Laurent BURLION

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RESEARCH INTERESTS:

My primary research interest is nonlinear control and estimation, from both a theoretical and a practical point of view, with a focus on applications both to industrial aerospace benchmarks or unmanned aerial systems. Recent activity has focused on state constraints and input saturation.

EMPLOYMENT:

Rutgers, the State University of New Jersey, USA **1/2019-present**

Assistant Professor

Onera, the French Aerospace Lab, Toulouse, FR **4/2010-12/2018**

Research Scientist:

- developed advanced Backstepping based control laws for control of nonlinear uncertain flexible systems,
- developed a novel control method based on a subtle Output to Input Saturation Transform (OIST) to take into account state constraints in combination with anti-windup loops,
- proposed a novel anti-collision algorithm which was embedded on a fleet of three UAVs,
- developed novel robust anti-windup solutions in presence of a time varying parameter with application to visual servoing,
- worked on many applications to aerospace systems (satellite, civil and combat aircrafts, launchers, UAVs) with many industrial and academic partners such as AIRBUS, DASSAULT Aviation, CNES, ASTRIUM, ESA, LAAS-CNRS, L2S-CNRS,
- led the $ 3 Million VISIOLAND project (VISIOn based control solutions for automatic Landing of aircraft or UAVs).

University of Michigan, Aerospace Engineering, Ann Arbor, MI. **8/2017-8/2018**

Visiting researcher collaborating with Pr. Ilya Kolmanovsky:

- developing advanced reference governors techniques for uncertain systems,
- developing novel very flexible aircraft models and ad hoc reference governors solutions,
- exploring reference governors techniques in presence of nonlinear dynamics or time-varying constraints with application to visual servoing or UAVs in wind gust.

DGA-LRBA, French MoD, Vernon, FR **9/2003-3/2010**

Expert Engineer in guidance and control

- worked on advanced nonlinear control solutions with industrial such as Airbus Defence and Space, MBDA and SAGEM,

- ➢ was responsible from the road map "Guidance, control and optimization",
- ➢ prepared in parallel a Ph.D. at L2S-CNRS.

EDUCATION:

INP Toulouse, Habilitation (French accreditation to supervise research) 12/2019

Habilitation Thesis: « *Nonlinear Control and Observation of Aerospace Systems* »,

Committee: T. Ahmed-Ali, J-M. Biannic, S. Caux, F. Cazaurang, B. Clement, I. Fantoni and A. Marcos.

University of Paris Sud, L2S-CNRS, Ph.D., Physics 9/2003-2/2007

Thesis: « *Contribution to design and analysis of nonlinear sampled-data control systems* »,

Committee: A. Astolfi, C. Moog, C. Prieur, J. Daafouz, T. Ahmed-Ali, F. Lamnabhi-Lagarrigue.

Ecole Centrale Nantes, M.S., Control Engineering 9/2003

Ensta Bretagne (former Ensieta), Engineering Degree 9/2003

TEACHING:

- Vehicles Dynamics (Fall 2019), Rutgers-MAE 451.
- Aircraft flight Dynamics (Spring 2019, Spring 2020), Rutgers-MAE 471.
- Introduction to linear control systems (Fall 2014, Fall 2015, Fall 2016)

  Tutoring, Isae Supaero, 2nd year (equiv. MSc 1st year).
- *Linear filtering and signal processing (Fall 2014, Fall 2015, Fall 2016)*

  Tutoring, Isae Supaero, 2nd year (equiv. MSc 1st year).
- *Introduction to flight dynamics (Spring 2014, Spring 2015)*

  Tutoring, Isae Supaero, 2nd year (equiv. MSc 1st year).
- *Kalman filtering (Fall 2013, Fall 2014, Fall 2015, Fall 2016)*

  Tutoring, Enseeiht, 3rd year (equiv. MSc 2nd year).
- *Mathematical analysis (Spring 2012, Fall 2012)*

  Tutoring University Paul Sabatier, Toulouse, L1 (equiv. Undergraduate 1st year).

STUDENT SUPERVISION:

Doctoral Theses, co-advisor:

[1] G. Sabiron, "Design of a GNC Solution based on Bio-Inspired Optic Flow Sensors adapted to low speed measurement for an Autonomous Soft Lunar Landing", PhD, 2014.

External funding: ESA, Airbus Defence and Space.

[2] E. Duraffourg, "Nonlinear control with flexible modes, aerospace applications", PhD, 2014.

[3] V. Gibert, "Observability analysis and robust nonlinear observers design for vision based landing of a transport aircraft on an unknown runway", PhD, 2016.

External funding: Airbus.

[4] E. Chambon, "Frequency and time-domain constrained control of linear systems. Application to a flexible launch vehicle", PhD, 2016.

[5] T. Cunis, "Modeling, Analysis, and Control for Upset Recovery - from System Theory to Unmanned Aircraft Flight", PhD, 2019.

[6] A. Bourdelle, "Attitude control of a satellite in presence of sloshing", PhD candidate, in progress.

External funding: Cnes.

[7] C. Zhao, PhD candidate, in progress.

[8] R. Schieni, PhD candidate, in progress.

[9] J. Lopez Muro, PhD candidate, in progress.

Postdoctoral researcher, co-advisor:

[1] C. Chauffaut, 2015.

Master Theses, supervisor:

[1] N. Jacob, "Nonlinear model predictive control of a missile", 2007.

[2] M. Archen, "Control of large scale uncertain nonlinear flexible systems", 2011.

[3] D. Hernandez, "Transportation of cable suspended load using two rotary wing UAVs", 2012.

[4] E. Chambon, "Nonlinear Energy-Based Control Method for fixed wing UAV Automatic Landing", 2013.

[5] B. Espivent, "Vision based automatic landing of a fixed wing UAV", 2014.

[6] M. Fogel, in progress.

Graduate projects, supervisor:

[1] S. Duverger and.C. Issanchou "Modeling and nonlinear control of an automated wind kite", 2014.

[2] A. El-Mourabit and B. Pontin, *"Virtual constraints for kite-based systems control*", 2014.

JOURNAL PAPERS (* INDICATES MY STUDENTS)

[J29] L. Burlion, V. Gibert, M. Malisoff and F. Mazenc, "*Stabilization and robustness analysis of a nonlinear system arising in vision based landing of airliners*", submitted.

[J28] T. Cunis*, J-P. Condomines, and L. Burlion, "*Stability and control synthesis for deep-stall recovery using sum-of-square*", submitted.

[J27] T. Cunis*, J-P. Condomines, and L. Burlion, "*Local stability analysis for large polynomial spline systems*", accepted to Automatica.

[J26] L. Burlion, M. Malisoff, F. Mazenc, "*Stabilization and Robustness Analysis of Saturating Integrators arising in Vision Based Landing of Aircraft with Sampling*", accepted to Systems & Control Letters.

[J25] T. Cunis*, J-P. Condomines, L. Burlion and A. La Cour-Harbo, "*Dynamic stability analysis of aircraft flight in deep stall*", accepted to AIAA Journal of Aircraft.

[J24] M.M. Nicotra, D. Liao-McPherson, L. Burlion and I.V. Kolmanovsky, *"Spacecraft Attitude Control with Nonconvex Constraints: An Explicit Reference Governor Approach",* accepted to IEEE Trans. on Automatic Control.

[J23] T. Ahmed-Ali, E. Fridman, F. Giri, M. Kahelras, F. Lamnabhi-Lagarrigue and L. Burlion, "*Observer design for a class of parabolic systems with large delays and sampled measurements*", accepted to IEEE Trans. on Automatic Control.

[J22] L. Burlion, L. Zaccarian, H. de Plinval and S. Tarbouriech, "*Discontinuous model recovery anti-windup for image based visual servoing*", Automatica, vol.104, pp.41-47, 2019.

[J21] F. Mazenc, L. Burlion and M. Malisoff, "*Backstepping design for output feedback stabilization for a class of uncertain systems*", Systems & Control Letters, vol.123, pp.134-143, 2019.

[J20] F. Mazenc, L. Burlion and M. Malisoff, "*Stabilization and robustness analysis for a chain of saturating integrators with imprecise measurements*", IEEE Control Systems Letters, vol.3(2), 2019.

[J19] T. Cunis*, L. Burlion and J-P. Condomines, "*On Piece-wise Polynomial Modeling for Control and Analysis of Aircraft Dynamics beyond Stall*", AIAA Journal of Guidance, Control and Dynamics, vol.42(4), pp. 949-957, 2019.

[J18] V. Gibert*, F. Plestan, L. Burlion, J.Boada and A. Chriette, "*New scheme for visual estimation of deviations based on sliding mode and high gain approaches: application to the landing of a civil aircraft*", Control Engineering Practice, vol.75, pp.17-25, 2018.

[J17] F. Mazenc, M. Malisoff, L. Burlion and J. Weston, "*Bounded Backstepping Control and Robustness Analysis for Time-Varying Systems under Converging-Input-Converging-State Conditions*", European Journal of Control, vol.42, pp.15-24, 2018.

[J16] L. Burlion, J-M. Biannic and T. Ahmed-Ali, "*Attitude tracking of a flexible spacecraft under angular velocity constraints*", International Journal of Control, published online 12-2017

[J15] T. Ahmed-Ali, F. Giri, M. Krstic, L. Burlion and F. Lamnabhi-Lagarrigue, "*Adaptive Observers design in presence of heat PDE sensor*", Automatica, vol.82, pp. 93-100, 2017.

[J14] E. Chambon*, L. Burlion and P. Apkarian, "*Time-response shaping using Output to Input Saturation Transformation*", International Journal of Control, vol. 91(3), pp.534-553, 2018.

[J13] P. Bidaud, L. Burlion, H. de Plinval, T. Loquen, J. Marzat and C. Pralet, "*Dealing with complexity through advanced control techniques*", in a special issue celebrating the 70th birthday of ONERA, Vol.12(13), AL12-13 (the electronic Journal of Onera, on-line accessible), 2016.

[J12] E. Chambon*, L. Burlion and P. Apkarian, "*Détermination de matrice semblable Metzler par optimisation non lisse*", JESA, European Journal of Automation, vol.50, pp.75-94, 2017.

[J11] E. Duraffourg*, L. Burlion and T. Ahmed-Ali, "*Finite-time observer based Backstepping control of a flexible launch vehicle*", Journal of Vibration and Control, (published online 09-2016), vol. 24(2), pp. 1535-1550, 2018.

[J10] T. Ahmed-Ali, F. Giri, M. Krstic, L. Burlion and F. Lamnabhi-Lagarrigue, "*Adaptive Boundary Observer for Parabolic PDEs subject to Domain and Boundary Parameter Uncertainties*", Automatica, vol.72, pp 115-122, 2016.

[J9] T. Ahmed-Ali, E. Fridman, F. Giri, L. Burlion and F. Lamnabhi-Lagarrigue, "*Using exponential time-varying gains for sampled-data stabilization and estimation*", Automatica, vol.67, pp 244-251, 2016.

[J8] E. Chambon*, L. Burlion and P. Apkarian, "*A Nonsmooth Optimization-based Approach to Interval Observers Design*", in IET Control Theory & Applications, vol. 10, no. 11, pp. 1258-1268, 2016.

[J7] T. Folin, T. Ahmed-Ali, F. Giri, L. Burlion and F. Lamnabhi-Lagarrigue, "*Sampled-Data Adaptive Observer for a Class of State-Affine Output-Injection Nonlinear Systems*", in IEEE Trans. on Automatic Control, vol. 61(2), pp.462-467, 2016

[J6] T Ahmed-Ali, F. Giri, M. Krstic, F. Lamnabhi-Lagarrigue and L. Burlion, "*Adaptive observer for a class of parabolic PDEs*", in IEEE Trans. on Automatic Control, vol.61(10), pp.3083-3090, 2016.

[J5] G. Sabiron*, T. Raharijaona, L. Burlion, E. Kervendal, E. Bornschlegl and F. Ruffier, "*Sub-optimal Lunar Landing GNC using Non-Gimbaled Optic Flow Sensors*", in IEEE Trans. on Aerospace and Electronic Systems, vol. 51 (4), pp.2525-2545, 2015.

[J4] J.M. Biannic, L. Burlion and H. de Plinval, "*Robust control design over large flight envelopes: a promising approach for aerial robotics*", in a special issue of the Aerospace Lab Journal on Aerial Robotics, Vol.8(1), AL8-01 (the electronic Journal of Onera, on-line accessible), 2014.

[J3] R. Postoyan, T. Ahmed-Ali, L. Burlion, F. Lamnabhi-Lagarrigue, "*On the Lyapunov-based adaptive control redesign for a class of nonlinear sampled-data systems*", Automatica, vol.44(8), pp 2099-2107, 2008.

[J2] L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*On the stability of a class of nonlinear hybrid systems*", Nonlinear Analysis: Theory, Methods and Applications, vol.65(12), 2236-2247, 2006.

[J1] L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*On the stabilization of sampled-data nonlinear systems by using backstepping on the higher order approximate models*", International Journal of Control, vol.79(9), 1087-1095, 2006.

BOOK CHAPTERS

[B1] E. Chambon*, P. Apkarian and L. Burlion*, "Flexible launch vehicle control using robust observer-based controller obtained through structured H∞ synthesis",* in "Advances in Aerospace Guidance Navigation and Control: selected papers of the 3rd CEAS Specialist Conference on Guidance, Navigation and Control", Springer, pp.23-38, 2015.

[B2] H. de Plinval and L. Burlion, "*Nonlinear visual servoing control for VTOL UAVs with field of view constraint*", in "Advances in Aerospace Guidance Navigation and Control: selected papers of the 3rd CEAS Specialist Conference on Guidance, Navigation and Control", Springer, pp.531-548, 2015.

[B3] V. Gibert*, L. Burlion, A. Chriette, J. Boada and F. Plestan, "*A new observer for range identification in perspective vision systems*", in "Advances in Aerospace Guidance Navigation and Control: selected papers of the 3rd CEAS Specialist Conference on Guidance, Navigation and Control", Springer, pp.401-414, 2015.

[B4] G. Sabiron*, P. Chavent, L. Burlion, E. Kervendal, P. Fabiani, T. Raharijaona and F. Ruffier, "*Toward an autonomous lunar landing based on low-speed optic flow sensors*", in "Advances in Aerospace Guidance Navigation and Control: selected papers of the 2nd CEAS Specialist Conference on Guidance, Navigation and Control", Springer, pp.681-699, 2013.

CONFERENCE PUBLICATIONS

[C54] L. Burlion and I. Kolmanovsky, "*Vision based Landing of an Aircraft using Robust Extended Command Governors*", submitted.

[C53] T. Cunis*, D. Liao-MacPherson, J-P Condomines, L Burlion, I. Kolmanovsky, "*Economic Model Predictive Control Strategies for Aircraft Deep-stall Recovery with Stability Guarantees*", in proc. of the 58th IEEE Conference on Decision and Control, (CDC 2019).

[C52] L. Burlion, M. Malisoff and M. Mazenc, "*Stabilization and robustness analysis for a chain of saturating integrators arising in the visual landing of aircraft*", in Proc. of the 58th IEEE Conference on Decision and Control, (CDC 2019).

[C51] J.-M. Biannic, A. Bourdelle*, H. Evain, S. Moreno and L. Burlion, "*On robust LPV-based observation of fuel slosh dynamics for attitude control design*", in Proc. of the 3rd IFAC Workshop on Linear Parameter Varying Systems, (LPVS 2019), vol.52(28), pp. 170-175, 2019.

[C50] A. Bourdelle*, J-M. Biannic, H. Evain, C. Pittet, S. Moreno and L. Burlion, *"Modeling and control of propellant slosh dynamics in observation spacecraft"*, in Proc. of the 8th European Conference for Aeronautics and Space Sciences, (EUCASS 2019), Madrid, Spain, (Best Student Paper Award in Flight Dynamics, GNC and Avionics).

[C49] A. Bourdelle*, J-M. Biannic, S. Moreno, C. Pittet and L. Burlion, "*Propellant sloshing torque H∞-based observer design for enhanced attitude control"*, in Proc. of the 21st IFAC Symposium on Automatic Control in Aerospace, (ACA 2019), vol.52(12), pp. 286-291, 2019.

[C48] A. Bourdelle*, L. Burlion, J-M. Biannic, S. Moreno and C. Pittet, *"Towards new control design oriented models for fuel sloshing in observation spacecraft"*, AIAA SciTech 2019 Forum, San Diego, CA, 2019.

[C47] L. Burlion, M. Nicotra and I. Kolmanovsky, "*A fast reference governor for the constrained control of linear discrete-time systems with parametric uncertainties*", in Proc. of the 57th IEEE Conference on Decision and Control, (CDC 2018), pp. 6289-6294, 2018.

[C46] F. Mazenc, L. Burlion and V. Gibert*, "*Stabilization of a nonlinear system that arises in the context of vision based landing of an airliner*", in Proc. of the 57th IEEE Conference on Decision and Control, (CDC 2018), pp. 5313-5318, 2018.

[C45] T. Ahmed-Ali, E. Fridman, F. Giri, M. Kahelras, F. Lamnabhi-Lagarrigue and L. Burlion, "*Observer design for a class of parabolic systems with arbitrarily delayed measurements*", in Proc. of the 57th IEEE Conference on Decision and Control, (CDC 2018), pp. 2199-2204, 2018.

[C44] J-M. Biannic, L. Burlion and S. Tarbouriech, *"Finite time LPV analysis of vision based landing system with Anti-Windup augmentation"*, in Proc. of the 2nd IFAC Workshop on Linear Parameter Varying Systems, (LPVS'18), vol. 51(26), pp.37-42, 2018.

[C43] F. Mazenc, L. Burlion and M. Malisoff, "*Backstepping design for output feedback stabilization for uncertain systems using dynamic extension*", in Proc. of the 2nd IFAC Conference on Modelling, Identification and Control of Nonlinear Systems, (MICNON 2018), pp.260-265, 2018.

[C42] F. Mazenc, L. Burlion and V. Gibert*, "*Stabilization of a system that arises in the context of vision based landing of a civil aircraft*", in Proc. of the annual American Control Conference, (ACC 2018), pp. 2978-2983, 2018.

[C41] T. Cunis*, L. Burlion and J-P.Condomines, "*Piece-wise Identification and Analysis of the Aerodynamic Coefficients, Trim Conditions, and Safe Sets of the Generic Transport Model*", AIAA SciTech 2018 Forum, Kissimmee, FL, January 2018.

[C40] F. Mazenc, M. Malisoff and L. Burlion, "*Bounded backstepping through a dynamic extension with delay*", in Proc. of the 56th IEEE Conference on Decision and Control, (CDC 2017), pp.4351-4356, 2017.

[C39] J-M. Biannic and L. Burlion, "*Performance analysis of saturated parameter-varying systems with application to vision-based landing assessment*", in Proc of the 20th IFAC World Congress, pp.10513-10517, 2017.

[C38] L. Burlion and H. de Plinval, "*Vision based anti-windup design with application to the landing of an airliner*", in Proc of the 20th IFAC World Congress, pp.10482-10487, 2017.

[C37] C. Chauffaut*, L. Burlion, F. Defay and H. de Plinval, "*Collision Avoidance of multiple MAVs using a multiple Outputs to Input Saturation Technique*", in Proc of the International Micro Air Vehicle Conference and Competition, (IMAV 2017), pp.190-195, 2017.

[C36] T. Cunis*, J-P. Condomines and L. Burlion, "*Six-degrees-of-freedom trim analysis of unmanned aerial systems based on piecewise polynomial aerodynamic coefficients*", in Proc. of the 2017 Workshop on Research, Education and Development of Unmanned Aerial Systems, (RedUAS 2017), pp. 108-113, 2017.

[C35] L. Burlion and H. de Plinval, "*Toward vision based landing of a fixed-wing UAV on an unknown runway under some FoV constraints*", in Proc of the 2017 International Conference on Unmanned Aircraft Systems, (ICUAS 2017), Miami, Florida, pp. 1824-1832, 2017.

[C34] C. Chauffaut, F Defaÿ, L Burlion and H de Plinval, "*UAV obstacle avoidance scheme using an Output to Input Saturation Transformation technique*", in Proc of the International Conference on Unmanned Aircraft Systems, (ICUAS 2016), pp. 227-234, 2016.

[C33] V. Gibert*, L. Burlion, A. Chriette, J. Boada and F. Plestan, "*Vision based automatic landing of a civil aircraft by using nonlinear pose estimation*", in Proc of the 6th European Conference for Aeronautics and Space Sciences, (EUCASS 2015), Krakow, Poland, 2015.

[C32] E. Chambon*, L. Burlion and P. Apkarian, "*Output to Input Saturation Transformation: Demonstration and Application to Disturbed Linear Systems*", in Proc of the 54th IEEE Conference on Decision and Control, pp.7566-7571, 2015.

[C31] V. Gibert*, L. Burlion, A. Chriette, J. Boada and F. Plestan, "*New pose estimation scheme in perspective vision system during civil aircraft landings*", in Proc of the 11th IFAC Symposium on Robot Control, SYROCO 2015, vol.48(19), pp.238-243, 2015.

[C30] L. Burlion and H. de Plinval, "*Visual landing insensitive to the depth with variable constraints: a twisting based solution*", in Proc. of the.23rd Mediterranean Conference on Control and Automation, MED 2015, pp.603-610, 2015.

[C29] T. Ahmed-Ali, E. Fridman, F. Giri, L. Burlion and F. Lamnabhi-Lagarrigue, "*A new approach to enlarging sampling intervals for some sampled-data systems and observers*", in Proc of the 12th IFAC workshop on Time Delay Systems, IFAC TDS 2015, vol.48(12), pp.440-445, 2015.

[C28] E. Chambon*, P. Apkarian and L. Burlion, "*Metzler matrix transform determination using a non-smooth optimization technique with application to interval observers*", in Proc. of the SIAM conference on Control and Its Applications, SIAM CT 15, pp. 205-211, 2015.

[C27] V. Gibert*, L. Burlion, A. Chriette, J. Boada and F. Plestan, "*Nonlinear observers in vision system: application to civil aircraft vision based landing*", in Proc. of the European Control Conference, ECC 2015, pp. 1812-1817, 2015.

[C26] T. Ahmed-Ali, F. Giri, M. Krstic, L. Burlion and F. Lamnabhi-Lagarrigue, "*Adaptive observers for parabolic PDEs with uncertain parameter in the boundary condition*", in Proc. of the European Control Conference, ECC 2015, pp. 1337-1342, 2015.

[C25] E. Chambon*, L. Burlion, and P. Apkarian, "*Robust output interval constraint using O/I saturation transformation with application to uncertain linear launch vehicle*", in Proc. of the European Control Conference, ECC 2015, pp. 1796-1801, 2015.

[C24] G. Sabiron*, L. Burlion, E. Kervendal, E. Bornschlegl, T. Raharijaona and F. Ruffier, "*Autonomous Lunar Landing Based on Bio-inspired Visual Motion sensors tested in flight*", in Proc of 9th International ESA Conference on Guidance, Navigation & Control Systems, ESA GNC 2014.

[C23] G. Sabiron*, L. Burlion, T. Raharijaona and F. Ruffier, "*Optic flow-based nonlinear control and optimal guidance for lunar landing*", in proc of IEEE International Conference on Robotics and Biomimetics, ROBIO 2014, pp. 1241-1247, 2014.

[C22] T. Ahmed-Ali, L. Burlion, F. Lamnabhi-Lagarrigue and C. Hann, "*A sampled-data observer with time-varying gain for a class of nonlinear systems with sampled-measurements*", in Proc of the 53rd Conference on Decision and Control, Los Angeles, pp.316-321, 2014.

[C21] L. Burlion, H. de Plinval and P. Mouyon, "*Backstepping based Visual Servoing for Transport Aircraft Automatic Landing*", in Proc. of IEEE Multi conference on Systems and Control, MSC 2014, pp. 1461-1466, 2014.

[C20] G. Sabiron*, L. Burlion, G. Jonniaux, E. Kervendal, E. Bornschlegl, T. Raharijaona, and F. Ruffier, "*Backup State Observer Based on Optic Flow Applied to Lunar Landing*", in Proc of international conference on Intelligent RObot and Systems, IROS 2014, pp. 2325-2332, 2014.

[C19] L. Burlion, C. Poussot-Vassal, P. Vuillemin, M. Leitner and T. Kier, "*Longitudinal manoeuvre load control of a flexible large-scale aircraft*", in Proc of the 19th IFAC World Congress, pp. 3413-3418, 2014.

[C18] E. Duraffourg*, L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*Finite time adaptive observer of a flexible nonlinear model of a launcher*", in Proc of the 19th IFAC World Congress, pp. 546-551, 2014.

[C17] L. Burlion, E. Duraffourg*, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*Global asymptotic stabilization for some nonlinear models of flexible aerospace vehicles*", in Proc of the 52nd Conference on Decision and Control, Florence, pp.4230-4235, 2013.

[C16] E. Duraffourg*, L. Burlion and T. Ahmed-Ali, "*Longitudinal Modeling and Preliminary Control of a Non-linear Flexible Launch Vehicle*", in Proc. of the 11th IFAC International Workshop on Adaptation and Learning in Control and Signal Processing, Caen, pp.209-214, 2013.

[C15] E. Duraffourg*, L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*Nonlinear full-state control of a flexible hypersonic vehicle*", in Proc. of the IEEE conference on Electronics, Control, Measurement, Signals and their application to Mechatronics, 2013.

[C14] E. Duraffourg*, L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*Nonlinear control of the longitudinal rotational dynamics of a flexible aircraft*", in Proc. of the European Control Conference, pp.335-340, 2013.

[C13] L. Burlion and H. de Plinval, "*Keeping a ground point in the camera field of view of a landing UAV*", in Proc of the IEEE International Conference on Robotics and Automation, pp.5763-5768, 2013.

[C12] G. Sabiron*, P. Chavent, L. Burlion, E. Kervendal, P. Fabiani, T. Raharijaona and F. Ruffier, "*Toward an autonomous lunar landing based on low-speed optic flow sensors*", in Proc of Euro GNC 2013, pp.993-1011, 2013.

[C11] L. Burlion and H. de Plinval, "*Automatic UAV landing with ground target maintained in the field of view*", in Proc of Euro GNC 2013, pp.1546-1562, 2013.

[C10] J-M. Biannic, L. Burlion, S. Tarbouriech and G. Garcia, "*On dynamic inversion with rate limitations*", American Control Conference, pp. 191-196, 2012.

[C9] L. Burlion, "*A new Saturation function to convert an output constraint into an input constraint*", 20th Mediterranean Conference on Control and Automation, (MED 2012), pp.1217-1222, 2012.

[C8] L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*Updating the gain of global finite-time high gain observers*", in Proc. of the 50th IEEE Conference on Decision and Control and European Control Conference, pp. 8145-8150, 2011.

[C7] L. Burlion, T. Ahmed-Ali, R. Postoyan and F. Lamnabhi-Lagarrigue, "*Adaptive control redesign for some nonlinear sampled-data systems*", in proc. of the IFAC Symposium on Nonlinear Control, (NOLCOS'07), pp.754-759, 2007.

[C6] L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*On the adaptive control of nonlinear sample-data systems*", in Proc. of the European Control Conference, (ECC'07), 2007.

[C5] T. Ahmed-Ali, L. Burlion and F. Lamnabhi-Lagarrigue, "*On the stabilization of sampled-data systems by using higher order approximations of the exact discretized systems*", in Proc. of IMACS World Congress, 2005.

[C4] L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*On the design of Lyapunov functions for state-dependent impulsive dynamical systems*", in Proc. of the IFAC World Congress, pp. 379-384, 2005.

[C3] L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*Stabilization of switching systems: a viability approach*", in Proc. of the 16th International Symposium on Mathematical Theory of Networked Systems, (MTNS 2004), 2004.

[C2] L. Burlion, T. Ahmed-Ali and F. Lamnabhi-Lagarrigue, "*On the stability of a class of nonlinear hybrid systems*", in Proc. of the 6th IFAC-Symposium on Nonlinear Control Systems (NOLCOS 2004), 2004.

[C1] L. Burlion, T. Ahmed-Ali and N. Seube, "*Glider's roll control based on Backstepping*", in Proc. of the IFAC Conference on Control Applications in Marine Systems (CAMS 2004), 2004.

PATENT:

[P1] US Patent 20,160,026,189, "*Method and system for automatic autonomous landing of an aircraft*", J. Boada-Bauxell, V. Gibert, L. Burlion, A. Chriette, F. Plestan.

PROJECTS AND COLLABORATIONS:

In progress

- **ATLANTIS** (Computationally Efficient Atmospheric-Data-Driven Control Co-Design Optimization Framework with Mixed-Fidelity Fluid and Structure Analysis)

Funded by Advanced Research Projects Agency-Energy (ARPA-E). Collaboration with the University of Michigan, BYU, NREL, DARcorporation.

Completed

- **CONVEX** (Non-linear control for upset recovery of a fixed-wing MAV)

Funded by Onera. Collaboration with Enac, the French School of Aviation.

- **DROPTER** (Drone reconfiguration in the event of unforeseeable situations)

Funded by Onera. Period: 09/2017-12/2018.

- **COSOR** (Orbital robotic systems control)

Funded by Cnes and Onera. Collaboration with Cnes. Period: 09/2016-12/2018.

- **VISIOLAND** (VISIOn based LANDing solutions)

Funded by ANR. Collaboration with Airbus (Flight control department) and Irccyn.
Period: 11/2013-11/2017.

- **R&T CNES: "Adaptive control of a flexible satellite"**

Funded by CNES. Collaboration with Greyc CNRS. Period: 01/2014-12/2014.

- **SMAC** (Systems Modeling Analysis & Control)

Funded by Onera. Period: 01/2012-12/2015.

- **Clean Sky ITD SFWA**

Funded by European Commission. Collaboration with Airbus (Load control department).
Period: 01/2011-12/2013.

- **NICE** (Nonlinear Innovative Control designs and Evaluations)

Funded by European Defence Agency (EDA) Collaboration with Dassault Aviation (Flight control department), LAAS-CNRS and University of Tor Vergata. Period: 04/2010-09/2012.

COMMITTEES:

IFAC TC 7.3 (Aerospace): Member since 2014.

IEEE CSS TCAC (Aerospace Control): Member since 2019.