.2016.01.005, April **2016**.
- 20 HAZYUKA I., BUDINGER M., SANCHEZ F., MARE J-C., COLIN S., *Scaling laws based metamodels for the selection of the cooling strategy of electromechanical actuators in the early design stages*, Mechatronics, [doi:10.1016/j.mechatronics.2015.05.011](https://doi.org/10.1016/j.mechatronics.2015.05.011), **2015**.
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- 18 HOSPITAL F., BUDINGER M., REYSSET A., MARE J-C., *Preliminary design of aerospace linear actuator housings*, Aircraft Engineering and Aerospace Technology; Vol 87, N°3, pp 224-237, DOI 10.1108/AEAT-02-2013-0046, **2015**.
- 17 MARE J-C., *Friction modelling and simulation at system level - Considerations to load and temperature effects*, Proceedings of the Institution of Mechanical Engineers, Part I: Journal of Systems and Control Engineering, Vol 229, N°1, pp 27-48, DOI: 10.1177/0959651814548440, January **2015**.
- 16 BUDINGER M., REYSSET A., EI HALABI T., VASILIU C. MARE J-C., *Optimal preliminary design of electromechanical actuators*, Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering, August 6, **2013**.
- 15 WANG L., MARE J-C, *A Force Equalization Controller for Active/Active Redundant Actuation System Involving Servo-hydraulic and Electro-mechanical Technologies*, Proceedings of the

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 - 13 LISCOUET J., MARE J-C., BUDINGER M., *An integrated methodology for the preliminary design of highly reliable electromechanical actuators: Search for architecture solutions*, Aerospace Science and Technology 22, pp 9–18, **2012**.
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 - 10 KARAM W., MARE J-C., *Advanced Model Development and Validation of Landing Gear Shock Struts*, IMechE, Part G: Journal of Aerospace Engineering, Vol224, N°5 , pp 575-586, DOI 10.1243/09544100JAERO602, **2010**.
 - 9 LISCOUËT-HANKE S., MARE J-C., PUFÉ S., *Simulation Framework for Aircraft Power System Architecting* AIAA Journal of Aircraft, Vol 46, N°4, pp 1375-1380, July-August **2009**.
 - 8 KARAM W., MARE J-C., *Modelling and simulation of mechanical transmission in roller-screw electromechanical actuators*, Aerospace Engineering and Aircraft Technology journal, Emerald Publication, Vol. 81, N°4, pp 288-298, ISSN 1748-8842, **2009**.
 - 7 MARE, J-C., ATTAR B., *Enhanced model of four ways servovalves characteristics and its validation at low temperature*, International Journal of Fluid Power, Vol 9, N°2, pp 35-43, ISSN 1439-9776, **2008**.
 - 6 LISCOUËT-HANKE S., PUFÉ S., MARE J-C., *A simulation framework for aircraft power management*, Proc. IMechE, Part G: Journal of Aerospace Engineering, Vol 222 N°G6, pp 749-756, DOI: 10.1243/09544100JAERO342, **2008**.
 - 5 MARE J-C., *Dynamic loading systems for ground testing of high speed aerospace actuators*, International Journal of Aircraft Engineering and Aerospace Technology, Vol78, N°4, pp 275–282, **2006**, Emerald Group Publishing Limited, ISSN 1748-8842, DOI 10.1108/17488840610675546. **Outstanding paper of the year 2006**.
 - 4 MARE J-C., GEIDER O., COLIN S. *An improved dynamic model of pneumatic actuators*, International Journal of Fluid Power, Vol 1, N°2, pp 39-47, ISSN 1439-9776, October **2000**.
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 - 2 MARE J-C., *Self tuning generalised predictive control of an electrohydraulic actuator*, International Journal of Robotics and Automation, Vol 11, N°1, pp 41-47, ISSN 0826-8185, January **1996**.
 - 1 HERRERA C., GORLA B. et MARE J-C., *Vers la commande adaptative d'un actionneur électrohydraulique de position*, Journal of Automation and CIM, Revue d'Automatique et de Productique Appliquées, Vol 4, N°2, pp 123-140, ISSN 0990-7009, Septembre **1991**.

Invited communication at national or international conference

- 19 MARE J-C, *Why switching from hydraulic to electric actuation in Aerospace is not so simple*, The 10th International Conference on Fluid Power Transmission and Control, Hangzhou, China, April 11-13, **2021**.
- 18 MARE J-C., *Best Practices for efficient Simulation-Aided Engineering*, Keynote, 34th European Simulation Multiconference (EUROSYS), Toulouse, France, 21-23 October, **2020**.
- 17 MARE J-C., *Needs-oriented solutions for actuation in aerospace: taking the best of hydraulic and electric technologies*, Keynote talk at Fluid Power and Mechatronics IEEE international conference, FPM 2019, Wuhan, China, April 10-13, **2019**.
- 16 MARE J-C., *Recent advances in fluid power for actuation in aerospace*, Keynote presentation, Global Fluid Power PhD Symposium, Samara, Russie, 18-20 July **2018**.
- 15 MARE J-C., *Best practices in virtual prototyping - Application to electromechanical actuators*, Salon International de l'Aéronautique et de l'Espace, Paris, 15 Juin **2015**.
- 14 MARE, J-C., *Best practices in modelling and simulation applied to aerospace electromechanical actuators*, 2015 European Aerospace Engineering Conference, Toulouse, 11-12 mars **2015**.

- 13 MARE, J-C., *Implementation of mechanical quadriports in AMESim for the virtual prototyping of electromechanical actuators*, LMS European Aerospace Conference, Toulouse, 5 Octobre **2012**.
- 12 MARE, J-C., *Historical Evolution and Challenges in Aerospace*, Invited keynote lecture, Actuator 2012, Bremen 18-20 June **2012**.
- 11 MARE J-C., *AMESim for education and research in Aerospace Actuation - 12 years of experience*, LMS European Aerospace Conference, Toulouse, 06 Octobre **2011**.
- 10 MARE J-C., *More electrical aircraft – How new solutions require new approaches*, 3rd International Aerospace Business Meetings in the Basque Country & 5th International Conferences on New Aerospace Trends , Bilbao, June 4-5, **2008**.
- 9 MARE J-C., *Energy, environment and sustainable development within the commercial air transport*, Key lecture at the Symposium on Energy – Environment – Components of Sustainable Development, the Romanian Academy, Bucharest, 14 May **2008**.
- 8 MARE J-C., *Innovation in the Aerospace Industry*, Plenary session of the conference on Excellence Research – A chance for improving the Romanian Research Area, Brasov – Romania, 24-26 October **2007**.
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- 4 ROBOAM X., LANGLOIS O., MARE J-C., PIQUET H., SARENI B., *Bond Graph Modelling of an Electro-Hydrostatic Actuator for Aeronautic Application*, Invited in the special session 'Bond Graph Methodology - Theory and applications' of the IMAACS World Congress, Paris, 15-17 Juillet **2005**.
- 3 MARE J-C., *Récents développements en hydraulique pour l'Aéronautique*, Congrès Fluid Power Control de la Société des Ingénieurs de l'Automobile, Roanne, 4 et 5 Mai **1999**.
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- 97 Jian FU, Chaoqun ZHENG, Jean-Charles MARE & Wensen ZHANG, *Virtual prototyping of electrical THSA focused on mechanical power transmission functions*, Proceedings of the 32 ed congress of the International Council of the Aeronautical Sciences, September 6-10 2001, Shanghai, China
- 96 Development of a lumped parameter model of an aerospace pump for condition monitoring purposes, October **2020**, DOI: 10.25368/2020.82, Conference: 12th International Fluid Power Conference Volume: 2
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- 94 FU I., MARE J-C., Fu Y., *Position synchronisation of aerospace electromechanical actuators for distributed electrical actuation system*, Proceedings of the 31th congress of the International Council of Aeronautical Sciences, Belo Horizonte (Brésil), 9-14 Septembre **2018**.
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- 88 DELBECQ S., TAJAN F., BUDINGER M., MARE J-C., SANCHEZ F., *A framework for the conceptual and preliminary design of embedded mechatronic systems: application to EMA sizing*, Aircraft Systems Technology Workshop AST17, Hamburg, Germany, February 21–22, **2017**.
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- 73 ARRIOLA D., REYSSET A., BUDINGER M., THIELECKE F. MARE J-C., *From Airframer Requirements to Detailed Technical Specification of Electromechanical Actuators Aided by Knowledge-Based Methods*, SAE 2013 AeroTech Congress & Exhibition, Montréal, Quebec, Canada, 10.4271/2013-01-2163, September, **2013**.
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- 71 GNESI E., MARE J-C., *Modeling of EHA Module Equipped with Fixed-Displacement Vane Pump*, Proceeding of the 13th Scandinavian International Conference on Fluid Power, SICFP2013, June 3-5, Linköping, Sweden, **2013**.
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- 69 FRAJ A., MARE J-C., BUDINGER M., *Generation of power transmission architectures for redundant actuators*, Bath/ASME Symposium on Fluid Power and Motion Control, FPMC 2012, September 12–14, Bath, **2012**.
- 68 FAUGERE E., MARE J-C., CHANGENET C., VILLE F., DELLOUE D., *Coupling Mechanical and Thermal Lumped Parameters Model for the Preliminary Design of Power Transmissions Driven by Thermal Issues*, 8th International Congress on Aerospace Sciences, 23-28 September **2012**.
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- 65 MARE J-C., *2-D Lumped parameters modelling of EMAs for advanced virtual prototyping of EMAs*, Proceedings of Recent Advances in Aerospace Actuation Systems and Components, Toulouse, France, pp 122-127, June 13-14, **2012**.
- 64 FRAJ A., BUDINGER M., EI HALABI T., MARE J-C., *Modelling approaches for the simulation-based preliminary design and optimization of electromechanical and hydraulic actuation systems*, Proc of the 8th AIAA Multidisciplinary Design Optimization Specialist Conference, 23-26 April, Hawaii, **2012**.
- 63 MARE J-C., *Historical evolution and challenges in aerospace actuation*, Proc of the 8th International Fluid Power Conference, Dresden, March 26-28, **2012**.
- 62 WANG L., MARE J-C., FU Y., QI H., *Force equalization for redundant active/Active position control system involving dissimilar technology actuators*, Proc. 8th JFPS International Symposium on Fluid Power, Okinawa, 25-26 Octobre, **2011**.
- 61 MARE, J-C., *Combining hydraulics and electrics for innovation and performance improvement in aerospace actuation*, Proceedings of the Twelfth Scandinavian International Conference on Fluid Power, Tampere, Finland, May 18-20, **2011**.
- 60 LISCOUET J., BUDINGER M., MARE J-C., *Scaling laws for the simulation based preliminary design of electro-mechanical actuators*, proceedings of the International Workshop on Aircraft Systems Technology, March 31- April 1, Hamburg, **2011**.
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- 56 MARGER T., BUDINGER V., MARE J-C., MALBURET F., *Designing redundant metering valves for hydraulic actuators under mixability and low-cost constraints*, Proceedings of the 13th

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