

Alessandra Babuscia

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Telecommunication Engineer II at NASA Jet Propulsion Laboratory

Education

Massachusetts Institute of Technology

Cambridge, MA

Doctor of Philosophy, Department of Aeronautics and Astronautics

2012

Thesis: “*Statistical Risk Estimation for Communication System Design*”

Thesis Advisor: Prof. David W. Miller

Major: Communication and Networks

Minor: Space Systems

Politecnico di Milano

Milan, Italy

Master of Science, Department of Electrical Engineering and Computer Science

2007

Thesis: “*Analysis of innovative solution to optimize transmitting power distribution for a reconfigurable multi-beam Ka-Band antenna.*”

Thesis Advisor: Prof. Aldo Paraboni

Major: Satellite communication and atmospheric propagation

Minors: Digital transmission, Networks, Optical communication

Politecnico di Milano

Milan, Italy

Bachelor of Science, Department of Electrical Engineering and Computer Science

2005

Thesis: “*Analysis of Synthetique Storm Technique in a long path with low angle of elevation.*”

Thesis Advisor: Prof. Emilio Matricciani

Major: Digital communication system

Minors: Electrical Engineering, Computer Science

Research Grants

NASA Center for Innovation Funds

2014-2016

Jet Propulsion Laboratory R&D

2014

Jet Propulsion Laboratory CAP

2012-2013

Fellowships and Awards

NASA Group Achievement Award (332H)

2013

1st Prize at 2nd Mission Idea Context, Japan

2012

Amelia Earhart Fellowship Award

2010 and 2011

MIT Aeronautics and Astronautics Teaching Assistant Award

2010

Gordon Engineering Leadership Fellow

2010 and 2011

NASA JPL Graduate Fellow

2009, 2010 and 2011

ESA Young Graduate Trainee Program

2008, declined

Honor Award for Master of Science, Politecnico di Milano

2007

Honor Award for Bachelor of Science, Politecnico di Milano

2005

Research and Work Experience

NASA Jet Propulsion Laboratory

Pasadena, CA

Telecommunication Engineer II, Communication Architecture Research Group (332) Sept. 2013- now

Projects: PI for Inflatable antenna for CubeSat, Telecommunication Engineer for ASTERIA mission, Telecommunication Engineer for RainCube mission, Development of communication models for JPL TeamXc, Communication Chair Lead for TeamXc, Communication consultant for MarCO mission at proposal stage, Study on DSN support for interplanetary CubeSat communication; Development of communication and coverage studies for networks of CubeSat satellites at Lunar Lagrangian Point 1; Development of models to perform statistical risk estimation for communication system and networks; Development of communication analysis for a network of small satellites around Mars; Development of concept to perform radio science using small satellites and CubeSats; Preparation of journal articles, conference articles and book chapters.

Grants and Proposal: prepared proposals for multiple funding programs (JPL-CAP, JPL-SURP, JPL-R&D, NASA-ECI, NASA-CIF)

Conference organization and reviewing activities: Organizer, session chair and technical reviewer for the Interplanetary Small Satellite Conference, Session Chair for IEEE Aerospace Conference, reviewer for multiple journals.

Mentoring: Mentoring of graduate students from different institutions (Massachusetts Institute of Technology, University of Southern California, California State University Fullerton, Princeton, California State University Irvine); Participation to the PicoSatellite Class of Professor Jekan Thanga at Arizona State University.

Massachusetts Institute of Technology

Cambridge, MA

Postdoctoral Research Associate at Space System Laboratory

2012-Aug. 2013

Research projects: PI and program manager for inflatable antenna for CubeSat (CommCube-2); PI and program manager for CommCube-1 (relay with GlobalStar); Radiation analysis and feasibility study for a space distributed communication array (SOLARA/SARA project); Communication engineer for TSat (1U CubeSat to test micro-network propulsion); Development of models to assess risk for coupled variables and development of a mathematical framework for robust optimization (Statistical Risk Estimation for Communication System Design project, funded by NASA JPL); Expert elicitation for aircraft design (META research program, funded by DARPA).

Grants and proposal: prepared proposals for multiple funding programs (MIT-MISTI, JPL-CAP, NASA-INVEST, NASA-NIAC, JPL-SURP)

Mentoring: mentored 2 graduate students and several undergraduate students.

Massachusetts Institute of Technology

Cambridge, MA

Research Assistant at Space System Laboratory

2008-2012

Research projects: statistical risk estimation (Ph.D. thesis), statistic of subjective probabilities (methodologies for Expert Elicitation), numerical comparison of density estimation techniques, optimized scheduling for deep space communication systems, communication protocol development for CASTOR satellite communication system, inflatable antennas.

Additionally, design of communication hardware and software for the following satellite missions:

1. TerSat (funded by AFRL), Fall 2011-Spring 2012
2. REXIS mission (Student Collaboration Project for Osiris-Rex NASA New Discovery Mission), Fall 2011-Spring 2012 (avionic).
3. ExoplanetSat (funded by Draper) (Spring 2010-Spring 2011).
4. CASTOR (funded by AFRL) (Fall 2008-Spring 2011)
5. Talaris (Lunar X-Prize, Fall 2008-Spring 2009).

NASA Jet Propulsion Laboratory

Pasadena, CA

Research Associate at Communication Architecture Research Group

2011

Research projects: development of optimization frameworks for statistical risk estimation for communication system design, performed experimental test of Expert Elicitation methodology.

NASA Jet Propulsion Laboratory

Pasadena, CA

Research Associate at Communication Architecture Research Group

2010

Research projects: development of a numerical comparison of density estimation techniques in the context of statistical risk estimation for communication system design. Additionally, I lead a team of students to develop the student collaboration project for MOONRISE mission.

NASA Jet Propulsion Laboratory

Pasadena, CA

Research Associate at Lunar Mission Concept Research Group

2009

Research projects: development of an efficient communication system design and ground station scheduling for LUNETTE Mission, analysis of a communication system for a relay satellite in L2 for the fair side of the Moon.

Politecnico di Milano

Milan, Italy

Assistant Researcher at Department of Electrical Engineering

2008

Research projects: development of a modeling tool to characterize for rain attenuation and depolarization in space links (ESA), definition of the Mission Goals for TDP-5 Alphasat Satellite (ESA), and development of optimization methods for the reconfigurable antenna system (ESA).

Teaching Experience and Skills

Arizona State University

Phoenix, AZ

Guest lecturer and mentor in PicoSatellite design class (Prof. Jekan Thanga)

2014-2015

Massachusetts Institute of Technology

Cambridge, MA

Teaching Assistant at Department for Aeronautics and Astronautics

2008-2012

Classes:

1. **Space System Engineering (16.83-Undergrad)**, Fall 2011(principal duties: leading the development of two different satellite projects, lecturing on communication system design and leadership, mentoring the students in the development of communication system for their projects, grading.)
2. **Satellite Engineering (16.851-Grad)**, Fall 2010 and 2009 (guest lecturer in communication system)
3. **Space System Development (16.832-Undergrad)**, Spring 2011(same duties as 1)
4. **Space System Development (16.831-Undergrad)**, Fall 2010 (same duties as 1)
5. **Space System Engineering (16.83-Undergrad)**, Spring 2010 (same duties as 1). **Awarded with MIT Aero-Astro Teaching Assistantship Award (2010).**
6. **Special Project in Aeronautics and Astronautics (16.898-Undergrad)**, Fall 2009 (same duties as 1)
7. **Space System Development (16.832-Undergrad)**, Spring 2009 (same duties as 1)
8. **Space System Development (16.831-Undergrad)**, Fall 2008 (same duties as 1)

Leadership education (Fall 2010 and Fall 2011): Development of a specific educational methodology to teach practical leadership in satellite development class, published in Acta Astronautica.

MIT Graduate Teaching Certificate Program

2012

Politecnico di Milano

Milan, Italy

Guest lecturer in Satellite Engineering Class

2009-2012

Seminars:

1. "Development of communication technologies for miniaturized satellites", Dec. 2012
2. "CASTOR satellite: design, implementation and testing of the communication system", Mar. 2011
3. "Data rate based scheduling and application to lunar robotic exploration", Mar. 2010
4. "Communication Systems and Space System Engineering", Mar. 2009.

Invited Talks

Future In-Space Operations (FISO) Telecon Serie <i>"Inflatable Antenna for CubeSat"</i>	May 2015
Arizona State University, CubeSat Coffee Talk Seminar Remote <i>"Development of optimized communication systems for CubeSat"</i>	Apr 2015
Arizona State University, SESE Coffee Talk Seminar <i>"Development of communication technologies for interplanetary small satellite communications"</i>	Nov 2014
Jet Propulsion Laboratory Summer Seminar Series for Students Interns <i>"Inflatable Antenna for CubeSat"</i>	July 2014
73rd Annual SAWE International Conference on Mass Properties Engineering <i>"Inflatable Antenna for CubeSat: Design, Fabrication, Deployment and Tests"</i>	May 2014
Society of Allied Weight Engineers 39th Southwest Regional Conference <i>"Inflatable Antenna for CubeSat: Design, Fabrication, Deployment and Tests"</i>	November 2013
Massachusetts Institute of Technology, Dept. of Aeronautics and Astronautics Seminar <i>"Development of innovative communication technologies and design strategies for novel small satellite missions"</i>	March 2013
Boston University, ECE Department <i>"Development of innovative communication technologies and design strategies to perform interplanetary exploration for small satellite missions"</i>	February 2013
Massachusetts Institute of Technology, Women in Aerospace Symposium <i>"Statistical Risk Estimation for Communication System Design: Overview"</i>	May 2012
Massachusetts Institute of Technology, Department of Aeronautics and Astronautics <i>"Statistical Risk Estimation for Communication System Design"</i>	May 2012
NASA JPL, Communication Architecture Research Group <i>"Statistical Risk Estimation for Communication System Design: Expert Elicitation and Optimization"</i>	August 2011
Massachusetts Institute of Technology, Department of Aeronautics and Astronautics <i>"Statistical Risk Estimation for Communication System Design: Expert Elicitation"</i>	April 2011
NASA JPL, Communication Architecture Research Group <i>"Statistical Risk Estimation for Communication System Design: Preliminary Approach"</i>	August 2010
Massachusetts Institute of Technology, Space System Laboratory <i>"Data Rate Based Scheduling for Lunar Robotic Exploration"</i>	January 2010
NASA JPL, Communication Architecture Research Group <i>"A satellite at lunar L2 for the robotic exploration of the Moon: coverage and communication analysis"</i>	August 2009

Professional Service and Leadership

Interplanetary Small Satellite Conference Member of the Organizing Committee	Caltech, 2013 and 2014, Santa Clara University, 2015
Interplanetary CubeSat Workshop	MIT, 2012

Member of the Organizing Committee, Head of the Technical Committee and Session Chair

IEEE Aerospace Conference
Session Chair

Big Sky, 2013 and 2014

IEEE Aerospace and Electronic Journal, IEEE Transactions on Education, IEEE Potentials , IEEE Transactions on Communications, Journal of Aerospace Computing Information and Communication, IEEE communications Magazine, Acta Astronautica
Reviewer **2010-now**

Satellite and Space Communications Technical Committee (IEEE Communications Society) **2011-now**
Member

IEEE **2010-now**
Member

MIT satellite Team **2008-2012**
Leader in the development of the communication systems for the missions.

Zonta International Association **2011-now**
Member and Chair of Amelia Earhart for District one and six

Software Skills and Certifications

Matlab, STK (Basic and Master Certification), C, Java, LabView, HFSS, FEKO, DAS

Language Skills

English (fluent), Italian (mother tongue), German (elementary), Japanese (beginner)

Publications

Refereed Journal

1. K. Cheung, D. Abraham, B. Arroyo, E. Basilio, **A. Babuscia**, C. Duncan, D. Lee, K. Oudrhiri, T. Pham, S. Waldherr, G. Weltz, J. Wyatt, M. Lanucara, B. Malphrus, J. Bellardo, J. Puig-Suari and S. Corpino, "[Next-Generation Ground Network Architecture for Communications and Tracking of Interplanetary SmallSats](#)", **The Interplanetary Network Progress Report**, vol. 42-202, Jet Propulsion Laboratory, Pasadena, California, pp. 1-44, Aug. 15, 2014.
2. **A. Babuscia**, K. Cheung, D. Divsalar, C. Lee, "[Development of cooperative communication techniques for a network of small satellites and CubeSats in Deep Space](#)", **Acta Astronautica**, Vol. 115, pp. 349-355, June 2015, <http://dx.doi.org/10.1016/j.actaastro.2015.06.001>
3. **A. Babuscia**, K. Cheung, "In response to Ganguly, T., Wilson, K.J., Quigley, J. and Cooke, R.M. "[Reaction to Babuscia, A. and Cheung, K-M "An approach to perform expert elicitation for engineering design risk analysis: methodology and experimental results"](#)", **Royal Statistical Society (Series A), Letter**. Vol., pp. , July 15, 2014, DOI: 10.1111/rssa.12070 <http://onlinelibrary.wiley.com/doi/10.1111/rssa.12070/abstract>
4. **A. Babuscia**, K. Cheung, "[Statistical Risk Estimation for Communication System Design: Results of the HETE-2 Test Case](#)", **The Interplanetary Network Progress Report**, vol. 42-197, Jet Propulsion Laboratory, Pasadena, California, pp. 1-17, May. 15, 2014. http://ipnpr.jpl.nasa.gov/progress_report/42-197/197D.pdf

5. **A. Babuscia**, K. Cheung, “[A Quantitative Approach to Perform Expert Elicitation for Engineering Risk Analysis: Methodology and Experimental Results](#)”, **Royal Statistical Society (Series A)**, 7 Oct. 2013, DOI: 10.1111/rssa.12028, <http://onlinelibrary.wiley.com/doi/10.1111/rssa.12028/abstract>.
6. **A. Babuscia**, B. Corbin, M. Knapp, R. Jensen-Clem. M. Van de Loo, and S. Seager, “[Inflatable Antenna for CubeSat: Motivation for Development and Antenna Design](#)”, **Acta Astronautica**, vol. 91, pp. 322-332, June 19, 2013, <http://www.sciencedirect.com/science/article/pii/S0094576513001951>
7. **A. Babuscia**, M. McCormack, M. Munoz, S. Parra, David W. Miller, “[MIT Castor Satellite: Design, Implementation and Testing of the Communication System](#)”, **Acta Astronautica**, vol. 81, pp. 111-121, July 3, 2012. DOI: 10.1016/j.actaastro.2012.07.005. <http://www.sciencedirect.com/science/article/pii/S0094576512002688>
8. **A. Babuscia**, K. Cheung, “[Statistical Risk Estimation for Communication System Design](#)”, **IEEE Systems Journal**, vol. PP, issue 99, pp. 1-12, May 18, 2012. DOI: 10.1109/JSYST.2012.2201889. <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6264116>.
9. **A. Babuscia**, J. Craig, and J. Connor, “[Teaching Practical Leadership in MIT Satellite Development Class: CASTOR and Exoplanet Projects](#)”, **Acta Astronautica**, vol. 77, pp. 138-148, Apr 27, 2012. DOI: 10.1016/j.actaastro.2012.03.013. <http://www.sciencedirect.com/science/article/pii/S0094576512000859>
10. **A. Babuscia**, K. Cheung, “[Statistical Risk Estimation for Communication System Design: a Preliminary Look](#)”, **The Interplanetary Network Progress Report**, vol. 42-188, Jet Propulsion Laboratory, Pasadena, California, pp. 1-33, Feb. 15, 2012. http://tmo.jpl.nasa.gov/progress_report/42-188/188B.pdf

Conference Proceedings

To be presented

1. **A. Babuscia**, J. Sauder, T. Choi, J. Thangavelautham, “Inflatable antenna for Cubesats: development of the X-band prototype”, **IEEE Aerospace Conference**, Big Sky, MT, March 2016.
2. C. Hardgrove, J. Bell, J. Thangavelautham, A. Klesh, R. Starr, T. Colaprete, M. Robinson, D. Drake, E. Johnson, J. Christian, A. Genova, D. Dunham, B. Williams, D. Nelson, **A. Babuscia**, P. Scowen, K.M. Cheung, M. Beasley, T. McKinney, A. Tait, V. Hernandez, P. Wren, A. Thoesen, A. Godber, “The Lunar Polar Hydrogen Mapper CubeSat Mission”, **ESA Conference on Lunar Exploration**, Nordweijeik, December 2015.

Presented

3. **A. Babuscia**, T. Choi, K. Cheung, J. Thangavelautham, “Inflatable antenna for CubeSat: Extension of the previously developed S-Band design to the X-Band”, **SPACE 2015**, Pasadena, CA, September 2015.
4. C. Norton, **A. Babuscia**, J. Bellardo, J. Castillo-Rogez, S. Chien, J. Cutler, C. Duncan, R. Hodges, S. Katz, A. Klesh, B. Lim, C. Marrese-Reading, N. Plamer, E. Peral, P. Pingree, D. Rider, M. Smith, S. Statham, “Advancing Science and Technology via SmallSat Systems: From Earth to Beyond LEO”, **European CubeSat Symposium**, Liege, Belgium, September 2015.
5. K. Cheung, D. Abraham, B. Arroyo, E. Basilio, **A. Babuscia**, C. Duncan, D. Lee, K. Oudrhiri, T. Pham, S. Waldherr, G. Wertz, J. Wyatt, M. Lanucara, B. Malphrus, J. Bellardo, J. Puig-Suari and S. Corpino, “Next-Generation Ground Network Architecture for Communications and Tracking of Interplanetary SmallSats,” **CubeSat Workshop**, Calpoly, San Luis Obispo, April 2015.
6. **A. Babuscia**, K. Cheung, G. Wertz, E. Basilio, S. Waldherr, J. Wyatt, “Current efforts in the development of telecommunication technologies and services for future interplanetary CubeSat missions”, **Interplanetary Small Satellite Conference**, Santa Clara, CA, April 2015.
7. A. Chandra, **A. Babuscia**, J. Thangavelautham, “Using Statistical Risk Assessment to Optimize the Design of Inflatable Membrane Structures in Low Earth Orbit”, **Interplanetary Small Satellite Conference**, Santa Clara, CA, April 2015.

8. M. Ravichandran, **A. Babuscia**, A. Chandra, J. Thangavelautham, “Development of an Inflatable Antenna Prototype for Interplanetary CubeSats”, **Interplanetary Small Satellite Conference**, Santa Clara, CA, April 2015.
9. J. Thangavelautham, M. Robinson, Genova, Hohman, Dunham, A. Klesh, **A. Babuscia**, B. J. Anderson, and the Swirl development team, “FastTrack to the Moon: Technology Development of the Low-Cost SWIRL Lunar CubeSat Mission Concept”, **Low Cost Planetary Mission Conference**, Berlin, Germany, June 2015.
10. **A. Babuscia**, T. Choi, C. Lee, K. Cheung, “Inflatable Antennas and Arrays for interplanetary Communication using CubeSats and SmallSats”, **IEEE Aerospace Conference**, Big Sky, Montana, March 2015.
11. D. Divsalar, **A. Babuscia**, K. Cheung, “CDMA Communications Systems with Constant Envelope Modulation for CubeSats””, **IEEE Aerospace Conference**, Big Sky, Montana, March 2015.
12. **A. Babuscia**, K. Cheung, C. Lee “Augmenting and Evolving the Mars Relay Network Using a Network of Identical CubeSat”, **Mars CubeSat Workshop**, Pasadena, November 2014.
13. **A. Babuscia**, K. Cheung, D. Divsalar, C. Lee, “Development of cooperative communication techniques for a network of small satellites and CubeSats in Deep Space”, **65th International Astronautical Congress**, Toronto, Canada, September 2014.
14. K. Gomez, C. Lee, **A. Babuscia**, K. Cheung, “On the Formations of a CubeSat Constellation at the Earth-Moon L1 Libration Point”, **65th International Astronautical Congress**, Toronto, Canada, September 2014.
15. M. Knapp, **A. Babuscia**, “SOLARA/SARA: first steps toward a space-based radio interferometry constellation”, **65th International Astronautical Congress**, Toronto, Canada, September 2014.
16. **A. Babuscia**, K. Cheung, C. Lee, T. Choi, “Communication and coverage analysis for a network of small satellites around Mars”, **Interplanetary Small Satellite Conference**, Caltech, April 2014.
17. J. Finn, **A. Babuscia**, C. Lee, K. Cheung. “A Concept for a Constellation of CubeSats at the Lunar Lagrangian Point 1 (LL1) for radio aperture interferometry measurements: network analysis and simulation”, **Interplanetary Small Satellite Conference**, Caltech, April 2014.
18. K. Gomez, C. Lee, **A. Babuscia**, K. Cheung, “On the Formations of a CubeSat Constellation at the Earth-Moon L1 Libration Point”, **Interplanetary Small Satellite Conference**, Caltech, April 2014.
19. K. Oudrhiri, S. Asmar, R. Preston, N. Renno, H. Elliott, **A. Babuscia**, “Interplanetary CubeSat Gravity & Bi-Static Radar Experiments: Uncovering the surface & the subsurface features of Phobos”, **Interplanetary Small Satellite Conference**, Caltech, April 2014.
20. **A. Babuscia**, “Inflatable Antenna for CubeSat: Design, Deployment, Fabrication and Test”, **73rd Annual SAWE International Conference on Mass Properties Engineering**, Long Beach, May 2014. (INVITED)
21. **Babuscia**, K. Cheung, “Risk Based Space System Design: A Novel Probabilistic Approach to Design Risk for Small Satellites”, **IEEE Aerospace Conference**, Big Sky, Montana, March 2014.
22. **A. Babuscia**, M. Van de Loo, Q. Wei, S. Pan, S. Mohan and S. Seager, “Inflatable Antenna for CubeSats: Fabrication, Deployment, and Results of Experimental Tests”, **IEEE Aerospace Conference**, Big Sky, Montana, March 2014.
23. **A. Babuscia**, C. Hung, D. Divsalar, K. Cheung, “Code Division Multiple Access communications system for CubeSats at Lunar Lagrangian L1 and L2”, **IEEE Aerospace Conference**, Big Sky, Montana, March 2014.
24. **A. Babuscia**, “Inflatable Antenna for CubeSat: Design, Deployment, Fabrication and Test”, **Society of Allied Weight Engineers 39th Southwest Regional Conference** Long Beach, November 2013. (INVITED)
25. M. Knapp, **A. Babuscia**, F. Martel, S. Seager, “SOLARA/SARA: Solar Observing Low-frequency Array for Radio Astronomy/Separated Antennas Reconfigurable Array”, **Small Satellite Conference**, Utah State University, August 2013.
26. **A. Babuscia**, M. Knapp, B. Corbin, F. Hicks, M. Van de Loo, S. Seager, “[InCUBEation: a Series of Mission for Interplanetary Exploration using Small Satellite Platforms](#)”, **Interplanetary Small Satellite Conference**, Caltech, June 2013,
http://www.intersmallsatconference.org/docs/A.1.3_Babuscia_Presentation.pdf
27. **A. Babuscia** and K. Cheung, “[Statistical Risk Estimation for Communication System Design: Development of an Optimization Framework](#)”, **IEEE Aerospace Conference**, Big Sky, March 2013,
<http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=06497327>

28. **A. Babuscia**, B. Corbin, M. Knapp, R. Jensen-Clem, I. Sergeev, M. Van de Loo, and S. Seager, [“CommCube 1 and 2: a CubeSat Series of Missions to Enhance Communication Capabilities for CubeSat”](http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6497128&tag=1), **IEEE Aerospace Conference**, Big Sky, March 2013, http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6497128&tag=1
29. M. Knapp, **A. Babuscia**, R. Jensen-Clem, F. Martel, and S. Seager, [“SOLARA/SARA: Solar Observing Low-frequency Array for Radio Astronomy/Separated Antennas Reconfigurable Array”](#), **2nd Mission Idea Context**, Nagoya, 2012 (classified in the 1st place in the competition).
30. **A. Babuscia**, J. Craig, and J. Connor, “Teaching Practical Leadership: an Approach to Monitor and to Quantify Leadership Skills Development Across the Temporal Evolution of the Project”, **63rd International Astronautical Congress**, Naples, 2012.
31. **A. Babuscia**, B. Corbin, M. Knapp, R. Jensen-Clem, M. Van de Loo, S. Seager, “Inflatable Antenna for CubeSat: Motivation for Development and Antenna Design”, **63rd International Astronautical Congress**, Naples, 2012.
32. R. Jensen-Clem, M. Knapp, **A. Babuscia**, S. Seager, I. Sergeev, and M. Houston “CommCube-1: increase downlink volume through Globalstar network”, **63rd International Astronautical Congress**, Naples, 2012.
33. E. Matricciani and **A. Babuscia**, “A belt of satellites in low equatorial orbits simulating the geostationary orbit”, **30th International Communications Satellite Systems Conference**, Ottawa, 2012.
34. E. Clements, B. Alvisio, **A. Babuscia**, Z. Casas, B. Coffee, S. Giblin, L. Hallock, R. Kingsbury, M. Leaman, N. Lynch, M. O'Connor, E. Qian, F. Schmidt, M. de Soria-Santacruz, L. Sotomayor, C. Valledor, M. Tadge, L. Tampkins, E. Wise, M. Zhuang, M. Sanchez, K. Cahoy, “TERSAT: Trapped Energetic Radiation Satellite”, **26th Annual AIAA/USU Conference on Small Satellites** · Logan, UT, USA · Utah State University, 2012.
35. **A. Babuscia**, M. Van de Loo, M. Knapp, R. Jensen-Clem, S. Seager, [“Inflatable Antenna for CubeSat: Motivation for Development and Initial Trade Study”](#), **Proceedings of Interplanetary CubeSat Workshop**, Boston, 2012.
36. **A. Babuscia**, K. Cheung. “A Quantitative Approach to Perform Expert Elicitation for Space Communication System Design ”, **62nd International Astronautical Congress**, Cape Town, 2011.
37. **A. Babuscia**, M. McCormack, M. Munoz, S. Parra, “MIT Castor Satellite: Design, Implementation and Testing of the Communication System”, **Proceedings of 62nd International Astronautical Congress**, Cape Town, 2011. (Awarded for publication in Acta Astronautica, see above)
38. **A. Babuscia**, J. Craig, J. Connor, “Teaching Practical Leadership in MIT Satellite Development Class: CASTOR and Exoplanet projects”, **Proceedings of 62nd International Astronautical Congress**, Cape Town, 2011. (Awarded for publication in Acta Astronautica, see above)
39. **A. Babuscia**, L. Alkalai, J. Elliott, D. W. Miller, “Multi-Objective Optimization Methodology for Communication Systems with Application to Lunar Robotic Exploration”, **Proceedings of 61st International Astronautical Congress**, Prague, 2010.
40. Z. Bailey, **A. Babuscia**, L. Alkalai, J. Elliott, D. W. Miller, “A Trade Space Model for Distributed Lunar Surface Exploration”, **Proceedings of 60th International Astronautical Congress**, South Korea, 2009 .
41. P. Cunio, **A. Babuscia** et al., “Initial Development of an Earth-Based Prototype for a Lunar Hopper Autonomous Exploration System”, **Proceedings of AIAA Space 2010**.

Posters

1. **A. Babuscia**, K. Cheung, G. Weltz, E. Basilio, S. Waldherr, J. Wyatt, “Current efforts in the development of telecommunication technologies and services for future interplanetary CubeSat missions”, **Interplanetary Small Satellite Conference**, Santa Clara, CA, April 2015.
2. **A. Babuscia**, K. Cheung, “Development of communication technologies and architectural concepts for interplanetary small satellite communication”, **Conference on Spacecraft Reconnaissance of Asteroid and Comet Interiors**, Tempe, January 2015.
3. **A. Babuscia**, K. Cheung, C. Lee, T. Choi, “Communication and coverage analysis for a network of small satellites around Mars”, **Interplanetary Small Satellite Conference**, Caltech, April 2014.
4. J. Finn, **A. Babuscia**, C. Lee, K. Cheung. “A Concept for a Constellation of CubeSats at the Lunar Lagrangian Point 1 (LL1) for radio aperture interferometry measurements: network analysis and simulation”, **Interplanetary Small Satellite Conference**, Caltech, April 2014.

5. K. Gomez, C. Lee, **A. Babuscia**, K. Cheung, “On the Formations of a CubeSat Constellation at the Earth-Moon L1 Libration Point”, **Interplanetary Small Satellite Conference**, Caltech, April 2014.

Dissertations

1. **A. Babuscia**, “[Statistical Risk Estimation for Communication System design](#)”, Ph.D. Dissertation, MIT, May 2012.
2. **A. Babuscia**, “Analysis of Innovative Solutions for the Control of a Satellite Multi-beam Antenna”, Master Thesis, Politecnico di Milano, December 2007.
3. **A. Babuscia**, “Analysis of Synthetic Storm Technique as a model for Rain Attenuation in a path with low angle of Elevation”, Bachelor Thesis, Politecnico di Milano, July 2005.

Technical Reports

1. **A. Babuscia**, “Analysis of preliminary results from inflatable antenna tests at the MESA”, NASA JPL Internal Report for CIF fund award, Sept. 2014.
2. **A. Babuscia**, “Development of an X-Band Inflatable Antenna Prototype for CubeSat”, NASA JPL Internal Report for R&D fund award, Sept. 2014.
3. **A. Babuscia**, K. Cheung, A. Wall, D. Watkins “ISSC 2014: Conference report”, NASA JPL internal report.
4. **A. Babuscia**, “Statistical Risk Estimation for Communication System design: Expert Elicitation”, NASA Jet Propulsion Laboratory, Graduate Fellowship Report, August 2011.
5. **A. Babuscia**, “Statistical Risk Estimation for Communication System design”, NASA Jet Propulsion Laboratory, Graduate Fellowship Report, August 2010.
6. R. Clegg, N. Accardo, M. Knapp, D. Delatte, **A. Babuscia**, F. Saca, P. Banazadeh, et al., “Moonrise: Student Collaboration Project”, NASA Jet Propulsion Laboratory, Student Team Report, August 2010.
7. **A. Babuscia**, “A Relay Satellite at Lunar LL2 for Robotic Exploration of Lunar Far Side: Communication and Coverage Analysis”, NASA JPL Report, August 2009.

References

Dr. Kar-Ming Cheung (kar-ming.cheung@jpl.nasa.gov)

Technical Group Supervisor of Communication Architecture Research Group, Section 332H
NASA Jet Propulsion Laboratory, Pasadena, CA

Prof. Dave W. Miller (millerd@mit.edu)

Director of Space System Laboratory,
Department of Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, MA

Prof. Sara Seager, (seager@mit.edu)

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